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# Agile project management for design-build construction projects: a case study

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## ABSTRACT

Despite the rising relevance of Design-Build as a favored project delivery method in the United States, no notable change has been observed in how these construction projects are managed, and the Waterfall Project Management method continues to be used as the preferred method of managing these projects. The applicability of Agile Project Management methods to the management of construction projects with Design-Build as a project delivery method has yet to be ascertained. Can Scrum, one of the Agile Project Management frameworks, be effectively used in managing a Design-Build construction project during the design and the construction phase? This study covers the adaptations necessary to apply Scrum to a Design-Build construction project and conducts a case study where Scrum was applied to part of a Design-Build construction project. The outcomes from this study show that the implementation of Scrum in a Design-Build construction project potentially leads to better cost and schedule control, along with superior communication amongst multiple stakeholders. This study is vital to advance knowledge about the applicability of Agile Project Management methods in other Design-Build construction projects during both the design and construction phases. Further research can be conducted by scaling the application of Scrum to a Design-Build construction project for the entire lifecycle.

***Keywords:*** Agile project management, Construction engineering, Building retrofit.

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## 1. INTRODUCTION

Project delivery is a process consisting of planning, design, and construction necessary to accomplish a building facility or infrastructure. Numerous delivery methods have been developed in the last few decades to overcome the deficiencies of the traditional Design-Bid-Build project delivery method. Commonly used delivery methods are Waterfall Project Management (Lucidchart, 2021), Construction Management at Risk (CMAR), Multi-Prime, and Design-Build (DBIA, 2021). According to a report, Design-Build (DB) methods will represent 44% of construction put-in-place spending in the United States by 2021 (FMI Corporation, 2018). The Design-Build project delivery method has one entity, generally called the Design-Builder, with whom the owner has a single contract to provide both design services and construction (DBIA, 2019). Design-Build project delivery method has gained popularity as it saves money and time by way of fostering collaboration between designers and builders. Although the Design-Build project delivery method aims for increased collaboration, the way Design-Build projects are managed has not changed, and Waterfall Project Management methods continue to be used widely.

**Table 1.** Various Agile frameworks and their feature

| Framework | Distinct Feature |
|---|---|
| Scrum Framework | Focused on teamwork and accountability. Can be used in any industry. |
| Lean Software Development | Focused on delivering value to the customer with no waste |
| Extreme Programming | Focused on improving the quality and features of the software and aims at delivering high-value software quickly and continuously |
| Feature Driven Development | Focused on planning, designing, and building by using a feature list |
| Kanban Framework | Focused on visualizing and enhancing the flow of work and limiting the amount of work-in-progress |

Source: Educba (n.d.)

Agile Project Management has evolved as a preferred method for managing software development projects. Agile methodology grew out of the real-life project experience of leading software engineers (Denning, 2016). Agile is a mindset that is described by four values, defined by 12 principles and manifested through an unlimited number of practices (Manifesto for Agile Software Development, 2001). Agile mindset can be applied by leveraging frameworks such as Scrum, Extreme Programming, Kanban, Lean Software Development, Feature Driven Development, and Dynamic Software Development (Sliger, 2011). Agile projects rely on continuous customer feedback and can respond to changes faster and cheaper, which are some of the aims of the Design-Build project delivery method, although no research has been conducted on the applicability of Agile frameworks to Design-Build construction projects.

This paper describes a study aimed at determining whether Scrum can be utilized effectively in managing a Design-Build construction project by conducting a case study on an ongoing Design-Build construction project. The project involves retrofitting and expanding an existing school building located in Washington, D.C. A literature review has been conducted to include prior studies on the feasibility of Agile Project Management methods in other types of construction and related projects. Various processes and artifacts utilized in the Scrum framework and proposed adaptations of Scrum to Design-Build projects during design and construction phases are described. Case study results are described and analyzed to draw conclusions regarding the feasibility of Scrum in these types of projects.

## 2. SCRUM – AN AGILE PROJECT MANAGEMENT FRAMEWORK

Scrum was initially developed for managing and developing products. It has been used starting in the early 1990s to develop software, hardware, networks of schools, government, marketing, managing the operation of organizations, and almost everything we use in our daily lives as individuals and societies (Schwaber & Sutherland, n.d.). The Scrum cycle is shown in Fig. 1.

### 2.1 Scrum Artifacts

The two essential documents utilized by the Scrum Team are Product Backlog and Sprint Backlog. The product backlog is a list of all items required to be accomplished for the project to be complete. This list is always evolving based on the changes in stakeholder requirements and feedback received during the sprints. The Sprint Backlog is a list of items to be accomplished during a particular period or Sprint and is derived from the Product Backlog based on the priorities defined by the Product Owner.

