

User Involvement in the Development of a University Campus Project in Covid19 Period

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Abstract. This paper presents results of a research project investigating challenges related to user involvement in complex construction projects. Building upon specific experiences from the development project of the NTNU Campus in Trondheim, Norway, we focus on how the involvement of a broadly heterogeneous user groups has been tackled and how it was perceived by them. By mapping the experiences and processes within the Campus Project and analyzing them according to the placemaking theoretical framework, we identify the critical factors for successful user involvement processes. This provides a basis for establishing more effective user involvement processes and methods and contributes to a better involvement of NTNU's heterogeneous user groups.

This study presents the results of an online survey conducted between July and September 2021 among NTNU's campus users in Trondheim. The responses were clustered and analyzed according to three user groups, namely scientific staff, students and administrative staff. A significant finding in this study is that users do not necessarily wish to achieve the highest level of participation, but mostly want to be well informed, consulted, involved in a dialogue and collaborate in agenda setting together with decision makers. The scientific staff does put a stronger emphasis on all levels compared to the general population. Based on the findings from this survey, we identified two critical factors that require more attention in order to increase users' engagement and improve the participation. First, the channels of communication to disseminate information about the project should be adapted to the different user groups. Second, the nature of the information presented to the users should be better focused on addressing their specific concerns and requirements. Finally, we also identified challenges linked to COVID-19. Indeed, as students were away from the campus, their relationship to the place was altered. This could explain a lack of motivation to engage in the pre-existing processes.

The study is geared towards stakeholders engaged in the design and implementation of user involvement processes i.e., contractors, consultants, decision makers and end-users. Results from this report can also

be particularly valuable for actors outside the university organization and non-experts in user involvement processes, who will benefit from a better understanding of how these processes are perceived by users and what their expectations might be.

Keywords: Campus development, participation, management, covid19

1. Introduction

1.1 User involvement in complex projects

University campuses can be considered as cities within the city. While they operate on a smaller scale, they do share similar characteristics as cities, namely a variety of functions, users, activities and connections (Pagliaro et al., 2016). University campuses thrive towards a greener future to help tackling global challenges related to sustainability both within their physical environment to reduce their environmental impact but also from a socio-cultural standpoint focusing on management and operations, education, and maintaining a good relationship with local communities (Fachrudin et al., 2019; Zhu et al., 2020). In both university campuses and cities, a failure to address environmental, managerial and organizational challenges combined with a low efficiency and weaknesses in fundamental services will subsequently result in users' dissatisfaction (Pagliaro et al., 2016). The involvement of users in urban development and construction projects contributes to reducing the risk of discontent in the process (Johansen et al., 2022; Jowkar et al., 2022; Temeljotov Salaj & Lindkvist, 2021). User involvement is becoming a central theme in construction projects and a plethora of methods for involving users have been developed, however scholars have found that a lack of concrete framework for who should be involved, how and to which degree combined with an unclear governance structure makes it challenging to implement the results of the participatory processes into the projects (Gohari & Holsen, 2016; Kim et al., 2016a; Senior et al., 2021). Vukmirović & Nikolić (2021) conducted an extensive study based on eleven cases of urban transformation and stressed the need to secure the following conditions: active democratic participation of the local community; users' involvement in the decision-making process regarding changes in the urban environment that could affect them; the planning process should also be flexible and modifiable according to the requirements of users, entrepreneurs, and investors.

1.2 Place Making theory

According to the Project for public spaces (PPS), placemaking is a people-centered approach and a process for transforming public spaces. As a practical framework, it covers three main areas, namely planning, design and management of public spaces with the goal of improving quality of life, providing economic opportunities to all citizens (Vukmirović & Gavrilović, 2020). The place making approach takes the needs and aspiration of local communities as a starting point to develop public spaces that support social interactions, wellbeing, and economic exchange. Beyond the physical intervention on places, placemaking is also defined in the literature as a democratic intervention seeking the active participation of all interested parties in a project such as community members, facilitators, local authorities, non-governmental organizations, and academia (Strydom et al., 2018).

