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Your Media Speak So Loud I Can't Hear a Word You're Saying: Impact of Media and Media Selection on Performance

Martin Hassell
University of Arkansas, Fayetteville

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Your Media Speak So Loud I Can't Hear a Word You're Saying:
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Your Media Speak So Loud I Can't Hear a Word You're Saying:
Impact of Media and Media Selection on Performance

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Business Administration

by

Martin Hassell
Utah State University
Bachelor of Science in Management, 2006
Brigham Young University
Master of Information Systems Management, 2008

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University of Arkansas

This dissertation is approved for recommendation to the Graduate Council.

_____
Dr. Moez Limayem
Dissertation Director

_____   _____
Dr. Fred Davis   Dr. Jeff Murray
Committee Member   Committee Member

_____
Dr. David Douglas
Committee Member

Abstract

With the proliferation of communication media and technologies available, it is important for teams to understand the influence of these media on the performance of their communications. Additionally, it is important for researchers to understand how teams choose and use media. Literature on communication media impacts and communication performance has been somewhat fragmented, and researchers have used different theories and paradigms to study this problem. Researchers still do not have a full understanding of how media influences communication, whether teams recognize and select appropriate media for their communication needs, and what makes some communication more effective, irrespective of the communication media. The overall objectives of this research are to help managers and teams achieve greater communication performance and fill gaps in and strengthen media impacts and communication performance literature. The specific purposes of this research are to determine how well teams understand and select communication media, to consolidate and refine media impacts theory, and to better recognize and understand factors that contribute to superior performance.

This research consists of three essays. In the first essay, we study teams' media choices when they are faced with specific communication needs. We found that teams base their media choices on convenience and ease of use rather than on the needs of the communication. We also found that communication performance was not as affected by the medium as prevailing theories would predict.

In the second essay, we take a deeper look at media impacts and outcomes of media use. In an effort to evaluate, consolidate, and refine existing media theory, we conducted team experiments where teams used several types of media. We did not find significant performance

effects of the communication media. We argue that the medium may not matter as much as previously supposed.

The third essay involves a qualitative analysis of communication and communication performance. We use a case-study approach to identify factors that contribute to superior performance. We find that other individual process factors play a role in communication performance and decision quality. We also find that the media does not have much of an effect on communication processes.

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I would also like to thank my supportive wife, Mary. She has been a great blessing through all the days and nights and years of toil. She has sacrificed so much so that I could accomplish this goal.

Dedication

This dissertation is dedicated to my wonderful wife, Mary, and to my sweet girls.

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Introduction

In order for teams to make the best choices and decisions, they must communicate effectively. Individuals and teams that are able to communicate effectively are better at analyzing options and alternatives and making better decisions. Consequently, effective communication is important for individuals and teams in any organization and context.

There can be many factors that influence teams' abilities to communicate at a high level. Some of these factors include the communication media (Daft & Lengel, 1986; Dennis, Fuller, & Valacich, 2008; Short, Williams, & Christie, 1976), experience with the media and other communicators (J. R. Carlson & Zmud, 1999), and social structures and relationships that exist among team members (Robert, Dennis, & Ahuja, 2008). Researchers have made great progress in understanding communication performance and media impact, and there has been a lot of important theory and development in these areas (e.g., Daft & Lengel, 1986; Dennis et al., 2008; Short et al., 1976; Zigurs & Buckland, 1998). These theories have led to great progress in communication performance.

Nevertheless, there are still important and continuing issues in communication performance and media impacts that deserve additional attention, and there is a need for greater understanding and improvement in communication performance. The overall objective of this research is to improve communication performance, especially as it relates to communication media. Improved communication performance will lead to improved task performance and better decisions and outcomes. We seek to accomplish these objectives through three related essays in which we study different aspects of media impacts and communication performance.

The first aspect of this research involves studying the media selections of teams when they are faced with a communication task. We study how teams consider their communication needs and select media according to those needs. Additionally, we compare the performance of teams that select their media with that of teams that are assigned theoretically-optimal media. This will lead to a better understanding of whether individuals recognize and choose the best media for their communication needs. The second aspect of this research involves consolidating and refining researchers' understandings of the impacts of communication media on communication performance. Finally, the third aspect of this research is concerned with understanding more about the factors that make communication more effective and how communication media influence these factors. The next sections, describe the three essays in more detail.

Three Essays

Essay one. The first essay in this dissertation looks at the media choices of teams when they are faced with a specific communication task. It assesses teams' performance on the task when they use their selected media. Because individuals have been shown to make media choices based on factors such as convenience or ease of use (P. J. Carlson & Davis, 1998), it is likely that teams do not give sufficient consideration to the communication needs of their tasks. Therefore, it is likely that individuals and teams choose media that lead to inferior communication performance. This research studies this issue by presenting teams with a communication task, providing them with their choice of media, and comparing their performance to teams that are assigned theoretically-optimal media.

For this essay, we developed a task called the International Institute task. The International Institute task is similar to a hidden-profile admissions task (Dennis 1996), yet it

requires larger amounts of information exchange. For the selection condition, teams were able to select and use any media or combination of media they wanted. For the assignment condition, teams were assigned to use a combination of media based on an application of the Media Synchronicity Theory (MST) (Dennis et al., 2008). This study involved 174 individuals in 55 teams in two separate studies. The teams consisted of three or four individuals per team.

Essay two. The second essay in this dissertation is based on evaluating media impacts and analyzing and refining existing media theory. The central objective of this essay is to obtain a better understanding about the impact of media on communication performance. There has been a lot of important theory and development in communication media influence (e.g., Daft et al. 1987; Dennis et al. 2008; Short et al. 1976; Zigurs and Buckland 1998). Evaluating and refining theories allows researchers to utilize and move forward with better understandings and better theories.

In order to assess the impact of communication media on communication performance and the competing theories, we conducted an experiment consisting of 165 individuals in 54 teams, participating in the International Institute task. It involved large amounts of information exchange to aid in and enrich the assessment of media impact and communication performance. The teams participating in the task were assigned to one of several media treatments. These media treatments were designed to test the tenets of media theories and lead to conclusions about theoretical performance and media impact. The media treatments allowed us to test different types of media, such as low-richness or low-synchronicity, as well as combinations, or portfolios, of media. In addition to different media conditions, we also captured various media perceptions and outcomes. Through this research, we will be able to make conclusions and refinements to existing media theory.

Essay three. The third essay in this dissertation takes a deeper, qualitative look at the factors that contribute to communication performance and decision quality. The third essay also looks at how media contribute to these factors. An area of research that is lacking in the communication media literature is the actual quality of information sharing and discussion. Researchers refer to this sharing and discussion as conveyance and convergence (Dennis et al. 2008). In many IS studies, information sharing and discussion has been considered important, but it is often considered from the standpoint of amounts rather than quality (e.g., Dennis 1996; Robert et al. 2008). We argue that the quality of the information shared is likely to be more important than the amount of information shared. We also look at other factors that may play role in and explain communication performance and decision quality. This research will increase researchers' understandings of communication performance and help explain and clarify some of the conflicting results found in existing media research. We use a qualitative approach to enrich our understanding of performance factors. We observe and analyze several cases of team communication and decision making.

References

Carlson, J. R., & Zmud, R. W. (1999). Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions. *Academy of Management Journal*, *42*(2), 153–170. doi:10.2307/257090

Carlson, P. J., & Davis, G. B. (1998). An Investigation of Media Selection Among Directors and Managers: From "Self" to "Other" Orientation. *MIS Quarterly*, *22*(3), 335–362.

Daft, R. L., & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Management Science*, *32*(5), 554–571.

Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, Tasks, and Communication Processes: A Theory of Media Synchronicity. *MIS Quarterly*, *32*(3), 575–600.

Robert, L. P., Dennis, A. R., & Ahuja, M. K. (2008). Social Capital and Knowledge Integration in Digitally Enabled Teams. *Information Systems Research*, *19*(3), 314–334. doi:10.1287/isre.1080.0177

Short, J. A., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons.

Zigurs, I., & Buckland, B. K. (1998). A Theory of Task/Technology Fit and Group Support Systems Effectiveness. *MIS Quarterly*, *22*(3), 313–334.

Essay 1: The Matter of the Media Choice: Evaluating Media

Choices and Outcomes in Communication Tasks

Martin Hassell

Moez Limayem

Abstract

For teams to communicate at a high level, they must recognize the communication needs of their tasks and select appropriate communication media to best meet those needs. However, it is unclear whether teams think about and understand their communication needs and choose appropriate media when faced with specific communication tasks. This paper reports on research that evaluates teams' choices of communication media when they are faced with a specific communication task. This research assesses teams' communication performance and decision quality with their selected media and compares those with the performances of teams who are assigned theoretically-optimal media. The objectives of this research are to help managers and teams recognize and improve their media choices and communication performance and to increase researchers' understanding of teams' media choices and the quality of those choices. This research involved two experiments consisting of a total of 174 individuals comprising about 55 teams of 3 to 4 individuals per team. The teams were assigned to and divided between a media selection condition and a media assigned condition. The data indicate that teams choose media based on convenience and ease of use rather than the needs of the communication task. The data also show that performance and other outcomes are not significantly affected by the media used.

Essay 1: The Matter of the Media Choice: Evaluating Media

Choices and Outcomes in Communication Tasks

Introduction

Effective communication is important for teams to successfully complete tasks, make optimal decisions, and achieve desired outcomes. In organizational settings, effective communication can be especially important because of financial, legal, or performance consequences of good or bad decision-making. Researchers have long studied aspects of communication in an effort to improve communication performance. In the Information Systems (IS) literature, much of the research has focused on studying the impact that communication media or technology have on communication (e.g., Daft & Lengel, 1986; Dennis, Fuller, & Valacich, 2008; Short, Williams, & Christie, 1976). IS researchers have found that communication media influence several aspects of communication, including the amount of information shared (Dennis, 1996; Robert, Dennis, & Ahuja, 2008), information integration (Robert et al., 2008), and decision quality (Dennis & Kinney, 1998). However, a question that still remains is do managers and teams understand and choose the best media for their communication needs?

Information systems researchers have looked at some aspects of individuals' and teams' media choices. Researchers have studied themes and media choices of effective managers (e.g., Daft, Lengel, & Trevino, 1987) and managers' media choices in general (e.g., Carlson & Davis, 1998; Markus, 1994). However, one area of this research that has not received sufficient attention is studying and understanding whether individuals' media choices actually lead to optimal communication performance. There is especially a need to understand whether teams recognize the communication needs of their tasks and choose media that fit these needs. When

given a specific communication task, do individuals understand and choose the best media for the task? How do media choices influence communication and task performance for a given task?

In this research, we attempt to bridge these gaps by studying teams' actual media choices when they are faced with a specific communication task. Second, we study the communication and task performance outcomes of those media choices. And third, we compare the performance of teams that choose their communication media versus that of teams that use theoretically-optimal media for the task. We provide additional insight into how well teams consider and recognize the communication needs of specific tasks and how well they select media that fit the needs of the task (Zigurs & Buckland, 1998).

Additionally, the paradigm around much of the prior research on media choice is based on the use of a single medium for a given communication task (Carroll, 2008; Dennis et al., 2008). In reality, individuals and teams use a combination of multiple media for their communication needs (Carroll, 2008), but researchers do not understand teams' choices and uses of multiple media for specific communication tasks.

We attempt to answer four main research questions in this research. 1. How do teams choose media when they are faced with a specific communication task? 2. When given a specific communication task, how do teams use multiple media? 3. How do teams that choose their own media perform versus teams that are assigned theoretically-optimal media? 4. What are the differences in the satisfaction of teams that choose their media versus teams that are assigned media?

In order to study and answer these research questions, we developed a lab experiment in which teams are given a specific communication task that requires large amounts of information

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exchange. We use two different studies to fully evaluate teams' choices and performance. In the next sections of this paper, we describe relevant background research and literature, develop our hypotheses, and describe the method of this research in detail. We then discuss the results of the studies and conclude with a general discussion.

<p style="text-align:center">Media Choice</p>

In the IS, management, and communication literatures, there have been several important studies on media choice (i.e. Carlson & Davis, 1998; Kock, 2004; Markus, 1994; Treviño, Webster, & Stein, 2000). Research in this area has studied media choices in several contexts. This research has generally focused on explaining managers' choices for communication activities and why they may choose different media. The majority of this work has focused on the use of a single medium, but some research has begun looking at the prospect of multiple media for communication tasks (e.g. Carroll, 2008; Watson-Manheim & Bélanger, 2007). We discuss some of the key research below.

Markus (1994) studied the choice and use of email among managers. One of the objectives of this research was to determine how managers' use of email matched the predictions that Media Richness Theory (MRT) (Daft & Lengel, 1986) would provide. MRT would predict that managers would choose a richer medium, like face-to-face, instead of email for equivocal or ambiguous communication and would choose a leaner medium, like email, for unequivocal communication. In order to test this prediction, Markus compared the use of email among higher-level managers against the use of email among lower-level managers. The logic was that higher-level managers have more equivocal information and communication than do lower-level managers. Therefore, higher-level managers should more frequently use richer media and lower-level managers should more frequently use leaner media. What Markus actually found was that

higher-level managers used email more than lower-level managers. Also, through more in-depth investigation, Markus found indications that the higher-level managers were using email for equivocal communication as well. Markus concluded that social factors (sponsorship, socialization, and social control) played a role in managers' choice of media and that these factors were more influential than managers' perceptions and understanding of information richness and media richness.

Carlson and Davis (1998) studied executives' and managers' media choices. Using observation and interviews, the researchers studied the communication of executives and managers in a public agency. Although they did not focus on which particular media the individuals chose, the authors found that executives and managers had different reasons for choosing media. Executives tended to use media that are more convenient or easy to use. Managers chose media that were possessed capabilities that are better for relationship building and easier interpretation. Carlson and Davis described the executives' choices of media as "self-oriented" and the managers' choices of media as "other-oriented."

As media research has continued, there has been a push to study the use of multiple media rather than limiting individuals to the use of a single medium. Not only has this been theorized as superior for performance (Robert & Dennis, 2005), but it has also been argued to be more realistic and relevant to practice (Carroll, 2008).

In their work, Watson-Manheim and Belanger (2007), considered the use of multiple media. Through a series of interviews about communication and media choices in two different organizations, they found that some workers preferred combinations of media, termed media repertoires, for many communication tasks while others used single media for the same communication tasks. Based on the objective of the communication, the workers preferred

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different media. When tasks were more complex, workers preferred the use of face-to-face communication. Email was used to record exchanges or document actions. For simple tasks or logistics, a majority of the workers preferred to use email. They also found that institutional norms played a role in media preferences. Watson-Manheim and Belanger developed a framework for studying media repertoires and called for greater research focusing on the use of multiple media.

Carroll (2008) studied the use of mobile IT artifacts among various groups of individuals. She found that individuals typically used a portfolio of media for everyday communication. She postulated that their decisions to use the media were based on rational thoughts and previous experience with the media.

Generally missing from the research on media choice is an understanding of how individuals or teams use media when they are faced with a specific communication task rather than everyday communication activities. Also, there is little research looking at the link between media choices and the outcomes of those choices.

In this research we look closer at how individuals and teams choose media when they are faced with a specific communication task. Based on prior media choice research, we expect that individuals will choose media based on ease of use and convenience (Carlson & Davis, 1998) rather than the task needs or on performance considerations. In other words, individuals likely do not adequately consider the needs of their communication tasks and instead choose the most convenient medium.

We are also interested in understanding individuals' choices as they relate to using a single medium or multiple media. Recent research has theorized that multiple media is more representative of actual communication experiences (Dennis et al., 2008). Research has also

demonstrated that for everyday communication needs, individuals use a combination of communication media (Carroll, 2008). However, if individuals are faced with a specific, communication situation, would they forgo the convenience of using a single medium?

<div align="center">Media Synchronicity</div>

In explaining and predicting communication performance, we draw from the Media Synchronicity Theory (MST) (Dennis et al., 2008). This theory contends that media have inherent capabilities. These capabilities are specified in MST as transmission velocity, rehearsability, reprocessability, parallelism, and symbol sets. Dennis et al. (2008) define these capabilities thusly: transmission velocity is the speed at which a message is transmitted; rehearsability is the degree to which a medium allows a message to be rehearsed before it is transmitted; reprocessability is the degree to which a medium allows the receiver of the message to reprocess the message; parallelism is the number of simultaneous messages that can take place; and symbol sets is the number of symbols or cues the medium is capable of transmitting.

