Experiences Implementing the Construction Manager/General Contractor Delivery Model for a New School Construction Project in Oregon

Submitted by

Wade August Smith

A Dissertation Presented in Partial Fulfillment

of the Requirements for the EdD

Concordia University - Chicago

River Forest, Illinois

June 2019

CONCORDIA UNIVERSITY CHICAGO

Experiences Implementing the Construction Manager/General Contractor Delivery Model for a New School Construction Project in Oregon

by

Wade August Smith

has been approved

Date

_____

Paul Sims, Ph.D., Dissertation Chair

_____

Katherine Green, Ph.D., Committee Member

_____

Angela Tagaris, Ph.D., Committee Member

Abstract

Considerable capital improvements will be sought by Oregon school districts to address facility infrastructure challenges over the coming years, necessitating the need to utilize one of three allowable project delivery systems: design-bid-build (DBB), design-build (DB), or an alternative delivery model, construction manager/general contractor (CM/GC). While prior research has been performed related to the three models, data gathering and analysis has focused almost exclusively on quantitative project metrics such as cost (i.e., which model is cheaper) and schedule (i.e. which model is faster). Limited research related to the subjective experiences of project stakeholders, especially from those who implemented CM/GC, is available. This qualitative research consisted of a bounded case study and served to illuminate the CM/GC model at a specific site in order to provide an in-depth understanding of stakeholder experiences who implemented the delivery system. Results from this research affirm that the CM/GC model is collaborative, supports positive relationships, and promotes productive communication among stakeholders. Project members, specifically owners, felt listened to and supported throughout the program, described themselves as part of a team, and relayed that the model supported project success. Critically important considerations were also identified for future users to contemplate when implementing CM/GC, which included the importance of selecting suitable project team members in addition to establishing clarity among roles, expectations, and program contingency access.

Keywords: Stakeholder theory; Project delivery model; CM/GC; Construction manager/general contractor; Design bid build; Design build; Stakeholder theory; CM at-risk; School construction

Dedication

This dissertation is dedicated to the amazing school district leaders who labor every day in service of public education. Often underappreciated and over-scrutinized for their tireless efforts and devotion, the success of their district and its stakeholders often correlates directly to their own positional achievement. I hope that this research provides the much-needed support for so many who find themselves thrust into the construction spotlight following a successful bond campaign. Often with limited training and experience to draw from, an awesome responsibility is now placed squarely on their shoulders to deliver. I urge all leaders who find themselves in this situation to respect the fact that every decision, including the construction delivery model chosen, can have lasting impact on their district and community for years to come. Let this case study and its findings inform their decision making process and help lead them down the road towards success!

Acknowledgements

To my wife and daughters who have graciously allowed me the opportunity to advance my career, learning, and passions, despite the incredible sacrifices they have had to endure to do so. I am truly blessed and forever grateful for their support.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Nearly half of Oregon's schools in operation today were built either post-World War I (1918-1935) or between the years 1948-1955 (post-World War II) (Oregon School Capital Improvement Planning Task Force and Portland State University, Hatfield School of Government, Center for Public Service, 2014). As a result, approximately 40% of Oregon's school facilities require substantial renovation or replacement due to their dilapidated and aged status. Statewide, it is estimated that 7.6 billion dollars is needed to accommodate such infrastructure improvements for current facilities alone (Oregon School Capital Improvement Planning Task Force and Portland State University, Hatfield School of Government, Center for Public Service, 2014). As a result, considerable capital improvements will be sought by Oregon districts to address infrastructure challenges over the coming years, necessitating the need to utilize one of the three allowable project delivery systems: design-bid-build (DBB), design-build (DB), or an alternative delivery model, construction manager/general contractor (CM/GC).

The myriad of choices for project delivery leads to confusion and has become increasingly complex for owners to navigate (American Institute of Architects [AIA], 2011). All too often, the responsibility for determining which delivery system to utilize is left to school district superintendents, business managers, or school boards, who are often inexperienced or lack sufficient understanding to inform their decision. With millions of dollars at stake, the trust of their taxpayers and stakeholders at jeopardy, and public scrutiny lurking around every corner, the decision is a critically important one. School district officials must thoroughly understand the different delivery systems available,

their inherent strengths and weaknesses between them, and choose carefully the method that best meets their program needs based on sound criteria and reasoning.