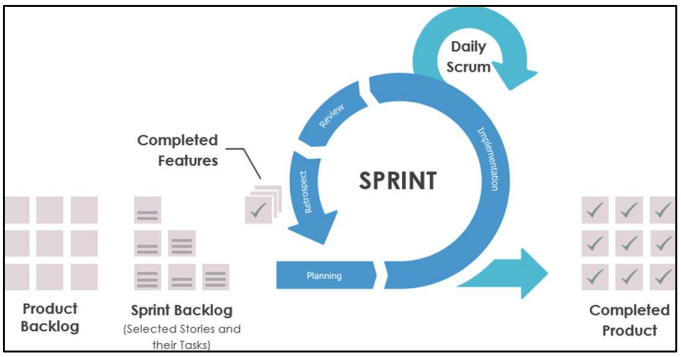


**Fig. 1.** Scrum Cycle (Visual Paradigm, 2021)

### 2.2 Scrum Team

A Scrum Team consists of a Product Owner, the development team, and a Scrum Master. Scrum Teams are self-organizing and cross-functional (Schwaber & Sutherland, n.d.). A design team in construction which consists of architects and engineers and the construction team with various trade subcontractors is already cross-functional and also self-organizing due to the inherent nature of contracting. The product owner is one person and is responsible for managing the product backlog. The Scrum Master is responsible for making sure that the Scrum framework is followed by the team and also helps the development team to create high-value products.

### 2.3 Scrum Process

The Scrum team uses five time-restricted events as planning tools as per the Scrum Guide. These events are –

- Sprint
- Sprint Planning
- Daily Scrum
- Sprint Review
- Sprint Retrospective

A Sprint is a duration ranging from one to four weeks during which the development work is accomplished. A Sprint encompasses the four other events that are an integral part of the Scrum framework. During Sprint Planning, the Scrum team plans the 'what and how' of the projected increment. During this event, a sprint backlog is derived from the product backlog, which consists of the tasks that the team decides to accomplish during the given sprint and makes a plan on how each task will be accomplished. A Daily Scrum is a 15-minute event that occurs every day where the development team plans for the work during the next 24 hours and inspects the work completed since the last daily Scrum resulting in optimized performance and better collaboration amongst the team members.

A Sprint Review is an event where everyone comes together to discuss the progress made during the sprint. Key stakeholders are also invited by the Product Owner to receive feedback on the product increment developed during the sprint. The Sprint Retrospective is an event for the Scrum Team to inspect itself and create a plan for improvements to be made during the next sprint (Schwaber & Sutherland n.d.).

## 3. AGILE PROJECT MANAGEMENT IN CONSTRUCTION: A LITERATURE REVIEW

A limited amount of prior research has been accomplished to determine the applicability of Agile Project Management in construction projects (Mohammed & Chamberlin, 2020), (Dallasega et al., 2019). The authors postulate that the limitations that exist in making changes once construction is put in place may have led to the widespread belief that agility in the construction industry is challenging to achieve. The goal of this literature review is to study the evolution of ideas of Agile applicability in construction in general and in various phases of construction.

Adopting Agile Project Management can lead to cost optimization, collaboration in real-time using software, and happier clients (Wilson, 2018). Illustrating the difference between Waterfall Projects and Agile Projects, Owen and Koskela (2006) argue that the application of Agile Project Management to construction requires careful consideration, given that resources are unlikely to remain fixed if the scope of the project is varied. They also argue that the construction industry is structured around contractual risk avoidance, leading to barriers in utilizing Agile Project Management methodologies, which are based on trust. Nevertheless, the authors do provide the argument that Agile Project Management, as used in Information Systems, has similarities with the method's usage in the design phase of construction (Owen & Koskela, 2006). However, the authors do not provide a definitive study on Agile Project Management's application in the construction phase.

Integrated Project Delivery (IPD) is a delivery method that takes a collaborative approach and integrates all project stakeholders to take advantage of the knowledge of all team members (Associated General Contractors of America, 2020). Straucusser (2015) argues that approaches such as integrated project management and integrated project delivery have core principles that are common to those of Agile Project Management, and the project teams should evaluate multiple tools and techniques to choose what works best for the project (Straucusser, 2015). The author uses case studies where principles of Agile Project Management were applied and has drawn parallels between Agile Manifesto Principles and prevalent Construction Management techniques.

Additional research was examined to find reasons for using a combination of various project management methodologies in managing a construction project. Špundak (2014) argues that instead of adapting a project to a specific project management methodology, methods should be combined and adapted to a specific project. Stare (2014) also believes that certain Agile practices can be utilized for projects that are still carried out traditionally. Lean Construction, which is an adaptation of lean manufacturing principles and practices to construction, is also proposed as one of the methodologies that can be combined with Agile to manage construction projects. Waste in construction can be reduced, making the projects more efficient and profitable while also being fast and flexible by combining Lean and Agile methodologies (Iqbal, 2015).

