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AGILE TEAM COMMUNICATION IN CONSTRUCTION PROJECTS: A SURVEY-BASED APPROACH

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Agility is a concept that provides new opportunities for proper management of construction projects. Since little is known about role of communication in agile project management, focusing specifically on the concept of communication to improve agile project practices would be beneficial. Communication plays a central role in project team development and increasing relationship quality with stakeholders. This study aims to evaluate factors measuring agile communication addressed in existing literature using a questionnaire survey. To achieve the study objective, data were collected from civil engineers working in various construction projects. Then, relative importance index (RII) was used to analyze data gathered from the respondents. The findings indicate that the significant role of face-to-face communication to convey information and continuous interaction of the client in the project execution process were the most important indicators of agile project communication, respectively. The study findings are expected to aid improving the agile communication practices, and eventually contributing to the adoption of agile solutions for professionals in the construction industry.

Keywords: Self-managing, Collaboration, Project management, Agility, Information flow.

1 INTRODUCTION

Well-defined, new, and agile concepts are needed in the construction sector, since the construction industry suffers from quality defects, delays, and cost overruns under the traditional project management methods and approaches (Arefazar *et al*. 2022, Mahamid 2016). Agile applications in the project management and organizations can make clients or team members more satisfied with the project outputs, increase productivity, and enhance the quality of the deliverables (Jethva and Skibniewski 2022, Zakrzewska *et al*. 2022). The successful achievement of such project objectives requires self-managing (i.e., agile) project teams (Hofman *et al*. 2023). Therefore, agile project teams can be managed with a better leadership (Hofman *et al*. 2023), establish collaborations among themselves (Wale-Kolade 2015), provide better information transmission (Ozorhon *et al*. 2022), and be willing to capture continuous improvement approaches (Salo and Abrahamsson 2007) to adapt changing project requirements. Another important factor of agile project teams is the communication construct, which can enable increasing team interactions and consequently improve project performance (Malik *et al*. 2021). Effective communication that is key to ensuring high productivity and increasing customer

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satisfaction could make an important contribution to developing agile projects (Hummel *et al*. 2013).

Although agile concepts have widely been investigated in the construction management literature, only a few studies have focused on its relationship with communication. Hummel *et al*. (2013) performed a systematic literature review on communication mechanisms in agile systems development in construction projects and found that small teams usually prefer to use informal face-to-face communication, while informal communication may cause significant communication problems for large teams. Ozorhon *et al*. (2022) developed a conceptual model to explore an agile hybrid approach in construction projects, which includes poor communication with client and stakeholders as an indicator of drivers, and face-to-face communication as one of the key enablers. Likewise, Malik *et al*. (2021) proposed a conceptual framework to analyze relationships among agile practices, psychological empowerment, innovative behavior, and project performance. They found that agile communication is of utmost importance for empowering agile project teams in innovative goal-oriented projects. In change management context, Arefazar *et al*. (2022) defined facilitated communication as one of the most effective agile solutions. This study aims to provide a detailed insight to industry professionals about agile practices in construction projects by addressing indicators of agile communication. This study could provide clarity on the most important aspects of agile communication for project teams and practitioners. Additionally, the findings of this study can also be a useful setting for construction companies seeking to increase their project performance via agile solutions.

2 METHODOLOGY

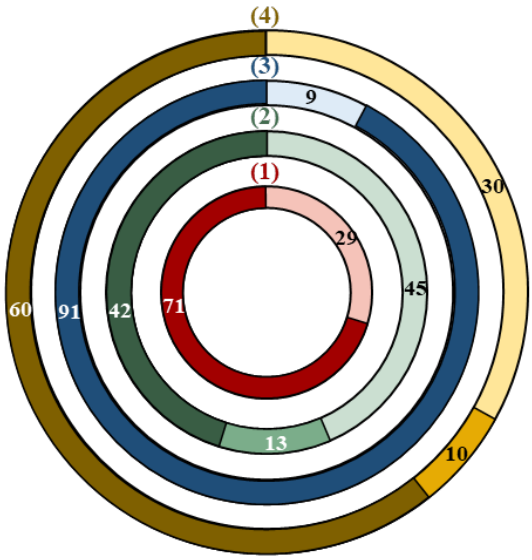
The main focus of this study is to measure agile communication using validated scales adapted from the study of Malik *et al*. (2021). The items used in measuring the agile communication construct are presented in Table 1. To indicate civil engineers' degree of agreement with the items regarding their insights on agile communication, questionnaire survey was designed by means of five-point Likert scale ranging from 1 (disagree) to 5 (agree). In addition, the questionnaire used in this study also included a section depicting demographic data such as education level, experience in the construction industry, gender, and age.

Table 1. Survey items measuring agile communication (Adapted from Malik *et al*. (2021)).

Item No	Items measuring agile communication
Item 1	Project team members had constant access (either visually in the workplace or through a software system) to information such as project status.
Item 2	The client was available and helped answering questions regarding project requirements.
Item 3	Project team members organized everyday team meetings to discuss the progress and if needed, adjusted future work.
Item 4	A meeting was conducted after an iteration during which the team presented its goal/scope, the work completed, the key decisions and a demo of the completed work.
Item 5	Project team members emphasized more on face-to-face communication for conveying information within team.

