

Effects of knowledge sharing and miscommunication on the effectiveness of workgroup diversity: Does the medium matter?

An empirical study examining how the relationship between diversity and team performance depends on the type of virtual communication channel

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ABSTRACT

Cultural diversity in the workplace is increasing and so is the number of corporate managers interested in learning how to capitalize on the benefits of diverse workgroups. Literature on the effectiveness of workgroup diversity show that scientists have widely explored this field by now. However, findings regarding the effects workgroup diversity has on task performance have been so far inconsistent. This study seeks to find some clarity in this. Given the pervasiveness of virtual media channel use in the workplace nowadays, the model of this study aims to examine the moderating effects of media channel through the mediating effects of knowledge sharing and miscommunication. Consequently, the research question of this study is: What is the influence of media channel on the relationship between workgroup diversity and task performance. The way this study planned to approach this research question was via an experimental study which involved a between-group experimental design. Task performance was measured objectively by requesting the subjects to participate in a decision-making group exercise. Thereafter, knowledge sharing and miscommunication were measured subjectively through a survey. Finally, group diversity was measured based on the group composition of nationalities in the group. Participants were tested in three different conditions, namely, video- audio-, and text-based channel setting. At the end, a mediation and moderation analysis was executed via a multi-regression analysis. Study results showed that, media channel was not a relevant factor to explain the inconsistent findings in the literature. The last chapter provides a discusses about why this might be the case and includes future research recommendations. Last but not least, despite the model not being significant, the study findings managed to challenge widely shared misconceptions regarding the capabilities of text- and audio-based channels to facilitate task performance in diverse workgroups. Corporate managers are encouraged to consider alternating the channels to enhance task performance.

KEYWORDS: *Intercultural communication, Workgroup diversity, Media channel, Knowledge sharing, Miscommunication*

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1. Introduction

Multicultural workgroups have been increasingly pervasive in not only the work environment of big multinationals but also organizational life in general (Baranek & Martz, 2005; Horwitz, Bravington, & Silvis, 2006; Van Knippenberg, De Dreu, & Homan, 2004). Based on the increase of global markets and the technological advancements it can be argued that the demographic of organizational groups has become and will continue to be more and more diverse (Van Knippenberg et al., 2004). In line with this, corporate managers are also becoming more and more interested in reaping the benefits believed to be found in diverse groups for better organizational outcomes (Van Knippenberg et al., 2004). Nonetheless, the potential value to be acquired from diverse workgroups do not seem to always be guaranteed. In reality, the cross-cultural differences inherent in such diverse communication environments make it so that issues related to communication problems and ineffectiveness would often emerge and impede the attainment of the benefits promised (Gibson, Huang, Kirkman, & Shapiro, 2014). Additionally, given the growing global market and technological advancements, this issue has become a pressing matter to society and thereby scientists as well (Gilson, Maynard, Jones Young, Vartiainen, & Hakonen, 2015).

Many efforts examining how to bridge the gap between reaping the benefits of diverse workgroups and eliminating communication ineffectiveness, have aimed at understanding and detecting which determinant factors make the difference in the effects workgroup diversity has on group performance, i.e., enhancing the positive effects and minimizing the negative. (Van Knippenberg et al., 2004). However, sometimes both the negative and positive effects can interact and thus lead to inconsistent results. This makes the phenomenon of effectiveness of workgroup diversity a complex and interesting one to look at. To name a few, the social categorization perspective and the information/decision-making perspective are two of the most recurrent perspectives studied in the field (Williams & O'Reilly, 1998). Additionally, scholars have also given considerable attention to the communication process in diverse groups by focusing on its effects on group performance. This was often done specifically from the perspective of interpersonal relationship development or task information exchange (Kanawattanachai & Yoo, 2008; Woolley, 2009; Hofhuis, Van der Rijt, & Vlug, 2016). Moreover, the nature of the task performance was also another angle from which this topic has been studied. Several scholars argue that the nature of the task could explain the effect of workgroup diversity on group performance (Nakui, Paulus, & Van der Zee, 2011; Leung, Maddux, Galinsky, & Chiu, 2008). As a result, the effects of group diversity on group performance were tested with various different types of tasks, such as those based on problem-solving, creativity, or decision-making. Despite the large amount of studies devoted to the negative effects of workgroup diversity and others supporting the notion that the positive effects

outweigh the negative ones, literature in the field of effectiveness of workgroup diversity remains inconsistent. Some study findings stand by the idea that in spite of the difficulties that often arise from cross-cultural differences there are still valuable benefits to be obtained from diverse workgroups as compared to homogenous groups (Van Knippenberg et al., 2004; Homan, Van Knippenberg, Van Kleef, & De Dreu, 2007; Mannix & Neale, 2005). This has been much supported by studies that looked into the benefits that conflict and dissent within a diverse workgroup has on group performance.

Needless to say, this topic has been widely studied from many different angles. There are clearly negative and positive effects found regarding the relationship between diverse workgroups and group performance, however, what is still unclear is the *when* and *how* of the inconsistent research results found in this field of study. An interesting path to explore in this field would be to examine how these patterns develop in virtual communication interactions, and whether the channel used makes the difference. This has not been looked at yet and might give new insights that can clarify some of the contradictions in earlier literature. In fact, exploring the effects of virtual channels on the effectiveness of diverse workgroups is now more relevant than ever. Due to the current Covid-19 situation, the use of virtual media channels has exponentially increased recently. It is being heavily used not only for working practices, but also for teaching in schools and universities. Still, regardless of the Covid-19 situation, its wide popularity is by no means something new. Due to the increasing technological advancements and growing global markets, the use of virtual workgroups in organizations has naturally went up in popularity as well (Gilson et al., 2015). Studies that have focused on information technologies (IT), independent of workgroup diversity, have proven that the use of technological media channels have in fact different effects on the communication quality of a workgroup. The study outcomes involve both positive and negative effects. Namely, on the one hand, IT was proven to decrease social loafing (Bryant, Albring, & Murthy, 2009) and reduce status differences between team members (Anderson, McEwan, Bal, & Carletta, 2007). But on the other hand, it was also proven to cause greater misunderstandings and lags in information exchange (Andres, 2012).

In brief, considering the impact of IT media channels on the effectiveness of diverse workgroups and the effects of other determinant factors suggested in the field of study, triggers the curiosity to see whether media channel could potentially be proven to cause a moderating effect on the relationship between workgroup diversity and task performance in virtual teams. This in turn, could potentially lead to insights that can explain the inconsistent results reported in this field of study. More importantly, since this angle has not been studied yet from an experimental perspective, this study aimed to contribute to the literature of effectiveness of workgroup diversity by filling in this gap. Accordingly, this led to the following formulation of the research question for this study:

What is the influence of media channel on the relationship between workgroup diversity and

task-performance.

To investigate this particular angle, this study was based on a quasi-experimental research design. To be more specific, this study examined the impact of media channel on the relationship between workgroup diversity and group performance, by looking closely at the mediating variables of knowledge sharing and miscommunication. In addition, the experimental design consisted of a factor involving three conditions of virtual communication settings. That is, videocall, audio-based, and text-based. At the end, the study findings revealed that the type of media channel is not a significant component to explain the inconsistent research results found in this field of study. Objective measurements of task performance in the experiment showed no significant difference between the three conditions. Insights on why this is the case are provided in this study. As for the social relevance, the result of this study can help break down some popular misconceptions corporate managers might have, leading them to disregard the capabilities of certain virtual channels to achieve optimal task performance. Ultimately, the recommendation provided in this study can encourage business managers to reconsider their workgroup communication strategies for better results. Finally, advice for further research in the field is provided.

2. Theoretical Framework

To answer the research question, this chapter will provide an overview of the theoretical approaches and contributions done already in the field by other scholars. This will help to obtain a clearer idea of what the phenomenon being studied is. This overview contains the conceptualizations of the main concepts of cultural diversity, task performance, and media channels. Aside from this, the conceptualizations of the sub-concepts of knowledge sharing and miscommunication will also be included. Each of these will be followed by the formulation of a few predictive relationships based on theoretical contributions of previous research done in the field. This theoretical overview consists of three sections. First, it will talk about the relationship between work group diversity and task performance. Secondly, a literature discussion will be provided about the mediating effects of knowledge sharing and of miscommunication respectively. As third and last, this section will end with a discussion about the influence of media channels on the relationship between work group diversity and the two mediating variables mentioned above separately.

2.1. Diversity in workgroups and task performance

The concept of cultural diversity can be defined in various ways, and the choices that a researcher make have an impact on their findings. For this reason, conceptualizing diversity carefully is important. Following the definition of Shachaf (2008), in this study workgroup diversity is particularly referred to as the heterogeneity among a group based on their national cultures. That is, the culture of the country they feel the most identified with as being their home country. Cultural diversity is usually viewed as a spectrum, where teams can range from being homogeneous to heterogeneous, or somewhere in between. As previously mentioned, in this study, culture diversity is based on the cultural background or nationality of the team members. While this can be measured in a subjective way by asking the team members for their opinion on how diverse they perceive the group to be, it can also be measured objectively by measuring the number of nationalities in the team, and dividing this by the total number of team members. In this study, cultural diversity is measured according to the second method.

With regards to task performance, in this study task performance is defined as the extent that the aggregated contribution of a group is deemed optimal or poor based on the judgement of a set list of criteria (Hackman, 1990). Additionally, since it has been argued that the quality of task performance of a group is subject to different factors depending on what the nature of the task is (Nakui et al., 2011; Leung, Maddux, Galinsky, & Chiu, 2008), specifying this is therefore important. Thereby, following McGrath's (1984) typology, this study will utilize a task involving decision-making.

For decades scholars have given the relationship between workgroup diversity and task performance significant attention. Study results in the field show that this relationship can be both positive and negative. Scientists point out various processes that are responsible for the positive and negative effects. Two of the most recurrent ones are categorization and elaboration of task-relevant information (Van Knippenberg et al., 2004). Given their prevalence in the field of study, it is important that these two processes are first discussed in greater detail to thereby provide a base for the following sections. According to Van Knippenberg et al. (2004), categorization processes in the context of diverse workgroups refer to the tendency group members have to group up with similar others in the group, which consequently leads to the formation of in- and out-groups within a team, such as minorities. With regards to the elaboration of task-relevant information processes, this refers to the tendency group members have to engage in thorough processing of task-relevant information, as a way to reconcile conflicting viewpoints in a diverse workgroup. These processes entail sharing different viewpoints and knowledge with other members, internally processing this information, subsequently engaging in group discussions, and finally discuss the integration of the implications (Van Knippenberg et al., 2004).

Multiple factors have been looked at to examine how exactly these two processes perform from different angles within diverse groups. The perspective of task- and relationship conflict is a good example to show how these two processes can interact and have both simultaneously positive and negative effects on task performance (Guenter et al., 2016). When task conflict brings challenges in a team through tension and confrontations it can also facilitate the exchange of ideas and ultimately task performance (Jehn & Mannix, 2001). Task conflict then has a positive effect on task performance. Relationship conflict is when there is a personal issue between team members, i.e., unrelated to the task (Simons & Peterson, 2000). Relationship conflict, contrary to task conflict, has a negative effect on task performance because this type of conflict takes the groups' focus away from the task and bringing dysfunctional tension into the group. Given that this makes it detrimental to the task performance, imply that relationship conflict has a negative effect on task performance.

Following the previous two causal effects, it is arguably possible then to still not gain the benefits of workgroup diversity despite having both positive and negative effects on task performance. That said, if task conflict linked to knowledge sharing (Jehn & Mannix, 2001) and relationship conflict is related to interpersonal factors (Gamero, Gonzalez-Roma, & Peiro, 2008), it can be argued then that, to minimize the negative effects and enhance the positive effects, it would be worth looking into ways of how knowledge sharing and miscommunication mediates the relationship between workgroup diversity and task performance. Examining closely the conditions in which knowledge sharing is mostly enhanced and the conditions in which miscommunication is the most triggered, might in turn give insight and help explain the contradicting findings in the field.

For this reason, this study adopted both a positive and negative relationship to examine. The positive relationship will look at the proposed mediating effect of knowledge sharing. While the negative relationship will look at the proposed mediating effect of miscommunication. At the end, the focus will be shifted to media channels to see whether using one particular media channel over another could in this way dictate the strength of each of the two relationships proposed.

2.2. The positive relationship between workgroup diversity and task performance

2.2.1. Workgroup diversity and knowledge sharing

As was mentioned previously, diversity has been found to have positive effects on task performance. One of the main reasons for this is an increase in knowledge sharing. Knowledge sharing in this study is defined as the act of give and take, among individuals, when it comes to valuable information such as task-related information, know-how, and feedback (Cummings, 2004). Many scholars have looked into the relationship between workgroup diversity and knowledge sharing (Presbitero & Attar, 2018; Van den Hoof & De Leeuw van Weenen, 2004).