During the design phase of a construction project, a large number of project participants, such as architects, engineers, estimators, and schedulers, are involved. Sommer (2016) recognized that complex schedules with multiple pages and a lack of understanding of other participants' tasks plague the design phase. To overcome these issues, Demir and

Theis (2016) proposed a framework to utilize Agile methodology during the design phase of the construction project, calling it Agile Design Management (ADM). The authors conclude based on case studies that implementing ADM led to improvements in transparency and solved common issues during the design phase, as identified by Sommer (2016). However, Demir and Theis (2016) do not provide a case for using Agile methodologies during the construction phase. Similarly, Streule et al. (2016) made a case for using Scrum in the design phase of a project utilizing a case study and provided adaptations necessary to the Scrum framework for its implementation in the design phase. Struele et al. (2016) state that Scrum can be applied to the construction phase using Daily Scrums conducted on-site, which could help various subcontractors identify daily goals and work progress. However, no further details are provided on how Sprint Planning and other processes of the Scrum framework can be adopted during the construction phase. Agile Project Management has significant usefulness in pre-construction phases; however, application during the construction phase has various hurdles that remain to be addressed (R. Owen, et al., 2006). The construction phase of a project utilizes a broader diversity in terms of project team members, and the temporary nature of teams hinders the continuous implementation of Agile practices from design through construction phases (Owen et al., 2006).

Although the works cited above are by no means exhaustive, previous works studied the implementation of Agile Project Management primarily in the design phase of a construction project. Moreover, most works cited above do not focus on a specific construction project delivery method. Although there are compelling cases presented for the applicability of Agile methodology during the design phase (Demir et al., 2016; Streule et al., 2016), a comprehensive discussion of adaptation required during both the design and construction phases in a delivery method like Design-Build is missing. The authors remove this gap by discussing a framework based on Scrum that can be applied to the design and construction phases of a project.

## 4. ADAPTING SCRUM FRAMEWORK TO MANAGE DESIGN-BUILD PROJECT

The Design-Build Process can be divided into four phases: Selection of a Design-Builder, Design, Construction, and Closeout. Fig. 2 shows a continuum of the phases related to this process.

Once the Design-Builder is selected, the process of design is initiated based on the project requirements of the owner. A Design-Builder can either be a firm with in-house design expertise or a general contractor that outsources the design aspects of the project. Construction projects involve architects, structural engineers, mechanical engineers, electrical engineers, fire protection engineers, and other professionals, depending on the type of project. In a Design-Build project, once the design reaches a particular stage, construction is initiated, leading to a continuum where both the design team and the construction team collaborates. Significant work is accomplished during two crucial phases of Design and Construction, and the adaptation required in terms of team composition and the Scrum process during these phases is discussed.

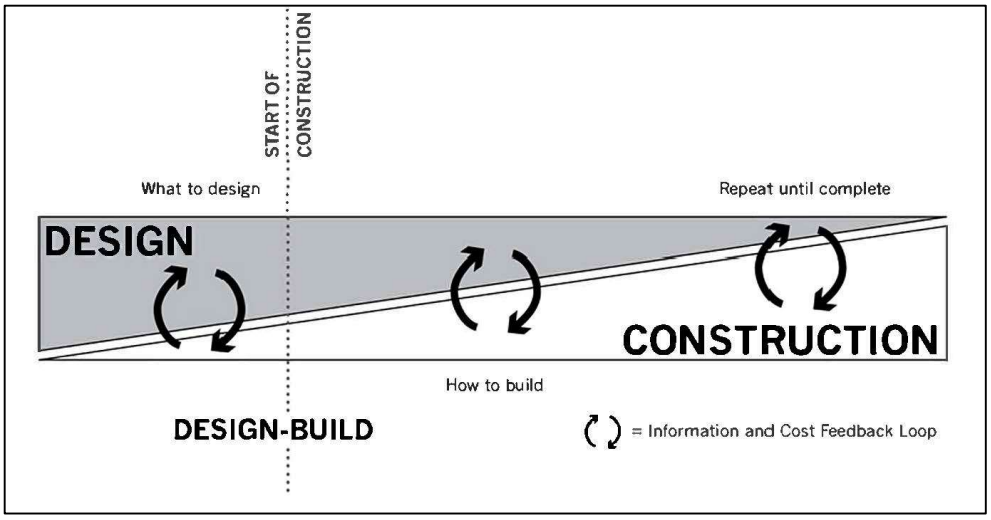


**Fig. 1.** Continuum in Design-Build Delivery Method
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### 4.1 Scrum Design Team Composition