The inherent capabilities of media cause media to be higher or lower on synchronicity. Lower transmission velocity and symbol sets and higher rehearsability, reprocessability, and parallelism contribute to lower media synchronicity. Higher transmission velocity and symbol sets and lower rehearsability, reprocessability, and parallelism contribute to higher synchronicity. Lower synchronicity media are better suited for the conveyance process of communication. This process consists of the sharing of large amounts of novel information (Dennis et al., 2008). Higher synchronicity media are better suited for the convergence process of communication. This process consists of coming to a shared interpretation of the information that has previously been transmitted (Dennis et al., 2008).

According to MST, communication performance is highest when multiple media are used for communication. That is, performance on a single communication task is highest when a lower-synchronous medium is used for conveyance and a higher-synchronous medium is used for convergence. According to MST, teams that use this combination of media will outperform teams that use either a lower-synchronous medium for the entire task or a higher-synchronous medium for the entire task (Dennis et al., 2008).

<div style="text-align:center">Hypotheses</div>

Media Choice

With a correct understanding of their communication needs, individuals or teams should be able to recognize when they should use a lower-synchronous medium and when they should use a higher-synchronous medium within their communication tasks. One of the fundamental objectives of this research is to understand and determine whether individuals or teams even think about or consider the communication needs of their tasks when they are choosing media.

Prior research on media choice indicates that individuals or teams may not adequately consider the needs of their communication when making media decisions. For example, Carlson and Davis (1998) found, through their study of media selection, that directors only considered the information content or situation context in about 14% of their media choices. Similarly, managers only considered information content or situation context in about 17% of their media choices. Additionally, Webster and Trevino (1995) found that social influences played a significant role in individuals' media choices. This indicates that individuals or teams are less likely to consider the communication needs of the task and more likely to consider other factors when making media choices. Based on these reasons, we expect that individuals or teams will

make less-optimal media choices because they will fail to adequately consider the communication needs of the task.

For a specific communication task, teams should have a reasonable view of the entire task, and they will be able to comprehend what is needed to complete the task. Similarly, they will recognize that efficient communication will lead to less time spent on the task. In this circumstance, teams will most likely desire a medium that will get the task completed as quickly as possible. Because teams will seek media that are the fastest or easiest to use (Carlson & Davis, 1998), they will be most likely to choose media that convey visual and audible cues. In general, these types of media tend to be higher in synchronicity than media that involve writing and reading (textual cues). For this reason, teams will more frequently choose media that are higher in synchronicity.

An important aspect of this research is the idea of what constitutes a convenient medium. We draw from the media capabilities described by MST to make these distinctions. The classification of media capabilities and higher or lower synchronicity serves as the theoretical basis for convenience. Media with higher rehearsability and reprocessability generally require more effort and time when they are used to communicate a message. As an illustration, email is a medium that is capable of rehearsability and reprocessability. An individual sharing the contents of a business meeting will employ more time and effort to compose the details in an email. This may be due to extra time and cognitive effort to compose complete and accurate details. On the receiver's end, the individual will likely use some level of reprocessability, whether that is rereading and verifying the entire contents at once or rereading small parts of the message. Conversely, a medium like face-to-face that is higher in synchronicity is likely to be considered more convenient. Individuals using this medium are less likely to consciously think about

whether their message is complete and accurate, and they are likely to find it easier to speak and listen to words than they are to write and read words (Kock, 2004).

Individuals likely perceive that working synchronously requires less effort than working asynchronously. This is because when teams are working synchronously, the members do not have to wait for information or responses to shared information. Instead when information is exchanged it is immediately received and responded to and questions can be immediately addressed and answered. Working synchronously also allows individuals to detect and observe how information is received and treated. This allows individuals to assess what others think about their own and others' information. These perceptions will result in individuals believing that working synchronously results in efficient, effective communication.

Because of the capabilities of the face-to-face medium, it is considered to be the highest in media synchronicity (Dennis et al., 2008) and the most natural medium (Kock, 2004). Therefore, individuals will likely prefer the face-to-face medium over any other medium because it has the greatest affordances for working synchronously.

When faced with a task that requires large amounts of information exchange, we expect that individuals are even more likely to choose the face-to-face medium. This is because they will want to avoid the effort of typing or writing large amounts of information (Simon, 2006). Even though a medium that allows for individuals to rehearse and verify the information they share should lead to the greatest communication performance (Dennis et al., 2008), individuals will instead base their communication choices on convenience.

H1: When faced with a task that requires large amounts of information exchange, teams will most frequently choose the face-to-face medium.

We expect that individuals will give greater consideration to convenience and efficiency than they will to the needs of the communication task. Therefore, instead of considering the separate conveyance and convergence processes and how different media may be better or worse for each process, individuals will likely make media choices based on reducing the cognitive effort required of the task. The use of a lower-synchronous medium requires more effort than the use of a higher-synchronous medium, and when multiple media are used, one of the media is likely to be lower in media synchronicity. An additional consideration is the effort required to switch between multiple media during a single communication task. It is probable that teams will consider this an inconvenience and will elect to use a single medium for tasks that require large amounts of information exchange. We propose:

H2: When faced with a task that requires large amounts of information exchange, teams will choose a single medium more than they will choose a combination of multiple media.

Team Performance

As argued by MST, teams that use a medium low (vs. high) in media synchronicity for the conveyance process of a communication task will experience greater conveyance performance. Likewise, teams that use a medium high (vs. low) in media synchronicity for the convergence process of a communication task will experience greater convergence performance. As a result, teams that use both low- and high-synchronicity media for a communication task should outperform those that use only a single medium for a communication task.

H3: Teams that use a low-synchronous medium for the conveyance processes of a task and a high-synchronous medium for the convergence processes of a task will outperform teams that only use a single medium for the entire task.

Time

We expect that teams that use multiple media will take more time to reach consensus than teams that use a single medium. Writing and reading text takes longer than speaking and hearing words (Kock, 2004). In prior research, teams using text-based communication were found to take more time than teams using face-to-face, video, or audio (Suh, 1999). Because the teams using multiple media will use email, they should take longer to convey information than those teams that only use audio or video media. In addition, email is low in media synchronicity (Dennis et al., 2008), resulting in a reduced ability for teams to work in synchronicity. Individuals writing and reading information at different paces will cause delays and downtime in receiving and responding to information. Also, the natural break required when switching between media will add to the time required for teams using multiple media. We propose:

H4: Teams that use a single, non-textual medium will take less time to arrive at consensus than will teams that use a combination of media.

Satisfaction

In this research, we study three different aspects of satisfaction. We look at satisfaction with the team's meeting, satisfaction with the team's processes, and satisfaction with the team's solution. We hypothesize outcomes for each aspect of satisfaction, beginning with meeting satisfaction.

Individuals are likely to experience greater satisfaction in a meeting when the media they use are more convenient and easier to use. A medium higher in media synchronicity should generally be more convenient and easier to use than a medium lower in media synchronicity. We argue that teams that are able to choose their media will choose media higher in media synchronicity. Therefore, teams that choose their media will likely experience greater

satisfaction. Also, individuals that use a combination of media will have to switch from one medium to another during the task. This is likely to cause additional cognitive load which will lead to less satisfaction. We expect that the individuals in teams that have the choice of media are likely to be more satisfied than the individuals on teams that do not choose. The chosen media will likely be more satisfying than the assigned media.

H5: Individuals that choose a medium high in media synchronicity will experience greater satisfaction with their teams' meeting than will individuals that use a combination of media.

Because a medium high in media synchronicity allows individuals to work synchronously, individuals are more likely to focus on the discussion and feel more entrained with the other members of the team. This will help individuals feel like the processes or activities are effective and efficient. Also, a medium high in media synchronicity allows individuals to take turns speaking and listening and to respond to one individual at a time. This will result in positive regard to how the team handles the communication. Therefore, we propose that for process satisfaction:

H6: Individuals that choose a medium high in media synchronicity will experience greater satisfaction with their teams' processes than will individuals that use a combination of media.

Finally, we believe that there will be a reversal for solution satisfaction. Teams that use a combination of email and video conference will likely take longer to reach consensus. This should cause individuals to feel like they have invested more effort into the task. A perception of greater effort will result in a perception of a greater outcome. Furthermore, individuals that use a combination of media may recognize the distinct processes of exchanging and discussing

information. Even though greater effort will have been expended, individuals may recognize the benefits of using multiple media and identify that with better solutions. Regarding solution satisfaction, we argue that the teams that use the combination of media will experience greater satisfaction:

H7: Individuals that use a combination of media will experience greater satisfaction with their teams' solutions than will individuals that choose a medium high in media synchronicity.

Study 1

Method

In order to better understand teams' media choices and performance, we developed a lab experiment where individuals worked in teams to solve a task that required large amounts of communication. In this task, we varied the communication media that teams used. We allowed some teams to choose and use any media and assigned the other teams to use specific media for the task.

Task

The task used in this study is an adaptation of a previously used task called the International Institute Task (Zigurs, Poole, & DeSanctis, 1988). The complete task details are included in Appendix A. Our adaptation of the International Institute Task is a hidden-profile task where all the members of a team possess small amounts of common information and large amounts of private information related to the task. In order for teams to make an optimal choice, the individuals on the teams must effectively process and share the private information they each possess (Stasser & Titus, 1985). The private information held by an individual member is not enough to solve the task on its own. The objective of hidden-profile tasks it to simulate situations where individuals in teams possess different information and expertise. Teams that communicate

effectively will be better able to evaluate the information and the alternatives and determine the optimal solution.

In the current task, individuals had relatively small amounts of common information and large amounts of private information. This ensured that teams shared and discussed large amounts of information in order to understand the alternatives and make the best decisions. We allowed team members to keep possession of the common and private information for the duration of the task. This allowed individuals to reference and review pertinent information, and it reduced errors based on poor information recall and information inaccuracy. In studying hidden-profile tasks, Lightle et al. (2009), found that outcomes were susceptible to information bias and recall issues. By allowing individuals to maintain possession of all task materials, we minimized these potential issues.

In this task, the teams were given information about a hypothetical international studies program sponsored by the university. The team members assumed the role of an admissions committee that determined which applicant, from a set of highly-qualified candidates, to admit to the program. All of the candidates have strong academic ability, so the teams had to look for several factors beyond academic performance. In the task instructions, individuals were given four personality traits to look for. They were told that these four personality traits were linked to success in the program. They should choose the individual that best exemplified these traits.

Each team member was given complete information about only one of the candidates. The individual information included three essays written by the candidate and two letters of recommendation written by others. Using the essays and recommendations, the teams evaluated the personality traits and the important qualities of each candidate. Each team member received basic facts about all the applicants. The common information in this task slightly favors a sub-

optimal applicant. When the essays and recommendations of all applicants are considered together, the optimal candidate's attributes and qualifications are superior to the other candidates.

This task is heavy on conveyance, yet it still requires quality convergence. The conveyance process is operationalized through the initial information sharing portion of the task. Because individuals do not have extensive information about the other applicants in the task, the team members are required to share this information with the other members of their team. This information is completely novel to the other team members, and there are large amounts of information to convey. The convergence process is operationalized through the discussions about the conveyed information. The members of the teams have to discuss the information until they arrive at consensus.

Procedure

Three or four participants signed up for a study session time slot. When participants arrived, they were placed in teams with the other individuals who signed up for that time. The teams were assigned to one of two conditions for the task: a full-choice condition and an assigned-media condition. Teams in the full-choice condition were given the task instructions and introduction and were shown an example application packet. The teams were told that they would be placed in individual rooms where they would have time to read about their applicant. They were told that after they took the time they needed, they would then discuss the applicants together as a team. They were then told to decide, as a team, on the communication medium or combination of media that would be best for accomplishing the task, and they were told that they would actually be using the media they chose. Teams were given the choice of any media or combination of media they wanted. To help them consider a wide range of possibilities, they were given a card with a list of media on it. The list included email, paper documents or memos,

face-to-face meeting, phone conference, video conference, instant messages, text messages, and desktop team collaboration application. Teams were also told that they could choose a communication medium that was not included in the list. After they chose media for their discussion, a lab assistant set up their media and they continued with the task.

Teams in the assigned condition were given the same introduction as the full-choice condition and were told that they would be taken to separate rooms where they would have time to read about their applicants. However, they were told that they would use email and video conference for their discussions. They were instructed to send a single email that included the relevant information about their applicants to their team members. Individuals were instructed not to ask questions or discuss the applicants by email. They were then told that they would use a video conference to finish their discussion about their different applicants. The video conference occurred after they had all shared one email and read the emails from their team members. Computers were setup in each room with email applications and accounts for each team member.

All participants were randomly assigned an applicant to the international institute. Each participant was given a single application packet that contained three essays written by the applicant and two letters of recommendation written by someone connected to the applicant. They also included a single sheet of summary facts about all of the applicants. All applicant portfolios were very similar in length.

Each participant was given sufficient time to read about their applicant. After each had taken the amount of time they needed to learn about their applicant, or the teams had finished exchanging and reading their emails, the lab assistant began the team discussion. If the teams chose to use a face-to-face meeting, all the participants were brought to one room for their meeting. They were allowed to keep all their information, but they were told not to share their

packets with anyone else. They then discussed the information with each other until they decided on one applicant to admit to the program. In the assigned-media condition, the lab assistant setup their video conference or media after the teams had completed their emails. They were told to finish discussing the candidates and the information by video conference. All meetings and discussions were captured or recorded. After the teams arrived at consensus, they were directed to the online survey where they answered questions about their perceptions and experiences.

Participants

For our study, we recruited individuals associated with the university where we work. We recruited participants using flyers, email announcements, classroom invitations, and word-of-mouth. Most of the participants were undergraduate business students. However, we also had graduate business students, undergraduate and graduate students from other colleges, employees of the university, and other adults who responded to the invitation to participate in the study. The participants received a small payment for participating, a small amount of extra course credit, or in some cases, both a payment and extra course credit.

There were 106 participants in this study, and they had an average age of 22.10 years old. They were balanced well between male and female, with 48% being female. A majority of the participants were undergraduate business students. However, there were several graduate students and several non-students as well.

In total, we ended up with 33 teams in our study. The teams consisted of three or four members, depending on the number of participants who showed up for their scheduled time slot. Most of the teams had 3 members. There were a total of 15 teams in the media-choice treatment and 18 teams in the email-video conference treatment.

Measures

For the purpose of evaluating team performance, we assessed the teams' admissions decisions. In creating the task, we designed one of the applicants to be the strongest in personality and social attributes. These attributes matched those given in the task instructions for the desired applicant. The other applicants possessed some levels of the desired attributes, but they were inferior to the optimal candidate. For validation purposes, we had an experienced admissions expert independently evaluate the applicants. The expert had previously served on actual admissions committees evaluating national applicants to a prestigious study abroad program. The expert ranked the applicants in order of qualifications. The expert's choice of applicant and rank of applicants matched the designed solution and rank. Teams that selected the optimal applicant received a 4 for their performance score; teams that chose one of the other applicants received a 3, 2, or 1 for their performance score, depending upon which applicant they selected. The second-best applicant was worth three points, the third-best applicant was worth two points, etc.

We measured the time each team took to complete the task. We considered the point when teams received the task instructions to be the start time. We used the time that the first person in each team completed the study to be the end time for the team.

We measured individuals' perceptions of the different aspects of satisfaction using existing measures. We used measures for the satisfaction with the meeting from Dennis (1996). This scale included Likert-type scale questions. The reliability of this scale was acceptable (alpha = .86). For process satisfaction and solution satisfaction, we used measures developed by Green and Taber (1980). Each of these scales included five items. Both possessed acceptable reliability

(process satisfaction alpha = .94; solution satisfaction alpha = .89). The complete list of measures is included in Appendix B.

<center>Analysis and Results</center>

Media Choice

There were 15 teams that received the media-choice treatment and 18 teams that received the email-video conference treatment. Media choice, decision quality, and time were measured at the team level, and the satisfaction variables were measured at the individual level.

The teams in the media choice condition unequivocally chose to use the face-to-face medium. Fifteen teams were given the choice of medium and 15 out of 15 chose to use a face-to-face meeting. No other medium was chosen. Using a z-test for proportions, we chose a comparison value of 0.70. We determined that if 70% of media-choice teams chose the face-to-face medium, we would consider this to be "more frequently" than any other medium. We found strong support for H1 ($Z = 2.536$, $p = 0.006$), indicating that teams chose the face-to-face medium more than any other medium when they were faced with a task that requires large amounts of information exchange.

We also found strong support for H2. Teams chose to use a single medium more frequently than they chose to use multiple media. All 15 teams in the treatment chose to use a single medium. (Using a 0.70 comparison level, $Z = 2.536$, $p = 0.006$).

