HOW CAN EXCELLENT AND EFFECTIVE LINKS OF COMMUNICATION BE FORMED AND MAINTAINED WITHIN CONSTRUCTION TEAMS?

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Communication is one of the key success factors for every construction project. The impact of COVID-19 pandemic on communication was significant, which is likely to last in the post-COVID era. The main objective of this research is to build on previous studies and elucidate the team effectiveness and communication in the construction industry which highlights the causes of poor communication given the impacts from COVID-19. This research made use of both qualitative and quantitative methods to collect primary raw data through a questionnaire and secondary data from literature. Upon analysis of primary data, it was found that there is a distinct lack of social relationship building, as this formed the most significant causative factor for communication failure. Some recommendations were provided to enhance communication and conduct future research in this area, which could benefit both practitioners and researchers.

Keywords: Communication, COVID-19, Information Sharing, Pandemic, Social Relationships.

INTRODUCTION

Communication has become a crucial aspect of people's day-to-day life, it sparks various means of interaction, and results in development of social relationships. Consequently, there is a plethora of communication methods being utilised—some proving to be more effective than others. The principles of communication mentioned earlier, are carried into the professional environment and form a critical part in the efficiency, growth and ultimately the longevity of professional settings. Within these professional environments, the construction industry has been a primary focus, while the multi-disciplinary teams merge to create construction projects, and design teams. Historically speaking, studies have shown how the industry is fragmented, as Gledson *et al.*, (2012) suggested. This leads to failures in communication which has proven to be a notoriously common issue. However, this issue is an accumulation of numerous factors which needs to be addressed to promote inter-disciplinary communication and collaboration, and also build social relationships, trust, efficient flow of information while also be reliable and sustainable.

Emmitt and Gorse (2003: 30) found that issues arise when the parties involved in the construction projects comprise of different professions, *"The building industry is notorious for its adversarial behaviour and distrust between different professional groups."* Not only this, but they mentioned that the industry comprises of many disparate organisations that come together in pursuit of shared project objectives and organisational goals. However, these are not necessarily compatible or mutually supportive, and thus may not align with people's objectives. Similarly, Hanford (2014) explained that although construction projects consist of different groups working on the same project, they do not necessarily work as a team. Each group or organisation is not concerned with collaborating with other groups but instead look after its members' interests.

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This research focuses on the historical issues incurred from failures in communication within the construction industry and a comparison to recent global events given the devastating impacts from COVID-19 and Brexit. In the next sections, the literature is reviewed, and the research problem and methodology are stated. Then, results are presented and discussed in detail. Finally, the conclusion and the recommendations for future research are provided.

LITERATURE STUDY

Emmerson (1962) found that 'ineffective communication' was the biggest issue faced by the industry. More recently, Mahamid (2016) and Hussain (2018) suggested that communication has remained as the leading issue within the industry despite its flaws being made clear. A report by the Project Management Institute (2013) found that ineffective communication is the root cause of one-half of unsuccessful projects. Emmitt and Gorse (2003: 6) claimed that there was *"little to no improvement"* following the findings in 1962. Since the centrality of goals in professional communication is well understood (Charles 1996; Sarangi and Roberts 1999; Holmes and Stubbe 2003; Bhatia 2004; Koester 2006; Handford 2010) it can be used to explain its conflictual nature within the construction industry. To combat this conflictual nature, Berry (2016) mentioned how shared goals understanding are required by the team. Therefore, negotiating these common goals become an intrinsic part of any team building process. Despite communication being a significant issue within the industry, Duarte and Snyder (2001) outlined communication as a critical competency to effectively lead design teams. Adeyekun (2019) recommended frequent meetings and the submission of relevant information prior to the scheduled meetings as a way to enhance communication. Kozlowski (2006) stated that team building is a holistic process, one that all members go through together. This may allude to the building of social relations between team members, but more importantly, at the involvement of all team members and not just that of a project leader or manager.

Many researchers (Charles 1996; Thomas *et al*, 1998; Franks 1998; Somogyi 1999; Sarangi and Roberts 1999; Holmes and Stubbe 2003; Bhatia 2004; Koester 2006; Handford 2010; El-Sayegh, 2012; Berry, 2016) suggest increasing interpersonal relationships and skills between team members as means to increase the teams' capabilities, as these relationships assist in the improvement of project communication. Berry (2016) claims that successful social relationships are required for effective collaboration and communication on construction projects. However, whilst these suggestions appear to be promising, they may face external criticism with regards to cultural differences, language barriers, geographical implications, and travel restrictions.