The design phase requires the owner to be involved heavily in every facet of design to define and provide feedback for the development of design along with the general contractor and designers. The Project Manager shall assume the role of a product owner and manage stakeholder expectations. Using requirements gathering and feedback received from the owner, the Project Manager shall formulate the product backlog to achieve the overall goal of the project in terms of design. The development team shall consist of architects and engineers and shall work on design development. An estimator and a scheduler working for the general contractor shall also be included in the development team along with an Engineer. The Project Engineer shall act as the Scrum master to ensure that the team follows the Scrum framework and shall also contribute to the development team in terms of engineering requirements from the perspective of the general contractor. As an alternative, the teams can also consider having a dedicated Scrum Master as efficient facilitation is necessary for successful application of Scrum. Scrum Masters can run meetings, facilitate stakeholder interactions, facilitate feedback on visions, escalate impediments to other Scrum Teams, evaluate and improve team processes, and forecast completion.

### 4.2 Scrum Process for Design Team

During the design phase, several informed design decisions are required to lay the foundation for a successful project. In order to provide a roadmap, the owner shall prepare a project charter containing an overall plan to guide the development team. The scope of work shall be defined in the product backlog, which is in itself a continuously evolving document. The Project Manager will refine the product backlog based on the input and feedback generated from the continuous process of design development. Two-week sprints will be ideal during the design phase in which tasks are self-assigned to each member of the development team. The tasks, as well as the plan, shall constitute the sprint backlog, which is ultimately derived from the product backlog. Examples of tasks are "Design of external façade," "Design of water heating system," and "Design of rooftop HVAC units." During the biweekly sprint planning meeting, the product manager shall prioritize, and the design team shall decide the tasks each member shall accomplish during the upcoming sprint. A meeting with a duration not exceeding 15 minutes shall take place every day during the sprint, where every team member shall discuss the work in progress and seek solutions to problems that may have popped up. This meeting can happen over the phone because most people working in the development team will generally be located at different offices. While the design team members are working on design development, the project estimator shall work on determining the estimated cost of the developed design. The design developed during the sprint, along with a rough order of magnitude estimate, shall make up a product delivered to the stakeholders at the end of the sprint. During the review meeting, the team along with the stakeholders will evaluate the increment and gather feedback that can be used in the future sprint. A retrospective meeting shall follow the review meeting, where the team ponders upon its performance during the last sprint and analyze potential changes that can lead to process improvement. When the team receives feedback from the stakeholders, it shall be incorporated into the backlog, and the team shall make sufficient revisions for the overall product to reach a satisfactory level of doneness. During the sprint, the Project Manager shall also use the feedback from the stakeholders as well as the development team to perform "Backlog Refinement". Backlog Refinement ensures that the Product Backlog contains items that are appropriate and are prioritized.

When the design reaches a certain level, the order to initiate construction shall be issued. The decision to initiate construction shall be taken in coordination with the general contractor, design team, and other stakeholders.

### 4.3 Scrum Construction Team Composition

Construction is distinct from software in a way that it is relatively easy to make changes to software after receiving feedback while it is costly and requires a significant level of effort to make changes after construction has taken place.

Scrum is not a process or technique, but a framework within which one can employ various processes and techniques (Schwaber & Sutherland, n.d.). While one cannot expect to incorporate every facet of Scrum methodology during the construction phase, every facet of how a team works in a Scrum environment can be implemented during this phase. During the construction phase, the design team and the owner shall assume the role of stakeholders, while the Project Manager shall assume the role of the product owner. The Engineer shall assume the role of Scrum master while the Superintendents and foremen of the subcontractors shall be part of the development team.

### 4.4 Scrum Process for Construction Team

The sprint duration during the construction process shall be a week-long as there are a large number of activities that are undertaken simultaneously by different subcontractors requiring rigorous planning. During the Sprint meetings, the Project Manager shall determine the activities that are to be completed during the week per the overall schedule and will assign relevant tasks to each subcontractor. The Engineer shall act as the Scrum master and shall take care of the interests of the development team and ensure the Scrum framework is followed while also solving any problems arising during the sprint. The Superintendent shall ensure that the development team has all the resources necessary to finish the tasks assigned to them efficiently. The Project Manager shall ensure that the project satisfies all schedule and financial requirements as well as schedule regular

inspections laid out in the contract for quality control.

At the end of each sprint, an Owner-Architect-Contractor (OAC) meeting shall be held, which shall include project participants from both design and construction teams. Together, the meeting shall review the sprint and receive feedback from every participant, while also discussing modified or new requirements based on the feedback. The feedback received shall be utilized by the design team and the construction team to plan their next sprint.