Then, 200 questionnaires were distributed to civil engineers working on construction firms, and a total of 139 usable responses were returned. Demographics of the 139 respondents are illustrated in Fig. 1. The majority of the respondents held a bachelor's degree, while nearly 91% were male. Based on the age distributions of the respondents, most of them had 25–34 years old (60%), followed by 35–44 years old (30%), and 45+ years old (10%) respondents. Additionally, 58% of them had at least 10 years of experience in the construction industry.

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Legend

Category	Frequency	Percentage
(1): Education level		
Bachelor	98	71%
MSc	41	29%
(2): Experience in construction industry (Year)		
<10	59	42%
10-20	62	45%
>20	18	13%
(3): Gender		
Male	126	91%
Female	13	9%
(4): Age group		
25-34	84	60%
35-44	41	30%
45+	14	10%

Fig. 1. Response demographics.

On the other hand, the data collected were analyzed using the relative importance index (RII) method to determine the relative importance of each statement and to understand civil engineers' perceptions. This method was adopted in many studies (Gunduz *et al*. 2015, Hiyassat *et al*. 2016, Jarkas *et al*. 2014, Smith-Colin *et al*. 2021), since it is regarded as one of the best techniques to determine primary factors (Metro *et al*. 2021). The RII is calculated by the formula given in Eq. (1):

$$\text{RII} = \sum w_i/(A * N) \quad (1)$$

where w_i is a score given to each item by the respondents, ranging from 1 to 5; N denotes total number of respondents; and A represents highest score (i.e., 5 in this survey). Here, The RII value lies between 0 and 1, and a higher value of the RII indicates more important factors of agile communication.

3 RESULTS AND DISCUSSION

The results of means, standard deviation, and RII analysis for agile communication items are presented in Table 2. The face-to-face communication for conveying information among different project team members (Item 5) was found as the most important factor in providing agile communication (Table 2). The finding of this study is also confirmed by Ozorhon *et al*. (2022), in which they emphasized that face-to-face communication rather than written communication provides smooth information sharing and motivation among team members through informal communication. At this point, Hummel *et al*. (2013) pinpointed that face-to-face communication should be used as the primary factor to avoid information loss or miscommunication. According to Elghariani *et al*. (2018), success of agile implementations relies on face-to-face communication among them.

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On the other hand, support and timely availability of the client to answer questions about project requirements (Item 2) is considered by the respondents to be the second most significant indicator measuring agile communication (Table 2). The client plays an important role in the performance requirements and expectations as well as the provided feedback throughout the project (Arefazar *et al*. 2022; Malik *et al*. 2021). Based on the findings, involving clients throughout the project is vital for the immediate response to change the scope and assumptions (Zakrzewska *et al*. 2022). Hence, there is a need for improving collaboration with clients who frequently change their requirements in agile methods (Ochodek and Kopczyńska 2018). Additionally, the findings show that the continual access to information of team members (Item 1) is one of the crucial agile indicators (Table 2). In this context, access to information about the current status of the project can be improved via communication tools and channels (Hummel *et al*. 2013). With easy access to information, agile workplace applications increase work efficiency, thereby turning the risky projects into profitable ones with cost savings (Ulukan 2020).

Table 2. RII analysis results.

			Number of respondents scoring							
Item No	**Mean**	**Standard deviation**	**Disagree**	**Slightly disagree**	**Neutral**	**Slightly agree**	**Agree**	**N**	**RII**	**Rank**
Item 1	3.77	0.943	2	10	39	55	33	139	0.754	3
Item 2	3.86	0.997	3	11	29	56	40	139	0.771	2
Item 3	3.58	1.148	10	13	33	52	31	139	0.717	5
Item 4	3.59	1.062	8	9	43	51	28	139	0.718	4
Item 5	3.89	1.040	4	11	26	53	45	139	0.778	1

Note: N denotes the total number of responses for each item.

4 CONCLUSIONS AND RECOMMENDATIONS

To support the work of project teams, it is essential to implement an innovative and well-established management method for construction projects. In this study, agile concepts were addressed in the context of communication and the identified agile communication factors were analyzed statistically to determine the most significant ones based on civil engineers' opinions. Considering the significance of face-to-face communication for agile implementations, this could help construction professionals take appropriate preventive steps against miscommunication and misunderstandings among team members. Another contribution of the current study can also be related to that it facilitates revealing and understanding the underlying factors that result in improving agile construction projects.

Despite presenting contributions that would benefit the project management applications, this study poses several limitations. First, the study findings are based solely on civil engineers' evaluations in Turkey. Hence, the data can be collected from diverse construction professionals or civil engineers in different countries, and the outcomes can be compared to each other. Second, from the methodological point of view, this study evaluates the agile communication items through the RII method. Therefore, using factor analysis or regression analysis to explain the effect of these items can be a useful direction for future studies. Overall, the findings presented in this research allow construction companies in recognizing the importance of agile solutions more extensively.

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