The intercorrelations of the dependent variables are shown in Table 1. The satisfaction scores for individuals within teams were averaged for the correlation analysis. In Table 2, the means and standard deviations for the dependent measures are displayed across treatment groups.

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Table 1

Intercorrelations (and p-values) between dependent variables

	Mean [Std. Dev.]	Decision Quality	Time	Meeting Sat.	Process Sat.	Solution Sat.
Decision Quality	2.820 [.846]	1 (.000)				
Time	44:16 [10:44]	.226 (.207)	1 (.000)			
Meeting Sat.	5.986 [.569]	.114 (.529)	.129 (.474)	1 (.000)		
Process Sat.	6.203 [.713]	.020 (.912)	-.097 (.590)	.808 (.000)	1 (.000)	
Solution Sat.	6.210 [.553]	.042 (.817)	-.244 (.170)	.726 (.000)	.850 (.000)	1 (.000)

Table 2

Means [and standard deviations] of the dependent measures

Medium Measure	Face-to-Face	Email-VC
Dec. Quality	2.67 [.976]	2.94 [.725]
Time	40:56 [12:38]	47:03 [8:13]
Meeting Sat.	5.917 [1.199]	6.052 [.815]
Process Sat.	5.975 [1.322]	6.414 [.788]
Solution Sat.	6.113 [1.199]	6.297 [.888]

Performance

The decision quality for the teams was analyzed using ANOVA. The hypothesis, H3, that teams that used email-video conference would outperform teams that used face-to-face, was not supported ($F(1,31) = .878, p = .356$).

Time

The time teams took on the task was analyzed using ANOVA. There were no significant differences in the time that teams took using different media to complete the task ($F(1, 31) = 2.808, p = .104$). Although it is not significant, teams using email-video conference did take about six minutes longer on average to complete the task. Nevertheless, hypothesis 4 was not supported.

Satisfaction

The three measures of satisfaction that we used in our study were analyzed using ANOVA. We found no significant effect on meeting satisfaction from the differences in media used ($F(1, 104) = .473, p = .493$). Consequently, H5, that face-to-face teams would be more satisfied with their meeting, was not supported. We hypothesized that face-to-face teams would be more satisfied with their teams processes than would email-video conference teams. We found a significant effect of media on process satisfaction: ($F(1, 104) = 4.474, p = .037$). However, it was in the opposite direction than we hypothesized. Email-video conference teams were more satisfied with their team's processes. Finally, there were no significant media effects on solution satisfaction ($F(1, 104) = .822, p = .367$). Thus, H7 was not supported.

Summary

Based on the teams' media choices in our study, instead of considering the needs of their communication tasks or processes, teams chose media based on their level of synchronicity,

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naturalness (Kock, 2004), or ease of use (Carlson & Davis, 1998). However, we did not find any differences in performance or other outcomes based on the media used by the teams in our study.

We found it interesting that even though teams may have chosen media based on the perceptions of how easy it would be to use, they were not more satisfied than the teams that used email-video conference. In fact, we found that email-video conference teams were significantly more satisfied with their teams' processes than were face-to-face teams.

Study 2

In our first study, every team that had the choice of media selected the face-to-face medium. Because many teams are unable to meet together face-to-face, we were also interested in learning about teams' communication choices when the face-to-face medium is not an option. We also wanted to validate our argument that teams will choose the medium highest in media synchronicity when they are faced with a communication task that requires large amounts of information exchange. Additionally, we wanted to compare the communication performance and satisfaction that result from the use of other media with that of the face-to-face medium. For these reasons, we conducted a second study where we removed the face-to-face medium from the set of media that teams could choose for their discussion.

When the face-to-face medium is not an option and teams are required to meet virtually, individuals will likely choose the most convenient, available medium. Regardless of the task or the needs of the task, we expect that individuals will choose a medium that is high in media synchronicity and most like the face-to-face medium (Kock, 2004). Because a video conference provides both video and audio transmission, a video conference medium is similar to the face-to-face medium. Individuals will likely perceive video conferencing to provide the same benefits of the face-to-face medium and will still be more convenient than a medium that requires text-based

communication or lacks a visual component. Therefore, teams will likely choose video

conferencing when meeting face-to-face is not an option.

H8: When faced with a task that requires large amounts of information exchange and the

face-to-face medium is not an option, teams will choose a video conference more frequently than

they will choose any other medium.

Because the face-to-face medium and the video conference medium have similar

capabilities, we do not expect differences in performance when either medium is used. Likewise,

we do not anticipate differences in the different aspects of satisfaction between face-to-face and

video conference. Prior research has looked at satisfaction differences between face-to-face and

video conference and has failed to find significant differences between the two media (Simon,

2006; Suh, 1999).

Method

For study 2, we used the same task and procedure as in Study 1. However, we modified

one of the treatments. We gave teams the choice of media; however, we left face-to-face meeting

off the list of available media and informed the participants that they would be placed in separate

rooms for the study. Also, at the end of the study, we asked individuals to indicate the media that

they considered best for this communication task if they were to repeat the task. All other

procedures and measurements were the same.

For study 2, we studied 22 additional teams of three to four individuals per team. In all,

there were 68 participants, of which 43% were female. The average age of the participants was

21.9 years.

Analysis and Results

Of the 22 teams in the study, all 22 teams chose to use the video conference medium to share and discuss information with their team. We used a Z-test for a proportion to test H8. Using a criteria of 0.70, we found strong evidence ($Z = 3.071$, $p = 0.001$) that teams prefer a medium high in synchronicity, like video conference, when the face-to-face medium is not available and the task required large amounts of information sharing. This finding also further validates H2 above, that teams prefer the use of a single medium when faced with a specific communication task. Additionally, nearly all individuals, when they were asked their choice of media after completing the task, indicated that they would ultimately prefer to use the face-to-face medium for the communication task. A few individuals indicated a preference for using a video conference again because of the convenience of being in different places for the discussion.

We also compared the outcomes of the video conference medium with the face-to-face and email-video conference media. Table 3 displays the means and standard deviations for the outcome measures for video conference.

When we compared outcomes of the video conference medium with those of face-to-face and email-video conference, we found no significant differences in performance. However, we did find that teams that only used a video conference took less time to complete the task than teams that used email-video conference ($F(2,52) = 3.565$, $p = .035$). We used ANOVA and a post-hoc Tukey test to confirm the significant difference in time between video conference and email-video conference. There were also no significant differences in aspects of satisfaction. Although, teams that used video conference had higher satisfaction means than did teams that used face-to-face.

Table 3

Means [and standard deviations]
of the dependent measures

Medium	Video Conference
Measure	
Dec. Quality	2.86 [.710]
Time	38:38 [9:32]
Meeting Sat.	6.179 [.768]
Process Sat.	6.385 [.633]
Solution Sat.	6.276 [.810]

Discussion

One of our major objectives of this research was to understand how teams choose media

when they are faced with a specific communication task. We sought to gain better insights into

the way teams think about their communication needs and how the media fits with those needs.

What we found was that when teams had the possibility of holding a face-to-face meeting, they

unequivocally chose this option. Therefore, teams in our study placed much greater emphasis on

convenience and ease of use than they did on how media may help or hinder their conveyance

and convergence processes. Additionally, when teams were discussing their media choices, they

frequently selected face-to-face because it would be "easiest." A few teams even groaned about

how difficult this task would be using email or other text-based media.

We also found that in our study, teams did not elect to use multiple combinations of

media for their communication needs. Although individuals may use repertoires of media for

series of communication needs (Watson-Manheim & Bélanger, 2007), they find it easiest to use a

single medium when it is possible. One explanation for this is during everyday tasks, individuals have several different communication tasks. Therefore, they may choose what is most convenient for that particular task or communication at that particular time.

We relied on MST for our comparison of better and worse media for this communication task. MST predicts that teams that use a medium lower in media synchronicity, like email, for conveyance, and a medium higher in media synchronicity, like video conference, for convergence would outperform teams that used a single medium for the whole communication task. With the teams and the task in our study, we failed to find performance differences based on the communication media. Teams that used face-to-face or video conference only, performed equivalently with teams that used an email-video conference combination. We expected that by increasing the amount of information shared and discussed, we might better detect media impacts. Nevertheless, like prior studies (i.e., Dennis & Kinney, 1998; Dennis, 1996; Simon, 2006; Suh, 1999), we did not find direct media impacts. Perhaps, it really does not matter so much what type of medium teams choose and use.

Finally, we also looked at other outcomes such as time required and different aspects of satisfaction. Teams that used the face-to-face medium required less time, but it was not significant. Teams that used the video conference medium required about the same amounts of time as teams that used the face-to-face medium. However, video conference teams required less time than did email-video conference teams.

For the satisfaction outcomes, the only aspect of satisfaction that had effects from the medium was process satisfaction. We were surprised to see that individuals that used email and video conference together were significantly more satisfied with their teams' processes. We

expected them to be least satisfied. Perhaps they perceived the benefits of being able to rehearse and reprocess the initial information that they shared and received.

Limitations

Like all studies, our study has limitations. Perhaps the task is structured in such a way that teams were unable to fully think about and consider the communication needs of the task. Also, perhaps individuals failed to correctly process the task and applicant information, and so they failed to share adequate information. The task information may have also hidden or negated actual impacts of the medium. Because of the large amounts of communication required by this task, we expected this to be a superior way to test media choice and impacts. Care should be taken when applying these results to other teams and contexts.

Contributions

This research has both scientific and practical implications. This work increases researchers' understandings of how individuals choose media in a given communication context. It shows that teams place an emphasis on convenience and ease of use. It also shows that teams may not adequately understand or consider the communication needs of a task. Additionally, this research provides a concrete link between media choices and communication performance. This study contributes to the extensive research on media impacts theory. The results of this research show that there is additional work required to understand or correctly identify media impacts. As a practical contribution, this research informs managers about individuals' desires for convenient communication, and it indicates that the medium and setting may not significantly impact the performance of teams' communications.

Conclusion

In this research we studied teams' media choices and the outcomes of those choices. We found that teams unequivocally preferred the face-to-face medium when it was available and the video conference medium when face-to-face was not available, even though the needs of the task may have been better suited for other media. We were surprised to find, however, that there were no significant performance differences when different media were used.

References

Carlson, P. J., & Davis, G. B. (1998). An Investigation of Media Selection Among Directors and Managers: From "Self" to "Other" Orientation. *MIS Quarterly*, *22*(3), 335–362.

Carroll, J. (2008). Theorizing the IT Artifact for Mobility: A Portfolio, Not a Singularity. *ICIS 2008 Proceedings*. Retrieved from http://aisel.aisnet.org/icis2008/64

Daft, R. L., & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Management Science*, *32*(5), 554–571.

Daft, R. L., Lengel, R. H., & Trevino, L. K. (1987). Message Equivocality, Media Selection, and Manager Performance: Implications for Information Systems. *MIS Quarterly*, *11*(3), 354–366.

Dennis, A. R. (1996). Information Exchange and Use in Group Decision Making: You Can Lead a Group to Information, but You Can't Make It Think. *MIS Quarterly*, *20*(4), 433–457.

Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, Tasks, and Communication Processes: A Theory of Media Synchronicity. *MIS Quarterly*, *32*(3), 575–600.

Dennis, A. R., & Kinney, S. T. (1998). Testing Media Richness Theory in the New Media: The Effects of Cues, Feedback, and Task Equivocality. *Information Systems Research*, *9*(3), 256 –274. doi:10.1287/isre.9.3.256

Green, S. G., & Taber, T. D. (1980). The effects of three social decision schemes on decision group process. *Organizational Behavior & Human Performance*, *25*(1), 97–106. doi:10.1016/0030-5073(80)90027-6

Kock, N. (2004). The Psychobiological Model: Towards a New Theory of Computer-Mediated Communication Based on Darwinian Evolution. *Organization Science*, *15*(3), 327 –348. doi:10.1287/orsc.1040.0071

Lightle, J. P., Kagel, J. H., & Arkes, H. R. (2009). Information Exchange in Group Decision Making: The Hidden Profile Problem Reconsidered. *Management Science*, *55*(4), 568–581.

Markus, M. L. (1994). Electronic Mail as the Medium of Managerial Choice. *Organization Science*, *5*(4), 502–527.

Robert, L. P., & Dennis, A. R. (2005). Paradox of Richness: A Cognitive Model of Media Choice. *IEEE Transactions on Professional Communication*, *48*, 10–21. doi:10.1109/TPC.2004.843292

Robert, L. P., Dennis, A. R., & Ahuja, M. K. (2008). Social Capital and Knowledge Integration in Digitally Enabled Teams. *Information Systems Research*, *19*(3), 314–334. doi:10.1287/isre.1080.0177

Short, J. A., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons.

Simon, A. F. (2006). Computer-mediated communication: Task performance and satisfaction. *Journal of Social Psychology*, *146*(3), 349–379. doi:10.3200/SOCP.146.3.349-379

Stasser, G., & Titus, W. (1985). Pooling of Unshared Information in Group Decision Making: Biased Information Sampling During Discussion. *Journal of Personality and Social Psychology*, *48*(6), 1467–1478. doi:10.1037/0022-3514.48.6.1467

Suh, K. S. (1999). Impact of communication medium on task performance and satisfaction: an examination of media-richness theory. *Information & Management*, *35*(5), 295–312. doi:10.1016/S0378-7206(98)00097-4

Treviño, L. K., Webster, J., & Stein, E. W. (2000). Making Connections: Complementary Influences on Communication Media Choices, Attitudes, and Use. *Organization Science*, *11*(2), 163 –182. doi:10.1287/orsc.11.2.163.12510

Watson-Manheim, M. B., & Bélanger, F. (2007). Communication media repertoires: Dealing with the multiplicity of media choices. *MIS Quarterly*, *31*(2), 267–293.

Webster, J., & Trevino, L. K. (1995). Rational and Social Theories as Complementary Explanations of Communication Media Choices: Two Policy-Capturing Studies. *Academy of Management Journal*, *38*(6), 1544–1572. doi:10.2307/256843

Zigurs, I., & Buckland, B. K. (1998). A Theory of Task/Technology Fit and Group Support Systems Effectiveness. *MIS Quarterly*, *22*(3), 313–334.

Zigurs, I., Poole, M. S., & DeSanctis, G. L. (1988). A Study of Influence in Computer-Mediated Group Decision Making. *MIS Quarterly*, *12*(4), 625–644.

Appendix A

International Institute Task

Background to the Study

Many universities and other organizations sponsor a variety of special programs that attract large numbers of applicants. These programs are highly sought after, and the competition for them is high. An important problem faced by these organizations is how to decide among the many qualified people who are interested in these programs.

In such situations, most organizations try to be as objective as possible, and use quantifiable criteria wherever they can. Criteria such as previous grade point averages and aptitude and ability test scores make it easier to compare individual applicants. However, organizations also must rely on information about applicants that is less quantifiable and more subjective.

This study is designed to further our understanding of the way people communicate and go about making decisions in this type of situation. For this study, we have created a scenario very similar to an actual admissions decision. The decisions that you will be making in this study are typical of those faced by organizations that sponsor special programs like the one used for this study. The applicants to the program in this study have varied qualifications, and you may find that some criteria for admission are more important than others.

By your participation in this study, you can make a contribution to our knowledge of how teams communicate and make decisions in these types of situations. Please participate to the best of your ability.

This study is comprised of three parts. Part 1 introduces you to the university's international studies program and provides you with the information about the applicants. In part

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2 you will work with other members of an admissions committee to decide whom to admit to the

program. Finally, in part 3 you will answer questions about this experience.

Thank you so much for your participation.

Part 1

A. Program Overview

The International Institute

      Four leading universities, including the ABC University, are participating in the

development of the International Institute, a special program for academically and socially

successful students interested in applying traditional majors in international settings. Students in

the program will specialize in applying their chosen field in a specific country or region of the

world, and they will spend one year at a university in a foreign country. Students will take

courses offered by those schools as well as courses offered by professors from the ABC

University and other participating schools who will visit the foreign schools. They will return to

their American schools for at least their final year of study. They will get intimate exposure to

the ways of thinking and working in another country. It is anticipated that graduates of the

program will find employment in foreign embassies, international government, and international

business.

      If the program is to be successful, the students must do a good job of representing the

U.S. at the foreign universities. To apply for admission, all students must have a Grade Point

Average of at least 3.50. Aside from academic achievement, students will also need to have good

social skills and the right personality.

International Success

International success is based on academic ability and several personality characteristics. In addition, there are other factors that can be helpful such as previous international exposure, foreign language skills, and personal interests.