Better collaboration between multiple stakeholders can lead to a decrease in the time for which issues remain unsolved. A study has shown that 82% of owners feel they need more collaboration with the contractors (KPMG, 2015). The integrated Design-Build process undertaken in this way shall produce a continuum where both teams shall utilize feedback loops produced by the design and the construction teams in order to create a project that satisfies continuously evolving requirements of stakeholders in an Agile fashion.

## 5. CASE STUDY – APPLICATION OF SCRUM FRAMEWORK TO MANAGE PART OF A DESIGN-BUILD PROJECT

The method proposed in Section 4 was implemented at a privately-held 100-employee general contracting firm, MCN Build, located in the Washington, D.C. metro area in the United States with an annual project volume of over US$ 500 million in 2019. The firm has expertise in Design-Build project delivery and primarily operates in the school building sector. This case focused on a Design-Build school construction project located in Deanwood, Washington, D.C., under a GMP contract of over US$ 50 million. The project involved demolition, erection of temporary facilities, renovation of the existing school building (Phase 1), the addition of a new building (Phase 2), and connecting both structures. The project team kickstarted the project in August 2018. Design development continued while crews carried out demolition. The design team issued final drawings of Phase 1 and Phase 2 for construction in May 2019. Phase 1, which included demolition, the building of temporary facilities, and renovation, was substantially completed in July 2019. The team managed this Design-Build project in a fashion similar to the ways typical construction projects are managed, i.e., using the Waterfall Project Management method. The team held OAC meetings every week, which involved the project management team, the Superintendent, owner representatives, and the design team. Issues of construction progress were discussed during these meetings, but discussions were not undertaken for future tasks and features as these meetings were only used to brief the stakeholders in regard to the construction progress made. The team used a master schedule created at the start of the project to create three-week schedules for the field team. The master schedule was updated every two weeks in order to incorporate any new advances or delays in construction. The team had little to no opportunity to create a solid plan based on these updates since none of the stakeholders are consulted when these updates are prepared. The construction management team acted as a centralized planning body, which then directs the work of numerous stakeholders involved in the project.

While the construction team was preparing to kickstart Phase 2 involving the construction of the new building, the owner floated an idea of an outdoor classroom to be constructed on the roof of the new building addition. The roof plan before and after modification is shown in Fig. 3. The design team was instructed to modify structural steel for the section, which was to support the outdoor classroom on the roof since modifying a structure becomes extremely difficult and costly once it is placed. New structural drawings related to the outdoor classroom section were prepared and issued in August 2019 and were incorporated in the construction. However, there was no express instruction given to create an architectural design for the outdoor classroom. No further requirements and feedback were collected from the stakeholders, and the construction was continued for the rest of the building. Finally, it became apparent to the team that a design for the outdoor classroom would be required soon in order to incorporate it into the overall building construction and prevent significant delay to the overall project schedule.

### 5.1 Implementation – Scrum Framework Applied to Design and to Build the Outdoor Classroom Section

Adaptation and implementation of Scrum were undertaken to finish the design and construction of the outdoor classroom section. The teams were categorized and given the Scrum roles as described in Section 4.

**Product Owner** - Jacob Goldsmith (Project Manager)
**Scrum Master** - Eddie Lawton (Project Engineer)
**Design team** - Isaac Gregory (Architect), Bill Smith (Structural Engineer), Kyle Jones (Mechanical Engineer), Rick Johnson (Landscape Architect)
**Construction team** - Ali Baires (Superintendent), Nathan Jackson, Mike Dysard, Adam Moore, James Applegarth (Foreman)

The design team used two-week Sprints while the construction team used one-week sprints. Basic training in Scrum was given to the stakeholders as a primer while the Project Manager and the Project Engineer were already well-versed with the Scrum methodology. The design team conducted Daily Scrums and Sprint Planning meetings virtually from different locations but conducted the Review and Retrospective in person. The construction team conducted all meetings onsite. The study spans 12 weeks, during which the outdoor classroom section was designed, approved, and constructed. Evaluation of usage benefits of the adopted Scrum methodology is limited to two performance parameters of the construction project – Schedule and Cost.

### 5.2 Project Results

The construction of the outdoor classroom has been completed on schedule and has not affected the critical path and has not delayed the original substantial completion date of the overall project. Before the implementation of Scrum, the project team was anticipating significant delays and added costs resulting from the failure to design the outdoor classroom section and start its construction in time. To make the outdoor classroom section accessible for disabled students, it required a ramp connecting the main building to the outdoor classroom. One the one hand, if the project team did not design the outdoor classroom section in time, construction would have to be stopped in order to incorporate ramp in the original design, otherwise leading to the necessary demolition of construction already put in place. On the other hand, after the project team implemented Scrum to manage both design and construction of the outdoor classroom section, the cost of the outdoor classroom section was calculated at US$ 243,000 and remained under the initially allocated allowance of US$ 250,000 by nearly 3%. Estimates showed that the demolition of various components that would have been necessary to accommodate a ramp by lowering the slab would have cost more than US$ 43,000 (see Fig. 4 and Fig. 5). When added to the outdoor classroom section cost, the sum of over US$ 286,000.00 would have been almost 18% more than the actual cost incurred after implementing Scrum and more than 14% over budget.