Drawing from some studies, it appears that workgroup diversity has a positive relationship with knowledge sharing (Daily & Steiner, 1998; Daily, Whatley, Ash, & Steiner, 1996). This is said to be explained by the fact that a highly diverse group tends to foster more creativity than a non-diverse group. This is owing to the fact that, there are dissimilar mental models resulting from cultural programming as mentioned earlier (Hofstede, 1991). As a consequence, and following the reasoning of Shachaf (2008), this stimulates the generation of better and/or a wider selection of alternative ideas and perspectives.

More on factors that support the positive effects of workgroup diversity on knowledge sharing, Van Knippenberg and Schippers (2007) point out that, the type of diverse groups that tend to achieve the positive effects of diversity are those which usually have a favorable believe and attitude towards diversity. Achieving the positive effects are thus often the result of the member's drive to reap the benefits inherent in diverse workgroups. In many cases these groups are also more competent in accomplishing this (Chen & Eastman, 1997; Ely & Thomas, 2001; Van Knippenberg & Haslam, 2003). As a result, it can then be argued that, such groups are also perhaps more experienced and thus more likely to be openminded and capable of detecting and processing potential value in each other's differing ideas, which in turn enhances knowledge sharing.

Just slightly different than the previous point, Hofhuis, Van de Rijt and Vlug (2016) suggest that workgroup diversity is likely to have a positive effect on knowledge sharing in so far as there is a positive diversity climate. In a study of Hofhuis, Van de Rijt and Vlug (2016) it has been proven that a group in which there is a positive diversity climate, has a greater chance of benefiting from

information sharing and idea generation. This is so given that, when there is a positive diversity climate there is likely a good level of trust which in turn stimulates a feeling of openness to communicate with ease about different viewpoints without the feeling of being judged in return. This ultimately leads to more knowledge sharing.

In addition to diversity climate, it can be argued that group cohesion within a diverse workgroup also has a positive effect on knowledge sharing. Luca and Baxter (2012) underline the positive effects of team commitment and motivation in diverse workgroups on knowledge sharing (Bui et al., 2016). In support of this, Mannix & Neale (2005) recommend based on their study findings that to increase group cohesion within a diverse workgroup, efforts need to be put in connecting the group members through bridges that focus on highlighting things they have in common, such as, norms, values, or overarching goals, which then can help establish a feeling of unity that is relevant to the specific team. Gaining a feeling of unity among the group members will lead to more group cohesion, which in turn will more likely result in fostering a feeling of openness which promotes knowledge sharing.

Having said this, Nemeth, Mosier and Chiles (1992) argue that, the opposite of group cohesion, i.e., conflict, is also considered a factor that can enhance knowledge sharing. Studies show that conflict is by no means rare in diverse workgroups. Conflict, as long as it is constructive, is considered to be a factor that provokes discussion and thus deeper exploration of diverse ideas from different angles (Nemeth, Mosier, & Chiles, 1992). As a result, the degree of knowledge sharing will increase. Van Knippenberg et al. (2004) also supports this and highlights that it is particularly the differences in mental models within a diverse workgroup that can turn conflict into more knowledge sharing. They assert that, facing conflicting viewpoints within a diverse workgroup requires more thorough elaboration than not, hence, this prevents the group from prematurely adopting the idea that has the most consensus. This can especially be the case when facing nonroutine problems (Van Knippenberg & Schippers, 2007). As a result, actively engaging in discussions to further elaborate on ideas and the communication process instead, will likely improve the quality of the ideas, hence also knowledge sharing (Paulus & Brown, 2007; Van Knippenberg & Schippers, 2007). To add more to this, study findings of Sinaceur, Thomas-Hunt, O'Neill, and Neale (2004) revealed that, constructive conflict leading to more knowledge sharing in a diverse workgroup is likely to take place in the case that a minority member with perceived expertise or ascribed status is present in the group. Larson, Sargis, and Bauman (2004) advice the benefit of having group leaders supporting the input of minorities in order to form a coalition. This is deemed to be a good thing since a coalition fosters group discussion, which again leads to more knowledge sharing.

Closely related to the benefit of coalitions on knowledge sharing, Dahlin, Weingart, and Hinds (2005) and Dinsbach, Feij and De Vries (2007) claim that, in comparison to a homogenous group, a group that is moderately consisting of minority members is likely to lead to more knowledge

sharing due to the fact that minority members have a tendency to spend less time on discussing personal matters and more on task-related issues. Some scholars however argue against this view by stating that, especially a moderately diverse group tend to be the most vulnerable to the negative effects of in-group bias (Dahlin et al., 2005). This, they claim is because moderately diverse workgroups are much more prone to being blocked by the development of the effects of in-group bias supporting mostly only the ideas of the members in the majority. A field study conducted by Gibson and Vermeulen (2003) challenges this notion as it revealed that, a diverse workgroup will be more effective if they consist of a moderate number of weak subgroups. Weak subgroups or equally weak subgroups is key here, otherwise the negative influence of in-group bias is likely to consume a great deal of the group's time and effort as they focus on sorting out the subgroups memberships before actually getting to work. Thus, should this not be the necessary, they could instead be spending the time and effort on exploring different perspectives and reaching a consensus consisting of depth of information which positively affects knowledge sharing. In view of this, this is expected to also apply to completely heterogenous groups given that, fully diverse workgroups would work even better than moderately diverse groups due to the effects of in-group bias being thus in such case lower, which in turn prevents the loss of range of new ideas, hence knowledge sharing.

Finally, related to the actual content of ideas being shared within diverse workgroups, Dahlin et al. (2005) underlines that to ensure a positive effect of workgroup diversity on knowledge sharing, two things need to be checked. One, attention should be put on checking whether cultural diversity is relevant for the task at hand. If this is not the case the effect will not be positive. Two, the kind of knowledge that is required for the task, i.e., depth of information or range of information needs to be taken into consideration as well. Based upon the study findings of Dahlin et al. (2005), if the task requires depth of information, then moderately diverse groups in comparison to high diverse workgroups are the most appropriate for a higher degree of knowledge sharing. The reason behind this is because, in a moderately diverse workgroup there is still some diversity in worldview perspectives (Alderfer & Smith, 1982; Cox, 1993) and cognitive orientations (Choi, Nisbett, & Norenzayan, 1999), yet the amount of differing ideas or likely still not excessive. This way, processing and exploring the ideas shared in-depth remains more feasible, hence promoting knowledge sharing. If range of information is required, then more can be gained from a highly heterogenous workgroup. This was confirmed by the study findings of Dahlin et al. (2005). At the end, it can be thus argued that, to consider the nature of the task requirement, is vital for there to be a positive effect of diversity on knowledge sharing.

Following these lines of reasoning, the following hypotheses are formulated:

H1: There is a positive relationship between diverse workgroups and knowledge sharing.

2.2.2. Knowledge sharing and task performance

This section represents the second part of the literature discussion regarding the mediating effect of knowledge sharing on the positive relationship between workgroup diversity and task performance. Therefore, the focus here will be on the positive effects of knowledge sharing on task performance.

Whether knowledge sharing is a common practice within a group or not is critical to the outcome quality of the task performed by a group. The more knowledge is shared among individuals the greater the likelihood is for the group to maximize their results (Du Plessis & Hoole, 2006; Wang, 2001). Following this logic, it can be argued that the more information is gathered, the more material there is to work with, discuss about, and or further give shape to, which then increases the chances of maximizing the quality of task performance.

Dahlin et al. (2005) point out that, attention should be laid however on maintaining the quantity of the variety of ideas shared at a reasonable amount. The more reasonable the amount of ideas, the more feasible it will be for the group to actually process the ideas in depth and effectively make use of them to enhance task performance. A reasonable amount here, can arguably be based on the available time range and group size.

Luca and Baxter (2012) on the other hand, provide a standpoint showing a negative relationship between knowledge sharing and task performance. They posit that, if during the process of knowledge sharing there is a presence of power contest between minority and majority members within a group resulting in resentment, this can lead to a lower outcome quality of the groups' task performance. From this it can be argued that, regardless of the amount of ideas generated through the process of knowledge sharing, if there are negative feelings attached to some of the ideas, these would be less likely to be eventually considered and implemented in the task, thus lowering the chances of maximizing the quality of task performance. That said, still in most cases a positive effect holds.

Conflict within a group, as long as it fosters constructive discussions, is considered to be a good factor that can explain why knowledge sharing is deemed to have a positive effect on a groups' task performance (Nemeth, Mosier, & Chiles, 1992; Van Knippenberg et al., 2004) . Having constructive discussions during the process of knowledge sharing can be seen as increasing the chance that the group will engage in more critical thinking and thorough elaboration which then can lead to more variety and nuanced or well-thought out ideas, which ultimately can maximize the final quality of the groups' task performance. Larson, Sargis and Bauman (2004) add to this by highlighting the power of having a good leader within the team to guide the group through constructive discussions which can then help reap the maximum benefits that can result from this, to finally enhance the groups' quality of task performance.

Adding to the benefits of having a good leader, it can be argued that when there is a limited time available to complete the task, the help of a skillful leader is highly needed to guide the group swiftly through any potential issues that may arise. Under which condition, knowledge sharing will have a positive effect on task performance. Dahlin et al. (2005) warns that if there are negative effects of in-group bias, this can cost the group valuable time to settle the issues that arise. This in turn can lead to limiting the group from spending time processing the ideas generated which means that less useful knowledge inputs end up being used that can enhance task performance at the end. For this exact reason, a skillful leader can still turn this negative effect into a positive one and thus ultimately enhance task performance.

Lastly, another factor that is said to explain the positive relationship between knowledge sharing and task performance, is the extent that the knowledge or ideas gathered match or are relevant to the requirements of the task (Dahlin et al., 2005). This counts for both the fit regarding the content of the ideas as well as whether the results gathered from knowledge sharing were mainly breadth or depth. Thus, the stronger the match between the sum of knowledge gathered and the task requirements, the higher the quality of the task performance will be. This and all the other point mentioned above have led to the following hypothesis:

H2: There is a positive relationship between knowledge sharing and task performance.

2.3. The negative relationship between workgroup diversity and task performance

2.3.1. Workgroup diversity and miscommunication

Apart from the positive effects, through knowledge sharing, diversity can also have negative effects, because of the fact that it makes it more difficult to communicate. More often than not interactions in culturally diverse environments are said to be likely prone to face communication problems due to cross-cultural differences. Miscommunication in multicultural environments has been examined by scholars from many different perspectives (Garand, 2009; Fox, 1997; Chick, 1989). Drawing from the definition provided by Olsina (2002), in this study miscommunication is defined as failure to reach a mutual understanding in an interaction due to manifest or latent factors that cause communication difficulties. That is, factors that are unmistakably identifiable or those that go by undetected until later.

Workgroup diversity is said to have a positive effect on miscommunication. Garand (2009) explains that miscommunication in a multicultural environment is often caused by the following factors. Namely, culturally bonded preconceptions people have of their communication partner(s), acoustic problems more related to linguistics, and discursive misunderstandings and cognitive

breaks. Adding support to the first point regarding preconceptions, Van Knippenberg et al. (2004) claim that diverse workgroups are prone to miscommunication because of the instinctive development of intergroup biases caused by social categorization. As for the list of barriers related to linguistics, Novinger (2001) claims that aspects of non-verbal communication are also factors prone to cause miscommunication in a diverse workgroup. Not knowing exactly how to interpret nuance intonations, hand gestures, face expressions, or volume for instance, can quickly lead to miscommunication. This thus indicates that due to social categorization and linguistics, workgroup diversity is considered to have a positive effect on miscommunication.

In further support of this positive effect, Hinds and Weisband (2003) claim that shared understanding is often fostered by the presence of shared experiences, similar backgrounds and norms, as well as group tenure. That being said, in the case that a diverse workgroup is significantly geographically dispersed from each other and thus have to deal with difference in time-zones, or significant differences in environmental circumstances such as commuting, or lifestyle routines, families and such, it can be argued that such groups then have less time available to spend on non-task related matters. Relationship development and gaining implicit knowledge about members' way of being are deemed essential to eliminate false assumptions that provoke miscommunication. Therefore, lacking the opportunity to achieve this in a diverse workgroup will lead to a positive effect on miscommunication.

Last but not least, adding to the influences of linguistic issues and despite the many claims that diversity in workgroups are more likely to face miscommunications, Kaur (2011) opposes Garand's (2009) viewpoint. He asserts that, especially in workgroups where no one is native in the language being spoken, miscommunications are shown to be not as frequently encountered as one might think. This is so, because, people are inclined to jointly adjust their tolerance to potential clashes originating from cultural differences and differing communication styles to intentionally work around the drawbacks that often come with working in a language that is non-native to everyone. This being said, efforts put in tolerance adjustments are still not enough to guarantee a good communication quality that is free from misunderstandings and miscommunications. Aspects more directly linked to linguistics also often play a role in these types of situations. However, Kaur (2011) contents from his research results that miscommunications and misunderstandings in such particular setting is not directly influenced by the differences among the member's personal background culture per se, but that it is more related to the in-group and out-group situation often formed within workgroups. In-group and out-group in this case is dependent on the degree that each member have affiliations or similarities with the language being spoken and its culture. Consequently, similar to how the in-group bias effect was explained earlier, the members of the out-group that do not manage to adjust to the norms of both culture and linguistics of the majority group are prone to cause communication problems that lead to a great deal of miscommunications and

misunderstandings. Hinds, Neeley and Cramton (2014) also managed to confirm this dynamic in their field study. Hence, in a fully diverse workgroup it is not the cultural differences per se that cause miscommunications and misunderstandings, but instead it is the lack of similar affiliations of members that are considered minorities in the group that does. Taking all of these point into account, led to the formulation of the following hypothesis.