Based on the study of other international studies programs, researchers have identified personality characteristics which help to predict international success:

1. Independence (The degree to which an individual is free from the influence of others)

2. Social Success (The degree to which an individual is well liked and has friends in different social groups)

3. Self-Concept (The degree to which an individual is confident with their own intellectual and interpersonal skills)

4. Awareness (The degree to which an individual is conscious of others' thoughts, feelings, and behavior)

Of course, it can be difficult to determine which factors are the most important and how to balance these characteristics with academic ability. It can also be difficult to assess the personality traits when only given applications.

In this study we will ask you to make judgments about whether or not various applicants should be admitted to the International Institute. You will base these judgments on the students' background information, written essays, and recommendations.

Section 2: Application Overview

A preliminary screening has reduced the number of applicants under consideration to a few very strong candidates. From this set of candidates, you must select the best one for the International Institute. The selected applicant should have the greatest likelihood for international success, and he or she should represent the university and the United States well.

In order to make the best decision, your team will have to share important information about each of the applicants with one another.

For each applicant you will be given the following summary information:

1. Age

2. Gender

3. GPA

4. Major

5. Foreign language exposure

6. International exposure

To help keep the workload manageable, each team member has received complete application portfolios for only one applicant. Therefore, it is important that you read the application materials carefully because your team members will depend on you for important information about your applicant. You must also make sure you provide the other members of your team with enough information for them to be able to assess all the candidates accurately.

The information that you personally have for one of the applicants includes three essays written by the applicant and two recommendations provided by others.

If you are to make good decisions, you will have to combine your own judgment with the information that you have and gain about the applicants.

You should be guided by two goals when making your decision:

1.   To make an optimal admission decision that selects the student with the greatest likelihood of success

2.   To select the student who will represent the university and our nation well in foreign settings

It is important that you make this decision as a group. You should work together and try to take advantage of your diverse talents and resources. Your team must agree on one candidate to accept to the program. Please give this your best effort.

Sample Common Information

Haley Bryant	
Age:	20
Gender:	Female
GPA:	3.90
Major:	Psychology
Foreign Language:	Two years HS Spanish
Traveled Abroad:	No
Preferred Destination:	Spain

Sample Essay

In 500 words or less, please answer this question: How has your background prepared you for success at the International Institute?

Our food certainly wasn't authentic, but we always gave it our best try. I know a little about the kinds of foods people eat in Norway, Germany, and Indonesia because we sampled many of those foods at our dinner table. My mom came up with this great idea when I was little to give us exposure to ethnic foods and to give us some excitement during dinner. One Friday a month we would choose a different country from around the world and try to make their food for our dinner. Sometimes we randomly chose a country, and other times we coordinated a dinner because of an event or a person.

Sometimes the dinners didn't taste very different from what we were used too. Other times, however, they were more exciting. I can still remember the smell of some of the cheeses that we tried. They smelled terrible, but I was always willing to try a little of them.

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Along the way my family and I developed a greater understanding of many other countries and cultures. On the nights we made food from other countries, we also learned about the geography of the countries, and we talked about many of the facts and customs of the countries. This exposure gave me a desire to visit many of the places we learned about.

Even though making and eating foods from other countries may not appear to be a big deal, it has helped me. The result of this practice is that I can eat about anything, and I know something about other countries. This experience will help me while I am in Spain to fit in better with the people. It also gave me a desire to experience the food and culture of Spain first-hand. Even though I haven't actually lived out of the U.S., I don't feel like living in a new place would be too difficult for me.

Eating the real food in Spain may be different than what I am expecting, but because of the time I spent learning about other countries at the dinner table, the overall experience won't be as big of a shock to me. I have been prepared to work with other people and their unique ways. For this reason, I will be successful at the International Institute.

Appendix B

Measurement Items

Communication Satisfaction – 7-point Likert-type scale anchored by Strongly Disagree to Strongly Agree – (Dennis, 1996)

How do you feel about the process by which your team made its decision?

How do you feel about the team's discussions?

All in all, how do you feel?

To what extent did you enjoy participating in this meeting?

How much fun was this meeting?

Solution Satisfaction – 7-point Likert-type scale anchored by Strongly Disagree to Strongly

Agree – (Green & Taber, 1980)

How satisfied or dissatisfied are you with the quality of your team's solution?

To what extent does the final solution reflect your input?

To what extent do you feel committed to your team's solution?

To what extent are you confident that your team's solution is correct?

To what extent do you feel personally responsible for the correctness of your team's solution?

Process Satisfaction – 7-point anchored by different categories – (Green & Taber, 1980)

How would you describe your team's problem solving process? (inefficient - efficient)

How would you describe your team's problem solving process? (uncoordinated - coordinated)

How would you describe your team's problem solving process? (unfair - fair)

How would you describe your team's problem solving process? (confusing - understandable)

How would you describe your team's problem solving process? (dissatisfying - satisfying)

Appendix C

Research Compliance Protocol Letter

September 25, 2012

MEMORANDUM

TO: Martin Hassell
                             Moez Limayem

FROM: Ro Windwalker
                             IRB Coordinator

RE: New Protocol Approval

IRB Protocol #:   12-09-109

Protocol Title: *Media Synchronicity and Communication Project*

Review Type: ☒ EXEMPT   ☐ EXPEDITED   ☐ FULL IRB

Approved Project Period: Start Date: 09/25/2012 Expiration Date: 09/24/2013

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval.   Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 600 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes.   All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

Appendix D

Documentation of Multi-Authored Paper

July 3, 2013

Subject: Multi-Authored Paper

I certify that Martin Hassell is the first author of the multi-authored paper entitled "The Matter of the Media Choice: Evaluating Media Choices and Outcomes in Communication Tasks." Martin Hassell completed a large majority of the work on this paper, much more than 51% of it.

Sincerely,

Moez Limayem
Dissertation Director

Essay 2: Media Impacts: Much Ado about Nothing

Martin Hassell

Moez Limayem

Abstract

With the proliferation of communication technologies available, it is important for individuals and teams to understand the influence of these technologies on their communications. Literature on media influence and communication performance has been somewhat fragmented, and researchers have used different theories and paradigms to study this problem. However, researchers still do not have a full understanding of how media influences communication performance. Additionally, researchers continue to draw from various media theories without a clear understanding of which is best. The purpose of this research is to compare several dominant media theories and solidify practical and theoretical understanding of media's influence on communication performance. The study included 165 individuals in 54 teams participating in a team communication task. The research evaluated the explanatory and prediction power of several dominant media theories. This study failed to find support for any of the media theories, calling into question the efficacy of media theories and the actual impact that the medium has on communication performance.

Essay 2: Media Impacts: Much Ado about Nothing

Introduction

Innovations in technology have resulted in individuals having many options for communication media. Some of these options include instant text, synchronous audio, video conferencing, etc., from a single device and from virtually anywhere in the world. It is likely that most people do not think deeply about how communication media may influence their ability to communicate their messages effectively with others. Media decisions have been found to rely more on social or habitual behaviors rather than with an understanding of the communication needs (Webster & Trevino, 1995). Research has shown, however, that communication media may have an influence on communication performance (Carlson & Zmud, 1999; Daft, Lengel, & Trevino, 1987; Dennis & Kinney, 1998; Robert, Dennis, & Ahuja, 2008). Consequently, individuals may be reducing their communication effectiveness because of the communication media they use. Reduced communication performance can contribute to poor decisions or costly or negative outcomes. It is important, therefore, for individuals to understand which media they should be using based on the needs of their communication. It is likewise important for researchers to correctly understand how media influence communication. It is also important for researchers to be able to prescribe which communication media are best suited for different communication needs.

There has been a lot of important theory and development in communication media influence (Daft & Lengel, 1986; Short, Williams, & Christie, 1976; Zigurs & Buckland, 1998). These theories have led to great progress in communication performance. Nevertheless, new theory continues to emerge, which seeks to overcome the limitations of prior theory (Dennis, Fuller, & Valacich, 2008; Kock, 2004). Additionally, as technology, or the use of technology,

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drastically changes how individuals communicate, additional theorizing can serve to better reflect reality. Nevertheless, new theory is not always superior to established theories. There can be great value in evaluating the power of newer theories with more established theories. This allows researchers to utilize and move forward with better theory or to remain grounded in prevailing theory. Additionally, theories can also prove to be inadequate or limited.

The central purpose of this paper is to understand how media affect communication performance. We do this by studying different theories and how they explain the impact of technology on communication performance. Ultimately, we are interested in determining which theory best explains the influence of media on communication. We consider three seminal media theories used in the Information Systems literature. In addition to the two well-established theories, Media Richness Theory (MRT) (Daft & Lengel, 1986) and Social Richness Theory (SRT) (Short et al., 1976), we also consider Media Synchronicity Theory (MST) (Dennis et al., 2008). We chose these theories based on their substantial use in prior research (e.g., Dennis & Kinney, 1998; Lee, 1994; Markus, 1994), the use of these theories as foundations for other theories (e.g., Carlson & Zmud, 1999). In the case of MST, we chose it because of its potential to effectively explain and predict communication performance. The expected outcome of this research is increased guidance and direction to both managers and researchers about the influence of communication media.

In order to assess the impact of communication media on communication performance and the competing theories, we will conduct a lab experiment consisting of teams participating in a hidden-profile task using various media for their communication.

The next section of this paper gives background on the media theories discussed in this research. Additional sections describe the development of our hypotheses, our methodology, and the results and contributions of this research.

Theoretical Background

Media Richness Theory

Much of the research on media influence and communication performance has been based on Media Richness Theory (MRT) (Daft et al., 1987; Daft & Lengel, 1984, 1986). This theory proposes that media differ in their level of richness, or ability to convey various sets of information, and that, based on the characteristics of messages, the level of richness of the medium influences communication performance. For example, video conferencing is considered richer than phone conferencing because it conveys facial expressions and non-verbal cues, whereas phone conferencing only conveys audible cues. Daft and Lengel (1986) describe two conditions, equivocality and uncertainty, in which messages vary and media richness plays an important role. Equivocality is the presence of complex or ambiguous information. It entails, not the lack of information, but the presence of ambiguous information (Daft & Lengel, 1986). Uncertainty is a lack of information. In this paper, we focus only on equivocality because that is the typical direction of most of the research on MRT (Dennis & Kinney, 1998).

The main crux of MRT is that richer media lead to better communication of equivocal messages and leaner media lead to better communication of unequivocal messages (Daft et al., 1987). The logic is that richer media allow more cues and symbols, like the tone and inflection of voice or facial and eye expressions, to be communicated. These additional cues and symbols provide more clues about the intent and meaning of the message, thus leading to greater understanding of ambiguous information. Conversely, richer media used for unequivocal

messages can lead to too much information or distracting information; thus making understanding more difficult (Daft & Lengel, 1986).

The main premise of MRT is that for equivocal messages or tasks, teams that use a richer medium will have better communication performance than will teams that use a leaner medium.

The use of MRT has brought great progress to media research. Yet, it has limitations. One of the limitations of MRT is that it postulates the use of a single medium for the entire communication task (Dennis et al., 2008). In reality, individuals and teams frequently rely on a combination of media for their communication needs. Furthermore, a single medium may help some aspects of communication and hinder other aspects in the same task. Therefore, MRT may not actually reflect the reality and needs of individuals and teams. We expect that media theories that account for the multiple processes of communication tasks will outperform theories which do not.

There has been mixed and inconsistent empirical support for MRT, especially dealing with new electronic media (e.g., Dennis & Kinney, 1998; Lee, 1994; Markus, 1994; Webster & Trevino, 1995). These inconsistencies have led to further research and theorizing about media influence. Much of this additional research has focused on individuals' familiarity with the communication medium and the other communication partners.

Carlson and Zmud (1999) proposed that individuals can use lean media more richly to achieve higher performance. Their basis is that when individuals are knowledgeable with the media, the task, or the other team members, they can achieve greater understanding with fewer assisting cues. Additionally, Robert et al. (2008) showed that social relationships, referred to as social capital, enhance teams' abilities to understand messages and to properly integrate information. The authors found that teams with more social capital integrated information better

and made higher-quality decisions. The presence of social capital alleviated the negative consequences of lean media. Alge, Wiethoff, and Klein (2003) studied the temporal orientation of teams. They found that teams with a past or an expectation of a future used lean media to communicate better than teams without experience together.

Social Presence Theory

Another important theory, generated somewhat in parallel to MRT, that has been a foundation for a lot of IS media research, is Social Presence Theory (SPT) (Short et al., 1976). Similar to MRT, SPT focuses on the capabilities of media to convey a variety of cues and symbols. The logic of this theory is that individuals understand and interpret information better when they are communicating in person with the message sender. Therefore, media that provide more of the humanistic aspects of the sender lead to better communication performance. Some of these aspects include the sender's face, conveyed by video or pictures; the sender's voice; the sender's mood or emotion; etc. Therefore, media such as video conferencing are considered to be higher on social presence than media such as email. One of the main arguments of SPT is that media that convey greater social presence will lead to greater communication performance.

The main premise of SPT is that the use of media higher on social presence leads to greater communication performance.

Like MRT, SPT also considers the use of only a single medium for the entire communication task. Therefore, it does not account for how the medium affects different aspects of communication performance.

Media Synchronicity Theory

In an attempt to address perceived limitations and gaps in prior media research and theory, Dennis et al. (2008) proposed the Media Synchronicity Theory (MST). This theory

argues that communication tasks should be considered at a finer level, and that each communication task has two fundamental processes: conveyance of new information and convergence on the shared interpretation of the information. Media differ on certain characteristics, and some of these characteristics are better or worse suited for the different communication processes. A medium with higher richness or social presence may be better for a part of the communication task but may be worse for the other part of the communication task. Consequently, individuals should communicate best when they use multiple media: one medium that is better for the conveyance of messages and another medium that is better for convergence on the meaning of those messages (Dennis et al., 2008). Although the idea of multiple media for a single communication task has received some attention and validation (e.g., Robert et al., 2008; Stephens, Sornes, Rice, Browning, & Saetre, 2008), MST theoretically describes how the characteristics of media make them especially suited for different communication processes.

The reconceptualization of communication tasks into two communication processes is what distinguishes MST from MRT and SPT. By looking at the level of these processes, rather than at the task as a whole, the theory seeks to more fully explain the influence of media on communication performance (Dennis et al., 2008). These two communication processes are referred to as conveyance and convergence.

The conveyance process involves the exchange of large amounts of new information. Because of the amounts of the information, the sender benefits from having more time to prepare the message. This preparation could include verifying the message for accuracy and completeness. Additionally, the receiver of the message benefits from having more time to reread or replay the message, leading to better processing of the information and better integration of the information into his or her mental model (Dennis et al., 2008).

The process of convergence involves coming to a shared understanding of information that is possessed. With this process, communicators usually share small amounts of non-novel information in order to resolve on a shared interpretation of the information. This process can involve discussions about the participants' interpretations of the message, and typically includes the rapid exchange and confirmation of short messages and questions. In order for communication to be successful, individuals must engage, to some extent, in both conveyance and convergence activities (Dennis et al., 2008).

Although there may be differences in task duration and intensity, most tasks consist of conveyance and convergence processes. In order for communication to be successful, individuals must properly convey information and converge on the meaning of the information. "Without adequate conveyance of information, individuals will reach incorrect conclusions. Without adequate convergence on meaning, individuals cannot move forward to other activities as they will lack a shared understanding" (Dennis et al., 2008, p. 580).

According to MST, the type of medium used for the communication plays a role in the effectiveness of these communication processes. Some media are inherently better at transmitting large amounts of information—conveyance—and others are better for rapid exchanges of small amounts of information—convergence. For example, detailed instructions on how to create a web page are best communicated through physical documents or email. In the first place, the creator of the information can reread and rehearse the information thoroughly in order to check for accuracy and completeness. This ensures better transmitted information. In the second place, the receiver can reread and reference the instructions if the instructions are in written text. Compare this medium with a telephone call. The sender may relay the same list of instructions to the receiver of the information, but the sender cannot rehearse the message, nor can s/he check it

for accuracy or completeness before it is transmitted. Additionally, the receiver cannot replay the conversation, nor can s/he reference the original information. Conversely, it is likely more effective for the learner to ask clarification questions over the phone rather than through physical documents or email.