The participants were asked to respond to the following questions on a scale of 1 to 10.

- Familiarity – What was the level of their prior knowledge of Scrum framework and Agile Project Management in general?
- Communication – What was the level of ease observed in communication relative to their normal project management process?
- Guidance – What was the level of guidance provided by the Scrum Master?
- Schedule – What was the level of effectiveness of various meetings?
- Scalability – To what extent is Scrum scalable in Design-Build construction projects?
- Future use – What is the extent to which they would like to have Scrum used in future construction projects?

Four members from the design team and five members from the construction team provided responses to every question listed above. Results show that the members of the design team were more familiar with Agile methodology than the members of the construction team, which the teams anticipated. Analysis of the responses reveal that both the design team and the construction team believed that the level of ease in communication increased significantly relative to their regular project management process (see Fig. 6). The guidance provided by the Scrum Master as well as the effectiveness of meetings were also rated high. Analysis also shows that teams have high confidence in the scalability of Scrum and have high approval ratings for its usage in a future construction project.

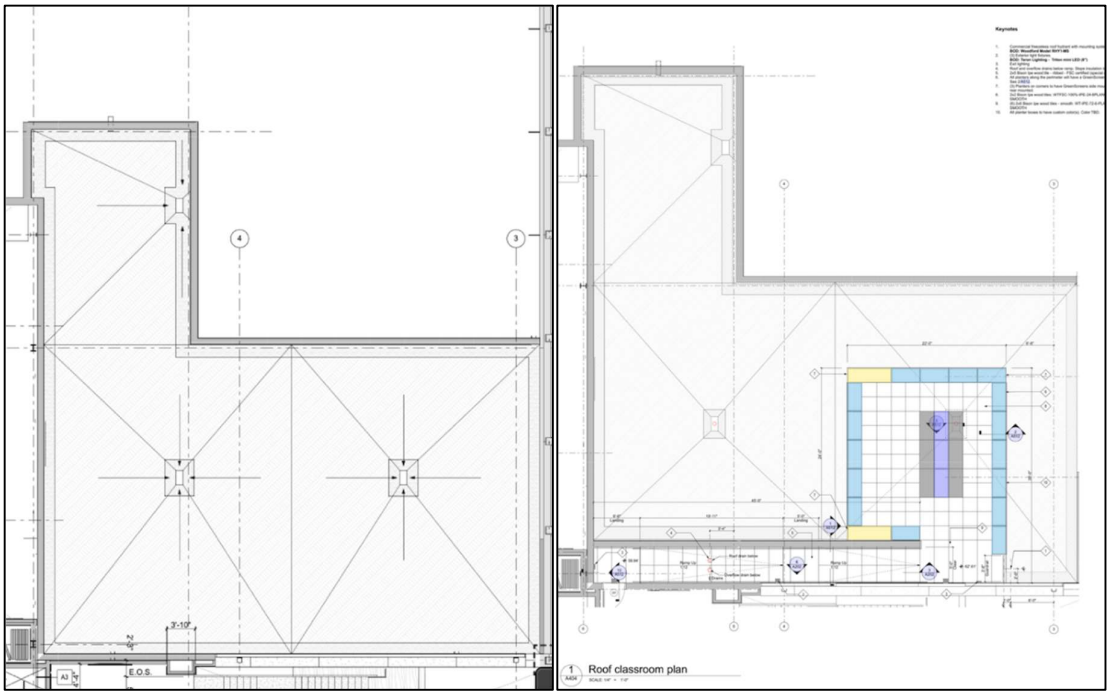


**Fig. 2.** Roof plan before and after the outdoor classroom was designed

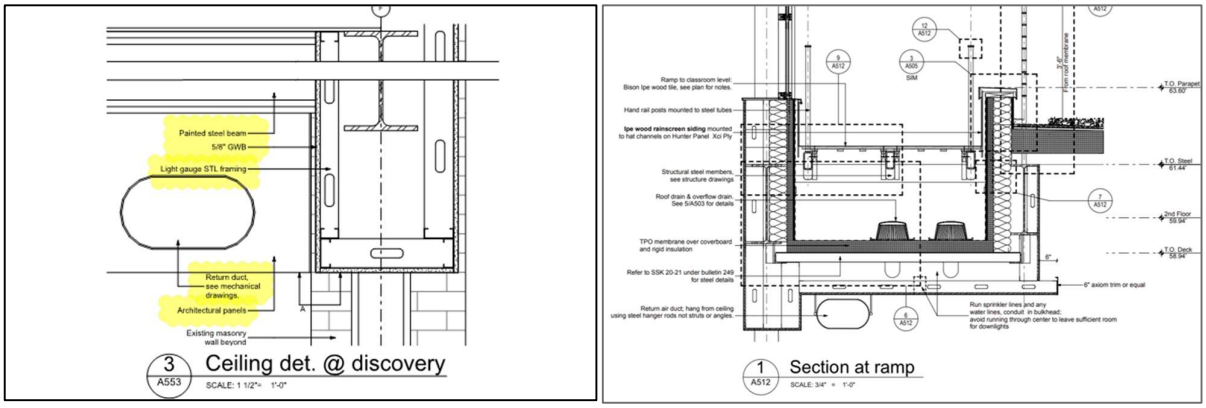


**Fig. 3.** Delay in design would have led to unavoidable demolition of all components marked in yellow to accommodate a ramp above by lowering the slab

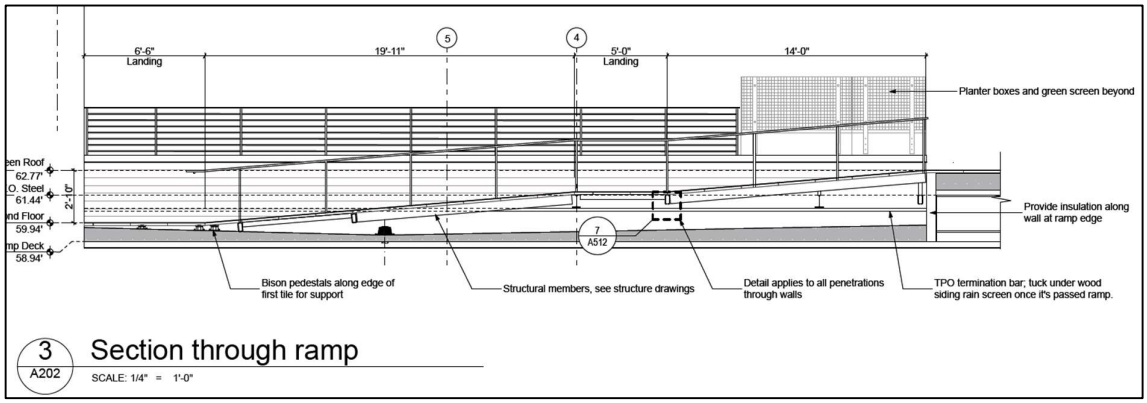


**Fig. 4.** Final section of the designed ramp

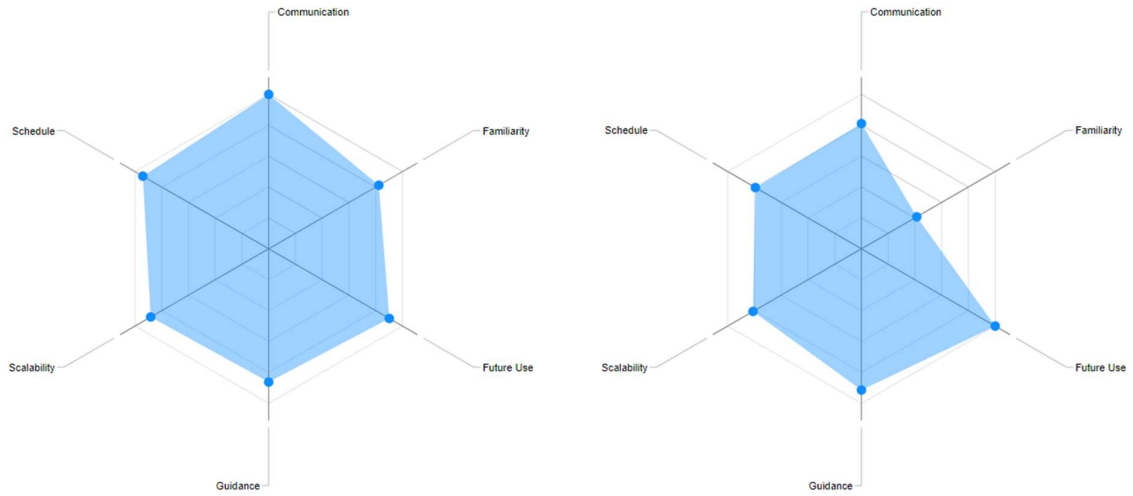


**Fig. 5.** Analysis of responses from design team (left) and construction team (right). Teams rated the questions on a scale of 1(low) to 10 (high)

## 6. DISCUSSION

It is understood that full agility is only possible during the design phase, while partial agility is gained during the construction phase in how the construction team is managed since changes in construction already put in place incur high costs. This can be mitigated by the use of BIM (Building Information Modeling) technology to convey the designer's intent to the stakeholders as realistically as possible using the current state of BIM technology. Designer's intent refers to the drawings and other information produced by the design team that convey the fundamental, intrinsic requirements of a design. Parametric modelling, which uses algorithm to create models, has been brought to the forefront with the increased use of BIM and can further assist in precise conveyance of designer's intent (Designing Buildings, 2015).