A means by which this could be counteracted would be through virtual meetings and technologies, but Hinds and Weisband (2003) found that virtual team members tend to share less information initially than those in a face-to-face setting. However, these findings were obtained over a decade ago, and since then there have been significant advancements in technology and the effectiveness of virtual platforms through which communication and collaboration can occur, such as Microsoft Teams, Zoom and Skype. All of the aforementioned platforms have the capacity to allow users or team members to share information live, conduct presentations and take control of each other screen as well as upload, store and manage project information in a virtual team environment.

Burke, Aytes and Chidambaram (2001) concluded, in their study, that cohesion in virtual teams takes longer to form than in collocated teams. In addition to previous research, Kirkham *et al.,* (2002) mentioned that maintaining good communication requires team members to feel motivated and satisfied; however, this is not always achievable virtually due to the absence of physical presence, therefore, interaction with co-workers increases this. On the other hand, Timmerman (2000) suggested that virtual communication helps limit issues like power or political conflicts, cliques, stereotyping, personality. Furthermore, Kirschner and Van Bruggen (2004) explained how virtual technologies have been designed to increase collaboration (i.e., document sharing and asynchronously discussing items) but have failed to encourage or support a shared understanding of the team forming processes.

Hinds and Weisband (2003) and Berry (2016) suggested that asynchronous communication provides a constant opportunity to talk through problems, share perspectives, get feedback, and answer questions that arise among team members without having to wait for a scheduled meeting. This method should, however, be supplemented by regular meetings between the wider design teams as Berry (2016) would suggest *"communication provides the basic building blocks with which people collaborate, make decisions, and act to achieve organisational objectives."* As meetings become more frequent, they become less intimidating for inexperienced team members or those with differing personality traits; thus, allowing them to extend their ability to contribute, collaborate and utilise effective means of communication.

Achieving collaboration within a team requires efficient effort and communication from team members to identify and solve problems together – this could be done virtually. When interpersonal skills are

developed, strong social relationships are encouraged between team members.

Some researchers (Marks *et al*, 2001; Emmitt and Gorse 2003; Dainty et al, 2006; Meng 2012; Berry 2016; Gamil and Rahman 2017; Rahman and Gamil 2019) discovered certain causative factors that lead to communication issues within the construction industry, such as:

- Geographical (Distance, Language, Culture)
- Organisation Size
- Project Complexity
- Organisational/Individual Goals
- Poor Technology
- Lack of Training
- Lack of Social Relationships
- No Project Management or use of Common Data Environment (CDE)
- Construction Site Noise
- Contractual Lines of Communication Limit options to Resolve Issues
- Misunderstandings/Misinterpretations
- Work Pressure/Stress
- Unclear Role/Responsibilities/Objectives
- Unmotivated Employees

To overcome and mitigate these causative issues surrounding communication within the construction industry, knowledge and awareness need to be improved upon, and a road map for progress must be established which is partial to all disciplines, interpersonal and project objectives but achievable regardless of the company size, and structure of financial stability.

RESEARCH PROBLEM

Communication within the construction industry is an issue that occurred prior to COVID-19 and Brexit. Historically speaking, it is accountable for numerous failures within the industry, and it needs to be addressed promptly. In contemporary times, the team communication has been impacted by significant developments made with regards to technological advancements such as Building Information Modelling (BIM) and virtual communication software. Due to COVID-19, the circumstances globally have resulted in the construction industry practitioners having a greater understanding of the topic area, due to more exposure with the virtual working environment. Therefore, there must be a more diligent look via the opinions of industry professionals who have utilised recent technologies in a far greater capacity than others during the pandemic. The primary focus of the current research is to identify the certain causative factors which result in communication failure and examine how they could be mitigated through sustainable methods and recommendations from experienced industry professionals. Upon sifting the voluminous existing literature, certain causative factors were identified which result in communication issues within the construction industry. They typically comprise of: lack of management, inexperience, disputes, poor relationships, and improper means of communication.

The main objective of the research is to build on previous studies and elucidate the team effectiveness and communication in construction. In addition, it will highlight the causes of poor communication, and thereby identify and isolate points in which communication which could be enhanced and sustained within this fragmented industry.