The connection between people and the places they share could be strengthened by a collaborative process that shapes a public realm in order to maximize shared value (PPS, 2008). To define a place and support its ongoing evolution, it is important to engage users in transformation of urban design, facilitating creative patterns, by paying particular attention to the physical, cultural, and social identities. As shown in Figure 1, the placemaking approach relies on four key attributes: *Sociability, Uses and Activities, Access and Linkages*, and *Comfort and Image* (Placemaking Leadership Council, 2018).



Figure 1 Placemaking Theory by Project for Public Space (2008)

1.3 Communication and tools

Social mechanisms can efficiently influence human attitudes and actions, such as: social norms, competition, praise and acknowledgement, social-identity theory, pilot examples, social learning, attention from others, face-to-face stronger together and consensus (Hauge et al., 2017).

Figure 1 is based on a study by (Temeljotov Salaj et al., 2020) and shows how different stakeholders in the decision-making process can bring the public participation up to the highest level, namely “empowerment”. Based on a regeneration project of an urban residential area in Trondheim, they have identified the key information systems used by the different actors to foster public participation. ICT-based tools are increasingly in focus to improve dialogue throughout the project, however there is no consensus on the type of tools and communication channels that should be used.

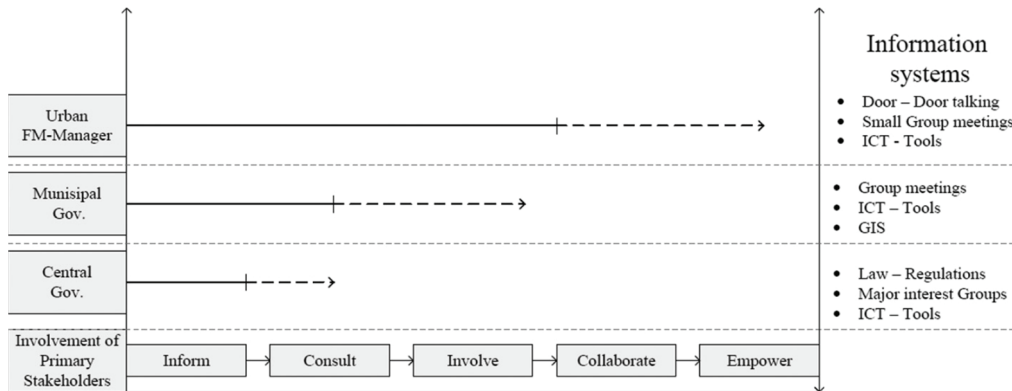


Figure 2 Comparison of main actors' contribution to citizens' participation (Temeljotov Salaj et al. 2020)

They also found that although systematic technical knowledge is important for the project's outcomes, weaknesses in communication skills and a lack of understanding of the social aspects will hinder the realization the vision of a sustainable built environment.

1.4 Social justice and social innovation

Innovative approaches in sustainable urban development are often connected with goals of improving health and wellbeing by linking them to the right to urban green space in the debate of urban sustainability, land use and power relations amongst different segments of society (Loewen et al., 2022). There is a growing interest for more citizen-centered approach of smart and sustainable city (Goodman et al., 2020) as well as a recent increase in the representation of social sciences and humanities in energy research and policies (Royston & Foulds, 2021). Improving the quality of life of citizens as well as empowering them to become active participants in city governance has become a priority in the recent smart cities' projects in Nordic countries (Anttiroiko, 2016; Berntzen & Johannessen, 2016; Simonofski et al., 2019). In the meantime, a large-scale bibliometric analysis of 74.932 research publications by Corsini et al. (2019) revealed that the social implications of public participation and community involvement were underrepresented in the planning, design, construction and operation of energy projects in urban contexts compared to the large amount of studies mainly focused on technological and managerial aspects. There is a need to shed light on the effects of the sustainable urban transition in terms of who will benefit from it and who will suffer (Distributional justice); how fair the decision-making processes are (Procedural justice) and how to identify and recognize the most vulnerable groups exposed to injustices (Recognition justice) (McCauley et al., 2019; Savelli & Morstyn, 2021; Sovacool & Dworkin, 2015). To better approach citizen participation, aspects of social innovation are important to consider. Social innovation has become a central theme in the policy sphere at EU level, with attention given to the empowering potentials of social innovations in processes that fosters citizen creativity and increase problem-solving capacity (Angelidou & Psaltoglou, 2019; Baer et al., 2021). In the challenging times of the Covid-19 pandemic, social innovation can foster empowerment, with citizens and self-reliant stakeholders who take change and development into their own hands (Manzini, 2014). Baer et al. (2021) found that focusing on social innovation in complex development projects supports the technical innovation aspect towards the improved quality of life of citizens and civil society. This contributes to raising awareness on how to identify responsibilities and practices for social innovation according to the