An additional component of MST is synchronicity. When multiple people work together at the same pace, at the same time and with a shared focus, they are working synchronously. Media influence the ability for individuals to achieve synchronicity (Dennis et al., 2008). Consider two individuals, for example, that are exchanging messages by email. There is time that passes between the time the sender of the message creates and sends the message and the time that the receiver receives and reads the message. Their ability to work synchronously is hindered by the delays in message generation, transmission, and processing. Conversely, individuals communicating through video conference instantly send and receive information. They are better able to work on the same issues at the same time. Synchronicity typically enhances the convergence process, but it typically harms the conveyance process (Dennis et al., 2008). This is because with convergence, individuals involved can quickly exchange short messages and gauge the level of agreement and respond to questions and misunderstandings immediately (i.e., more interaction and shared focus) (Ballard & Seibold, 2004). With conveyance, synchronicity does not allow individuals time to think about and craft the proper message, nor does it allow the receiver time to reprocess or integrate the information.

In order to understand the level of synchronicity of media, it is necessary to look at the objective capabilities of different media. MST defines five media capabilities (Dennis et al., 2008). These capabilities are

- Transmission velocity: the speed to which a medium is capable of transmitting a message.

- Parallelism: the capability of a medium to allow two or more messages to be conveyed at the same time.

- Rehearsability: the extent to which a medium allows a sender to rehearse a message before it is sent to a receiver.

- Reprocessability: the extent to which a receiver can reprocess a message one or more times.

- Symbol sets: the number of ways in which a medium can convey a message.

In general, faster transmission velocity leads to greater synchronicity; greater symbol sets leads to greater synchronicity; more parallelism leads to less synchronicity; and more rehearsability and reprocessability lead to less synchronicity (Dennis et al., 2008).

In summary, MST argues that communication performance is based on fitting the media to the communication process and the participants appropriating the technology faithfully. Many factors influence the fit, including team and task familiarity (Dennis et al., 2008).

The main premise of MST is that the use of lower-synchronicity media for the conveyance process and the use of higher-synchronicity media for the convergence process will lead to the best communication performance.

We expect that MST will outperform the other theories in a head-to-head comparison. Our justification is based on the communication benefits of using multiple media versus those of using a single medium. A single medium does not support all aspects of communication equally or effectively. A rich medium may actually create some difficulties in properly sharing accurate and complete information. This is because a rich medium may not allow individuals to review

their messages or communication. Even if their message is sent by video and recorded, there is a greater time investment required for them to re-watch the video. And, if they find inaccuracies or deficiencies, they may be unwilling or unable to rerecord or edit the video. A medium that is beneficial for resolving misunderstandings and aiding in quick questions and answers may hinder the sharing of the information in the first place. Without the effective sharing of unique or novel information, individuals and teams will be less effective at understanding and processing the information. Consequently, the use of a single medium will allow for effective performance in some aspects of communication but will result in ineffective performance in other aspects of communication. Therefore, theories that consider multiple media for a task should perform better than theories that consider only a single medium for a task.

In this research we also test other outcomes of media use. These outcomes include the time required to complete the task and several different aspects of satisfaction.

Researchers have drawn on and continue to draw on MST for theoretical justification and support for research in several disciplines, including information systems (Thomas & Bostrom, 2010), communication (Muhren, Van den Eede, & Van de Walle, 2009), and decision science (Sarker, Sarker, Chatterjee, & Valacich, 2010). Most likely, researchers will continue to use and apply MST in their research. MST has received some empirical scrutiny (e.g., DeLuca & Valacich, 2005, 2006; Dennis, Valacich, Speier, & Morris, 1998; Murthy & Kerr, 2003), with studies generally finding support for MST. However, additional empirical validation of MST will allow researchers to better evaluate the contribution and accuracy of MST and enable media-influence research to continue to build and refine media research and theory.

Method

In order to better understand media impacts and performance, we used a lab experiment where individuals worked in teams to solve a task that required large amounts of information exchange. In this task, we varied the communication media that teams used. One set of teams used email for the entire task. Another set of teams used a video conference for the entire task. A third set of teams used email to share initial information and a video conference to discuss the information. In order to compare the theories, we needed to create a situation that allowed me to compare MRT, SPT, and MST. For the treatments in our experiment, we chose media that varied according to media richness, social presence, and synchronicity.

Task

The task used in this study is an adaptation of a previously used task called the International Institute Task (Zigurs, Poole, & DeSanctis, 1988). The complete task details are included in Appendix A. The task is a hidden-profile task where all the members of a team possess small amounts of common information and large amounts of private information related to the task. In order for teams to make an optimal choice, the individuals on the teams must effectively process and share the private information they each possess (Stasser & Titus, 1985). The private information alone is not enough to solve the task. The objective behind hidden-profile tasks it to simulate situations where individuals in teams possess different information and expertise. Teams that communicate effectively will be better able to evaluate the information and alternatives and determine the optimal solution.

In the current task, individuals had relatively small amounts of common information and large amounts of private information. This ensured that teams shared and discussed large amounts of information in order to understand the alternatives and make the best decisions. We

allowed team members to keep possession of the common and private information for the duration of the task. This allowed individuals to reference and review pertinent information, and it reduced errors based on poor information recall and information inaccuracy. In studying hidden-profile tasks, Lightle et al. (2009), found that outcomes were susceptible to information bias and recall issues. By allowing individuals to maintain possession of all task materials, we minimized these potential issues.

In this task, each team member was given information about an international studies program sponsored by the university. The team members assumed the role of an admissions committee that determined which applicant, from a set of highly-qualified candidates, to admit to the program. All of the candidates have strong academic ability, so the teams had to look for several factors beyond academic performance. In the task instructions, individuals were given four personality traits to look for. They were told that these four personality traits were linked to success in the program, so they should choose the individual that best possessed these traits.

Each team member was given complete information about only one of the candidates. The individual information included three essays written by the candidate and two letters of recommendation written by other people. From these essays and recommendations, the teams evaluated the personality traits and the important qualities of each candidate. Each team member received basic facts about all the candidates. The common information in this task slightly favors a sub-optimal applicant. When the essays and recommendations of all applicants are considered together, the optimal candidate's attributes and qualifications are superior to the other candidates.

This task is heavy on conveyance, yet it still requires quality convergence. The conveyance process is operationalized through the initial information sharing portion of the task. Because individuals do not have information about the other candidates in the task, the team

members are individually required to share this information with the other members of their team. This information is completely novel to the other team members, and there are large amounts of information to convey. The convergence process is operationalized through the discussions about the conveyed information. The members of the teams have to discuss the information until they arrive at consensus.

Procedure

Three or four participants signed up for a study session time slot. When participants arrived, they were placed in teams with the other individuals who signed up for that time. Teams were then assigned to one of three media conditions. A requirement of this experiment is to use media that sufficiently vary in levels of richness, social presence, and synchronicity. For this study, the media do not necessarily need to be lowest versus highest in richness and synchronicity, only lower versus higher.

The lower-richness medium should convey fewer cues, have less immediate feedback, and have less language variety than the higher richness medium (Daft & Lengel, 1986). For the variance in richness we chose email versus video conference. Email is lower in richness than video conference because email conveys fewer cues, has less immediate feedback, and less language variety. Simply put, email generally conveys only text, whereas video conferencing conveys video and audio. Similarly, email and video conference also fit the requirements for the variance in media synchronicity. Email has higher rehearsability, reprocessability, and parallelism capabilities than does video conference (Dennis et al., 2008). These capabilities reduce synchronicity, causing email to be considered lower in synchronicity than video conference. Because of the fewer cues and lower capabilities of email compared to those of video conference, we also expect that email will sufficiently contribute to lower levels of social

presence as compared to video conference. Therefore, for the low richness, low social presence, low synchronicity conditions, we used email as the medium for the entire communication. For the high richness, high social presence, high synchronicity conditions, we used video conference as the medium for the entire communication. For the condition that allowed a portfolio of media to be used for the communication, we used email for the conveyance process and video conference for the convergence process. This sufficiently provides a test condition where a lower synchronous medium is used for conveyance and a higher synchronous medium is used for convergence.

The teams were assigned to one of the three media conditions for the task: email, video conference, or email-video conference. All participants were randomly assigned an applicant to the international institute. Each participant was given a single application packet that contained three essays written by the applicant and two letters of recommendation written by someone connected to the applicant. They also included a single sheet of summary facts about all of the applicants. All applicant portfolios were very similar in length.

After teams read through the introduction to the task, they were told that they would be placed in separate rooms from each other, and then they were told what media they would be using for the task. The teams that used the email-video conference portfolio were instructed to send a single email that included the relevant information about their applicants to their team members. Individuals were instructed not to ask questions or discuss the applicants by email. They were then told that they would use a video conference to ask questions and discuss their different applicants after they had all shared one email and read the emails from their team members. Computers were setup in each room with email and video conference applications and accounts for each team member.

Each participant was given sufficient time to read about their applicant. After each had taken the amount of time they needed to learn about their applicant, they began exchanging emails or the lab assistant setup the video conference for the teams.

In the email condition, the members of the teams only had access to email. Each message compiled by an individual on a team was sent to all the members of his or her team. Additionally, when an individual replied to an email, the reply was sent to all members of his or her team. In general, all the messages and replies were read by all the members of each respective team. The members of each team exchanged email messages until they made consensus decisions on which applicant to admit to the program.

In the video conferencing condition, the members of the teams only had access to a video conference program. This program provided multi-point audio and video. Each individual viewed a screen with video and audio feeds of each member of his/her team along with a video feed of himself/herself. A moderator initialized the video conference program after all individuals on the team had completed reading the task information and the applicant information. After the video feed was activated, the team members exchanged information about each of their candidates, discussed the information, and came to a consensus about which candidate to admit to the program.

All meetings and discussions were captured or recorded. After the teams arrived at consensus, they were directed to the online survey where they answered questions about their perceptions and experiences.

According to MRT, the teams that use video conferencing should perform better than the teams that use email. Similarly, SPT would also predict that the video conferencing teams would

be superior. MST would predict that the teams that use both email and video conferencing would outperform the teams that use only email or only video conferencing.

Participants

For our study, we recruited individuals associated with the university where we work. We recruited participants using flyers, email announcements, classroom invitations, and word-of-mouth. Most of the participants were undergraduate business students. However, we also had graduate business students, undergraduate and graduate students from other colleges, employees of the university, and other adults who responded to the invitation to participate in the study. The participants received a small payment for participating, a small amount of extra course credit, or in some cases, both a payment and extra course credit.

There were 165 participants in this study, and they had an average age of 21.95 years. There were more males than females (41% being female). A majority of the participants were undergraduate business students. However, there were several graduate students and several non-students as well.

In total, there were 54 teams that completed the study. The teams consisted of three or four members, depending on the number of participants who showed up for their scheduled time slot. Most of the teams had 3 members. There were a total of 16 teams in the email treatment, 20 teams in the video conference treatment, and 18 teams in the email-video conference treatment.

Measures

For the purpose of evaluating team performance, we assessed the teams' admissions decisions. In creating the task, we designed one of the applicants to be the strongest in personality and social attributes. These attributes matched those given in the task instructions for the desired applicant. The other applicants possessed some levels of the desired attributes, but

they were inferior to the optimal candidate. For validation purposes, we had an experienced admissions expert independently evaluate the applicants. The expert has experience serving on actual admissions committees evaluating national applicants to a prestigious study abroad program. The expert ranked the applicants in order of qualifications. The expert's choice of applicant and rank of applicants matched the designed solution and rank. Teams that selected the optimal applicant received a 4 for their performance score; teams that chose one of the other applicants received a 3, 2, or 1 for their performance score, depending upon which applicant they selected. The second-best applicant was worth three points, the third-best applicant was worth two points, etc. We used ANOVA to analyze the decision quality.

We measured the time each team took to complete the task. We considered the point when teams received the task instructions to be the start time. We used the time that the first person in each team completed the study to be the end time for the team. We used ANOVA to compare times across media treatments.

We measured individuals' perceptions of the different aspects of satisfaction using existing measures. We used measures for the satisfaction with the meeting from Dennis (1996). This scale included Likert-type scale questions. The reliability of this scale was acceptable (alpha = .86). For process satisfaction and solution satisfaction, we used measures developed by Green and Taber (1980). Each of these scales included five items. Both possessed acceptable reliability (process satisfaction alpha = .94; solution satisfaction alpha = .89). The complete list of measures is included in Appendix B. We used ANOVA to compare the satisfaction scores across the different media treatments.

Analysis and Results

The intercorrelations of the dependent variables are shown in Table 1. The satisfaction

scores for individuals within teams were averaged for the correlation analysis. In Table 2, the

means and standard deviations for the dependent measures are displayed across treatment

groups. Table 3 displays the results of the statistical analysis.

Table 1

Intercorrelations (and p-values) between variables

	Decision Quality	Time	Meeting Sat.	Process Sat.	Solution Sat.
Mean	2.87	44:51	5.834	6.056	6.091
Std. Dev.	[.754]	[14:22]	[1.043]	[1.217]	[.980]
Decision Quality	1 (.000)				
Time	-.122 (.379)	1 (.000)			
Meeting Sat.	.090 (.519)	-.093 (.503)	1 (.000)		
Process Sat.	.073 (.600)	-.281 (.040)	.815 (.000)	1 (.000)	
Solution Sat.	.124 (.370)	-.222 (.107)	.728 (.000)	.783 (.000)	1 (.000)

Table 2

Means [and standard deviations] of the dependent measures

Medium	Email	Video Conference	Email-VC
Measure			
Dec. Quality	2.81 [.911]	2.85 [.671]	2.94 [.725]
Time	51:11 [20:34]	37:48 [9:31]	47:03 [8:13]
Meeting Sat.	5.143 [1.271]	6.148 [.787]	6.052 [.815]
Process Sat.	5.230 [1.758]	6.364 [.630]	6.414 [.788]
Solution Sat.	5.604 [1.119]	6.262 [.828	6.297 [.888]

Table 3

F- (and *p*-values) for statistical tests on dependent measures

Dependent Measure	df	Effects Medium
Decision Quality	51	.137 (.872)
Time	51	4.766 (.013)
Meeting Satisfaction	162	16.826 (.000)
Process Satisfaction	162	18.192 (.000)
Solution Satisfaction	162	8.608 (.000)

Performance

There were no significant differences in decision quality among the different media groups. The email-video conference teams had a slightly higher performance mean (2.94); however, it was not a significant difference.

Time

The time required for teams to complete the task was significantly different across treatments. The teams that used email took the longest amount of time (51:11), and the difference was significant ($p = .013$). Post-hoc analyses revealed that the email condition was significantly different from the video conference condition (37:48) but not the email-video conference condition (47:03). Furthermore, the video conference condition and the email-video conference condition were not significantly different.

Satisfaction

We also found statistically significant effects for all the aspects of satisfaction. Post-hoc analyses revealed that individuals in the email condition were significantly less satisfied on meeting satisfaction, process satisfaction, and solution satisfaction as compared to individuals in both the video conference condition and the email-video conference condition. Individuals in the video conference condition and individuals in the email-video conference condition did not experience significant differences in satisfaction.

Discussion

The purpose of this research was to evaluate the accuracy of existing media theory. We failed to find any performance differences based on the media used by teams. MRT and SPT predict that the teams using only the video conference should have performed better in this task than the teams using only email or email-video conference. In this study, the teams using a video

conference did not perform better than the other teams, and the teams using email did not perform worse than the other teams. MST predicts that the teams using both email and video conference would outperform the other teams. In this study, the teams using both email and video conference did not perform significantly better than the teams using a single medium. Therefore, none of the theories accurately predicted the findings.

The results from this study give rise to questions about the actual impact media has on communication performance. The results also challenge the propositions of existing media impacts theories. There have been other studies that have found no effects of the media used. Several have been published (see Dennis & Kinney, 1998; Dennis, 1996; Simon, 2006; Suh, 1999 for examples), and it is likely that several studies that did not find significant effects have never been published. These studies and the current study add weight to the question of whether the medium really does matter.

An important argument of MST is that complete or more accurate information is shared when the conveyance process is performed using a medium low in media synchronicity (Dennis et al., 2008). For the purpose of understanding whether the medium affected the way teams shared information or the type of information that they shared, we observed and reviewed teams' communications. In our estimation, the type or amount of information shared was very similar across media treatments. Some email groups shared a lot of information initially and some shared very little. This was similar with the video conference groups as well.

Although performance effects were not discovered, there were significant effects in time and satisfaction. The teams in this study took more time when they used email, and they were less satisfied than the teams that used other media. If there really are no performance differences, teams would be better off using a medium higher in synchronicity than using email.

There are, of course, limitations to this study and to the application of this study in other contexts. The size of the teams was relatively small (but typical of published teams research). It is possible that there was not enough power to detect the effects of the media. Perhaps there are also limitations of the task and the information required to be exchanged. For example, this task requires individuals in teams to process the information they receive about their applicants. If they fail to process the information adequately, the other members of the team will not have adequate information available to them.