METHODOLOGY

The research makes use of both qualitative and quantitative methods to collect primary raw data. Qualitative methods are required for reviewing literature and identifying issues as they relate to communication in construction projects. Then, the identified issues are used in designing the questions administered within the research questionnaire. Quantitative methods are adopted to statistically analyse the data obtained from completed questionnaires.

The objective was to have professionals from varying disciplines within the construction industry complete the questionnaire. The questionnaires consisted of roughly 20 multiple-choice questions. The remaining questions asked for a few words from the participants to express their experiences, opinions, and recommendations for any change or improvement. The questions asked were based on objective social ontological assumptions in which the respondents were asked to answer some questions concerning the rules and regulations that are being adhered to in their organisations. However, towards the end, the questionnaire became more focused on constructionism in the form of questions promoting each individual's opinion and perspective. This demonstrates how the research included aspects of both qualitative and quantitative methodologies.

RESULTS

Findings from the primary raw data collected shows that there are developments, and a positive correlation was observed in the opinions of the multi-disciplinary teams. However, certain causative factors continue to exist and need to be addressed to ensure that the industry can move forward with regards to enhanced communication and utilising platforms to promote collaboration and the sharing of information freely.

BIM has been introduced as a revolutionary tool to combat some of the established issues within the AEC industry including collaboration and communication. Therefore, the first question evaluated BIM knowledge of the participants. Figure 1 figure provides a contrasting result from M&E engineers' and architects' views on BIM knowledge and BIM literacy levels.
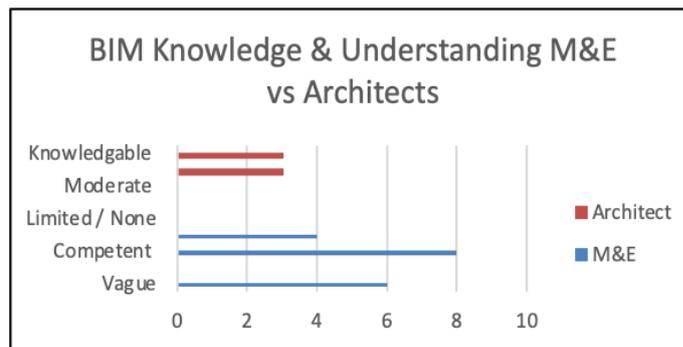

Figure 1 - BIM Knowledge and Understanding (M&E vs Architects)

Figure 1 makes it clear that many professionals have experience within the field of BIM. This appears to be a promising sign as having individuals collaborating with this background within project teams will inevitably encourage effective communication.

The responses to the next question revealed that the number of BIM strategies being implemented across the M&E discipline is considerably lower than those within the architectural sector (55% versus 100%). Whilst all architectural responses indicated a BIM strategy being implemented by their employers, only 10 out of a possible 18 M&E organisations have these strategies in place. This indicates a need for training and sustainable means of communication between employers and employees regarding company protocols and working culture. All employees should have the right to be kept up to date, trained and be provided with critical information to allow them to adapt to external team discussions and environments successfully. In addition, they should have the capacity to provide their input into discussions and effectively impact projects instead of being oblivious and seemingly passive when compared to their architectural counterparts.

Figure 2 displays some promising changes. To an extent, the industry has progressed in its attempt to implement and utilise BIM as a solution. Simultaneously, it is known to exhaust an extensive quantity of resources, i.e., time, cost, training, and motivated employees. An overhaul of existing organisational culture is still required as indicated by a considerable number of respondents. This is alarming as it points towards a number of causative factors, such as poor management, enforcement of company procedures, inefficient lines of internal communication, and limited resources. Based on the pie chart, the green coloured portion indicates that the use of BIM strategies contributes to a larger, more significant quantity of respondents However, 47% of construction industry professionals remain without any knowledge of the BIM strategy; this is a problematic area and one that will have a negative influence on how effective communication can be during construction projects. This is in contrast to the NBS 2020 Report for BIM statistics (NBS 2020). This figure was estimated to be less than 30%. The considerably lower percentage may be accredited to a number of reasons. For instance, the respondents' companies may not see financial gain from utilising SME's company, and the project scale did not warrant it.