project context (ibid). The authors also identified the importance of innovative approaches within stakeholder engagement processes across sectors and stakeholder groups to address the complexity of the projects accordingly.

1.5 Covid Influence

The outbreak of Covid-19 has highly impacted the education sector with schools and university campuses closing down and teaching activities being performed online (De la Hoz-Torres et al., 2022). Higher education institutions have had to deal with a degradation of the physical and social environment which has a significant effect on students, aggravating issues around routine and self-discipline, mental/physical wellbeing, study motivation and feelings of isolation (Raaper & Brown, 2020). This crisis has also given us an opportunity to reflect on our relationships with our local environment (Scott, 2020). The pandemic has influenced students and educators' needs in terms of indoor and outdoor environment and the digitalization of teaching has redefined the needs in terms of physical infrastructure (i.e. rooms equipped for online lectures and meetings).

1.6 The NTNU Campus development project as a case

This paper presents the case of the NTNU Campus development project in Trondheim, Norway. NTNU is the biggest university in Norway and has two sites in Trondheim, the main one, Gløshaugen regroups most of the technical and artistic disciplines while the second one, Dragvoll historically hosts the social sciences and humanities. This geographic scission is inherited from the time when these were two separate higher education institutions which merged in 1996. The relocation of the two sites onto one has been extensively debated for the past twenty years and has been redefined many times, with the past decade being marked with a stronger focus on users' involvement and efforts to improve the communication within the project. The overall process has major social, economic and environmental implications in the city where the students for accounts for 1/3 of the local population.

The research project "Better user involvement in complex construction projects" was conducted at NTNU in 2021. It investigated how the Campus Development project could:

- collectively reimagine and reinvent joint/public spaces as a heart of university community (UC stakeholders).
- strengthen the connection with end-users to maximize the shared value.
- facilitate creative patterns of use with particular attention to the physical, cultural, social, environmental, policy and other contextual identities that define a place and support its ongoing evolution.
- facilitate the reinventing of inner spaces changes (various types of rooms).
- engage end-users through the entire process (time).

For this project, different categories of users have different priorities and needs in terms of involvement in the Campus development project. Users can be categorized either according to their position in the organization (e.g., students, scientific staff, administrative staff) or by considering their affiliation (e.g., Faculty, central administration, library). Results from this survey suggest that both categorizations can be relevant to observe as they reveal diverging perspectives on different aspects of the campus development project.

This paper focuses on two key aspects of the project, namely the connection with- and the engagement of end-users by addressing the following research question: How has the involvement of a broadly heterogeneous user groups been tackled and how was it perceived by them?