This research project aimed to provide critically important information as it set out to describe and interpret the experience of an Oregon school district who had recently implemented CM/GC to deliver their capital school project. The results obtained allow future district decision makers greater insight into the CM/GC process to help them determine if the alternative delivery model is be best suited to support their district's future construction project.

Background of the Study

Oregon Revised Statute Chapter 279C and Oregon Administrative Rules Chapter 137 outline a school district's authority to utilize one of three procurement mechanisms to deliver capital construction: design-bid-build (DBB), design-build (DB), or construction manager/general contractor (CM/GC). Of the three delivery models, DBB is the most commonly used, and often referred to as the "traditional" method (Construction Management Association of America [CMAA], 2012). As outlined in its nomenclature, the process includes three primary steps; the owner contracts with an architectural firm to produce construction documents (design), the owner then uses the documents to solicit sealed bids from contractors to construct the building (bid), and the lowest responsible bidder is then hired to construct the facility (build).

The second permissible option is referred to as design-build (DB), where a single source of responsibility is sought from a vendor. In DB the owner contracts directly with an entity who is responsible for both the design and construction of the requested facility (AIA, 2011).

The final option available to school districts, often referred to as an alternative delivery model, construction manager/general contractor (CM/GC) is gaining popularity and is expected to increase in use over the coming years (McGraw Hill Construction, 2014). Also referred to as CM at-Risk (CMR) in other states, like DBB, the owner independently hires an architect to design the facility. However, unlike DBB, the owner contracts with a general contractor who also serves as a construction manager early on in the process (referred to as the CM/GC). This early on-board of all three stakeholders (architect, owner, and contractor), among other speculated benefits, is thought to enhance relationships among key project stakeholders (Rojas & Kell, 2008).

Significant research has been performed comparing and contrasting the three allowable delivery models. Benchmark performance indicators such as value (which model provides the lowest cost), project schedule (which model serves most expeditious), risk (which model is least likely to result in legal claims or suits), and quality (often measured by warranty-related issues and call-backs), have served as industry standard tools to differentiate between the models (Carpenter, 2014; Haponava & Al-Jibouri, 2012; Rashvand & Majid, 2014). Although objective indicators around value, schedule, risk and quality are important to a project's overall success, a significant void in research surrounding subjective project stakeholder experience is apparent. Few studies have analysed critical qualitative factors such as stakeholder experiences with construction delivery models, providing scarce resources upon which school district leaders can draw upon to help inform which delivery model might best suits their needs (Rashvand & Majid, 2014).

Problem Statement and Significance of the Study

Nationwide, an estimated $197 billion is needed to address infrastructure improvements across K-12 school campuses (Alexander & Lewis, 2014). In an attempt to address those needs in the state of Oregon alone, over $2.2 billion worth of school construction were approved through local school levies in the last six biennia (Oregon School Capital Improvement Planning Task Force and Portland State University, Hatfield School of Government, Center for Public Service, 2014). Without a clear understanding of the subjective experiences associated with the varying project delivery approaches, districts are making selection decisions void of critical information, leaving billions of taxpayer dollars to chance. As Oregon school systems prepare for their capital construction initiatives it will be critically important that their selection of project delivery method is an informed one (Sewalk, Mohr, Fitzgerald, & Taylor, 2016). As they weigh different options available to them through statute, consideration towards a model that promotes high satisfaction from project stakeholders should be contemplated. Often with millions of dollars at stake, the trust of their taxpayers in the balance, and the implications and consequences if school construction project outcomes are not positive, the decision over project delivery is paramount.