H3: There is a positive relationship between workgroup diversity and miscommunication.

2.3.2. *Miscommunication and task performance*

Succeeding the previous section, this section will cover the second part of the literature discussion regarding the mediating effect of miscommunication on the relationship between workgroup diversity and task performance. Scientists claim that miscommunication has a negative effect on task performance. Following the reasoning of Van Knippenberg et al. (2004), miscommunication in diverse workgroups tend to often be caused by erroneous held assumptions originating from stereotyping other members based on their ethnic origin. This often results in giving them discriminative treatment. Miscommunication for this reason can be seen as having a negative effect on task performance. This is arguably so because, treating a person differently, be it with good or bad intentions, could lead to unknowingly limiting the participation of a valuable member that could have potentially enhanced the task performance at the end significantly.

Apart from this, having false assumptions about the conduct of other members due to lack of knowledge of for instance their different lifestyles, time zones, commuting situation or other environmental circumstances, can lead to creating unnecessary problems that can subsequently result in miscommunications (Winds and Weisband, 2003). This can arguably slow down the execution process of the task and thus, limit the effectiveness of it in case there is a limited time attached for the task to be completed. This in turn will have a negative effect on the quality of the groups' task performance.

Adding to this, based on a study results of Hinds, Neeley, and Crampton (2014) they assert that, miscommunication that is caused by power contests within a workgroup can lead to out-group members feeling unappreciated or unwanted. This in turn can lead to limiting participation and the potential use of valuable input. Miscommunication then for this reason is deemed as having a negative effect of task performance.

As final point, Novinger (2001) contents that lacking the ability to correctly interpret non-verbal communication of group members can lead to an increase in miscommunication. Generally speaking, it can be argued that, a high propensity to face miscommunication within a group can cause frustrations, incorrect assumptions, and non-understandings which can both slow down the

process and negatively affect the quality of the task performance. These theoretical contributions altogether lead to the formulation of the following hypothesis:

H4: There is a negative relationship between miscommunication and task performance.

2.4. Media channel as explanatory factor

Taking into account the list of positive and negative arguments presented above, it is unclear whether diverse workgroup has a positive or negative relationship on task performance. Considering the special features to be provided by computer-mediated communication channels that are not present in a face to face setting, drives the curiosity to question whether using different types of media channel can help pinpoint at least when, or the condition in which the relationship between workgroup diversity and task performance will be more likely positive or negative.

As was mentioned in the introduction, there are not enough of experimental studies done on the influence media channel has on the performance of diverse workgroups. Nonetheless, there are some relevant support to be found (Calhoun, Teng, & Cheon, 2002; Lowry, Zhang, Zhou, & Fu, 2010; Shachaf, 2008; Yoo & Alavi, 2001). In this study, media channel refers to the different means by which people can communicate and interact with each other through computer-mediated channels. Particularly, in the scope of this study this involves the channels of video-based, audio-based, and text-based communication software.

2.4.1. Media channels and knowledge sharing

Based on the conceptual model of this study, media channel is said to have a moderation effect on the relationship between workgroup diversity and knowledge sharing. Drawing from the social presence theory, Short, Williams and Christie (1976) claim that the more a media channel allows for the transmission of communication cues the higher the communication quality will be. The reason for this is said to be because the more communication cues are provided, the more warm, personal, sensitive, and sociable the interaction is perceived. Linking this to knowledge sharing it can be argued that, the type of media channel used can negatively influence the promoting of knowledge sharing in the case of an incongruency related to a culture's communication preference. Given this, there appears to be a positive effect between the degree of social presence of a media channel and knowledge sharing. Additionally, and closely related to the elaboration theory mentioned earlier (Van Knippenberg et al., 2004), the media richness theory further supports this reasoning (Daft & Lengel, 1986). The media richness theory claims that, the more able a media channel is to allow for quick feedback to fine-tune understanding, the better and smoother the communication outcome will

be. Arguably then, higher flexibility leads to a stronger positive effect on knowledge sharing. Additionally, besides being able to quickly refine mutual understanding, this flexibility also helps fostering creative momentum, ergo a greater amount of alternative ideas, thus knowledge sharing.

More associated with creative momentum and knowledge sharing, Klitmøller and Lauring (2013) present a viewpoint involving a dilemma related to how different media choices and differences in communication styles and information preferences can have an impact on the level of knowledge sharing. They use a dichotomous classification of types of media channel that is based on the degree of communication cues, i.e., verbal and non-verbal, provided by media channels. Rich media channels are considered to be those that provide a high degree of verbal and non-verbal cues, while lean media channels not so much. They state that on the one hand, for instance, lean media channels can help with eliminating the restrictions caused by language barriers, which can arguably be distracting and thus hindering the attainment of a smooth communication flow that supports knowledge sharing. Despite these benefits that support communication quality, lean communication channels can be very time consuming due to its lack of instant feedback, which in turn can have a negative effect on knowledge sharing. This can be for three reasons, first, it can break the flow of creativity as there is no room for getting immediate feedback, back and forth, which can eventually support knowledge sharing.

Besides being bad for the flow of creativity, the lack of instant feedback can also seclude group members from participating in the process of knowledge sharing. Adding the weaknesses of lean channels, Cramton (2001) has identified five types of problems. Among them, the one that is related to degree of knowledge sharing is that computer-mediated communication channels can sometimes make it so that there are variations in the speed with which members receive access to information. To be more exact, due to internet connection, other technical problems, or unequal treatment within the group linked to social categorization, some members might get feedback on a more constant and immediate rate compared to others which will have to wait longer or be ignored completely. This in turn, is a reason why a lean channel can be deemed as limiting knowledge sharing within a diverse workgroup.

More regarding the weaknesses of lean communication channels, Klitmøller and Lauring (2013) argue that it can be that for reasons of cultural differences related to communication styles and information preferences, a lean channel can be inefficient with time since a sender may have an incorrect idea regarding what type of information the receiver actually needs. This can result in having an information overload while still having multiple information gaps included that require additional back and forth communication. This can with time develop frustrations in other group members and thus restrict the willingness or ease to share knowledge within the group.

Following the previous point however, Schaubroeck and Yu (2017) suggests the opposite in

the event that the group task at hand involves controversial topics. They claim that when the task has a risk of triggering controversial discussions it is best to use a leaner communication channel rather than a richer one. The reason for this is because lean communication channels can hide certain non-verbal cues (e.g. defensive posture and tones of voice) which can aggravate potential heated discussions and thus limit the degree of knowledge sharing. Put differently, in regards to tasks including potentially controversial topics, a lean communication channel has a more positive effect on knowledge sharing than a rich communication channel within a diverse workgroup. On top of that, a strong and formal team leader is deemed critically necessary in such a diverse workgroup, to help navigate and solve potential miscommunication as soon as they arise which otherwise can hurt the team performance. The group's perception regarding the reputation of the team leader is important as this can cause the quality of the results of knowledge sharing to suffer (Schaubroeck, Carmeli, Bhatia, & Paz, 2016).

Adding to the previous point regarding lowering the risk of unwanted confrontations by using a lean channel, Mannix and Naele (2005) claim that media channel can also influence knowledge sharing by giving minority more confidence and support in voicing their deviant opinion within a group. In this case, the leaner the type of media is, the more courageous a minority member will be to share his or her opinion and thereby enhancing knowledge sharing.

Another contribution coming from Klitmøller and Luring (2013) related to non-verbal cues and choice of channel is the following. They assert that culture and language differences have an influence to determine which media channel is the most suitable to use. They make a distinction between cases which involve the sharing of equivocal or more abstract knowledge and cases with more canonical or simple knowledge sharing. They argue that, for equivocal knowledge sharing, the degree of knowledge sharing gets severely affected if lean media channels are used. This is so because arguably, to convey and grasp ambiguous ideas any help from non-verbal communications could make the difference.

Given the inherent characteristic of computer-mediated communication channels that allows group members to not have to be physically gathered, is considered to promote knowledge sharing in a diverse workgroup. This is due to the fact that more people with great ideas can participate in the group while otherwise being unable to meet in person and thus participate (Kirkman & Mathieu, 2005). Next to that, in the case that there are a lot more people participating in a group, they could opt for an asynchronous and lean type of media channel which can allow more people to attend and which also means more input and diverse ideas to be generated, hence increasing knowledge sharing. Logistical problems and high commuting costs are being spared which can lower down the level of absenteeism often reported in large sized groups (Markham, Dansereau, & Alutto, 1982).

Aside from this, Krumm, Terwiel and Hertel (2013) concluded that, another advantage

diverse virtual teams have on diverse traditional teams is that they have to make explicit task-related rules. Due to the absence of communication cues available to help interpret feelings, emotions and thus reactions of group members, virtual workgroups benefit from the need to make explicit task-related rules emphasizing more conscientious working behavior to compensate for this deficiency. Having to collectively conform to explicit rules regarding cooperation and self-discipline behaviors enhances the chances of preventing distrust, thus fostering an environment that welcomes and encourages collaboration within the group. Working in an environment that contains the needed requirements for smooth collaboration ultimately can lead to facilitating knowledge sharing within a diverse virtual workgroup. It can be thus argued that, the less non-verbal communication cues media channel provides, the more attention will have to be given to making more explicit task-related rules, thus higher the chances of enhancing knowledge sharing.

Now, adding to the way how the use of more rich media channel can enhance knowledge sharing in diverse workgroups, Dennis, Fuller and Valacich (2008) reveal from their study that, depending on the type of communication process (i.e., conveyance or convergence) required for the execution of the task, a synchronous or an asynchronous communication channel will be more suitable. A synchronous communication channel is basically a rich media channel since it allows for live and immediate feedback. Whereas, an asynchronous communication channel is the exact opposite and so is more on the side of a lean channel. This can be considered highly relevant for the relationship between diverse workgroup and degree of knowledge sharing. If variety of ideas is the goal of the task, it can be argued that a lot of deliberation is needed to thoroughly convey an idea that might be quite unfamiliar to other group members. This is especially the case in a diverse workgroup where there are likely different mental models present in the group. In line with this, Dennis et al. (2008) claim that, when the task involves a high level of conveyance of ideas that might be complex to other group members, an asynchronous channel would do best. That is, a leaner (text-based) communication channel. Members have more time to process the information they receive as well as carefully develop the structure of the idea they want to convey (Robert & Dennis, 2005). Additionally, having more time to conceive the idea also allows the sender to take into account contextual information that might be helpful for the other group members to understand the message better, and thus support the process of knowledge sharing. Arguably for the opposite case, a richer channel suits better since as was already mentioned before, the live and immediate feedback will support the creative flow thus, knowledge sharing.

Touching upon another topic related to ingroup bias and discriminative treatment, Shachaf (2008) argues that the anonymity feature embedded in certain media channels can also have a positive effect on knowledge sharing. It is expected to reduce stereotypes and preconceptions that could impede knowledge sharing in a diverse group. At the end, this is expected to benefit knowledge sharing. Vignovic and Thompson (2010) gives a counterargument and claim that, many

studies support the standpoint that lower salience of cues can lead to discriminatory treatments in a diverse workgroup that does not have a positive attitude towards diversity (e.g., Homan, Van Knippenberg, Van Kleef, & De Dreu, 2007), which in turn can restrict knowledge sharing. The study of Vignovic and Thompson (2010) looked closely at the perceptions formed regarding the degree of intelligence and conscientiousness of fellow group members within a diverse workgroup, particularly when grammatical mistakes are spotted while using a text-based communication channel. As pointed out by Cramton (2001), spotting of grammatical mistakes in conversations can negatively impact the impression people have of each other, which consequently can negatively affect their willingness to collaborate, as well as the way in which they will further interact and collaborate. In the end, this can lead to decreasing the degree of knowledge sharing to be obtained in a diverse workgroup. Vignovic and Thompson (2010) therefore recommend that when working in a diverse workgroup it is of great importance to make sure that the cultural background of all members are salient to avoid misattributions influenced by grammatical errors spotted in text-based communication channels.

To sum up all the arguments provided in this section, the type of media channel is said to have a mediating effect on the strength of the relationship between workgroup diversity and knowledge sharing. This moderating effect is based on a few key features. That is, a channels ability to reap the benefits of the speed of feedback for a better communication flow, facilitate controversial discussions, support confidence of minority members, and support collaboration where there is risk of social categorization. Taking all these points into consideration, the following two hypotheses were formulated:

H5a: The relationship between workgroup diversity and knowledge sharing will be stronger in a text-only condition than in a video condition

H5b: The relationship between workgroup diversity and knowledge sharing will be stronger in an audio-only condition than in a video condition

2.4.2. Media channels and miscommunication

As for the final part of the chapter of the theoretical framework, this section deals with the literature discussion regarding the moderating effect of media channel on the strength of the relationship between workgroup diversity and miscommunication.