2. Method

2.1 Design of the survey

The questionnaire was designed to address the following assumptions formulated in the research project "Better user involvement in complex construction projects":

1. End users are a very **broad category** of stakeholders

2. There is a need for good **process requirements** for mapping, documentation, assessment, prioritization and tracking of end-user requirements
3. Process requirements also include the development of good **methods for involving end-users in decision-making processes** throughout the project
4. There is a need for good processes that **contribute to a better understanding of the complexity** of requirements among end-users (framework conditions, existing systems and infrastructures as well as other business matters)
5. There is a need to **ensure a better connection** between requirements, solutions and the effect of the solutions
6. There is a need for good **processes that improve the client's, consultants' and the contractors' understanding** of both the heterogeneity of the end-user's needs and possible limitations to articulate their needs

These assumptions were then theorized into the Placemaking Framework, and deeper into the PPS framework (Places, Placemaking movements and Systemic change). This resulted into the following structure for the questionnaire:

- I. Identification of stakeholders
- II. Identification of needs & problems/challenges of the participation process in the Campus development project
- III. Identification of process requirements for involvement in defining/evaluating space

2.2 Data collection process

The questionnaire was hosted on by Nettskjema in accordance with the NTNU guidelines on data collection. The questionnaire was fully anonym, required no login access and collected active consent of the respondents at the start. The questionnaire obtained NSD approval on 28.06.2021.

The link to the survey was posted online for the first time on 30.06.2021 on NTNU's intranet "Innsida" on the "all employees" and "all students" channels. It was then relayed onto intern channels at the departments level as well as on the channel "Participants to research studies wanted". The same process was repeated on 23.08.2021 to collect more responses at the start of the Fall semester. Both the intranet post and the survey itself were provided in Norwegian and in English. The survey was open and accessible for respondents for 61 days (30.06-30.08.2021).

2.3 Data analysis process

The survey was closed on 30.06.2021 and the results were exported from Nettskjema in an Excel format. Results from the Norwegian and English questionnaires were merged to form one dataset. Data mining and analysis were performed using Microsoft Power BI. This tool allowed for visualization of data and facilitated the exploration of possible interrelations between the different questions. All questions were collaboratively analyzed by a team of 4 researchers. This was done in two steps, first looking at the general answers (i.e., unsorted) to identify the overall trend. The second step consisted in going through the results and filtering them according to the respondents' status in the organization to identify significant differences that could be relevant to address in the analysis. At this stage, the three largest groups of respondents were identified as Scientific staff, Students and Administrative staff. The results of the survey were presented in a meeting between the researchers and actors from the Campus Development project, including Statsbygg. The discussion that took place on this meeting led to a request to obtain additional results from specific questions clustered by respondents' status and affiliation. These results are also presented in this report.

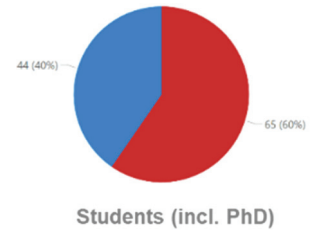
3. Results

3.1 Demographic

This section covers the composition of the sampled population in terms of user groups (e.g. administrative staff, students, ...) their affiliation to a Faculty, and whether or not they have been informed about the Campus Development project.

The following questions were asked under this section.

- Who are you?
- Have you been informed about the Campus Development Project?



➤ Who are you?

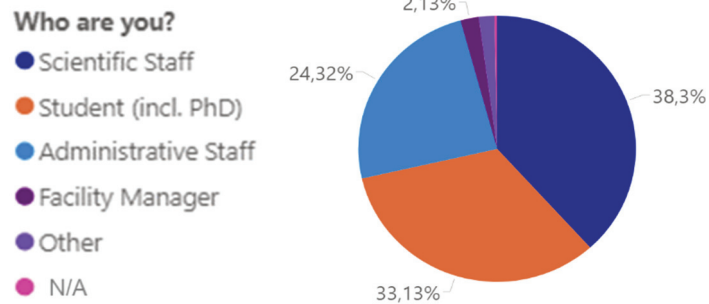


Figure 3 Distribution of the sampled population according to user groups

The total number of responses was three hundred and thirty-three (333), scientific staff represent the largest portion of the sampled population (38,3%). Additional answers were given in the open field section: Technical staff, University Librarians, Real estate section staff, Central Administration staff, Division for Governance and Management Systems staff and TTO.