It is also possible that personalities played a much bigger role than did the medium. Individuals may have dominated the discussions or pushed for certain applicants. We randomly assign applicants to participants, but individual personalities still may have affected the outcomes.

Irrespective of the limitations, there is a need for future research to continue to study issues related to media impacts. What are the contexts or the boundaries of existing media theories or media impacts? What are the other factors that lead to higher communication performance?

Contributions

This research has both theoretical and practical contributions. After comparing and evaluating several dominant media theories, this research raises questions as to the efficacy of those theories. It also gives additional support to prior studies that have failed to detect performance effects of media. For researchers, it tells us that maybe we do need to better evaluate media theories and impacts. For individuals, teams, and managers, this research shows that the choice of media for team meetings and communication may not significantly affect the

communication performance or the performance of the team. However, it does provide additional

evidence that email communications take longer and are less satisfying (Kock, 2007).

Conclusion

We set out to provide clarity and consolidation to some of the dominant media theories.

Ultimately, we sought for greater understanding of media impacts and performance. What we

found was that none of the dominant theories adequately explained the results of this research. In

our study, the medium had no significant effect on decision quality. Therefore, instead of

refining media theory, we raise questions as to the actual extent of media impacts and the

efficacy of media theory, or at least the boundaries of each. The medium may yet matter, but

there are likely to be other important factors worth considering.

References

Alge, B. J., Wiethoff, C., & Klein, H. J. (2003). When does the medium matter? Knowledge-building experiences and opportunities in decision-making teams. *Organizational Behavior and Human Decision Processes*, *91*(1), 26–37. doi:10.1016/S0749-5978(02)00524-1

Ballard, D. I., & Seibold, D. R. (2004). Organizational Members' Communication and Temporal Experience. *Communication Research*, *31*(2), 135 –172. doi:10.1177/0093650203261504

Carlson, J. R., & Zmud, R. W. (1999). Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions. *Academy of Management Journal*, *42*(2), 153–170. doi:10.2307/257090

Daft, R. L., & Lengel, R. H. (1984). Information Richness: A New Approach to Managerial Behavior and Organzation Design. In *Research in Organizational Behavior* (Vol. 6, pp. 191–233). Greenwich, Connecticut: JAI Press Inc.

Daft, R. L., & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Management Science*, *32*(5), 554–571.

Daft, R. L., Lengel, R. H., & Trevino, L. K. (1987). Message Equivocality, Media Selection, and Manager Performance: Implications for Information Systems. *MIS Quarterly*, *11*(3), 354–366.

DeLuca, D., & Valacich, J. S. (2005). Outcomes from Conduct of Virtual Teams at Two Sites: Support for Media Synchronicity Theory. In *Hawaii International Conference on System*

Sciences (Vol. 1, p. 50b). Los Alamitos, CA, USA: IEEE Computer Society. doi:http://doi.ieeecomputersociety.org/10.1109/HICSS.2005.481

DeLuca, D., & Valacich, J. S. (2006). Virtual teams in and out of synchronicity. *Information Technology & People*, *19*(4), 323–344. doi:10.1108/09593840610718027

Dennis, A. R. (1996). Information Exchange and Use in Group Decision Making: You Can Lead a Group to Information, but You Can't Make It Think. *MIS Quarterly*, *20*(4), 433–457.

Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, Tasks, and Communication Processes: A Theory of Media Synchronicity. *MIS Quarterly*, *32*(3), 575–600.

Dennis, A. R., & Kinney, S. T. (1998). Testing Media Richness Theory in the New Media: The Effects of Cues, Feedback, and Task Equivocality. *Information Systems Research*, *9*(3), 256 –274. doi:10.1287/isre.9.3.256

Dennis, A. R., Valacich, J. S., Speier, C., & Morris, M. G. (1998). Beyond Media Richness: An Empirical Test of Media Synchronicity Theory. In *Hawaii International Conference on System Sciences* (Vol. 1, p. 48). Los Alamitos, CA, USA: IEEE Computer Society. doi:http://doi.ieeecomputersociety.org/10.1109/HICSS.1998.653082

Green, S. G., & Taber, T. D. (1980). The effects of three social decision schemes on decision group process. *Organizational Behavior & Human Performance*, *25*(1), 97–106. doi:10.1016/0030-5073(80)90027-6

Kock, N. (2004). The Psychobiological Model: Towards a New Theory of Computer-Mediated Communication Based on Darwinian Evolution. *Organization Science*, *15*(3), 327 –348. doi:10.1287/orsc.1040.0071

Kock, N. (2007). Media naturalness and compensatory encoding: The burden of electronic media obstacles is on senders. *Decision Support Systems*, *44*(1), 175–187. doi:10.1016/j.dss.2007.03.011

Lee, A. S. (1994). Electronic Mail as a Medium for Rich Communication: An Empirical Investigation Using Hermeneutic Interpretation. *MIS Quarterly*, *18*(2), 143–157.

Lightle, J. P., Kagel, J. H., & Arkes, H. R. (2009). Information Exchange in Group Decision Making: The Hidden Profile Problem Reconsidered. *Management Science*, *55*(4), 568–581.

Markus, M. L. (1994). Electronic Mail as the Medium of Managerial Choice. *Organization Science*, *5*(4), 502–527.

Muhren, W. J., Van den Eede, G., & Van de Walle, B. (2009). Making Sense of Media Synchronicity in Humanitarian Crises. *Ieee Transactions on Professional Communication*, *52*(4), 377–397. doi:10.1109/TPC.2009.2032380

Murthy, U. S., & Kerr, D. S. (2003). Decision making performance of interacting groups: an experimental investigation of the effects of task type and communication mode. *Information & Management*, *40*(5), 351–360. doi:10.1016/S0378-7206(02)00017-4

Robert, L. P., Dennis, A. R., & Ahuja, M. K. (2008). Social Capital and Knowledge Integration in Digitally Enabled Teams. *Information Systems Research*, *19*(3), 314–334. doi:10.1287/isre.1080.0177

Sarker, S., Sarker, S., Chatterjee, S., & Valacich, J. S. (2010). Media Effects on Group Collaboration: An Empirical Examination in an Ethical Decision-Making Context. *Decision Sciences*, *41*(4), 887–931. doi:10.1111/j.1540-5915.2010.00291.x

Short, J. A., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons.

Simon, A. F. (2006). Computer-mediated communication: Task performance and satisfaction. *Journal of Social Psychology*, *146*(3), 349–379. doi:10.3200/SOCP.146.3.349-379

Stasser, G., & Titus, W. (1985). Pooling of Unshared Information in Group Decision Making: Biased Information Sampling During Discussion. *Journal of Personality and Social Psychology*, *48*(6), 1467–1478. doi:10.1037/0022-3514.48.6.1467

Stephens, K. K., Sornes, J. O., Rice, R. E., Browning, L. D., & Saetre, A. S. (2008). Discrete, Sequential, and Follow-Up Use of Information and Communication Technology by Experienced ICT Users. *Management Communication Quarterly*, *22*(2), 197–231. doi:10.1177/0893318908323149

Suh, K. S. (1999). Impact of communication medium on task performance and satisfaction: an examination of media-richness theory. *Information & Management*, *35*(5), 295–312. doi:10.1016/S0378-7206(98)00097-4

Thomas, D. M., & Bostrom, R. P. (2010). Vital Signs for Virtual Teams: An Empirically Developed Trigger Model for Technology Adaptation Interventions. *Mis Quarterly*, *34*(1), 115–142.

Webster, J., & Trevino, L. K. (1995). Rational and Social Theories as Complementary Explanations of Communication Media Choices: Two Policy-Capturing Studies. *Academy of Management Journal*, *38*(6), 1544–1572. doi:10.2307/256843

Zigurs, I., & Buckland, B. K. (1998). A Theory of Task/Technology Fit and Group Support Systems Effectiveness. *MIS Quarterly*, *22*(3), 313–334.

Zigurs, I., Poole, M. S., & DeSanctis, G. L. (1988). A Study of Influence in Computer-Mediated Group Decision Making. *MIS Quarterly*, *12*(4), 625–644.

Appendix A

International Institute Task

Background to the Study

Many universities and other organizations sponsor a variety of special programs that attract large numbers of applicants. These programs are highly sought after, and the competition for them is high. An important problem faced by these organizations is how to decide among the many qualified people who are interested in these programs.

In such situations, most organizations try to be as objective as possible, and use quantifiable criteria wherever they can. Criteria such as previous grade point averages and aptitude and ability test scores make it easier to compare individual applicants. However, organizations also must rely on information about applicants that is less quantifiable and more subjective.

This study is designed to further our understanding of the way people communicate and go about making decisions in this type of situation. For this study, we have created a scenario very similar to an actual admissions decision. The decisions that you will be making in this study are typical of those faced by organizations that sponsor special programs like the one used for this study. The applicants to the program in this study have varied qualifications, and you may find that some criteria for admission are more important than others.

By your participation in this study, you can make a contribution to our knowledge of how teams communicate and make decisions in these types of situations. Please participate to the best of your ability.

This study is comprised of three parts. Part 1 introduces you to the university's international studies program and provides you with the information about the applicants. In part

2 you will work with other members of an admissions committee to decide whom to admit to the program. Finally, in part 3 you will answer questions about this experience.

Thank you so much for your participation.

Part 1

A. Program Overview

The International Institute

Four leading universities, including the ABC University, are participating in the development of the International Institute, a special program for academically and socially successful students interested in applying traditional majors in international settings. Students in the program will specialize in applying their chosen field in a specific country or region of the world, and they will spend one year at a university in a foreign country. Students will take courses offered by those schools as well as courses offered by professors from the ABC University and other participating schools who will visit the foreign schools. They will return to their American schools for at least their final year of study. They will get intimate exposure to the ways of thinking and working in another country. It is anticipated that graduates of the program will find employment in foreign embassies, international government, and international business.

If the program is to be successful, the students must do a good job of representing the U.S. at the foreign universities. To apply for admission, all students must have a Grade Point Average of at least 3.50. Aside from academic achievement, students will also need to have good social skills and the right personality.

International Success

International success is based on academic ability and several personality characteristics. In addition, there are other factors that can be helpful such as previous international exposure, foreign language skills, and personal interests.

Based on the study of other international studies programs, researchers have identified personality characteristics which help to predict international success:

1. Independence (The degree to which an individual is free from the influence of others)

2. Social Success (The degree to which an individual is well liked and has friends in different social groups)

3. Self-Concept (The degree to which an individual is confident with their own intellectual and interpersonal skills)

4. Awareness (The degree to which an individual is conscious of others' thoughts, feelings, and behavior)

Of course, it can be difficult to determine which factors are the most important and how to balance these characteristics with academic ability. It can also be difficult to assess the personality traits when only given applications.

In this study we will ask you to make judgments about whether or not various applicants should be admitted to the International Institute. You will base these judgments on the students' background information, written essays, and recommendations.

Section 2: Application Overview

A preliminary screening has reduced the number of applicants under consideration to a few very strong candidates. From this set of candidates, you must select the best one for the

International Institute. The selected applicant should have the greatest likelihood for international success, and he or she should represent the university and the United States well.

In order to make the best decision, your team will have to share important information about each of the applicants with one another.

For each applicant you will be given the following summary information:

1. Age

2. Gender

3. GPA

4. Major

5. Foreign language exposure

6. International exposure

To help keep the workload manageable, each team member has received complete application portfolios for only one applicant. Therefore, it is important that you read the application materials carefully because your team members will depend on you for important information about your applicant. You must also make sure you provide the other members of your team with enough information for them to be able to assess all the candidates accurately.

The information that you personally have for one of the applicants includes three essays written by the applicant and two recommendations provided by others.

If you are to make good decisions, you will have to combine your own judgment with the information that you have and gain about the applicants.

You should be guided by two goals when making your decision:

1.   To make an optimal admission decision that selects the student with the greatest likelihood of success

2.   To select the student who will represent the university and our nation well in foreign settings

It is important that you make this decision as a group. You should work together and try to take advantage of your diverse talents and resources. Your team must agree on one candidate to accept to the program. Please give this your best effort.

Sample Common Information

Haley Bryant	
Age:	20
Gender:	Female
GPA:	3.90
Major:	Psychology
Foreign Language:	Two years HS Spanish
Traveled Abroad:	No
Preferred Destination:	Spain

Sample Essay

In 500 words or less, please answer this question: How has your background prepared you for success at the International Institute?

Our food certainly wasn't authentic, but we always gave it our best try. I know a little about the kinds of foods people eat in Norway, Germany, and Indonesia because we sampled many of those foods at our dinner table. My mom came up with this great idea when I was little to give us exposure to ethnic foods and to give us some excitement during dinner. One Friday a month we would choose a different country from around the world and try to make their food for our dinner. Sometimes we randomly chose a country, and other times we coordinated a dinner because of an event or a person.

Sometimes the dinners didn't taste very different from what we were used too. Other times, however, they were more exciting. I can still remember the smell of some of the cheeses that we tried. They smelled terrible, but I was always willing to try a little of them.

Along the way my family and I developed a greater understanding of many other countries and cultures. On the nights we made food from other countries, we also learned about the geography of the countries, and we talked about many of the facts and customs of the countries. This exposure gave me a desire to visit many of the places we learned about. Even though making and eating foods from other countries may not appear to be a big deal, it has helped me. The result of this practice is that I can eat about anything, and I know something about other countries. This experience will help me while I am in Spain to fit in better with the people. It also gave me a desire to experience the food and culture of Spain first-hand. Even though I haven't actually lived out of the U.S., I don't feel like living in a new place would be too difficult for me.

Eating the real food in Spain may be different than what I am expecting, but because of the time I spent learning about other countries at the dinner table, the overall experience won't be as big of a shock to me. I have been prepared to work with other people and their unique ways. For this reason, I will be successful at the International Institute.

Appendix B

Measurement Items

Communication Satisfaction – 7-point Likert-type scale anchored by Strongly Disagree to Strongly Agree – (Dennis, 1996)

How do you feel about the process by which your team made its decision?

How do you feel about the team's discussions?

All in all, how do you feel?

To what extent did you enjoy participating in this meeting?

How much fun was this meeting?

Solution Satisfaction – 7-point Likert-type scale anchored by Strongly Disagree to Strongly

Agree – (Green & Taber, 1980)

How satisfied or dissatisfied are you with the quality of your team's solution?

To what extent does the final solution reflect your input?

To what extent do you feel committed to your team's solution?

To what extent are you confident that your team's solution is correct?

To what extent do you feel personally responsible for the correctness of your team's solution?

Process Satisfaction – 7-point anchored by different categories – (Green & Taber, 1980)

How would you describe your team's problem solving process? (inefficient - efficient)

How would you describe your team's problem solving process? (uncoordinated - coordinated)

How would you describe your team's problem solving process? (unfair - fair)

How would you describe your team's problem solving process? (confusing - understandable)

How would you describe your team's problem solving process? (dissatisfying - satisfying)

Appendix C

Research Compliance Protocol Letter

September 25, 2012

MEMORANDUM

TO: Martin Hassell
                                Moez Limayem

FROM: Ro Windwalker
                                IRB Coordinator

RE: New Protocol Approval

IRB Protocol #:   12-09-109

Protocol Title: *Media Synchronicity and Communication Project*

Review Type: ☒ EXEMPT   ☐ EXPEDITED   ☐ FULL IRB

Approved Project Period: Start Date: 09/25/2012 Expiration Date: 09/24/2013

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval.   Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 600 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes.   All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

Appendix D

Documentation of Multi-Authored Paper

July 3, 2013

Subject: Multi-Authored Paper

I certify that Martin Hassell is the first author of the multi-authored paper entitled "Media Impacts: Much Ado about Nothing." Martin Hassell completed a large majority of the work on this paper, much more than 51% of the work.

Sincerely,

Moez Limayem
Dissertation Director

204 Business Building · Fayetteville, Arkansas 72701-1201 · 479-575-4500 · 479-575-4168 (fax) · http://waltoncollege.uark.edu/isys

The University of Arkansas is an equal opportunity/affirmative action institution.

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Essay 3: Effects of Information Processing, Evaluation, and Comparison

on Communication Performance and Decision Quality

Martin Hassell

Moez Limayem

Abstract

To make the best choices and decisions, teams need to communicate effectively. To enable teams to communicate effectively, researchers must understand how communication media and other factors impact communication. This research delves deeper into understanding communication and media impacts by studying different aspects of communication. Two of which are conveyance quality and convergence quality. Through this work, researchers were able to better understand why some teams communicate more effectively than others and how to help teams communicate at a higher level. The authors use a case-study approach to understand the factors that lead to high communication and decision quality. The study analyzes communication cases of teams using various media in a hidden-profile task that requires large amounts of information exchange. Through this research, the authors identify individual process factors that play a role in effective communication and performance. These factors include information processing, information evaluation, and information comparison.