The lack of companies implementing BIM strategies may hinder or negatively impact the company representatives when working on BIM-enabled construction projects. It could also potentially limit their interpretation of BIM discussions and their input during team discussions which may ultimately have adverse effects on their reputation, trust, and would result in others being reluctant to liaise with them regarding technicalities or issues.
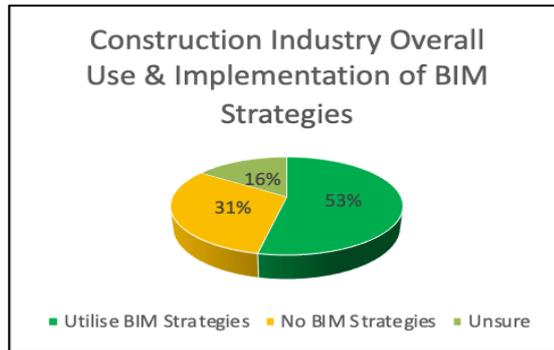
Figure 2 - Use of BIM Strategies within Construction Industry

The next question was about the impact of virtual working for on communication. Burke, Aytes and Chidambaram (2001) claimed that cohesion in virtual teams take longer to form than in collocated teams. However, as shown in Figures 3, the respondents seem to disagree with the previous findings. In fact, it states that virtual meetings promote team collaboration and provides a platform for all interpersonal skill and comfort levels, i.e., introvert and extroverts can feel equally at ease in a virtual environment. Whilst 44% of respondents claimed virtual working does enhance effective communication, another 27% agreed, to a certain degree, that it partially improved their communication experience.
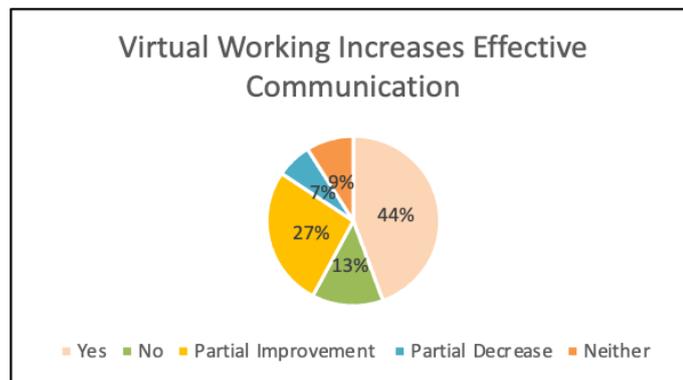

Figure 3 - Virtual Meeting Impact on Communication

In response to the next question, more than 90% of respondents have experienced the ability to share information freely and collaboratively on virtual software when required as shown in Figure 4. This, again, shows the positive impact the virtual software has had and continues to have. However, individuals have only recently begun implementing them due to the current pandemic being experienced across the globe.
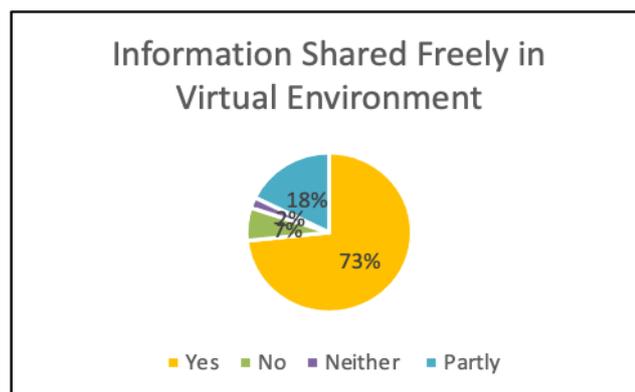

Figure 4 - Information Shared Virtually

Figures 5 and 6 show opinions pertinent to the social relations impacting their professional communication, which is contrasted with the number of introverts and extroverts. From the figures, it is evident that the majority of respondents are introverts. This may explain why many respondents have seen the positives from working virtually, as it breaks down social barriers that are often encountered in face-to-face interactions and provides a platform to still build social relations. The research noted from

the extroverted respondents that their priority was to retain face-to-face meetings as the source of communication source and only to be supplemented by virtual meetings when absolutely necessary. However, they also saw partial improvement in working virtually. Figure 6 also displays a considerable number of responses to social relationships impacting their communication whilst working within a team. This should not be the case, and individuals should, in theory, display a consistent level of communication regardless of the situation. This does, however, highlight the importance of retaining design teams to work together repeatedly or host 'ice-breaking' social events so that important social relations can be established.
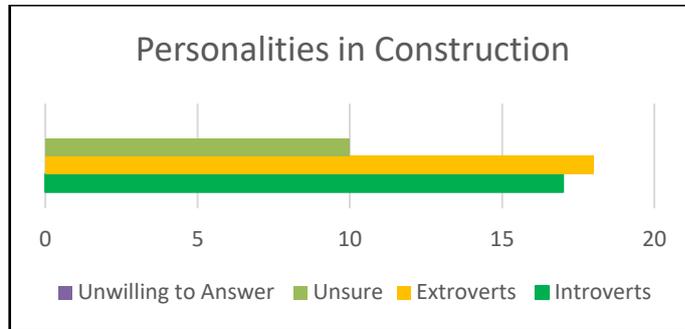