➤ Have you been informed about the Campus Development Project?

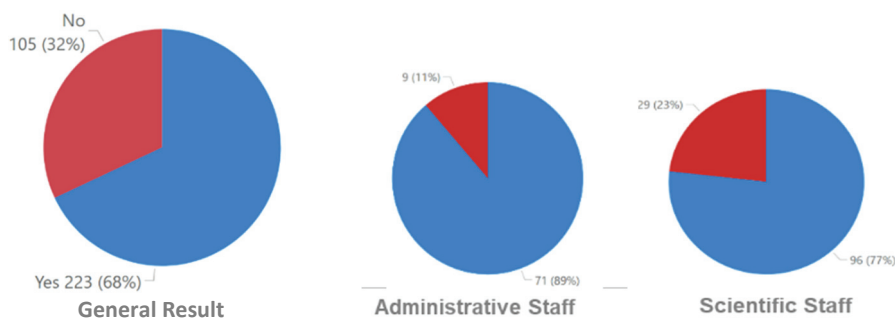


Figure 4. Have you been informed about the Campus Development Project? General results and according to different user groups.

68% of the sampled population declared that they have been informed about the campus development project.

89% of administrative staff and 96% of scientific staff, said they have been informed about the campus development project. However, students represent the least informed group with 60% of them declaring that they have not been informed about the campus development project.

3.2 Communication methods and tools – average values.

This section focuses on identifying the methods and tools used by respondents and which ones would be likely to motivate them to participate in the project. Results are given both for the general population as well as according to different user groups.

- How often do you use different communication mediums to share information?

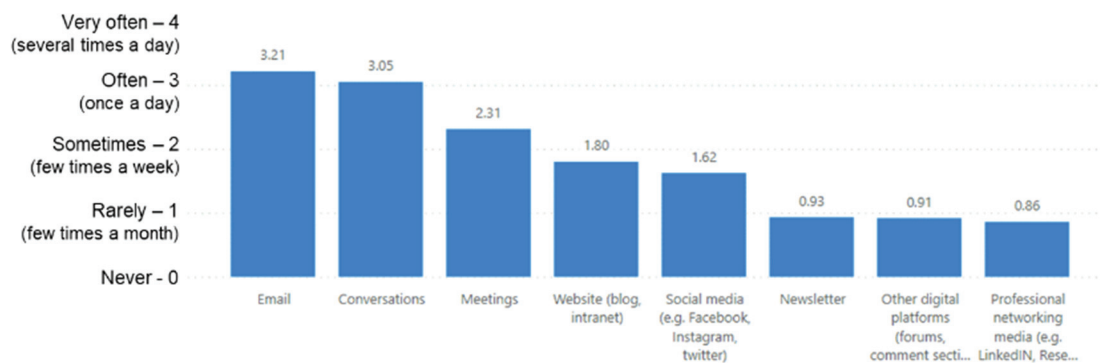


Figure 5. Methods and tools used by respondents to share information.

Looking at the results from the general population, emails, conversations, and meetings stand out as the three most used mediums for sharing information. Websites (incl. blogs, and intranet), and social media are also used but to a lesser extent. Professional networking (e.g. LinkedIn), other digital platforms, and newsletters stand very low.

- Which setups/tools are most likely to motivate you to participate in a project?

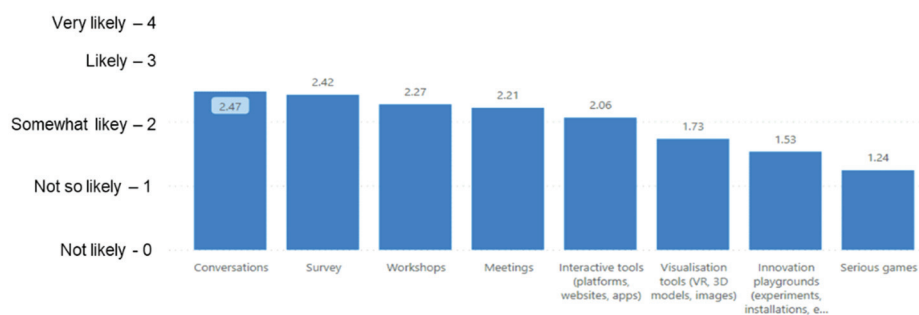


Figure 6. Setups/tools most likely to motivate respondents to participate in the project.