Training is necessary for all members of the project team, including those working in the field to implement Agile Project Management on any full-scale construction project. Overall, the project team members should be made aware of advantages of utilizing Agile methodology. The Project Manager on the team should have the necessary Product Owner training while the Scrum Master on the project should have Scrum Master training. In turn, these individuals should guide the design team and the construction team on the Scrum framework and how various processes being adopted by the team are a subset of the Scrum framework. With proper training, everyone on the team should have the necessary knowledge of what is expected out of each member to create self-governing teams. Teams should also be willing to give up the conventional hierarchical roles defined for implementing sequential project management methods. In contrast, Agile works on the principles of collaboration, which requires that the hierarchical roles be removed within the team. Scrum of Scrums is a technique used to scale Scrum to large groups over a dozen people (Agile Alliance, 2019), which can be implemented within an organization to use Scrum methodology for multiple projects. While implementing Scrum, one should be aware that Scrum is a framework within which distinct processes can be developed by the team. This inherent flexibility of Scrum framework can lead to a swift implementation of Scrum across the project as well as an entire organization.

One limitation of the presented case study is a relatively large number of members of the Scrum team. The size of the team resulted from specific operational requirements related to the management of the construction project in the study. Future studies may address the impact of the Scrum team size on project management productivity. It would be of interest to determine if the nature of construction projects generates optimal project management Scrum team sizes that are significantly different from guidelines for project management Scrum team size in other project domains such as software systems development and deployment.

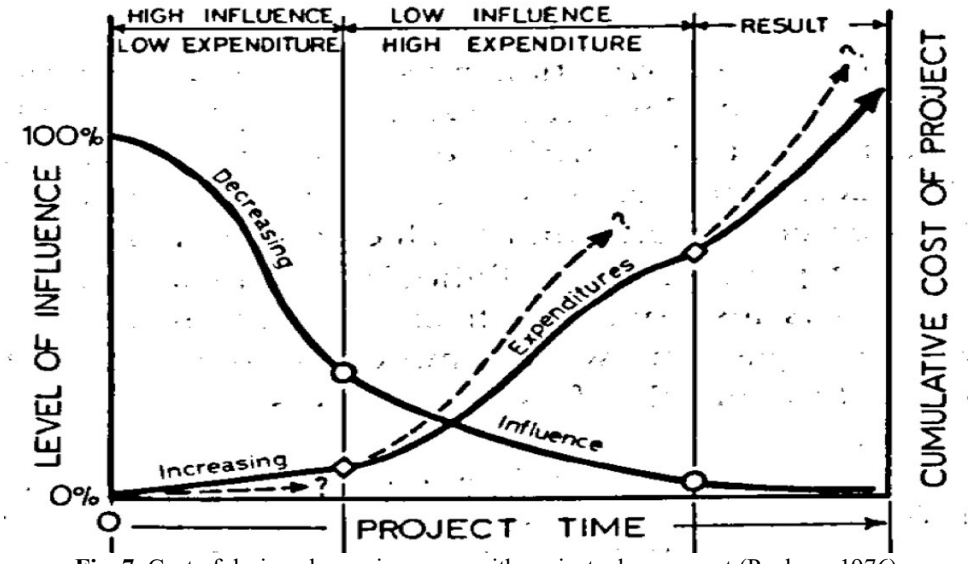


**Fig. 7.** Cost of design change increases with project advancement (Paulson, 1976)

## 7. CONCLUSIONS

As shown in this paper, the application of Scrum to construction projects with the Design-Build delivery method is possible. With proper training, the project teams can achieve agility in decision-making. Moreover, unobstructed and transparent lines of communication as a result of using Scrum can ensure timely decisions leading to better cost, schedule, and quality control. Since Scrum is a framework, the authors recommend that each team should tweak and adapt the processes to determine what works best for their teams, rather than focusing on minute details. This will ensure a swift implementation of Scrum on any scale of project from small to large.

Additional research can be conducted by adopting and scaling up the Scrum method as described above for managing an entire project to gain more definitive insights concerning the scalability of the method from small to large-sized Design-Build construction projects.

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