Figure 5 - Personalities in Construction

Figure 6 - Impact of Social Relations in Construction

The next question explored the causative factors of communication failure. Previous studies (Berry, 2016 and Gamil and Rahman, 2017) outlined how stress and associated working pressures are primary causative factors; however, the current research finds these factors slipping in severity. The factor highlighted by the respondents was poor relationships. Amongst the responses, a number of respondents also selected 'Other' and provided a brief description on their views. These include: lack of understanding between other disciplines, workload and being a 'third party' that is not involved in majority of team meetings or discussions. While the factors listed above are individually titled, it is understood that they all tie into one another and have an adverse knock-on effect, i.e., if one individual is suffering due to intense working pressures, this may, in turn, cause stress. If one is of an introverted personality, they may react negatively to social relations, establish poor relationships or face reduced capacity to sustain a relationship for an extended period of time.

It is concerning that stress, and pressure levels seem to remain consistent throughout these times whilst they have been well established factors for several decades within the construction industry. Social relations need to be enhanced through social events, meet and greets, ice breakers and retaining design teams; interpersonal skills should be developed by the individual. Within organisations and training, courses and internal meetings are held to discuss how they can adapt, continuously learn and make progress towards the betterment of the organisation and the wider design team and industry.

Workshops may also be a healthy addition to this process in the preliminary stages to encourage people to discuss areas that cause them discomfort in a social setting. This could help in finding agreeable, feasible solutions to all parties.
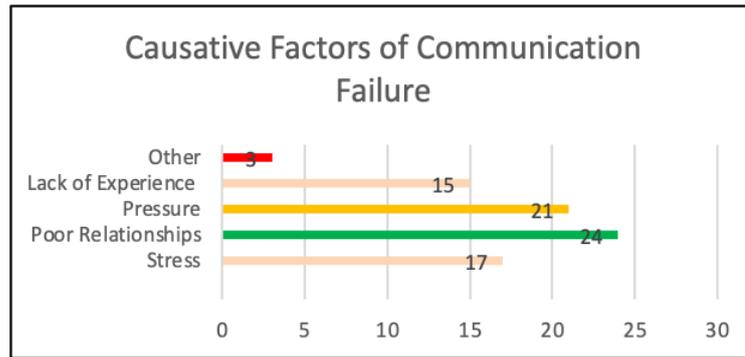
Figure 7 - Causative Factors

The next questions were about the preferred means of communication and information sharing. Despite the majority of the respondents being introverts, the results identified that their preferred means of communication and sharing information is through face-to-face interactions and email, as shown in Figure 8 and 9 respectively. This also shows that despite the positive correlation of virtual working on effective communication and information sharing, the predominant preference would be to meet in-person. This, however, does not combat the geographical issue that was highlighted previously, which may need to be further reviewed. A means of mitigating this would be to collate a hybrid solution where geographically dispersed teams shall meet face-to-face and provide a virtual conference link to the wider demography of the team to ensure meetings are still hosted with the relevant personnel. However, this begs the question: are people stuck in their ways of working such as emails and more older methods of working? Organisations may need to adopt newer solutions, change their working cultures, and use protocols such as BIM strategies to store, access, and manage information efficiently.
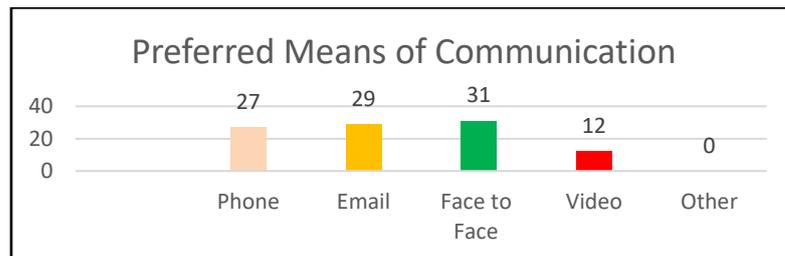