Respondents believe the tools most likely to motivate them to participate in a project would be conversations, surveys, and workshops. While innovation playgrounds and serious games may be less likely to motivate them to participate in a project.

3.3 Communication methods and tools -Administrative staff

This section presents administrative staff views on the following questions:

- How often do you use different communications mediums to share information?

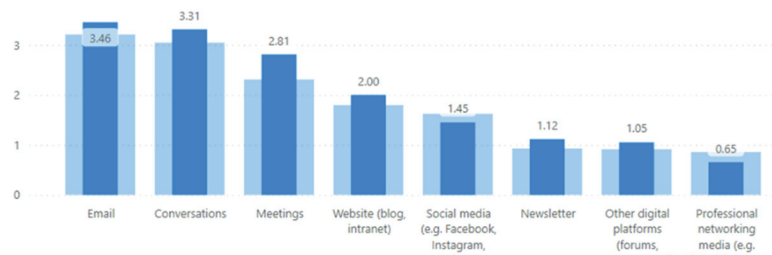


Figure 7. Communication mediums: Comparing average values with response from administrative staff

The response shows that emails, conversations, and meetings are the top three probable communication mediums administrative staff is likely to use to share information (above average). Digital platforms and a professional networking (e.g LinkedIn) are mostly unlikely to be used by administrative staff but websites, Newsletter and other digital platforms still score slightly above average for this group.

- Which setups/tools are most likely to motivate you to participate in a project?

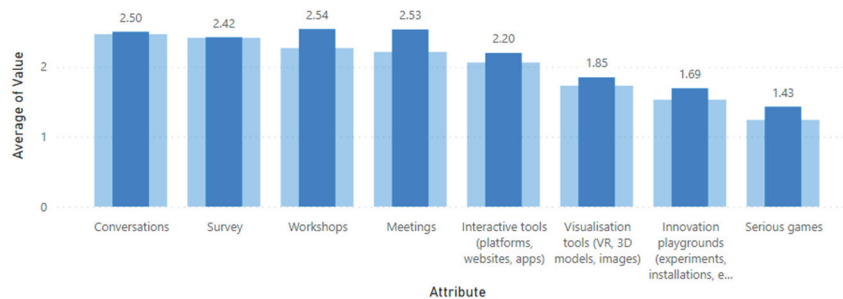


Figure 8. Setups/ Tools: Comparing average values with response from administrative staff

Generally, administrative staff prefer meetings, workshops, and conversations to motivate them to participate in a project, this is slightly above average when compared with the average values from all respondents.

3.4 Communication methods and tools -Scientific staff

This section presents scientific staff views on the following questions:

- How often do you use different communications mediums to share information?

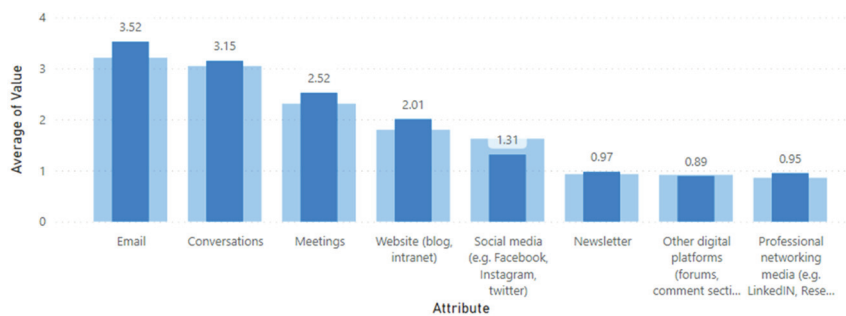


Figure 9. Communication mediums: Comparing average values with response from Scientific staff

For the scientific staff email, conversations, and meetings are the top three communication medium people are likely to use to share information. Social media score under average for this group. Results shows little or no interest in digital platforms (e.g., forums, comment section), and professional networking.