The media richness theory developed by Daft and Lengel (1986) claims that the more flexible a media channel is in facilitating quick clarifications to improve understanding, the better the communication quality outcome, thus the lower the chances of facing miscommunication will be in diverse workgroups. On the basis of this it can then be argued that, a leaner media channel has a positive effect on miscommunication within a diverse workgroup.

More on the aspect of flexibility certain media channels provide in terms of speed of giving feedback, Cramton (2001) states that, in a diverse group, when using a lean media channel that provides low speed when giving feedback, the likelihood of there being more miscommunications is higher. He states that, this is especially so considering the problem related to out-group members getting unequal treatment and thus being more likely ignored when they pose questions in the group for instance. Other majority group members may be more likely to receive attention and feedback first, thus leaving minority members more likely with misinformation which leads to miscommunication. Kirkman and Mathieu (2005) argues the same for in the case of large-sized diverse groups.

Lack of flexibility in feedback, however, does not always have to lead to miscommunication. Robert and Dennis (2005) argue that, with text-based channels people have more time space to thoroughly structure their thoughts, and to polish the spelling and grammar. On top of that, lean media channels can also spare group members the frustrations and discomfort that can come from having a thick accent that is hard to understand. More so, besides thick accents, foreign intonations and gestures of body movements can also enhance miscommunication. Take for instance the head movement Indians make to communicate a yes. In most western cultures this means the opposite. Shachaf (2008) also supports this claim in her study and argue that, the self-scribing feature of lean media channels is beneficial because it can cancel out misunderstandings that often originate from communicating in a language that is not native to all group members within a diverse workgroup. Therefore, under these conditions it can be argued that rich media channels have a positive effect on miscommunication within diverse workgroups.

Although eliminating non-verbal cues with lean channels in some cases can lead to less miscommunication, in other cases it has the exact opposite effect. According to Klitmøller and Lauring (2013), underline the case in which complex or abstract knowledge is being shared. Lean communication channels in such a situation is said to trigger miscommunication because they lack the ability for group members to pick up non-verbal cues that help with preventing or deal with miscommunications. In a rich communication channel, a group members with language difficulty can use their hands and face expressions to help bring the message across. Non-verbal cues can also help other group members to know when something is unclear or needs further clarifications. Not only that, but the sender of a message can also in this way detect whether there is a disagreement left unspoken about. If this is the case, the chance is right there to immediately deal with it. This consequently implies that, lean media channels have a positive effect on miscommunication in diverse workgroups.

Finally, to wrap up this section, the moderating effect that types of media channel have on the strength of the relationship between workgroup diversity and miscommunication is attributed to the following features. Its ability to fine-tune understanding, regulate the effects of in-group bias and

finally, regulate the pros and cons of non-verbal communication cues in diverse workgroups. Having said this, the following two hypotheses are suggested:

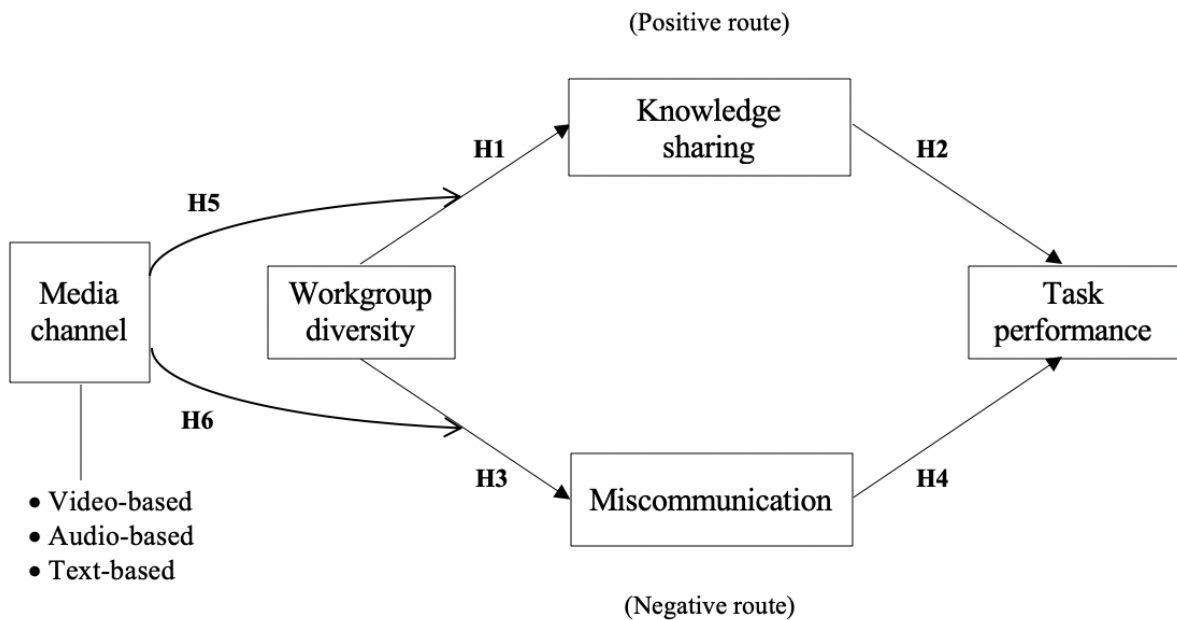
H6a: The relationship between workgroup diversity and miscommunication will be stronger in an text-only condition than in a video condition.

H6b: The relationship between workgroup diversity and miscommunication will be stronger in an audio-only condition than in a video condition.

2.5. The conceptual model

The conceptual model below summarizes the moderating effect of media channel on the relationship between workgroup diversity and task performance, mediated by knowledge sharing and miscommunication.

Figure 1. Conceptual model.



3. Method

3.1. Choice of method

To best study the cause and effect relationship of the research question formulated above, the most suitable type of research design to opt for is a quasi-experimental research design (Babbie, 2014). Particularly, a between-subjects design. In line with Neuman (2013), this design is the most adequate to properly answer the research question since it offers the strongest tests for cause and effect relationships. To be more precise, an experimental research design allows the researcher to draw generalizable assumptions about a causal relationship by putting a selected group of subjects in an unusual controlled environment to observe and test them on a set of predicted observable effects on their behavior. For this, the predicted effects are first formulated into a set of hypotheses which in turn will be tested in the experiment on their validity. This is necessary because to arrive at a generalizable research finding involving a causal relationship, it is critical for the study to follow a systematic set of rigorous procedures that allow for the following list of criteria to be met. An objective observation of the phenomena in question needs to be ensured, the inclusion of a large sample size, and the collection of numerical data that validates the reality measured (Slevitch, 2011). The following paragraphs will justify how the research design of this study managed to guarantee these required set of criteria.

3.2. The decision-making exercise

As part of the research design, to objectively observe the phenomenon of effectiveness of workgroup diversity, participants had to be put in a situation, acting as a stimulus, in which they would be challenged enough to get them to activate their cognition and engage in group discussions, which involved them sharing different viewpoints with each other. More importantly, participants had to be put in a situation which allowed them to have a common goal to work towards and which would include a standardized evaluation system. These were the few criteria necessary to ultimately measure the group's performance in an objective manner. The chosen exercise to use in the experiment was the desert survival test developed by Johnson and Johnson (1982). This test was a decision-making group exercise and satisfied all the criteria. The main purpose of this exercise was to have the participants share their different viewpoints, regarding a specific subject matter, with the final aim being to work towards a group consensus together. In a nutshell, the participants were first mentally situated in a plane when suddenly this crashed and left them stranded in the middle of a desert. The task for them was to rank a set of 15 random items found on the plane based on the most useful for their survival to the one most useless. A systematic score sheet was provided on which they had to fill in their answers. The participants had to do this exercise first individually and afterwards as a group. During the group part, participants were asked to share their individual answers and engage in a group discussion in which they would ideally use reasoning to reach a group consensus, i.e., a single final group ranking. Lastly, the score sheet was developed in such a way that

all individual and group rankings were assessed in a standardized manner based on how close they were to a pre-established correct ranking provided by the developer of the test (Johnson & Johnson, 1982). To be specific, the task performance was calculated by the sum difference between each item in the group ranking and the correct ranking respectively. A higher final group score meant a lower task performance and vice versa.

3.3. Research design

The particular design of the experiment developed for this study was a between-subject design (Neuman, 2013). The design involved a factor consisting of three levels, or also referred to as conditions. These three conditions represented three types of media communication channels: video-, audio-, and text-based channel. Each one was expected to have a different effect on the dependent variable, i.e. task performance. The experiment therefore involved observing the behavior and experience of a set of groups of participants as they all got exposed to one single treatment (Charness, Gneezy, & Kuhn, 2012). That is, be assigned to participate in one of the three different conditions involving one of the channels mentioned above. This experiment design allowed for the measuring of the effects of each channel condition individually, which were afterwards quantitatively compared against each other. Aside from the factor variable of media channel, there was also a main independent variable and two mediating variables within the conceptual model. The main independent variable was workgroup diversity, while the two mediating variables were knowledge sharing, and miscommunication. All in all, these four independent variables were said to have a particular effect on the dependent variable, also known as outcome variable, of task performance. More specifically, the two mediating variables mentioned above were said to help explain the relationship between workgroup diversity and task performance. While, the factor variable representing the three channels served as the moderating variable supposed to be having a potential effect on the strength of the relationship between workgroup diversity and each of the mediating variables separately.

3.4. Experiment procedure

First of all, since the aim of this study is to look at how media channels influence the way people perform in a diverse workgroup, the plan was to simulate the conditions of the different media channels to ensure an objective observation of the phenomena in question. This study looked exclusively at three different channel conditions, namely: video-based, audio-based, and text-based. Each condition consisted of a group of three to five participants, but ideally four. Given that all the conditions involved a virtual setting, they all took place online via the conference software called Zoom. Considering the features of each of the three conditions, the text groups were limited to only using the chat box while the audio groups were limited to using only voice. Finally, the video groups were allowed to use video and voice but not the chat box.

To objectively observe the phenomena in these three conditions, a stimulus was needed. As was already described in a previous section, the stimulus used in this study was the decision-making group exercise called “the desert survival test”. This task was developed by Johnson and Johnson (1982) and used specifically to test group performance. In order to avoid potential biases, close attention was put on guaranteeing equal treatment as much as possible among the conditions. This was done by making sure that all sessions received the introduction and instructions through a video conference setting where everyone was also able to see each other. The only difference between the sessions involved the moment where the conditions were put in place during the group discussion phase. Other than that, the procedure remained consistent for every single experiment session, thus group.

Once the condition was engaged, the participants were instructed to carry out the group exercise. During this phase they were given a limited period of 20 minutes to complete it. Once completed, they were asked to fill in the online survey for which they received seven minutes to do so. This was followed by a discussion of the correct answers and the filling in of the rest of the score sheet, i.e. the final scores. Lastly, the session was closed off by a short briefing regarding the relevance of the study outcome, as well as an offer to share the final outcome report, and a final thank you note.

3.5. Sample

3.5.1. Target population

The only two requirements set for participating in this study was age, participants had to be between the ages 20 to 30, and they also had to be able to speak English. People in this age group are deemed suitable for the scope of this study given that this age group is known to be tech savvy as consequence of being exposed to interacting via technology already from an early age. An overall minimum standard of tech savviness was thus present in the sample population. Moreover, people in this age group are expected to have at least a minimum amount of experience working with a group on a task via computer-mediated communication channels. This is taken by the fact that between the ages 20 to 30, people are mostly either studying or working on building up their career. Both of these life stages are likely to involve having to work and communicate sometimes via different virtual media channels. Additionally, considering the widespread of international environments as a result of globalization and the advancement of communication technologies, people in this age range are suitable because they are expected to be familiar with being and/or communicating in international environments. All these points make this age group a coherent group to base the sample on for this study. Finally, regarding the second requirement, being able to speak English is a relevant criterium, because the focus of this study was not on the lack of being able to speak a common language.

3.5.2. *Sampling design*

Following the rules related to quantitative studies and generalizations, the minimum acceptable sample size was of 90 participants. That is, at least 30 participants per condition. The type of sampling method implemented was a non-probability sampling involving mainly convenience sampling with a bit of quota sampling (Babbie, 2014). The traits driving the quota sampling was nationality. This was related to the goal of controlling for an equal distribution of level of diversity in the groups.

The way the eventual sample was established was by recruiting for voluntary participants via direct as well as indirect networks circling around the researcher. These networks were quite spread around, meaning many of the participants lived in different cities or countries, formed part of different social networks detached from each other and thus were unacquainted. At the end of the sessions, participants were also asked to ask someone they know to participate in a later session.