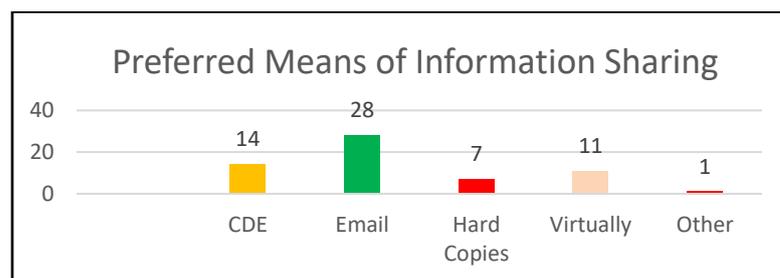*Figure 8 - Preferred Means of Communication*

Figure 9 - Preferred Means of Information Sharing

Towards the end of the questionnaire, respondents were asked direct questions regarding their opinions and views from their prior experiences within construction, and the barriers they encountered due to geographically dispersed teams, language and cultural barriers, and how they overcame the issues. The following provides a summary of the responses:
- Geographical issues were overcome via virtual meetings (numerous responses agreed with this).
- Regular catchup meetings.
- Use of technical jargon hinders the inexperienced people to understand discussions and leads to misinterpretations.
- Lack of site visits to see, appreciate and resolve issues.
- Time zone difference: flexibility of the design team to accommodate all members as needed.

- Virtual meetings made social integration difficult as cameras were switched off.
- To overcome the formation of new teams, social events are required to break the ice, ease the tensions of unfamiliarity, and help establish bonds.
- Specifications and documents being written in varying languages required translation.
- Geographically dispersed teams required more frequent but often shorter meetings to communicate and monitor project progress continuously.

The results of the direct questions asked towards the end of the research addressed the professionals' opinions and views on their recommendations to overcome the adversarial relationship and the fragmented nature of the construction industry. In addition, it demonstrated how the industry could be improved with regards to its methods of communication. The following provides an overview of the results:

- Early involvement of the entire design team.
- Increase frequency of meetings.
- Adopt a no-blame culture.
- Ensure face-to-face is the primary meeting method with virtual meetings to supplement only.
- Brief workshops to be implemented with relevant disciplines to tackle issues relating to their trade.
- Appreciate workload and pressures faced by other disciplines.
- Provide initial clarity on individual and collective goals, promote teamwork, have an open-door policy to problems.
- Continue to develop virtual workings and meetings.
- Keep design teams together and employ experienced project managers.
- Employ local design teams in, same geological region.
- All disciplines work synchronously in one collective model.
- Participant in lesson learnt sessions, pro-active and positive approach.
- Provide constant and early constructive feedback to the design team on any issues.
- Remove all job titles and work as equals.

DISCUSSION

Upon completion and receipt of the data, it became clear that communication is the leading issue within the construction industry. However, there is seemingly a want to develop solutions to understand processes that can be implemented to sustain the future of the industry. A significant number of respondents referred to action upon lesson learnt sessions, early involvement of design teams and ensuring face-to-face interactions as the primary source to resolve the ongoing issue. This ties in with the recommendations previously made by Kozlowski (2006,) and Beal *et al.,* (2003) regarding the review of group cohesion against task commitment and pride in performance.

Additionally, it was evident that the amount of information required to be produced during each stage varies and how it is communicated between the design team also varies, which inevitably impacts the team's performance and how effective their communication is. However, the effect seen was far more remarkable than first anticipated; this has escalated the need for a solution to address this area of concern. 91% of respondents claimed that there was at least 25% or greater frequency of a variance in the quality of communication across each design stage. In addition, 69% of the individuals stated that the communication quality varied across disciplines.

Similarly, previous studies support these findings as Berry (2016) had discussed virtual teams overcoming geographical issues but also, more importantly, increasing collaboration, communication, and creative outputs irrespective of time and space. Yet, there is a reluctance to accept this as the norm, and there is a growing need to utilise face-to-face interactions and meetings as the primary source—despite the vast majority of individuals being introverts.