Essay 3: Effects of Information Processing, Evaluation, and Comparison

on Communication Performance and Decision Quality

Introduction

In order for teams to make the best choices and decisions, they must communicate

effectively. There can be many factors that influence teams' abilities to communicate at a high

level. In the IS discipline, most of these factors center on communication media. These factors

include the media itself (Daft & Lengel, 1986; Dennis, Fuller, & Valacich, 2008; Short,

Williams, & Christie, 1976), experience with the media and other communicators (Carlson &

Zmud, 1999), and social structures and relationships that exist among team members (Robert,

Dennis, & Ahuja, 2008). In other teams research, factors such as how teams handle common and

private information (Gigone & Hastie, 1993), how teams search for and use new information

(Fischer et al., 2011; Jonas, Schulz-Hardt, Frey, & Thelen, 2001; Schulz-Hardt, Frey, Lüthgens,

& Moscovici, 2000), and how teams evaluate information (Hollingshead, 1996) have been found

to influence decision quality. However even with the vast amount of research that has been

conducted, researchers still do not fully understand why some teams communicate effectively

and others do not, even when the media or circumstances are similar.

One area of research that has seen only limited attention is the study of communication

quality, especially the study of conveyance quality and convergence quality. Conveyance and

convergence are formalized by the Media Synchronicity Theory (MST) (Dennis et al., 2008).

Conveyance is the process of communication that consists of sharing large amounts of new

information. Convergence is the process of communication that consists of coming to an agreed

upon interpretation of the conveyed information. In order to communicate effectively, teams

must convey and converge effectively.

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Prior research has investigated some aspects of conveyance and convergence, such as amount of conveyance and amount of convergence (i.e., Robert et al., 2008). This insight has led to significant findings regarding communication performance. However, the amounts of conveyance and convergence do not necessarily equate to quality, and prior work has not fully accounted for or considered the quality of conveyance and convergence. It is likely that quality is an important aspect of explaining and predicting communication performance.

In this research, we aim to fill these research gaps by conceptualizing and analyzing conveyance quality and convergence quality and studying other factors that contribute to communication performance and decision quality. We study the quality and effects of conveyance and convergence through the analysis and observation of teams that participated in a communication-intensive task. This task required teams to share large amounts of novel information and discuss the shared information in order to make the best decisions and recommendations. We expect that teams that convey information effectively and converge effectively on the shared information will achieve high decision quality. We also identify other factors of communication performance and decision quality through our analyses and observations.

This research provides an important aspect of better understanding the factors that lead to better communication performance. It also provides additional insights on how different media affect communication. Through this research, we seek to help managers and teams recognize and achieve better communication performance. This work also gives guidance on general media usage for the different aspects and types of communication.

Background

Prior IS research on media impacts has covered many areas and has led to significant findings about communication performance. Communication performance is directly tied to task performance (Dennis et al., 2008). Much of the prior research on media and communication has centered on individuals' abilities to share information and discuss the shared information (Dennis & Kinney, 1998; e.g., Dennis, 1996; Robert et al., 2008). Prior research has looked at how different media allow individuals to share more or less information. Studies have shown that computer media generally lead to more information shared in teams than does the face-to-face medium (Dennis, 1996). However, greater amounts of information sharing do not necessarily equate to better decision outcomes (Dennis, 1996).

The Media Synchronicity Theory (MST) (Dennis et al., 2008) makes an important contribution to media impacts research. This theory argues that researchers need to look at communication tasks from a finer level. Rather than considering communication as one big task, it should be recognized to have two distinct processes: conveyance and convergence. Conveyance and convergence are a part of all communication tasks. Conveyance is the sharing of large amounts of novel information, and convergence is coming to a shared understanding of the preprocessed information (Dennis et al., 2008). Conveyance includes information shared by one or more individuals that is new to one or more of the individuals participating in the communication. Convergence is the discussion of the interpretation of the information.

Although the separation of tasks into communication processes itself is not necessarily new, most media research has generally looked at how a single medium influences the performance of the whole communication task (e.g., Daft & Lengel, 1986; Kock, 2004; Robert et al., 2008; Simon, 2006; Suh, 1999), not how it influences the communication processes.

Consequently, many studies did not consider how one medium may help or hinder a portion of the communication task and have the opposite effect for the other portion of the communication task. In their work on MST, Dennis et al. (2008) argue that research should look more closely at how media specifically affect the communication processes of each task (i.e., conveyance and convergence).

Because different communication needs hold different media requirements, researchers must look deeper at aspects of conveyance and convergence that influence communication performance. In MST, media are characterized as being higher or lower in media synchronicity, based on the capabilities of the media. The level of media synchronicity and the capabilities are projected to be more or less beneficial to the conveyance and convergence processes (Dennis et al., 2008). For example, lower-synchronicity media are better for conveyance because they allow senders to rehearse their messages, checking them for accuracy and completeness, and they allow receivers to reprocess the messages, helping them to integrate the information. Studying conveyance and convergence quality may prove fruitful in providing understanding of communication performance.

From our own work, we have observed that there is likely more to the story of communication performance than just the media used and the experience and relationships of team members. Some teams, we have observed, share vast amounts of information, yet this sharing did not contribute to the teams making better decisions. Also, many teams discussed large amounts of shared information, but they failed to arrive at the best decision. Conversely, other teams share very little information or have very little discussion, yet still make quality decisions.

Communication Quality

Conveyance Quality

For a conceptualization of conveyance quality, we draw primarily from Bovee, Srivastava, and Mak's (2003) work on information quality. Although the context is slightly different, conveyance quality is really about providing useful information to others. Bovee et al. (2003) provide four aspects of information quality: relevance, accessibility, interpretability, and integrity (accuracy and completeness). Relevance is the degree to which the information relates to the needs of the task or problem. Accessibility can be described as the degree to which individuals or systems have access to the information. Interpretability is the degree to which individuals or systems can interpret and use the information. Finally, integrity is the degree to which the information is accurate and complete. For conveyance to be high quality, it must have sufficient levels of relevance, accessibility, interpretability, and integrity.

Relevance. In communication tasks, information that is shared must be relevant. Conveyance that is relevant includes the sharing of information that applies toward specific issues and challenges being discussed at a particular time. It also includes sharing information at appropriate times so that it is useful to current discussions.

Accessibility. In a communication context, accessibility includes conveying information that is useful for the receiver or receivers to thoroughly evaluate the issues and options. When an individual shares important information that they possess, they are making that information accessible to others. An additional aspect of accessibility is sharing information at the appropriate time. If information is shared too late in the communication, teams may already have set preferences and fail to give adequate consideration to the information (Fischer et al., 2011).

Interpretability. Interpretability plays an important role in the quality of the conveyance. Interpretability means that individuals share information that is able to be understood and interpreted by those receiving the information. This includes sharing enough information for receivers to comprehend the meaning of the information and not sharing so much information that receivers are confused or overloaded.

Integrity. The final aspect of conveyance quality is integrity. Integrity is composed of accuracy and completeness. For individuals and teams to achieve high-quality conveyance, the information they share must be accurate and complete. If individuals share inaccurate information, teams will be unable to correctly assess and integrate the correct information. Also, if individuals fail to share complete information, teams will not have all the information they need to correctly assess and discuss the issues and alternatives. High conveyance quality requires accurate and complete information.

Convergence Quality

In this section we discuss and conceptualize convergence quality. In order for teams to achieve high convergence quality, they must effectively discuss and agree upon the interpretation of conveyed information. They also must recognize whether they have agreement or not (Lind & Zmud, 1991). One key of convergence is the level in which individuals understand, express, and resolve their interpretations of the preprocessed information. We conceptualize three aspects of convergence quality that are especially relevant. From the information quality model (Bovee et al., 2003) we draw on accuracy and accessibility; we add the additional aspect of timeliness.

Accuracy. The first aspect of convergence quality is accuracy. In order for individuals to understand and convey their interpretations of the information, they must give and receive accurate information. During convergence, if answers or confirming information are incorrect, it

would be difficult for teams to converge on the meaning of the information. An additional aspect of accuracy is that of the receivers accurately indicating their level of interpretation or understanding. If they do not hold the same interpretations or understandings, they must indicate it.

Accessibility. The second component of convergence quality is accessibility. For teams to achieve a high level of convergence, individuals must be able to access clarifying or supporting information, and individuals must ask questions or have the ability to ask questions if there are misunderstandings. Additionally, if an individual has a question or misunderstanding, they must ask questions or ask for clarifications so others understand their questions and can provide clarification. If individuals on a team have different interpretations of information but they cannot or do not ask or receive clarification, the team cannot converge effectively.

Timeliness. The last aspect of convergence quality is timeliness. Timeliness includes discussing the preprocessed information and interpretations at appropriate times. In other words, individuals must ask questions or provide answers when the teams can still benefit from the information. Similarly, an individual that does not fully understand or comprehend information that has been shared should ask clarification questions at appropriate times when the individual or team can still benefit from the additional clarification. An important consideration in timeliness is the progression of teams' discussions. If teams are already committed or are leaning toward a course of action, it would likely be too late for additional information or clarification to help teams arrive at the proper interpretation or conclusion (Fischer et al., 2011). Therefore, it is necessary for convergence to take place before teams are biased toward a decision or course of action.

Other Factors

In addition to studying conveyance and convergence processes in team communications, we also study other factors that may affect communication performance and decision quality. These factors may include preferences and biases and information processing and evaluation. Prior research has shown that individuals with pre-discussion preferences are resistant to changing those preferences (Greitemeyer & Schulz-Hardt, 2003). Prior research has also found that teams are biased toward information that is common as compared to information that is private (Gigone & Hastie, 1993). In this study, we will look at how these and other related factors may influence communication performance and decision quality.

Teams Analysis Context

We analyzed teams' participation in a communication task that required high levels of information exchange. The task that these teams participated in required teams to use various media or combinations of media to communicate information about applicants to an international program. The task also required teams to reach consensus. The task has an optimal solution, and the decision quality of teams was assessed based on how their solution matched the optimal solution.

Task

The task used in this study is the International Institute task. The International Institute is a fictional international studies program. Several candidates applied to be part of the program, but only one candidate could be selected. The participants act as members of the admissions committee and must read extensive information about and discuss the applicants. Then they choose the best one for admission. The application materials for each applicant include brief background information, three essays written by the applicant, and two letters of

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recommendation written by others. Although all the applicants are designed to be competitive and qualified, the task is designed so that one of the applicants is superior. The choice of the superior candidate was validated through expert opinion and pilot testing.

The participants in the task assumed the role of the admissions committee. Although all members of the committee received some minor amount of common information about all the applicants, each individual on a team received complete application materials for one applicant only. Therefore, teams had to share and discuss the application information of all the applicants in order to recognize the optimal candidate. Only through learning about the other applicants could individuals correctly assess the quality of all the applicants. The individuals were allowed to maintain possession of all application materials and refer back to them as they desired.

The International Institute task is considered a hidden-profile task (Stasser & Titus, 2003). This means that teams have some information that is shared by all members of the teams, but a majority of the information is separated among the members of the team. The shared information alone is not sufficient for correctly solving the task. Only through the individuals adequately conveying their unique information and the teams adequately converging on the information can they correctly identify the solution. Hidden-profile tasks are designed to mimic actual team contexts where individuals possess different knowledge and expertise and must pool their knowledge to make the best decisions (Stasser & Titus, 1985).

Procedure

Individuals were placed on teams with other individuals who signed up for the same time slot. We used various combinations of communication media for this task in order to vary the media. Teams were assigned to use a medium or portfolio of media. The media used in this study

include email, video conferencing, face-to-face meetings, or various combinations of these media.

After teams were formed, they received a brief summary of the task and information about the media they would use. The application portfolios were randomly assigned to individuals on a team. The individuals on a team were separated into different rooms unless they were using face-to-face communication. Individuals were given time to read thoroughly through the task instructions and their application portfolios. After they were comfortable with the information and had no questions, they began discussing the task and application information. All task communication was recorded by video or captured electronically.

Analysis Approach

My analysis involved a case-study approach. This method has been successfully utilized in IS research (e.g., Chua, Wareham, & Robey, 2007; Lee & Xia, 2010; Sherif, Zmud, & Browne, 2006). Based on the transcripts and recordings of teams' interactions, we analyzed the communications of several teams to identify when and how communication performance and decision quality were achieved. Through this approach, we were able to gain a better understanding of why some teams communicate more effectively than other teams and how the media influences communication processes.

Observations and Results

Overview of Findings

When we set out to study the conveyance and convergence quality of teams participating in a hidden profile task, we expected to see clear distinctions and evidence of higher and lower quality conveyance and convergence. We also expected to find great variations in these processes according to the media that teams used for their communications. What we observed,

however, was that most teams conveyed similar information, and the medium did not significantly affect teams' abilities to convey and converge effectively. Consequently, the actual quality of teams' conveyance and convergence did not appear to have a meaningful impact on teams' performance. As a result, we looked for other factors that may have been responsible for the variations in communication performance and decision quality. It was not so much the teams' abilities to share information, it was more the information that they chose to share.

One thing that we observed was that, in general, individuals did an adequate job of conveying information about their applicants. However, even when adequate information was conveyed and converged upon, many teams were unable to detect the superior applicant. After additional study, we observed that perhaps it was individuals' abilities to process the information they possessed and their abilities to understand how it compared with and related to the information possessed by others that had a major influence on communication performance and decision quality. We provide additional insights on this and provide examples later in the paper.

Conveyance and Convergence Quality

Many teams in this study were able to achieve high communication performance and decision quality without having all the aspects of quality conveyance or convergence. However, if the information conveyed was inaccurate, it caused teams to make inferior decisions. For example, an individual on one team incorrectly told his teammates that his applicant had already spent a year living in a foreign country when he actually had not. It was not accurate, and it caused the team to incorrectly attribute greater experience to this applicant and they ended up selecting this applicant.

In other instances, teams were able to communicate effectively without conveying very much information, or they did not communicate effectively even though they had shared a lot of

information. As an example, one individual, in sharing about her applicant, said "her essays were fun to read. She shared experiences that clearly showed that she had the social success factors needed to be successful in the program. She is perfect for this program." Even though this individual did not share a long list of details, her teammates were able to gain a good perspective of the applicant. In another example, each member of the team thoroughly discussed many of the details of each applicant's essays and their recommendations. This team spent a lot of time conveying information, but they were unable to recognize which applicant was superior. There did not appear to be a correlation between amount of information shared and discussed and performance.

Most of the teams shared similar amounts and types of information. And, most of the teams shared information that seemed to be sufficient and high quality, yet they were unable to recognize the superior applicant. They also seemed to converge well on the information that had been shared. Therefore, we believe that other important factors besides conveyance and convergence are responsible for the variance in performance.

Media Impacts

The type of medium used did not appear to affect the quality of conveyance and convergence or the performance as we expected. After observing teams' communications across several types of media, we found that individuals were able to achieve quality conveyance using different types of media. MST argues that a medium low (vs. high) in media synchronicity will better contribute to quality conveyance (Dennis et al., 2008), and there were examples of teams using email and achieving quality conveyance. However, we also saw examples of teams using a medium high in media synchronicity, like video conference or face-to-face, achieving equally high conveyance.

As an illustration, one individual conveyed the following information in an email to his

or her teammates:

> "Alyssa's essay about her background mentions thriving, a theme also present in her first essay. She described a job she had at a restaurant and how there were challenging moments that she overcame, eventually being promoted and given more autonomy by management. She recalls moments with customers that were both pleasant and uncomfortable, and how she worked to improve the experience for each type of customer. This demonstrates fortitude, respect, and optimizing situations. She also recognized how this job improved her communication skills, a vital component in dealing with people from all walks of life and ways of thinking and behaving."

This example effectively conveyed important information about this person's applicant. The

other members of the team were able to understand more about the qualifications of this

applicant.

Similarly, a member of a team using a video conference conveyed the following

information. "She had a personal experience living with an international student. She not only

helped the student survive, she helped her thrive. She worked at a restaurant where she learned to

work with all different types of people."

In this example, the individual successfully conveys important information about his/her

candidate. There were many instances of individuals conveying and converging well or poorly

on all types of media used. At least in the context that we studied, we failed to find effects of the

medium on either communication processes or communication performance.