A uniform invitation was used to brief prospective participants about the experiment session during the recruitment phase. Hence, all participants were informed beforehand about the approximate duration of the session, i.e. approximately an hour. Additionally, a planning software was used to arrange the time slots of the experiment session. The software used was called Datumprikker. Via a link of the Datumprikker, participants were asked to personally select feasible time slots without knowing who else have also already chosen the same one. As was mentioned before, a group was only complete once it had at least three participants confirmed in one time slot. The maximum size was a group of five people. While recruiting, all participants were immediately asked for their email address. This was needed to send them the needed materials necessary for the experiment session. All sessions were confirmed at least 24 hours prior to the starting time. A reminder was given to all participants at least four hours before the session started. The ideal group size aimed for was of four people, however, it happened a few times that one person had to cancel last minute and thus making it a group of only three people. Considering the chances of people cancelling last minute there were even some groups consisting of five people to avoid not having enough participants to run the session at the end. After completion of the data collection, there were five groups consisting of three people, 17 groups of four people, and two groups of five people. Regarding the time when the sessions took place, participants were offered a wide range of time slots to choose from, nonetheless most of them happened in the afternoon and night hours.

The groups were distributed among the different three conditions by following a simple chronological order: video, audio, text, video, etc. This order was only disrupted when a participant had for instance a slow internet connection which would harm the quality of the communication, and thus the session in general. In such case, the group was then changed to the condition of text-based channel. Following this chronological order made it so that the researcher would have as few interferences as possible in the distribution among the conditions.

In terms of the distribution of the group's level of diversity, the procedure was somewhat trickier than the distribution for the three conditions. In the beginning, the researcher had quite minimum influence over the composition of the groups. It was only once approximately three quarters of the sessions were executed that the researcher started to interfere in the group composition a little bit to somewhat balance out the distribution of levels of group diversity. This was the part involving quota sampling.

3.5.3. *Sample response*

The total amount of participants that took part in this research study exceeded the minimum sample size required ($N = 92$). From this total ($N = 92$), males made up for 52.2 percent of the sample population size, which was more than females counting for 47.8 percent ($M = 1.48$, $SD = .50$). The age range was between 20 and 30 years old ($M = 25.33$, $SD = 2.24$). The largest top four age groups in chronological order were 25-year-olds (19.6%), 26-year-olds (18.5%), 27-year-olds (17.4%), and finally 23-year-olds (14.1%). With respect to the distribution of national cultures, the most frequent one was Aruban (28.3%). The following top three groups consisted of Dutch (19.6%), Chinese (6.5%) and Germans (5.4%). There were in total 28 different national cultures administered in this study.

In terms of occupation, the majority, comprising of 37.0 percent of the participants were students, 30.4 percent were students with a job on the side, and 20.7 percent were people working under the supervision of at least one employer. Only 6.5 percent were self-employed, and 5.4 percent were unemployed. The distribution regarding the level of education among the sample population consisted for the most part of bachelor graduates (48.9 %). This was followed by master graduates (26.1 %) being the second largest group. The remaining fraction of the participants was formed by 15 percent of people whom did at least a part of college but that has not yet or obtained a degree, and 8 percent of high school graduates.

Finally, in relation to the matter of language, there were in total 20 different native languages administered in this study. From this list, the most popular one was Papiamentu (30.4 %), which was followed by Dutch (19.6%), English (9.8 %), and Spanish (6.5 %). This goes to show that 90.2 percent of the sample population does not have English as their mother tongue. In addition to this, the questionnaire also measured their perceived level of English fluency ($M = 4.05$, $SD = .56$). From this, a large majority perceived themselves as being fluent when speaking English (75.0 %). Moreover, 16.3 percent regard themselves as being native speakers, 6.5 percent said they were proficient, and finally 2.2 percent ranked their fluency level as conversational. Finally, perceived comfort when speaking in English was also measure ($M = 6.20$, $SD = 1.54$). More than half of the sample population reported to be extremely comfortable speaking in English (59.8%), while only a small fraction claimed they feel extremely uncomfortable (4.3%).

3.6. Measures

The following section provides a detailed description of the measurement tools used for each variable involved in this study.

3.6.1. Workgroup diversity

The variable of diversity level was measured by calculating the amount of different nationalities in a group divided by its group size. The more diverse a group was, the higher and closer the value of diversity level was to the value of “1”. In the end, the sample population was more diverse than not ($M = .70$, $SD = .29$). Achieving an equal distribution of the diversity level within the groups was not fully attained, but at least an arguably decent attempt was achieved.

3.6.2. Task performance

The outcome variable of task performance was measure directly by the group score resulting from the score sheet of the desert survival test itself. The score sheet together with the test itself were developed by Johnson and Johnson (1982). A high final group score implied that the ranking that the group established together was far from being similar to the correct ranking pre-determined by the test, meaning that the group performance was poor. Therefore, the lower the group score, the better the group performance is. Technically, the group score is the sum result of the absolute differences between each individual item ranking established by the group and the individual item ranking pre-determined by the test. All in all, on average the participants scored decently ($M = 67.63$, $SD = 9.56$). The scores ranged between 46 and 82.

3.6.3. Media channel

The variable of media channels in this study were measured by giving each participant an individual code to identify the condition they took part in later in the analysis phase. This coding served two purposes. First, it served to measure the average score of each channel condition separately, i.e., video ($M = 66.38$, $SD = 9.69$), audio ($M = 67.23$, $SD = 9.71$), and text ($M = 69.45$, $SD = 9.32$). Descriptive statistic results showed that, the difference between the average scores per condition was quite slim. Second, it served to administrate the amount of people that participated in each condition, and to develop dummy variables from it to use in the hypothesis testing. The overall distribution of the participants among the condition was quite balanced ($M = 2.03$, $SD = .82$). To be specific, 34.8 percent of participants took part in the video condition, 33.7 percent were in the audio condition, and lastly, 31.5 percent of the participants were in the text condition.

3.6.4. *Knowledge sharing*

The degree of knowledge sharing was measured by a scale developed by Tang and Naumann (2016). Originally, this scale was created to measure creativity in diverse groups, which arguably was deemed to be comparable to the variable of knowledge sharing in the scope of this research study. The scale consists of six items and has a 7-point Likert scale design. The specific items included were: 'I felt that the group members actively brainstormed about new ideas', 'I felt that the group members had new and innovative ideas', 'I felt that the group members came up with creative solutions to the problems', 'I felt that the group members suggested new ways of performing the task', 'I felt that the group members were good at finding new problem solving methods', and finally, 'I felt that the group members were good at creativity'. Participants were asked to express their level of agreement or disagreement, with regards to the above-mentioned statement items, based on a scale of 1 to 7, where 1 referred to entirely disagree and 7 referred to entirely agree. Lastly, results of a reliability test showed that this scale used to measure knowledge sharing appeared to be reliable (Cronbach's $\alpha = .93$) and was also deemed optimal in the sense that it would not be improved by eliminating one item. All in all, the participants reported to have experienced a somewhat positive level of knowledge sharing within the group ($M = 5.47, SD = 1.13$).

3.6.5. *Miscommunication*

The mediating variable of miscommunication was measure by means of two scales which were eventually combined into forming one scale measuring miscommunication. The first one was developed by Ulrey and Amason (2001) and was particularly aimed at measuring intercultural communication effectiveness. Minor contextual adjustments were made to the items to make them fit as much as possible to the particular scope of this study. The scale comprised of six items in total and was also presented in a 7-point Likert scale design format. Similar to knowledge sharing, this scale measured particularly the level of agreement or disagreement of the participants. The items were formulated in the following manner: 'I understood the feelings of the other members', 'I communicated well with the other members', 'I was able to easily resolve misunderstandings with the other members', 'I understood the point of view of the other members', 'I was able to empathize well with the other members', and lastly, 'I was able to interpret the nonverbals of the other members'. This scale was combined with the following scale and were tested by means of a factor analysis for their validity. Details regarding this is provided in the following paragraphs.

The second scale used to measure miscommunication was designed by Gonzalés-Romá and Hernández (2014) and was meant to measure communication quality within a group. This scale was suitable considering that poor communication quality will inarguably lead to miscommunication. It included five items and also followed the design format of a 7-point Likert scale. The individual items were phrased in the following manner: 'To what extent was the communication among the

group members clear/ effective/ complete/ fluent/ and on time?'. Through this scale participants were able to assess the communication quality experienced in the group exercise on a scale of 1 to 7. The rating points ranged from 'Not at all' (1) to 'To the greatest extent' (2).

At the end, the two scales were combined together to form one scale variable measuring miscommunication ($M = 2.76$, $SD = 1.08$). However, prior to this a correlations test was executed to see whether these two scales had a significant and logical correlation. Based on the statistical outcome, the two scales appeared to have a significant correlation, $r = .73$, $p < .001$. Once that was confirmed the two scales were entered into a factor analysis. Principal Components extraction with Varimax rotation was used based on Eigenvalues (> 1.00), $KMO = .91$, $\chi^2(N = 92, 55) = 683.10$, $p < .001$. The resultant model explained 68.5% of the variance in the level of perceived miscommunication. Factor loadings of individual items onto the two factors found are presented in a table in the appendix (see Appendix A). Afterwards, a reliability test was conducted on the final scale which satisfied the criteria for reliable scales (Cronbach's $\alpha = .92$). This test also proved that this scale is in its most optimum state, that is, deleting one item would not improve the scale's level of reliability.

3.6.6. Control variables

As part of demographic items included in the questionnaire, there were altogether seven items. These items covered the administration of the population's age, gender, education, occupation, experienced comfort when speaking English, level of English fluency, nationality, and native language. Aside from demographic items, the questionnaire also included an item covering participant's level of experience with virtual workgroups. The purpose of these items were to help proof whether there is in fact a real relationship between the concepts involved in the scope of this research study, or if they are instead influenced by the items just mentioned. From a bivariate Pearson's R correlations test it appeared that four control variables appeared to have a significant correlation with one of the main variables contained in the hypotheses testing analyses. Occupation appeared to have a significant weak and positive correlation with miscommunication, $r = .24$, $p = .024$. Experienced comfort when speaking English showed to have a significant moderate and positive correlation with group diversity level, $r = .36$, $p = .001$. Additionally, education was found to have a significant weak and positive correlation with group diversity level, $r = .22$, $p = .036$. Finally, gender appeared to have a significant weak and negative correlation with DummyA, the dummy variable representing the sessions held in the audio condition, $r = -.28$, $p = .006$.

3.7. Dataset preparation

The procedure utilized to prepare the dataset for analysis started with transferring the raw data registered through Qualtrics into SPSS. Since Qualtrics was the software used to conduct the questionnaire, some unnecessary columns that came as default with the software were removed.

Subsequently, an inspection round was done to confirm that all participants conform to the age range set as sample prerequisite for this study. Given that the variable of age was initially a string variable this was recoded into a numerical variable. In addition, all nationalities were tweaked to make sure they are all written in a uniform way, i.e. first letter caps, same spelling, etc. This was followed by the recoding of variables that had to be flipped to fit the conceptual model. Afterwards, all items were checked for normality – each one of them resulted positive. Next, a reliability test was executed for each individual scale. Since all scales came out positive, there was no need to delete any item nor run a factor analysis. Moreover, since some key variables were not registered through Qualtrics, new columns had to be created for these missing variables. These missing variables were task performance and diversity level. More details was provided in the previous section of measurements. For task performance the final group scores per team, resulting from the score sheet, were added into a column. As for group diversity level, the amount of nationalities found in a group was divided by the group size. Once that was finished, the last three things to do as part of the data preparation procedure was, to group together corresponding survey items to compute new mean variables out of them, compute the dummy variables needed to properly code the three conditions of media channels, and compute the necessary interaction variables needed for the hypotheses testing. After this, the dataset was considered clean and ready for the execution of the analyses.

As an important final note to mind in the following chapter, to correctly interpret inferences involving task performance, all relationships related to this variable needs to be flipped. As mentioned in the section of measures, given that the task performance is measured by the final group score obtained in each group, according to the scoring system a higher group score means a poor task performance and a lower group score refers to a great task performance.

4. Results

Based upon the conceptual model, to provide a decent structure in presenting the analyses, the set of hypotheses have been divided into two sections. Given the nature of the variables involved and the hypotheses, the first section will present hypotheses 1 to 4 by means of a mediation analysis, whereas, the second section will present hypotheses 5 and 6 with the help of a moderation analysis (Privitera, 2015). Prior to running these analyses however, a bivariate Pearson's r correlation analysis was executed to assess the strength and direction of all the bivariate relationships possible among the variables involved in the conceptual model of this study (see Table 1). This helped prove whether the direction of effects proposed in the hypotheses were statistically acceptable, but also whether there are any interesting observations regarding new relationships to be considered in future research.

Table 1

Correlation Matrix (N = 92)

Variables	Descriptives		r				
	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Diversity level	.70	.29					
2. Knowledge sharing	5.47	1.13	-.15				
3. Miscommunication	2.76	1.08	-.02	-.66**			
4. Task performance ^a	67.63	9.56	-.03	.17	-.01		
5. DummyA ^b	.29	.46	-.07	-.14	.09	.09	
6. DummyT ^c	.32	.47	-.01	-.22*	.38**	.13	-.44**

Note: $N = 92$; * $p < .05$; ** $p < .01$; *** $p < .001$ (2-tailed).

^a Given that the task performance is measured by the final group score obtained in each group, according to the scoring system, a higher group score means a poor task performance and a lower group score refers to a great task performance.