There are several reasons for the communication issues faced throughout the construction industry. To partner with this, there are multiple ways to communicate such as group discussion, organisational meeting, corporate events, phone, email and virtual meetings. The barriers to communication can be categorized into four main topics: verbal, environmental, interpersonal, and emotional reactions. These barriers are mainly related to interpersonal skills and the mentality of individuals that make up the construction team. This ranges from their resilience, i.e., response to issues and how they react, whether with their rational, emotional, or wise mindset. A few examples are outlined below:

- Introverts – typically prefer correspondence via email or electronically
- Extroverts – typically prefer correspondence via phone or face-to-face interaction

Design team members opt for ease, convenience and the quickest route of communication i.e., email instead of utilising CDE's and following BIM execution plans and project protocols. This is primarily true on smaller-scale projects where email transmitted information is seemingly the norm. However, when a project escalates, both physically and financially, and draws upon significant complexities such

as the need for teamwork, collaboration, and effective communication, the methods of communications adapt to CDE, BIM implementation and experienced project leaders. However, this is an area that requires further research.

To ensure that the communication is effective and can be sustained, these methods of communication should not only be implemented based on the project scale but as standard on all projects irrespective of scale, value, or complexity. This is because it would promote a habit of working, familiarisation and promote a working culture to continuously improve upon the existing strategies. The smaller scale projects could be utilised to introduce team members to the method of working and also to build upon those social relations once established. It would also provide a platform in which they can grow parallel to one another and between all the design team members whether that be individually or organisationally. So, when the complexities arise, the team will be confident in their ability to overcome that using effective communication; they would also be relaxed knowing that the design team they have formed can be relied upon to deliver and share the relevant information quickly, efficiently and sustainably.

From the previous results and data analysis, it may be beneficial for the construction industry to adopt a constructionism approach, one where social order is in a constant state of change. In addition, fewer rules and regulations are enforced on organisations to restrict or limit their right to freely communicate and share information on projects with the wider design team. Although rules would still be needed to oversee and manage companies, this may require a hybrid of objectivism and constructionism.

CONCLUSION AND RECOMMENDATIONS

Despite the wide range of technologies involved, the construction industry still heavily relies on people. Findings from this research indicate the importance of relationships, the successful completion of projects, and the role of individuals interpersonal skills within multidisciplinary teams. This heavily relates to the previous findings within the same topic area and corresponds to studies and analyses of the psychology behind the issues in communication. In addition, it suggests the complex and adversarial nature of relationships in construction as the primary source of the issue.

The research can be applied to practical scenarios within the industry, much to its benefit and progression implementing solutions, technologies, and recommendations to mitigate issues and create a sustainable environment that can continuously be improved. These recommendations include, but are not limited to, the employment of an experienced project manager, early involvement of all disciplines within a design team, retain design teams that are familiar with one another, and ensure that the adoption of working strategies is consistent across all disciplines within a design team, i.e., all working towards the same BIM levels and ISO standards.

The structure and management provided by utilising BIM execution plans encourage collaborative working and requires constant and efficient communication. Having these plans in place and sufficiently managed can have profound benefits on the construction projects and further enhance the process of carrying out activities as a team such as lessons learned and project reviews. This reduces the likelihood of prior issues reoccurring and allows for a culture of continuous improvement and provides a sustainable mean to promote interpersonal and social relationships and sustain effective communication.

As the research concluded, there remains causative factors in communication relating to gaps in individuals' knowledge, and insufficient experience; however, training in a supporting working culture could mitigate the previously faced issues. This also allows interpersonal collaboration to occur when complexities arise, and the design team can rely upon each other's experience and knowledge to share and provide adequate information.

FUTURE RESEARCH

Upon the completion of the research and the collation of the primary dataset, the following recommendations are suggested to provide a greater understanding of the issues across the industry and provide a platform to delve further into some outlying potential causative factors:

- Conduct Global Research – The need for global research is also supported by Tijhuis and Fellows (2012). They claim that as construction projects become increasingly international, as well as interdisciplinary, the risk and costs of disharmonious working becomes even more extensive.
- Explore impacts of mental health within the industry and its effects on communication – More discourse-analytical and emancipatory research to be conducted.
- Explore potential impact of individuals' roles within a team and their work traits according to the Belbin Self-Inventory Reports – Does this impact effective communication?

In addition to the above, it would be advised to conduct a similar level of research with an alternative focus group targeting BIM coordinators, BIM managers, Construction Design and Management (CDM) representatives and a significantly increased number of contractors. As a supplement and to appreciate

the scale of the aforementioned issues, the research should be conducted on a global scale as to account for an increased demography from differing geological locations and working cultures whilst retaining the fundamental principles of the research question and objective.

REFERENCES

Adeyekun, A. J. (2019) An Assessment of Poor Communication between the Contractor and Subcontractor. *In:* James, D. (Ed.) *International Conference on Architecture and Civil Engineering,* Department of Civil Engineering, Jagannath University, Delhi – NCR, India.