Although prior research has been performed related to CM/GC projects, the research has been focused primarily on quantitative analyses focused heavily on cost and time variables (Carpenter, 2014; Konchar, 1997; Kulkarni, Rybkowski, & Smith, 2012; Rojas & Kell, 2008; Williams, 2003). The limited data related to project experience that does exist focuses heavily on project quality outcomes, providing only a cursory glimpse into stakeholder experiences related to the entire CM/GC process (Carpenter, 2014;

Konchar, 1997; Williams, 2003). As a result, scarce research has been performed analyzing subjective stakeholder satisfaction and experience, critical components of any project's overall success (Rashvand & Majid, 2014).

Theoretical and Conceptual Framework

Although standard benchmarks such as cost and value are important when delivering school construction projects, there are other subjective aspects that are critical to overall success. Since Freeman's (1984) ground-breaking contribution to the concept nearly 35 years ago, stakeholder theory has influenced organizations to broaden their measurement of success from simple economics, focusing evermore on value creation (Freeman, Harrison, Wicks, Parmar & De Colle, 2010). As stakeholder disappointment continues to be a root problem within construction projects, understanding how primary participants approach, are involved, interact, and make decisions during capital school campaigns will serve instrumental in ensuring value and satisfaction is supported (Eskerod, Huemann & Ringhofer, 2015).

Just as corporations are responsible to their stakeholders to ensure both economic and value creation, so too are those involved in delivering school construction projects to their constituency. From architect to administrator, and from contractor to school board member, stakeholder theory portends the importance that each key player understands their critical role to support value and success (Freeman et al., 2010). Often referred to as corporate social responsibility, stakeholder theory seeks to understand how value is created and supported, and the relationship components necessary to foster such outcome (Freeman et al., 2010). An entirely new lens upon which to approach school-related construction project delivery, stakeholder theory suggests that project team members

reframe their approach, focusing on shared value creation as a result of their collective interests. This does not mean that stakeholders abandon individual welfare, such as the contractor's profit or architect's design. It does, however, require team members to take into account the interests of fellow stakeholders and seek to understand and accommodate others' perspectives to support a positive outcome through a collective experience.

Stakeholder theory offers two distinct approaches upon which to approach human capital interaction; management of stakeholders (or managing stakeholders) approach and a management for stakeholders approach (Eskerod, Huemann & Ringhofer, 2015; Freeman et al., 2007; Freeman et al., 2010). In the later, and foundational to this research, casting a wide net for project stakeholder involvement, seeking to better understand the needs, wishes, hopes, and aspirations of key participants through actual project experience (e.g., managing for stakeholders), and acting in support of the collective outcomes, will aid in understanding drivers for value creation through stakeholder experience (Eskerod, Huemann & Ringhofer, 2015).

Despite compelling research around stakeholder theory, participant disappointment continues to affect construction projects. In order to better understand and overcome such adversity, one must apply stakeholder theory to the context and setting within the construction field itself (Eskerod, Huemann & Ringhofer, 2015). A conceptual framework, built around the relationships and perspectives from the primary project stakeholders (e.g. superintendent, architect, construction manager), in addition to other core stakeholders (e.g., board members, owner's representatives, principals, planning members), will serve foundational to a better understanding of experiences towards possible value creation resulting from the CM/GC delivery model.

To leverage stakeholder theory for increased value through shared understanding and communication, the CM/GC model appears well poised to support such conditions due to its integrated and collaborative approach. As noted by Bridoux and Stoelhorst (2016), "… contributions to joint value creation depend on how individual stakeholders frame their relationships with other participants in the value creation process" (p. 230). As stakeholder theory professes, organizations "…could create more value by forging relationships with stakeholders on a basis other than the strong financial incentives" (p. 246). The CM/GC model, in concept and function, appears by design to support greater collaboration, cooperation, and shared risk, appearing well structured to address many of the core tenets identified in stakeholder theory.

As Figure 1 details, the conceptual framework progression begins with an analysis of the three project delivery systems, emphasizing core differences between CM/GC and its counterparts. Former research around project delivery selection drivers and risk avoidance implications will be discussed, as they both frame the decision making process for districts. A deep analysis surrounding previously studied project success criteria, primarily objective in nature, will be reviewed, followed by stakeholder relationships and interactions between project participants.