- Which setups/tools are most likely to motivate you to participate in a project?

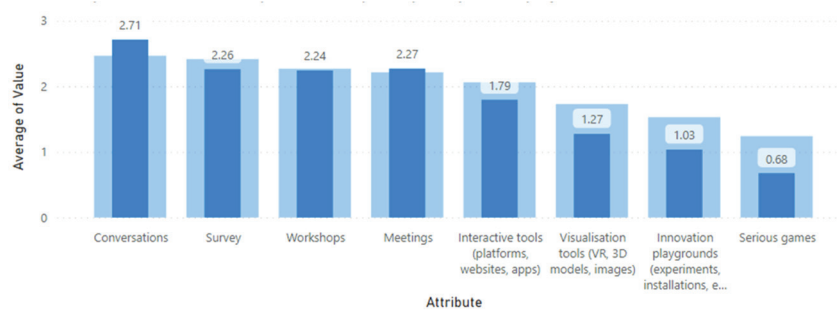


Figure 10. Setups/Tools: Comparing average values with response from Scientific staff

Conversations, meetings, and surveys represent the three most likely setup/tools to motivate scientific staff to participate in a project. However, survey, and workshop rank slightly below average value.

3.5 Communication methods and tools -Students

This section presents students' views on the following questions:

- How often do you use different communications mediums to share information?

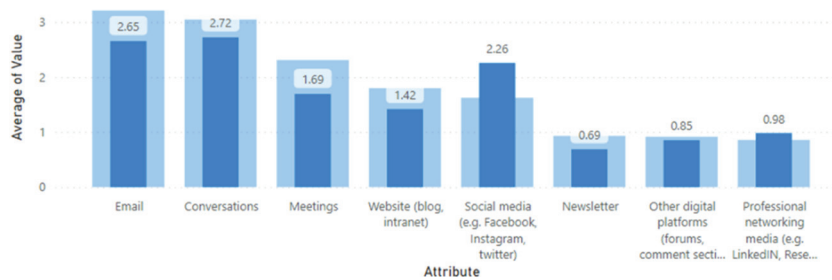


Figure 11. Communication mediums: Comparing average values with Student (incl. PhD)

Students selected conversations, emails, and social media (e.g Facebook, Instagram, Twitter, etc.) as key communication mediums likely to be used by students to share information. Out of the top three only social media rank way above average values. Conversations, email, and meetings are slightly below average values.

- Which setups/tools are most likely to motivate you to participate in a project?

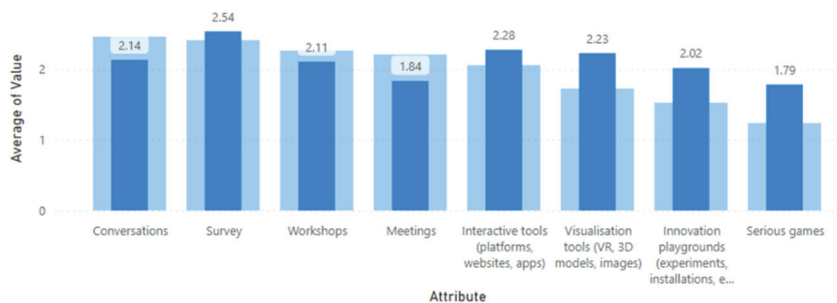


Figure 12. Setups/ Tools: Comparing average values with response from student (incl. PhD)

Students are most likely to be motivated by setups/tools like survey, interactive tools (e.g platforms, websites), visualization tools (e.g VR, 3D model) and “Innovation playgrounds” all ranked above average values. Conversations, workshops and meetings are all rated below average values. Additional preferred tools/methods/channels mentioned by respondents include discussion forums, Microsoft teams, Slack, scientific publications, leader groups, dialog-based setups, and presentations with food serving (for students).