^b DummyA is a dummy variable representing the sessions held in the Audio-only condition;

^c DummyT is a dummy variable representing the sessions held in the Text-only condition.

4.1. Test of hypotheses

Taking into account that hypotheses 1 to 4 form part of a mediation analysis examining the mediating effects of the concepts of knowledge sharing and miscommunication separately, a multi-regression analysis assessing the relationship between workgroup diversity and task performance was needed before proceeding with the results of each hypothesis. Results point out that, the model was not significant, $F(3, 88) = .83$, $p = .483$, $R^2 = .03$. Workgroup diversity appeared to have no direct effect on task performance, $b = 1.20$, $t = .32$, $p = .754$, 95% $CI [-6.36 - 8.76]$. Similarly, neither did the control variables included (see Table 2). This goes to show that, based on the study results, there

is no significant predictive effects attributed to workgroup diversity on task performance.

Table 2

Linear regression model predicting the task performance outcome ^a (N = 92).

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI</i> (lower)	<i>CI</i> (upper)
Constant	75.19	9.56	13.08	.001***	63.77	86.62
Workgroup diversity	1.20	.29	.32	.754	-6.36	8.76
<i>Control variables</i>						
Education level	-.56	.88	-.47	.637	-2.89	1.78
Comfort speaking English	-1.00	1.54	-1.43	.156	-2.39	.39

Note: N = 92; * $p < .05$; ** $p < .01$; *** $p < .001$

^a Given that the task performance is measured by the final group score obtained in each group, according to the scoring system, a higher group score means a poor task performance and a lower group score refers to a great task performance.

4.1.1. Knowledge sharing

Hypothesis 1 suggests that, there is a positive relationship between workgroup diversity and knowledge sharing. Based on the statistical outcome of a multi-regression analysis, *H1* cannot be accepted because the model did not turn out to be significant, $F(3, 88) = 1.69$, $p = .175$, $R^2 = .05$. Level of workgroup diversity appeared to have no direct effect on knowledge sharing, $b = .82$, $t = 1.85$, $p = .068$, 95% *CI* [-.06, 1.71]. In addition, the same counts for the control variables considered in the model, none were found to be significant (see Table 3). Based on this, hypothesis 1 had to be rejected.

Table 3

Linear regression model predicting the degree of knowledge sharing (N = 92)

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI</i> (lower)	<i>CI</i> (upper)
Constant	5.58	1.13	8.31	.001***	4.25	6.92
Workgroup diversity	.82	.29	1.85	.068	-.06	1.71
<i>Control variables</i>						
Education level	.05	.88	.36	.721	-.22	.32
Comfort speaking English	-.14	1.54	-1.72	.088	-.30	.02

Note: N = 92, * $p < .05$, ** $p < .01$, *** $p < .001$

The second hypothesis related to knowledge sharing was *H2*. Hypothesis 2 proposed that,

there is a positive relationship between knowledge sharing and task performance. The statistical outcome derived from this hypothesis indicated that H2 can also not be accepted. The model representing hypothesis 2 was found to be not significant, $F(3, 88) = 1.61, p = .193, R^2 = .05$. Furthermore, knowledge sharing had no significant direct effect on task performance, $b = 1.36, t = 1.54, p = .126, 95\% CI [-.39, 3.12]$. Besides that, none of the control variables inserted in the model appeared to have a significant direct effect on task performance either (see Table 4). As a result of this, hypothesis 2 had to be rejected.

Table 4

Linear regression model predicting the task performance outcome ^a ($N = 92$)

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	67.59	9.56	8.95	.001***	52.57	82.60
Knowledge sharing	1.36	1.13	1.54	.126	-.39	3.12
<i>Control variables</i>						
Education level	-.62	.88	-.54	.589	-2.89	1.65
Comfort speaking English	-.81	1.54	-1.23	.222	-2.11	.50

Note: $N = 92, * p < .05, ** p < .01, *** p < .001$

^a Given that the task performance is measured by the final group score obtained in each group, according to the scoring system, a higher group score means a poor task performance and a lower group score refers to a great task performance.

All in all, from a mediation analysis concerning knowledge sharing the results point out that there is no significant mediating effect attributed to knowledge sharing on the relationship between workgroup diversity level and task performance.

4.1.2. Miscommunication

Hypothesis 3 was related to the concept of miscommunication and claimed that, there is a positive relationship between workgroup diversity and miscommunication. Findings of a multi-regression analysis pointed out that H2 cannot be accepted. The model turned out to be not significant $F(4, 87) = 1.75, p = .147, R^2 = .07$. Nonetheless, the control variable of occupation showed to have a significant and positive direct effect on miscommunication, $b = .18, t = 2.24, p = .028, 95\% CI [.02, .34]$. As for the variable of workgroup diversity and the rest of the control variables included in this model, none appeared to have a significant direct effect on miscommunication (see Table 5). Based on this, hypothesis 3 had to also be rejected.

Table 5**Linear regression model predicting the degree of miscommunication (N = 92)**

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	2.73	1.08	4.23	.001***	1.45	4.01
Workgroup diversity	-.02	.29	-.05	.961	-.86	.82
<i>Control variables</i>						
Education level	-.16	.88	-1.23	.221	-.42	.10
Comfort speaking English	.04	1.54	.57	.574	-.11	.20
Occupation	.18	1.41	2.24	.028*	.02	.34

Note: N = 92; * $p < .05$; ** $p < .01$; *** $p < .001$

With regards to hypothesis 4, it was suggested that, there is a negative relationship between miscommunication and task performance. Similar to the previous hypotheses, based on the analysis outcome, it appeared that the model was not significant $F(2, 89) = .50, p = .607, R^2 = .01$. With regards to the direct effects of each individual variable included in the model, none turned out to be significant (see Table 6). This led to the conclusion that, hypothesis 4 had to be rejected.

Table 6**Linear regression model predicting the task performance outcome (N = 92)**

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	66.86	9.56	22.62	.001***	60.99	72.74
Miscommunication	-.32	1.08	-.33	.741	-2.23	1.60
<i>Control variables</i>						
Occupation	.73	1.41	1.00	.321	-.73	2.19

Note: N = 92; * $p < .05$; ** $p < .01$; *** $p < .001$

Overall, considering all the above-mentioned results, the variable of miscommunication appeared to have also no mediating effect on the relationship between workgroup diversity and task performance. Put differently, the relationship between workgroup diversity and task performance cannot be explained by the concept of miscommunication.

4.1.3. Media channels

Hypothesis 5a suggested that, the relationship between workgroup diversity and knowledge sharing will be stronger in a text-only condition than in a video condition. Statistical results of a moderation analysis revealed that, the model was found to be significant, $F(8,83) = 2.39, p = .023, R^2$

= .19. It appears that the model is able to explain 19% of the variances in knowledge sharing. Nevertheless, as can be seen in Table 7, none of the variables involved in the model showed to have a direct effect on knowledge sharing. This includes also the considered control variables. Consequently, hypothesis 5a had to be rejected.

Table 7

Direct effect of workgroup diversity and knowledge sharing and the moderation effect of Text-only condition (N = 92)

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	2.05	1.08	2.79	.007**	.59	3.52
Workgroup diversity	.25	.29	.32	.753	-1.32	1.82
DummyT ^a	-.82	.47	-1.06	.294	-3.42	.11
Workgroup diversity x DummyT ^b	-.03	.36	-.03	.980	-2.36	.72
<i>Control variables</i>						
Gender (1=male; 2=female)	.23	.50	.91	.367	-.27	.72
Education level	-.12	.88	-.84	.405	-.39	.16
Comfort speaking English	-.04	1.54	-.45	.654	-.23	.14

Note: N = 92; * $p < .05$; ** $p < .01$; *** $p < .001$

^a DummyT is a dummy variable representing the sessions held in the Text-only condition;

^b Workgroup diversity x DummyT is code for the interaction effect between workgroup diversity and the text-only condition.

As for hypothesis 5b, the proposition was that, the relationship between workgroup diversity and knowledge sharing will be stronger in an audio-only condition than in a video condition. Concluding from the results of a moderation analysis it appeared that, the model was found to be significant, $F(8,83) = 2.39$, $p = .023$, $R^2 = .19$. Much like hypothesis 5a, no significant direct effects were found from the variables and control variables involved in the model (see Table 8). As a result, hypothesis 5b was rejected.

Table 8

Direct effect of workgroup diversity and knowledge sharing and the moderation effect of Audio-only condition (N = 92)

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	2.05	1.08	2.79	.007**	.59	3.52
Workgroup diversity	.25	.29	.32	.753	-1.32	1.82
DummyA ^a	-1.66	.46	-1.87	.066	-3.42	.11
Workgroup diversity x DummyA ^b	1.51	.34	1.32	.190	-.76	3.79
<i>Control variables</i>						
Gender (1=male; 2=female)	.23	.50	.91	.367	-.27	.72
Education level	-.12	.88	-.84	.405	-.39	.16

Comfort speaking English	-0.04	1.54	-.45	.654	-.23	.14
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Note: $N = 92$; * $p < .05$; ** $p < .01$; *** $p < .001$

^a DummyA is a dummy variable representing the sessions held in the Audio-only condition;

^b Workgroup diversity x DummyA is code for the interaction effect between workgroup diversity and the Audio-only condition.

Proceeding with hypothesis 6a, it suggested that, the relationship between workgroup diversity and miscommunication will be stronger in a text-only condition than in a video condition. Statistical outcome originating from a moderation analysis indicate that, the model was found to be significant, $F = (9,82)$, $p = .003$, $R^2 = .25$. That is, 25% of the variances of the variable of miscommunication can be explained by this model. However, with regards to the individual predictive effects of each variable on miscommunication, none of the variables involved, including the control variables, turned out to be significant (see Table 9). As this is the case, it led to the conclusion that, hypothesis 6a had to be rejected.

Table 9

Direct effect of workgroup diversity and miscommunication and the moderation effect of Text-only condition ($N = 92$)

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	2.05	1.08	2.79	.007**	.59	3.52
Workgroup diversity	.20	.29	.28	.778	-1.23	1.64
DummyT ^a	1.04	.47	1.46	.147	-.38	2.46
Workgroup diversity x DummyT ^b	.19	.36	.21	.837	-1.64	2.02
<i>Control variables</i>						
Gender (1=male; 2=female)	.00	.50	.01	.989	-.45	.46
Education level	-.00	.88	-.00	.997	-.26	.26
Comfort speaking English	-.04	1.54	-.42	.679	-.20	.13
Occupation	.09	1.41	1.10	.273	-.07	.26

Note: $N = 92$; * $p < .05$; ** $p < .01$; *** $p < .001$

^a DummyT is a dummy variable representing the sessions held in the Text-only condition;

^b Workgroup diversity x DummyT is code for the interaction effect between workgroup diversity and the Text-only condition.

Last but not least, hypothesis 6b implied that, the relationship between workgroup diversity and miscommunication will be stronger in an audio-only condition than in a video condition. Following the statistical output of a moderation analysis it turned out that, the model was found to be significant, $F = (9, 82)$, $p = .003$, $R^2 = .25$. From this it can be understood that 25% of the variances of the variable of miscommunication can be predicted by this model. Having said this, however, neither of the variables involved in the model showed to have a direct effect on miscommunication, this includes the control variables as well. See Table 10 for further details. On the basis of these

results, hypothesis 6b had to be also rejected.

Table 10

Direct effect of workgroup diversity and miscommunication and the moderation effect of Audio-only condition (N = 92)

	<i>b</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>CI (lower)</i>	<i>CI (upper)</i>
Constant	2.05	1.08	2.79	.007**	.59	3.52
Workgroup diversity	.20	.29	.28	.778	-1.23	1.64
DummyA ^a	1.09	.46	1.31	.194	-.57	2.75
Workgroup diversity x DummyA ^b	-.58	.34	-.55	.585	-2.71	1.54
<i>Control variables</i>						
Gender (1=male; 2=female)	.00	.50	.01	.989	-.45	.46
Education level	-.00	.88	-.00	.997	-.26	.26
Comfort speaking English	-.04	1.54	-.42	.679	-.20	.13
Occupation	.09	1.41	1.10	.273	-.07	.26

Note: N = 92; * $p < .05$; ** $p < .01$; *** $p < .001$

^a DummyA is a dummy variable representing the sessions held in the Audio-only condition;

^b Workgroup diversity x DummyA is code for the interaction effect between workgroup diversity and the Audio-only condition.

5. Conclusion

5.1. Discussion

To answer the research question, based on the results of this study it appears that media channel has no influence on the relationship between workgroup diversity and task performance. Using one type of media channel over another did not make much difference in the outcome of the task performance of the group. The average outcome of the task performance of the participants in the different channel conditions did not differ significantly from each other. Therefore, media channel was unable to moderate the relationship between workgroup diversity and task performance. To explain why this is the case, it is crucial to first discuss the results of a few relevant relationships.

To start at the core of the conceptual model, the first step in the analysis of this study involved examining the relationship between workgroup diversity and task performance. The result of this analysis indicated that, the relationship between workgroup diversity and task performance was not significant. This, in the light of the conceptual model of this study, initially gave the impression that there might be indeed a canceling out effect attributed to the moderating variable of media channel. To prove this however, the second step was needed.