Beal, D. J., Cohen, R. R., Burke, M J and McLendon, L. (2003) Cohesion ad Performance in Groups: A Meta-Analysis Clarification of Construct Relations. *Journal of Applied Psychology,* **88**(6), 989-1004.

Berry, G. R. (2016) Enhancing Effectiveness on Virtual Teams – Understanding why Traditional Team Skills are Insufficient. *The Journal of Business Communication*, **48**(2), 186-206

Bhatia, V. K. (2004). *Worlds of Written Discourse*. London: Continuum.

Charles, M. (1996). Business negotiations: Interdependence between discourse and the business relationship. *English for Specific Purposes*, **15**, 19–36.

Dainty, A., Moore, D. and Murray, M. (2006) *Communication in Construction: Theory and Practice*. London: Taylor and Francis.

Duarte, D. L., and Snyder, N. T. (2001) *Mastering virtual teams: Strategies, tools and techniques that succeed*. 2ed. San Francisco, USA: Jossey-Bass.

Emmerson, H. (1962). *Survey of Problems before the Construction Industry: A Report Prepared for the Ministry of Works*. London: HMSO

Emmitt, S. and Gorse, C. (2003) *Construction Communication*. Oxford: Blackwell.

Emmitt, S, and Gorse, C. (2006) *Communication in Construction teams*. London: Taylor and Francis.

Gamil, Y., and Rahman, I. A. (2017) Identification of Causes and Effects of Poor Communication in Construction Industry: A Theoretical Review. *Emerging Science Journal*, 1(4), 239-247.

Gledson, B., Henry, D., Bleanch, P. (2012) *Does size matter? Experiences and perspectives of BIM implementation from large and SME Construction Contractors.* s. *In*: *1st UK Academic Conference on Building Information Management (BIM),* 5-7 September 2012, Northumbria University, Newcastle upon Tyne, UK.

Handford, M. (2010) *The Language of Business Meetings*, Cambridge: Cambridge University Press.

Handford, M. (2014). Communication in the construction industry. *In: The Routledge Handbook of Language and Professional Communication.* London: Routledge, 363-381.

Holmes, J. and Stubbe, M. (2003) *Power and Politeness in the Workplace: A Sociolinguistic Analysis of Talk at Work*, London: Routledge.

Hussain, M. A., Ayman, A. E. O., Hisham, S G, and Aziz, T. A. (2018) Causes and Impacts of Poor Communication in the Construction Industry. *In: 2nd International* Conference on Sustainable Construction and Project Management-Sustainable Infrastructure and Transportation for Future Cities, 16-18 December. Aswan, Egypt. 1-11.

Koester, A. (2006) *Investigating Workplace Discourse*, London: Routledge.

Kozlowski, S. W. J., and Ilgen, D. (2006) Enhancing the Effectiveness of Work Groups and Teams. *Psychological Science in the Public Interest*, **7**(3), 77-124.

Mahamid, I. (2016) Factors contributing to poor performance in construction projects: Studies of Saudi Arabia. *Journal of Multi-Disciplinary Engineering*. **12**(1), 27-38.

Marks, M. A., Mathieu. J. E., and Zaccaro, S. J. (2001) A temporally based framework and taxonomy of team processes. *Academy of Management Review*, **26**, 356-376.

National Building Specification (NBS). (2020) *10th Annual BIM Report*. https://www.thenbs.com/knowledge/national-bim-report-2020 [Accessed on July 29,2021].

Project Management Institute (2013) *The high cost of low performance: the essential role of communications*. Newtown Square, PA, USA: Project Management Institute.

Rahman, A., and Gamil, Y. (2019) *Assessment of Cause and Effect Factors of Poor Communication in Construction Industry. In: IOP Conference Series: Materials Science and Engineering, Volume 601, Postgraduate Symposium in Civil and Environmental Engineering 2019 (PSCEE 2019),* 31 March, Universiti Tun Hussein Onn Malaysia.

Sarangi, S., and Roberts, C. (1999) The dynamics of interactional and institutional orders in work-related settings. *In: Talk, Work and Institutional Order.* Berlin: De Gruyter Mouton.

Somogyi, A. (1999) The Role of Project Management, Report, unpublished.

Tijhuis, W., and Fellows, R. (2012). Culture in international construction. London: Routledge.