A methodological design is supported and triangulated by multiple sources of data. One on one interviews with project architects, contractors, and owner representatives will be performed, recorded and transcribed for accuracy. A focus group interview will be conducted and supporting research will be supplemented with project documents.

Researcher's Positionality

The researcher's role was that of a non-participant observer (Creswell, 2015). However, based on his recent work history in Oregon as a school district leader, the researcher did come across district and project team participants whom he has prior working experience. In addition, the researcher has supervised multiple capital construction projects over his career, utilizing both the CM/GC process as well as DBB. Prior personal experience with such delivery models was identified and bracketed to ensure personal bias and assumptions did not prejudice research processes or conclusions (Merriam & Tisdell, 2016).

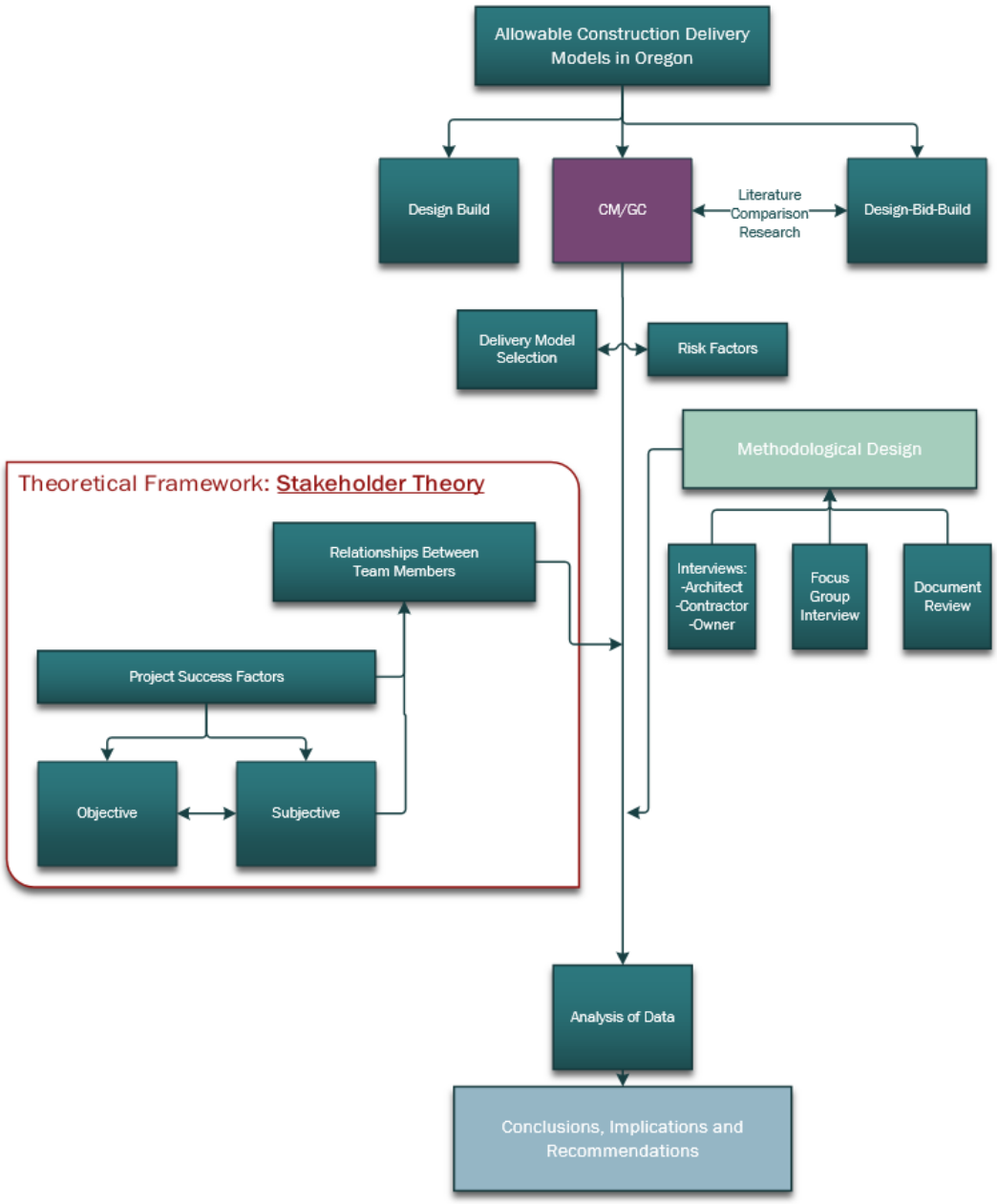


Figure 1. Theoretical and Conceptual Frameworks

Purpose of the Study

This qualitative study explored stakeholder experiences having implemented CM/GC to deliver a new school construction project in Oregon. Results obtained provide

future district decision makers with increased information upon which to make an informed construction delivery model choice when completing their capital school construction projects.

Research Questions

The primary research question that guided this qualitative study was:

R1: What are the experiences of a school district who implemented the construction manager/general contractor delivery model for their new school construction project in Oregon?

Additional research questions were:

R2: How do stakeholders describe their actual experiences with CM/GC versus their anticipated experiences?

R3: What aspect(s) of the CM/GC process did stakeholders find valuable to their experience?

R4: What aspect(s) of the CM/GC process did stakeholders find least valuable to their experience?

Rationale for Methodology

The research consisted of a bounded case study of a school district in Oregon who recently implemented the CM/GC delivery model to deliver their new school construction project (Merriam & Tisdell, 2016). Selection of the specific site was intentionally identified to ensure that the project scope and participant willingness to engage in the research provided the purposeful sampling necessary to address the research questions (Merriam & Tisdell, 2016).

Utilizing information gleaned from the Oregon Department of Education and Oregon School Boards Association, prospective sites were identified for consideration. Further contact was necessary to ensure the utilization of the CM/GC delivery model, in addition to attaining sufficient stakeholder willingness to participate in the research project. An adequate project site was identified to ensure at least 15 primary project participants were available and willing to be interviewed to achieve sufficient saturation (Merriam & Tisdell, 2016).