The second step involved the two mediating variables considered in the conceptual model to help explain the relationship between workgroup diversity and task performance, i.e. knowledge sharing and miscommunication. In accordance with this, the two mediation analyses executed were aimed to set the base to explain the proposed cancelling out effect of the moderating variable of media channel. From the results however, it appeared that neither knowledge sharing nor miscommunication showed to be significant mediators in this study. This implies that, the relationship between workgroup diversity on task performance cannot be explained by knowledge sharing nor miscommunication, or at least not by them alone. Consequently, this means that attention needs to be put into either another direction, i.e., other variables, or that additional factors need to be added to the model to be able to explain the inconsistent results in the field of study regarding effectiveness of workgroup diversity.

Despite all this, although no significant mediating effect was revealed, there were a few noteworthy observations that could help, to a certain extent, explain the reason for the outcome of the research question.

First, as part of the mediation analyses, particularly knowledge sharing, this study was not able to statistically confirm that a more diverse workgroup will lead to more knowledge sharing. Arguably this could be due to a few things. As mentioned by Dahlin et al. (2005), if cultural differences have no relevance or value for the task at hand, the degree of knowledge shared will not be positively affected, and thus will not result in higher task performance either. In line with this, it

can be argued that perhaps the topic of the exercise used in the study experiment was equally unfamiliar to everyone. This thus may imply that, having different cultural perspectives in the group was then not useful to enhance the task performance in this case. Whatever knowledge that was generated did not boost task performance. This is shown by the negative, yet not significant, effect of knowledge sharing on task performance.

Besides diversity being irrelevant, this outcome could have also been attributed to the fact that, there was no negative consequence for performing poorly in the group exercise. Arguably as a result of this, participants were perhaps more inclined to sacrifice having an optimal task performance for the sake of not ruining the pleasant group atmosphere. This can be backed up by the high degree of knowledge sharing and low degree of miscommunication subjectively reported in the survey. As was argued by Dahlin et al. (2005), this can further indicate that, although there was a high degree of knowledge shared, the participants did not effectively process and integrate the various ideas generated. In which case, this can potentially point to either the effects of a dominant personality being present in the team during the decision-making process, or, to the fact that the participants were in general too passive to go deeper into discussion. In both cases then, the elaboration-likelihood theory (Van Knippenberg et al., 2004) was probably not applied. The negative, yet not significant relationship between knowledge sharing and task performance proves this.

Moreover, to attribute one more potential factor to the probable lack of real discussion and integration of ideas, is lack of confidence coming from the fact that the theme of the exercise, i.e., the desert, was probably unfamiliar and thus difficult for everyone. Not being certain about which ideas are even right may have a negative effect on the effective of group discussion. Following the claim of Larson, Sargis and Bauman (2004), lack of effective group discussion could also be due to a lack of good leadership in the teams helping the members with processing and integrating the ideas shared in the group. In support of it probably being caused by a lack of effective group discussion, based on observations done during the experiment sessions, participants appeared often uncertain about their own and other's logic regarding the use of the materials. This probably led them to guessing.

Secondly, in connection with miscommunication, the study results illustrated something unexpected. Although the mediation analysis showed that the variable of miscommunication did not have significant mediating powers, the direction of the relationship between workgroup diversity and miscommunication appeared to be negatively correlated. This contradicts the direction suggested by hypothesis 3. A potential explanation for this is that, perhaps the intercultural communication skills of the participants were above average. As a result, they perhaps put a good effort in adjusting their style of communication and/or tolerance to potential clashes to avoid miscommunication (Kaur, 2011). Additionally, the considerable low amount of native English speakers further supports this idea. The theory of Kaur (2011) claims that, especially when everyone is also non-native speakers,

people tend to adjust their tolerance to potential clashes in intercultural interactions. This can thus explain the negative relationship between workgroup diversity and miscommunication.

Bringing all the above points together it can be argued that, there was a lack of effective group discussions in the groups. The results of the mediation analysis were probably influenced by a lack of adequate knowledge of the team members, participants preferring to be nice, a lack of confidence, and good leadership.

Looking now at the third step of analysis in the conceptual model, this involved the analysis of the moderation effects of the variable of media channels. When considering the correlations matrix of all the variables it appears to show that the text-based channel was the worst condition participants performed in, both on the basis of knowledge sharing and miscommunication. Only the text-based condition had a significant correlation. This leads to the conclusion that the participants underestimated the capabilities a text-based channel has in achieving results comparable to the other channels. It is important here to highlight that, the task performance was measured in an objective manner while knowledge-sharing and miscommunication were measured subjectively. This can arguably point at effects of response bias. The idea of a text-based channel not being the most favorable channel to use for such a group exercise can be said to be a widely shared preconception. This could also potentially explain why the results of the moderation effect of media channel did not come out significant.

Another plausible explanation for why text performed the worse in both the relationship between workgroup diversity and miscommunication is because, linking this back to the idea that participants were most likely being nice with each other, in the text-based channel they were put less on the spot or exposed, thereby provoking them to be even more passive in discussions compared to the other channels. Relating this to the theory of Krumm, Terwiel and Hertel (2013), a lack of having explicit task-related rules made among the participants can possibly explain why this was the case.

Last but not least, based on the correlation tests between the control variables and the concept variables it appears that there was a significant correlation between gender and both the video- and audio-based condition. More specifically, there were more females in the video condition and more men in the audio condition. Considering that the text-based channel was not significantly correlated with gender, implies that the groups in the text-based condition were more mixed based on gender. In addition to this, this also means that the groups in the text-based condition reported a lower degree of knowledge sharing and a higher degree of miscommunication compared to the other conditions. On the basis of this, it can be said that the gender composition of a group had an influence on the degree of both knowledge sharing and miscommunication. This being said, the reason why media channel didn't have a moderating effect on the strength of the relationship between workgroup diversity and knowledge sharing could be likely related to gender.

To conclude the points discussed for the moderation analysis, it can be said that aside from the recurrent theme regarding participants wanting to be nice to each other, the analysis was probably influenced by response bias driven by the preconceptions against the capabilities of text-based channel, a lack of task-related rules, and gender composition.

5.2. Limitations and future study recommendations

In terms of limitations, this study had a few. To begin, this study is subject to transferability issues. If the group exercise was done in a non-controlled scenario the results could have been different. In addition, the study was a cohort study involving groups that have zero tenure. Big majority of participants did not know who to expect in the team. Having more experience with group members could have perhaps shown more strong effects. Therefore, it is advised for future studies to look into experiments involving subjects with a longer common group membership. This could for instance be based on workgroups within an organization or student group projects. Also, some participants were in very different time-zones which means that doing the experiment during a different time of the day than other group members could have had an effect on the results. On top of that, as was already mentioned, another limitation was that the task was perhaps too unfamiliar to participants, that it could have influenced their motivation to do their best. As already mentioned before, being unfamiliar to the theme could have negatively affected the confidence of participants to be more actively engaged in discussions. For the same reason, the task was then perhaps not challenging enough for them. Further research can thus explore the phenomenon with an exercise based upon a more familiar theme that more people can relate to. Additionally, the fact that there were no negative or positive consequences to pressure participants to perform poorly or well, could have also influenced the outcome. Participants probably preferred to be nice and passive with each other instead of engaging in discussions and breaking the friendly atmosphere to achieve optimal task performance. As recommendation, future research should consider the inclusion of a reward element as an attempt to eliminate this bias. Lastly, this study was also limited due to the fact that, in the analyses variables that were based on group data were put together with variables based on individual data. Arguably, this can be said to have had an influence on the outcome. That being said, it is recommended for future research to focus on a fully group-based sample which automatically requires a much larger sample population.

5.3. Practical implications

In the light of the study results, business managers should avoid two things. First, they should avoid overestimating the positive effects of video-calls, and secondly, avoid underestimating the effects of text-based channels for the effectiveness of diverse workgroup in relation to the task

performance. The study findings here indicate that it does not really matter which media channel is used, the results of task performance will not differ significantly. Thereby, as recommendation, business managers should not feel obliged to have to invest in expensive software packages like Zoom and other webcam equipments for the entire group. More importantly, it should not see video-calls as the only possible way to achieve effective group work. At the end, any of the three type of media channels will do a similar job. If anything, it could be advised to change the type of media channel used from time to time. Especially during this period in which we are all in quarantine. In this way, business managers could, one, break the routine and, two, reap the benefits of the unique features that each channel provides. As a result, this can potentially lead to an increase in the task performance outcome.

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Appendix A: Factor Analysis

Table A1

Factor and reliability analyses for scales for perceived level of communication quality and understanding
($N = 92$)

Item	Communication quality	Understanding
I understood the feelings of the other members		.66
I communicated well with the other members		.56
I was able to easily resolve misunderstandings with the other members		.63
I understood the point of view of the other members		.85
I was able to empathize well with the other members		.87
I was able to interpret the nonverbals of the other members		.47
To what extent was the communication among the group members clear?	.85	
To what extent was the communication among the group members effective?	.81	
To what extent was the communication among the group members complete?	.85	
To what extent was the communication among the group members fluent?	.83	
To what extent was the communication among the group members on time?	.75	
R^2	.40	.28
Cronbach's α	.91	.84

Appendix B: Informed Consent

CONSENT REQUEST FOR PARTICIPATING IN RESEARCH

FOR QUESTIONS ABOUT THE STUDY, CONTACT:

Elizabeth Ramos Gordillo, 486378er@eur.nl, +31630517801.

DESCRIPTION

You are invited to participate in a research about working in groups. The purpose of the study is to understand how groups perform on a task under time pressure.

Your acceptance to participate in this study means that you accept to participate in an experiment. In general terms:

- your participation in the experiment will be related to performing a task that requires teamwork.

Unless you prefer that no recordings are made, I will use an audiotape during the experiment.

You are always free not to answer any particular question, and/or stop participating at any point.

RISKS AND BENEFITS

As far as I can tell, there are no risks associated with participating in this research. Yet,

I will not keep any information that may lead to the identification of those involved in the study. I will only pseudonyms to identify participants.

I will use the material from the experiment exclusively for academic work, such as further research, academic meetings and publications.

TIME INVOLVEMENT

Your participation in this study will take 45 minutes to an hour. You may interrupt your participation at any time.

PAYMENTS

There will be no monetary compensation for your participation.

PARTICIPANTS' RIGHTS

If you have decided to accept to participate in this project, please understand your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without penalty. You have the right to refuse to answer particular questions. If you prefer, your identity will be made known in all written data resulting from the study. Otherwise, your individual privacy will be maintained in all published and written data resulting from the study.

CONTACTS AND QUESTIONS

If you have questions about your rights as a study participant, or are dissatisfied at any time with any aspect of this study, you may contact –anonymously, if you wish, Joep Hofhuis – hofhuis@eshcc.eur.nl.

SIGNING THE CONSENT FORM

If you sign this consent form, your signature will be the only documentation of your identity. Thus, you DO NOT NEED to sign this form. You may also choose to give consent orally, or if you just continue your participation in this research experiment also means you are giving consent.

Additionally, if by anything in the future you decide you want your data deleted from this study's data set, you can always contact me.

I give consent to be audiotaped during this study:

Name:

Signature

Date:

Appendix C: Experiment Materials

This appendix includes all the materials used during the experimental sessions.

The case description

DESERT SURVIVAL SITUATION

It is approximately 10:00 A.M. in mid-August and you have just crash-landed in the Sonoran Desert in southwestern United States. The light twin-engine plane, containing the bodies of the pilot and co-pilot, has completely burned. Only the airplane frame remains. None of the rest of you has been injured.

The pilot was unable to notify anyone of your position before the crash. However he had indicated before impact that you were 113 km south-southwest from a mining camp which is the nearest known habitation, and that you were approximately 105 km off the course that was filed in your VFR Flight plan.

The immediate area is quite flat and rather barren, except for an occasional barrel and saguaro cacti. The last weather report indicated that the temperature would reach 43 degrees Celsius that day, which means that the temperature at ground level will be 54 degrees Celsius. You are dressed in lightweight clothing—short sleeved shirts, pants, socks, and street shoes, everyone has a handkerchief.



The Score sheet

ID NUMBER: _____

DESERT SURVIVAL SITUATION

Before the plane caught fire, your group was able to salvage the 15 items listed on the sheet. Your task is to rank these items according to their importance to your survival, starting with “1” being the most important to “15” the least important. You may assume you are the actual people in the situation, the group has agreed to stick together, and all the items are in good

Item	My Ranking	Team Ranking	Correct Answer	My Error	Team Error
Flashlight (4 battery size)				0	0
Jackknife				0	0
Sectional air map of the area				0	0
Plastic raincoat (large size)				0	0
Magnetic Compass				0	0
Compress kit with gauze				0	0
.45 caliber pistol (loaded)				0	0
Parachute (red & white)				0	0
Bottle of 1,000 salt tablets				0	0
A cosmetic mirror				0	0
Book (“Edible Animals of the Desert”)				0	0
A pair of sunglasses per person				0	0
1.89 L of 80 proof Vodka				0	0
1 overcoat per person				0	0
0.95 L of water per person				0	0
Score				0	0

Auxiliary document with unfamiliar terms

Jackknife



Sectional Air Map of the Area



1 Overcoat



Handkerchief



Potential Unfamiliar Terms

Magnetic Compass



Compress Kit with Gauze



.45 Caliber Pistol (loaded)



Bottle of 1,000 salt tablets



1.89 L of 80 proof Vodka



A Cosmetic Mirror



Questionnaire

Intro Thank you for participating in this research experiment.