4. Discussion and Conclusion

This paper presents results of a research project investigating challenges related to user involvement in complex construction projects. The theoretical fundamentals of citizen participation (Gohari & Holsen, 2016; Johansen et al., 2022; Jowkar et al., 2022; Kim et al., 2016; Temeljotov Salaj & Lindkvist, 2021), place making (Strydom et al., 2018; Vukmirovic & Gavrilović, 2020), and social innovation (Baer et al., 2021; Loewen et al., 2022), were used as a framework to approach challenges related to users’ involvement in complex building project. We focused on how the involvement of a broadly heterogeneous user groups has been tackled and how it was perceived by them in the campus development project of NTNU during Covid times. The digital survey was designed and structured according to the place making principles of planning, designing and managing public spaces that improve quality of life of all citizens (Vukmirovic & Gavrilović, 2020). The aim of the survey was to identify how the NTNU campus development project could support social interactions and improve wellbeing of the campus users not only in the operational phase but also during the design and implementation phases of the project. Fostering social innovation and developing innovative approaches to stakeholders engagement processes could help address the complexity of the projects and minimize conflict (Baer et al., 2021; Loewen et al., 2022).

The NTNU campus development project has a high degree of complexity due to the wide variety of users with diverging interests and the implication for the wider urban environment, i.e., the city of Trondheim. By mapping the experiences and processes within the Campus Project and analyzing them according to the placemaking theoretical framework, we identify the critical factors for successful user involvement processes. This provides a basis for establishing more effective user involvement processes and methods and contributes to a better involvement of NTNU’s heterogeneous user groups. Results of the survey support the need to develop innovative approaches to participatory processes in order to address the different users groups and foster social innovation.

As a conclusion, we emphasize the most significant findings of the research project “Better user involvement in complex construction projects” by shedding light on the weaknesses of the participation process in the campus development project and giving directions to improve users’ engagement.

- The students are less represented in the survey compared to their population size (104 respondents out of a total population of ca. 36 000 in Trondheim). Various factors could explain this:
 - Challenges linked to COVID-19, as students were away from the campus, their relationship to the place was altered which could explain a lack of motivation to engage in the survey.
 - Their lack of interest in taking part in the project.
 - They are generally less informed about the project itself. This could be explained by the types of communication mediums they use to share and receive information (i.e., social media) as opposed to what has mostly been used to communicate about the project (e.g. website, emails, discussions)
- Different user groups use different communication mediums/channels and have different preferences in terms of tools that could motivate them to participate in the project. Students would be best addressed with more innovative tools (e.g. serious games, interactive tools, innovation playgrounds), while administrative and scientific staff mostly use conversations, emails and meetings).

- Channels of communication and focus areas of the project could be better considered in the communication strategy in order to improve the outreach of the project and the participatory process.

Based on the findings from this survey, two key aspects require more attention in order to increase users' engagement and improve the participation process in the Campus Development project. The channels of communication to disseminate information about the project should be adapted to different user groups. The nature of the information presented to the users should be better focused on addressing their concerns and requirements. Improving the participation process is a pressing matter as the Covid-19 pandemic has altered the users' perception of the place and new spatial needs must be met to ensure the good operation of the campus facilities. The Campus development project has been and will be a very long process, there is therefore a need to have an involvement strategy that can capture users' needs and interests efficiently and as instantly as possible at different stages of the project, especially when major changes to the initial plan are being discussed. This strategy should be focused on meeting users where they are, with the tools and communication mediums they use the most, as opposed to adopting a "one size fits all" approach. This includes tailor-making the nature of the information and the format of the participation method to the different campus user-groups to ensure that relevant information reaches them.

As a recommendation, we foresee that the impact of users' involvement in complex construction projects should be explored further to reveal the most adequate methods, tools and processes to facilitate interaction between all stakeholders. This would increase value creation though more effective user involvement.

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