Information Processing, Evaluation, and Comparison

After failing to see major differences among or effects of conveyance and convergence,

we searched for other factors that influenced performance. In prior research, teams have been

found to develop a preference too early, before they have had a chance to consider enough

relevant information (Greitemeyer & Schulz-Hardt, 2003). We certainly observed evidence of

this in some of the teams. Furthermore, once one individual expressed their preference, the other

members of the team hesitated or failed to share dissenting information or opinions. They also then seemed to only provide confirming information to support the preference (Jonas et al., 2001). However, we also observed that many teams continued to vet applicants and revisit important considerations over and over again. For the majority of the teams, we did not see premature preference as a major issue to their performance.

Another issue that occurred in many teams was the sharing of positive versus negative information. If individuals on a team conveyed negative information about their applicants, the other members of the team seemed to develop a bias toward those applicants, and they were seldom chosen. Therefore, if individuals chose not to share negative information or opinions about particular applicants, the teams often would develop preferences toward those applicants. Those applicants may not have had superior qualifications, but the teams gave them preference because there was no negative information shared about them. Thus we see that teams may place more weight on negative information than they do on positive information, and this seemed to affect the performance of some teams.

Ultimately though, it appeared that the factors that most contributed to quality performance were the way individuals processed, evaluated, and compared information. Many individuals conveyed some important information that they possessed, but they frequently did not convey all of it or the most important pieces of the information. In other words, individuals frequently failed to recognize the important information that they possessed. Many teams that were unsuccessful failed to process their information adequately. As an example, one individual shared the following information about his or her applicant. "I have Kevin Young's portfolio and I would choose him to go to Italy because he is an international business major, he is excited to go and he is very qualified to start off."

Even though this individual had three essays and two recommendations about this applicant, the individual failed to process and share most of the important details about this applicant. Instead, he or she focused on the applicant's international business major instead of the more important details in his portfolio. There were several instances when individuals never shared information that they possessed that were extremely relevant to the team's discussion and decisions. We attribute this to a failure of individuals to adequately process information, and it likely was a major cause of poor performance in teams.

Another factor that was responsible for teams performing poorly was individuals' abilities to adequately evaluate the information that they possessed. Evaluation is when an individual is able to assign a level of value to information or attributes. Teams that successfully evaluated their information were better able to evaluate the important attributes of their applicants. Here is one case of an individual successfully evaluating and conveying the information that he or she possessed.

> "Personally, I think she would be a great fit for the International Institute. She seems to be her best in social settings and around people she doesn't know. She has an impressive resume and had great recommendations from faculty on campus. Going abroad is all about experiencing a new culture and getting out of your comfort zone, and I think that's what Alyssa is all about."

And, in the next case, the individual makes evaluations and provides justification for those evaluations.

> "For independence he has left home for college and as I said before has already studied abroad to France and Belgium. For social success he gave a great example of when he was in high school and was part of a math club and was able to compete regionally and nationally and was able to get to know people from other regions and cultures. This part also worries me a little because I'm afraid he hasn't had too many experiences in non-academic settings. For self-concept he is definitely very intelligent and then radiates in his essays along with his hard work to maintain that 4.0 GPA."

For teams to communicate successfully and make optimal decisions, they must be able to evaluate and assign importance to information that they possess and receive. Moreover, they also

must be able to determine how their information relates to the information possessed by others in their team. The final aspect that we identify is information comparison. We found that the most significant difference between teams that were successful and teams that were not was the ability of the individuals to successfully understand how their information compared to others' information. Oftentimes individuals would make a judgment or a valuation without actually having other information to compare with their own information, and they frequently failed to provide information for their teammates to compare with their information.

As an extreme example, one individual simply shared the following information about his or her candidate: "I have Haley Bryant and I wouldn't pick her." This information was conveyed before any other information was shared by anyone else on the team. It is conceivable that Haley Bryant may have been the best applicant, and the other applicants could have been much worse. However, the individual in this scenario assumed that he or she already knew how his or her applicant compared with the others. This applicant was never given any consideration, and the other members of the team never received information about her to form their own assessments and comparisons.

Even in teams where individuals processed and evaluated information well, if they failed to recognize how it compared with others' information, they were unable to select the best applicant. This is illustrated in one of the cases of communication: One person on a team asked about an applicant's, Samuel's, independence. The person who had Samuel's essays indicated that Samuel had a high level of independence. The same person then asked about another applicant's, Alyssa's, independence. Having heard about Samuel's high level of independence, the person who had Alyssa said that Alyssa did show independence, but she thought that Samuel was probably more independent than Alyssa. In actuality, Alyssa portrays greater independence

than Samuel, but the individuals who possessed the information on these applicants failed to understand how the independence of the applicants compared with each other. In this case, an inferior applicant was selected.

Discussion

The purpose of this study was to better understand factors that contribute to communication and decision quality. We argued that the communication processes of conveyance and convergence would be the key to understanding communication quality, and we expected that the medium would affect conveyance and convergence. We analyzed several cases of teams participating in a communication task which required large amounts of information exchange. We were surprised to find that as long as basic levels of conveyance and convergence were present, conveyance and convergence quality had little to do with performance. We also found that the medium had little effect on conveyance and convergence quality and overall performance.

The factors of communication that did play a role in team performance had more to do with individual processes. From our analysis, we identified three key factors of communication and decision quality in this context. Teams that performed well had individuals that successfully processed their information, successfully evaluated their information, and successfully understood how their information compared to others' information. Without these successful processes, teams were unable to consistently make optimal decisions. Even when large amounts of information were shared and discussed, teams had to adequately evaluate that information to be successful.

It is important for future research to continue to look at issues of communication performance and quality. Further testing is required to confirm the validity of our findings.

Perhaps lab experiments could be conducted to break down and understand these information processes. It would also be interesting to determine which of these processes is most critical or detrimental.

My research also has limitations. We studied teams in a single communication context. It may be that these factors are especially relevant in this context, and they may not be in other contexts. Additionally, these issues may be especially salient in hidden-profile tasks. It may be that in more natural teams settings, other factors play a bigger role.

Even with these limitations, this research still contributes to scientific knowledge and to practice. We contribute to existing research on communication and decision performance by identifying additional factors that affect performance. We also use a qualitative approach to show that conveyance and convergence likely do not sufficiently explain communication performance.

We contribute to practice by showing that there are individual factors that affect team performance. Individuals need to be aware of how they process, evaluate, and compare information that they hold. In many instances, individuals may hold assumptions about others' knowledge and alternatives. It would be beneficial for teams to work to fully understand all relevant information. It would also be beneficial for teams to put in necessary efforts to ensure that teams make correct comparisons of the information held by the individuals. Doing these things will help teams communicate well and make high-quality decisions.

Conclusion

The findings of this study suggest that individuals' abilities to process, evaluate, and compare information are important factors for communication quality and decision quality. Teams that perform these processes well have better communication and make better decisions. Although conveyance and convergence are important aspects of communication, this study did

not find these to be significant factors of performance. Also, this study did not find an effect of the medium on conveyance, convergence, or performance. Teams that adequately understood the information they possessed and how the information fit together performed well using any medium.

References

Bovee, M., Srivastava, R. P., & Mak, B. (2003). A conceptual framework and belief-function approach to assessing overall information quality. *International Journal of Intelligent Systems*, *18*, 51–74. doi:10.1002/int.10074

Carlson, J. R., & Zmud, R. W. (1999). Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions. *Academy of Management Journal*, *42*(2), 153–170. doi:10.2307/257090

Chua, C. E. H., Wareham, J., & Robey, D. (2007). The Role of Online Trading Communities in Managing Internet Auction Fraud. *MIS Quarterly*, *31*(4), 759–781.

Daft, R. L., & Lengel, R. H. (1986). Organizational Information Requirements, Media Richness and Structural Design. *Management Science*, *32*(5), 554–571.

Dennis, A. R. (1996). Information Exchange and Use in Group Decision Making: You Can Lead a Group to Information, but You Can't Make It Think. *MIS Quarterly*, *20*(4), 433–457.

Dennis, A. R., Fuller, R. M., & Valacich, J. S. (2008). Media, Tasks, and Communication Processes: A Theory of Media Synchronicity. *MIS Quarterly*, *32*(3), 575–600.

Dennis, A. R., & Kinney, S. T. (1998). Testing Media Richness Theory in the New Media: The Effects of Cues, Feedback, and Task Equivocality. *Information Systems Research*, *9*(3), 256 –274. doi:10.1287/isre.9.3.256

Fischer, P., Lea, S., Kastenmüller, A., Greitemeyer, T., Fischer, J., & Frey, D. (2011). The process of selective exposure: Why confirmatory information search weakens over time. *Organizational Behavior and Human Decision Processes*, *114*(1), 37–48. doi:10.1016/j.obhdp.2010.09.001

Gigone, D., & Hastie, R. (1993). The Common Knowledge Effect: Information Sharing and Group Judgment. *Journal of Personality and Social Psychology*, *65*(5), 959–974. doi:10.1037/0022-3514.65.5.959

Greitemeyer, T., & Schulz-Hardt, S. (2003). Preference-consistent evaluation of information in the hidden profile paradigm: beyond group-level explanations for the dominance of shared information in group decisions. *Journal of personality and social psychology*, *84*(2), 322–339.

Hollingshead, A. B. (1996). The Rank-Order Effect in Group Decision Making. *Organizational Behavior and Human Decision Processes*, *68*(3), 181–193. doi:06/obhd.1996.0098

Jonas, E., Schulz-Hardt, S., Frey, D., & Thelen, N. (2001). Confirmation bias in sequential information search after preliminary decisions: an expansion of dissonance theoretical research on selective exposure to information. *Journal of personality and social psychology*, *80*(4), 557–571.

Kock, N. (2004). The Psychobiological Model: Towards a New Theory of Computer-Mediated Communication Based on Darwinian Evolution. *Organization Science*, *15*(3), 327 –348. doi:10.1287/orsc.1040.0071

Lee, G., & Xia, W. (2010). Toward Agile: An Integrated Analysis of Quantitative and Qualitative Field Data on Software Development Agility. *MIS Quarterly*, *34*(1), 87–114.

Lind, M. R., & Zmud, R. W. (1991). The Influence of a Convergence in Understanding Between Technology Providers and Users on Information Technology Innovativeness. *Organization Science*, *2*(2), 195–217.

Robert, L. P., Dennis, A. R., & Ahuja, M. K. (2008). Social Capital and Knowledge Integration in Digitally Enabled Teams. *Information Systems Research*, *19*(3), 314–334. doi:10.1287/isre.1080.0177

Schulz-Hardt, S., Frey, D., Lüthgens, C., & Moscovici, S. (2000). Biased information search in group decision making. *Journal of personality and social psychology*, *78*(4), 655–669.

Sherif, K., Zmud, R. W., & Browne, G. J. (2006). Managing Peer-to-Peer Conflicts in Disruptive Information Technology Innovations: The Case of Software Reuse. *MIS Quarterly*, *30*(2), 339–356.

Short, J. A., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. London: John Wiley & Sons.

Simon, A. F. (2006). Computer-mediated communication: Task performance and satisfaction. *Journal of Social Psychology*, *146*(3), 349–379. doi:10.3200/SOCP.146.3.349-379

Stasser, G., & Titus, W. (1985). Pooling of Unshared Information in Group Decision Making: Biased Information Sampling During Discussion. *Journal of Personality and Social Psychology*, *48*(6), 1467–1478. doi:10.1037/0022-3514.48.6.1467

Stasser, G., & Titus, W. (2003). Hidden Profiles: A Brief History. *Psychological Inquiry*, *14*(3/4), 304–313.

Suh, K. S. (1999). Impact of communication medium on task performance and satisfaction: an examination of media-richness theory. *Information & Management*, *35*(5), 295–312. doi:10.1016/S0378-7206(98)00097-4

Research Compliance Protocol Letter

September 25, 2012

MEMORANDUM

TO: Martin Hassell
                           Moez Limayem

FROM: Ro Windwalker
                           IRB Coordinator

RE: New Protocol Approval

IRB Protocol #:   12-09-109

Protocol Title: *Media Synchronicity and Communication Project*

Review Type: ☒ EXEMPT   ☐ EXPEDITED   ☐ FULL IRB

Approved Project Period: Start Date: 09/25/2012 Expiration Date: 09/24/2013

Your protocol has been approved by the IRB. Protocols are approved for a maximum period of one year. If you wish to continue the project past the approved project period (see above), you must submit a request, using the form *Continuing Review for IRB Approved Projects*, prior to the expiration date. This form is available from the IRB Coordinator or on the Research Compliance website (http://vpred.uark.edu/210.php). As a courtesy, you will be sent a reminder two months in advance of that date. However, failure to receive a reminder does not negate your obligation to make the request in sufficient time for review and approval.   Federal regulations prohibit retroactive approval of continuation. Failure to receive approval to continue the project prior to the expiration date will result in Termination of the protocol approval. The IRB Coordinator can give you guidance on submission times.

This protocol has been approved for 600 participants. If you wish to make *any* modifications in the approved protocol, including enrolling more than this number, you must seek approval *prior to* implementing those changes.   All modifications should be requested in writing (email is acceptable) and must provide sufficient detail to assess the impact of the change.

If you have questions or need any assistance from the IRB, please contact me at 210 Administration Building, 5-2208, or irb@uark.edu.

Appendix B

Documentation of Multi-Authored Paper

July 3, 2013

Subject: Multi-Authored Paper

I certify that Martin Hassell is the first author of the multi-authored paper entitled "Effects of Information Processing, Evaluation, and Comparison on Communication Performance and Decision Quality." Martin Hassell completed a large majority of the work on this paper, much more than 51% of the work.

Sincerely,

Moez Limayem
Dissertation Director

Conclusion

With the reliance that organizations place on teamwork and team performance, it is critical for teams to use communication media that help them communicate effectively. Therefore, it is important for researchers to understand how teams evaluate communication needs and choose media for communication tasks. Researchers must also understand how media impact communication and how to help teams achieve high communication performance.

This research is composed of three essays that address these issues. In the first essay, we evaluated the media choices of teams that were presented with a specific communication task. We also evaluated their performance on the task when they used their chosen media. Through the use of a lab experiment, we found that, instead of considering the needs of the communication task, teams chose media that were most convenient, easy to use, and natural. Even though teams had many options and combinations of media available, 100% of the teams that had the choice of media selected the face-to-face medium. We conducted an additional experiment to understand teams' media choices when the face-to-face medium was not available. Corresponding with the first study, teams still chose the medium that was most convenient and easy to use. Every team in this second study (100%) that had the choice of media selected the video conference medium.

The teams in these studies did not choose the theoretically-optimal media, nor did they choose a combination of media, instead opting to use a single medium. These results suggest that teams do not adequately consider the needs of their communication, and teams do not choose media that best meet those needs. Nevertheless, we also found that performance was not adversely affected by the media that the teams chose. As an additional component of this research, we compared the performance of teams using the face-to-face or video conference medium with that of teams that were assigned theoretically-optimal media. We found that there

were no significant differences in performance across media. There were also no major differences in time taken to complete the task or satisfaction with the media or meeting. Although, teams that used the video conference medium took significantly less time to complete the task than teams that used the assigned media. Also, neither the face-to-face teams nor the video conference teams were more satisfied than the assigned media teams.

The findings of Essay 1 create questions as to whether it really matters which media teams choose and use for communication. As a result, in Essay 2, we took a closer look at the impacts media may have on communication performance and decision making. We evaluated and compared the efficacy of three dominant media impact theories, Media Richness Theory, Social Presence Theory, and Media Synchronicity Theory, with the objective to consolidate and refine media theory. We expanded on our earlier lab experiments by including media treatments that were high or low on the aspects identified as important in the three media theories. We found, again, that there were no significant differences in performance based on the media, and we did not find support for any of the media theories. Teams that used an email media condition did take more time to complete the task, and they were less satisfied than the other teams, but their performance was no worse. The results of this study call into question the efficacy of existing media theories and whether media actually do impact performance.

In the third essay, we took a qualitative approach to understanding the variations in communication performance and decision quality. We also sought to identify media impacts through a qualitative lens. In this research, we observed and analyzed teams participating in a communication task. We identified themes and factors that appear to contribute to successful performance, but we did not find that the media significantly affected aspects or processes of communication. Teams that performed well were able to process the information that they

possessed, evaluate the information that they processed, and adequately compare the information across individuals. Teams that had lower decision quality failed to perform these processes well. We did not find evidence that the medium directly affected these processes.

Our objective of this research was to better understand media impacts and team performance. We found that the media may not matter as much as was previously supposed. However, further research is necessary to confirm and validate these results. Either way, this work increases our understanding of media selection and impacts. But, this work also renews the need for additional research and theorizing about the medium. It also creates a call for additional research to better understand some of the individual processes in teams that affect communication performance. Yet, the greatest question posed by this research is does the media matter?