To complete your contribution, I would like you to read the following questions carefully and answer them as truthfully as possible. The whole questionnaire consists of 15 quick questions and it will take you no longer than 7 minutes to complete.

If you are using your phone, it reads better to flip it horizontally.

Q1 Please fill in your given ID number for this experiment.

(Find this in your email)

Q2 As you reflect on the experimental session, please indicate how much you relate to the following six statements presented below.

	Entirely Disagree (1)	Mostly Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Mostly Agree (6)	Entirely Agree (7)
I felt that the group members actively brainstormed about new ideas (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that the group members had new and innovative ideas (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that the group members came up with creative solutions to the problems (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt that the group members suggested new ways of performing the task (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I felt that the group members were good at finding new problem solving methods (5)

I felt that the group members were good at creativity (6)

Q3 As you reflect on the experimental session, please indicate how much you relate to the following six statements presented below.

	Entirely Disagree (1)	Mostly Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Mostly Agree (6)	Entirely Agree (7)
I understood the feelings of the other members (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I communicated well with the other members (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was able to easily resolve misunderstandings with the other members (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I understood the point of view of the other members (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was able to empathize well with the other members (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was able to interpret the nonverbals of the other members (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4 As you reflect on the experimental session, please rate the communication quality among the group.

	Not at all (1)	To a small extent (2)	To a moderate extent (3)	Neutral (4)	To a great extent (5)	To a very great extent (6)	To the greatest extent (7)
To what extent was the communication among the group members clear? (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To what extent was the communication among the group members effective? (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To what extent is the communication among the group members complete? (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To what extent was the communication among the group members fluent? (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

To what extent was the communication among the group members on time? (5)

Q5 As you reflect on the experimental session, please indicate how much you relate to the following three statements presented below.

	Entirely Disagree (1)	Mostly Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Mostly Agree (6)	Entirely Agree (7)
I believe that the group was very productive. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the group produced quality work. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe that the group attained the assigned goals. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6 What is your age?

Q7 What is your sex?

- Male (1)
- Female (2)
- Other (3)

Q8 What is the highest educational level or degree you have completed so far?

- Less than high school degree (1)
- High school graduate (2)
- Partly college but no degree (3)
- Bachelor's degree (4)
- Master's degree (5)
- PhD/ Doctoral degree (6)

Q9 What is the occupation status that best describes yours right now?

- Student (1)
 - Student and working (2)
 - Working (paid employee) (3)
 - Employer (4)
 - Self-employed (5)
 - Unemployed (6)
-

Q10 Please indicate on the following scale how much experience you have with working with virtual teams?

	A great deal (1)	A lot (2)	A moderate amount (3)	A little (4)	None at all (5)
When it comes to working with virtual teams I have _____ of experience. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 Which culture (national culture) do you identify yourself with the most?
Please, only write down the country.

Q12 What is your native language?

Q13 What is your level of English?

- Basic (1)
- Conversational (2)
- Proficient (3)
- Fluent (4)
- Native (5)

Q14 How comfortable are you with speaking English in general?

	Extremely uncomfortable (1)	Moderately uncomfortable (2)	Slightly uncomfortable (3)	Neither uncomfortable nor comfortable (4)	Slightly comfortable (5)	Moderately comfortable (6)	Extremely comfortable (7)
When it comes to communicating in English I feel _____. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q15 What type of session did you just participate in?

- Text-based (1)
- Audio-based (2)
- Video-based (3)

End of Block: Default Question Block

Explanation of correct answers

DESERT SURVIVAL ACTIVITY

ANSWER KEY

The answers to this Desert Survival Activity are based on over 2,000 actual cases in which men and women lived or died depending upon the survival decisions they made. The following answers and rationale were developed for this activity by Mr. Alonzo Pond, former Chief of the Desert Branch, Tropic Information Center of the Air Force University at Maxwell Air Force Base. During World War II, Mr. Pond spent much of his time working with the Allied Forces in the Sahara on desert survival problems. He encountered the countless survival cases that serve as a basis of the rationale for these rankings.

1. Cosmetic Mirror – Of all the items the mirror is absolutely critical. It is the most powerful tool you have for communicating your presence. In sunlight a simple mirror can generate 5 to 7 million candlepower of light. If you had no other items you would still have better than 81% chance of being spotted and picked up within the first 24 hours.
2. 1 Overcoat Per Person - Once you have a communication system to tell people where you are, your next problem is to slow down dehydration. Forty percent of the body moisture that is lost through dehydration is lost through respiration and perspiration. Moisture lost through respiration can be cut significantly by remaining calm. Preventing the hot, dry air from circulating next to the skin can cut moisture lost through perspiration. The overcoats, ironic as it may seem, are the best available means for doing this. Without them survival time would be cut by at least a day.
3. 1 Quart of Water Per Person – You could probably survive 3 days with just the first 2 items. Although the quart of water would not significantly extend the survival time, it would help to hold off the effect of dehydration. Once dehydration begins it would be impossible to reverse it with the amount of water available in this situation. Therefore, it would be best to drink the water during the first day so you can remain as clear-headed as possible when important decisions have to be made. Rationing it would do nothing at all.

4. Flashlight (4 battery size) – The only quick, reliable night signaling device is the flashlight. With it and the mirror you have a 24 hour signaling capability. Also, with batteries removed, the case can be used as a scoop or a container for a plastic still.
5. Parachute (red and white) – The parachute can serve as both shelter and a signaling device. The cactus could serve as tent poles and by folding the parachute give enough shade to reduce the temperature underneath it by as much as 20%.
6. Jackknife – Although not as crucial as the first 5 items, the jackknife would be useful for rigging the shelter and for cutting up the cactus for moisture. It's innumerable other uses give it the high ranking.
7. Plastic Raincoat (large size) – Can create a plastic sill by digging a hole and placing the raincoat over it, the temperature differential will extract some moisture and produce condensation on the underside of the plastic. The amount of water produced would be minimal, and might not be worth the effort.
8. .45-Caliber Pistol (loaded) – To be used as a sounding device such as firing three quick shorts in succession, the international distress signal. Probably not useful for hunting (effort would expel too much water/energy), but could be used as an option for producing a fire. Dangerous item to have because of physical and emotional stress of the group.
9. A Pair of Sunglasses Per Person - The intense sunlight of the desert could be a serious problem. However, the dark shade of the parachute shelter would reduce the problem. Sunglasses would however make things more comfortable.
10. Compress Kit with Gauze – Because of the desert's intensity, it is considered one of the least infectious places in the world. Due to the fact that blood thins with dehydration, there is little danger from bleeding unless a vein is severed. Any serious risks from infection would take days to develop, long after the water would have been gone. The kit materials might be used as rope, for wrapping your legs, ankles and head, including face, as a further protection against dehydration and sunlight.
11. Magnetic compass – The compass is of little use. It would be even dangerous to have around once the effects of dehydration take hold. It might give someone the notion of walking out. Possible usage – only as an auxiliary signaling device.
12. Sectional Air Map of the area – Might be helpful for starting a fire or for toilet paper, head cover, or eye shade. It is essentially useless and perhaps dangerous because it too might encourage walking out.
13. A Book Entitled “Edible Animals of the Desert” – The problem confronting the group is dehydration not starvation. Any energy expended in hunting would be costly in terms of water loss. Even if you actually killed an animal, digestion of proteins takes too much water to be worthwhile. Can be used only as paper – see no. 12

14. 2 Quarts of 180 Proof Vodka - When severe alcoholism kills someone, they usually die of dehydration. Alcohol absorbs water. There is a loss of 2 to 3 oz. of water per oz of alcohol. The vodka consumed could be lethal in this situation. Vodka could be helpful for a fire or as temporary coolant for the body. However, it represents more dangers than help.
15. Bottle of Salt Tablets (1000 tablets) – Wide spread myths about salt tablets exist. The first problem is that with dehydration and loss of water, blood salinity increases. Sweat contains less salt than extra cellular fluids. Without lots of extra water, the salt tablets would require body water to get rid of the increased salinity. The effect would be like drinking sea water. Even the man who developed salt tablets now maintains they are of questionable value except in geographical areas where there are salt deficiencies.

Procedure script

Hi guys! Welcome and thank you for your time and willingness to participate in this research experiment.

First of all, I want to ask you beforehand if you mind me voice recording this session and use the data exclusively for research purposes. Do any of you feel uncomfortable, or are not ok with this?

... *turn recording on*

Before we start, as part of general protocol of Erasmus University and research experiments I would like all of you to first read through the informed consent form I just shared in the chat box right here. (...)When you're done reading it and agree with everything, you can give your consent in three different ways. **1.** You can sign it with an "X" and send it back to me in the chat, **2.** You can orally give consent, **3.** By just continuing in this experiment is also considered the same. The entire session from this moment till the end will take about an hour.

—

Introducing, explaining, and guiding the exercise

Moving on to what you guys came here for. I have prepared an exercise for you guys to do in a group. Please, quickly check your email inbox and open the email you received from me. You will find in there your ID number for this experiment, the case description, the scoring sheet, a doc titled unfamiliar terms, and a survey link. First, download and open the case description document and the scoring sheet. Copy paste your ID number on top of the scoring sheet.

Ok, now that we have all the needed materials in check, let me give you a brief explanation of the exercise I brought you guys here to do: Basically, it's a decision-making exercise called "The desert survival test". To start I want you guys to really imagine that you're all on a plane right now, all of a sudden the plane starts to experience some serious technical problems and it crashed in the middle of the desert. You all landed safely, but the big question now is: How will you survive in the desert? From a list of objects/items found on the plane you're only allowed to keep 15 items. So, you need to choose wisely for what are the most important items to keep. Please, read the short case description carefully, you'll have 5 minutes to read it AND to fill in (individually) the first column on the score sheet. That is, the first column on the scoring sheet labeled "My ranking". So, 5 minutes to read and fill in the first column. (...)

(5 minutes passed) Now, I would like you to share and discuss together as a group your individual answers with the aim to reach a group consensus, meaning everyone should at least

minimally agree with the ultimate group answer. At the end, I want everyone to write down the same group answers in the second column labeled “Team ranking”. For this group discussion part you will have 20 minutes to come to a consensus and fill in the scoring sheet. I will keep the time for you.

HOWEVER, THERE IS ONLY ONE CONDITION/ RULE. And that is, right now, I would like you to go into chat only/ voice only/ or video only mode and discuss with one another towards a commonly shared group ranking. Again, it’s important that you all fill in the outcome of the group ranking on your scoring sheet. Meaning, at the end I expect to find the same answers on everyone’s scoring sheet for the second column. Your 20 minutes starts now.

GROUP DISCUSSION — 20 MINUTES!!

Now that we have filled in the first two columns I would like you to save this edited document and just keep it on your desktop for now. To finalize your contribution to this study I would like you to go again to your email and click on the URL that should direct you immediately to a survey. I will be right here for if there is anything unclear. For this you will have 7 minutes. After these 7 minutes we will proceed to the last part of session where we discuss the answers and round it off with a debriefing of your contribution. Having said that, your 7 minutes to fill in the survey starts now.

Explaining the score sheet

*I will now turn on my video to facilitate this phase for the sake of higher speed and clarity.

As I said before, let’s now quickly discuss the answers to see how well you did. Go back to the scoring sheet you worked on earlier. In the chat box you’ll see a ranking of the correct answers. However, to save time I will now read out loud for you the correct ranking from top to bottom. This following correct ranking you’ll have to fill in into the white middle column. Are you guys ready?

Read list out loud

Once the white column of “correct answers” is completely filled in, it should automatically give you the correct results for the last two column plus your individual and group final score as the bottom. Correct?

Could we go around and share the individual scores one by one? *Go around asking*.

Who has the lowest thus best score? ...HURRAY!

What are the final group scores?

Now, I’d like you to send me your score sheet via email, by attaching it in a reply email to the famous email I sent you guys earlier.

Debriefing the participants on the research and their contribution

I want to first of all thank you all again for taking your time and also effort in participating in this experiment session. Your participation today will contribute to a research I am currently conducting regarding the effects of media channels on the performance outcome of diverse virtual workgroups. In this research study I'm examining the nature and degree of knowledge sharing as well as communication quality or miscommunication. But, what's really particular about this study is that I'm testing and comparing the effects of text-based, audio-based, and video-based communication channels.

In case any of you are curious and interested in the outcome and wish to read into it once it is finalized, please let me know in the chat box and I will note down your email address. Finally, thanks to your contribution, aside from furthering the scientific literature on diverse virtual workgroups it could also help educate business managers about how they can better arrange the setting of diverse virtual workgroups to improve group task outcome and experience.

Thank you and have a pleasant day!