The sampling method implemented for the research project was grounded in typical sampling (Creswell, 2015). Key project stakeholders were identified and interviewed, one on one, in person or over the telephone due to schedules and distances between the stakeholder and the non-observer role of the researcher (Creswell, 2015). The interview process allowed for a deep understanding of the stakeholder's reflection and was necessary since observation of the construction processes and interactions were not be possible (Merriam & Tisdell, 2016). A semi-structured approach was used to glean open-ended responses, while also providing information to specific questions posed (Creswell, 2015). Interviews were recorded and transcribed to ensure researcher bias did not influence data collection. Digital transcription was performed using Trint© artificial intelligence software and then manually revised using the real-time voice to text interface to ensure accuracy of the transcribed data (Merriam & Tisdell, 2016).

In addition, a focus group interview was also conducted, supporting both reliability and trustworthiness of the findings by incorporating differing methodological data sources from the case study phenomenon (Caillaud & Flick, 2017; Merriam & Tisdell, 2016). Three participants were selected, providing a purposeful sampling of

project stakeholders (Creswell, 2015; Merriam & Tisdell, 2016). The focus group interview occurred over a phone bridge due to the schedules and location distances between the researcher and the subjects. The session was recorded, digitally transcribed, and reviewed for accuracy.

Finally, project documents were also collected and analyzed to support the research with multiple primary sources of information (Merriam & Tisdell, 2016). Select documents obtained consisted of public records associated with the case study project, primarily agency records and pertinent project materials. Documents collected and analyzed included: school board meeting minutes and actions surrounding the district's decision to implement the CM/GC process, advertisement and procurement documents around the district's search and selection of the general contractor and architect, artifacts related to the educational specifications programming for the project, notes and artifacts surrounding possible dispute resolution phenomena, presentations to school board, staff and community made by representatives of the project team, varying project documents such as punch list, budget, and schedules, and proposals submitted by firms as a part of the selection submittal process. A qualitative content analysis of the documents was performed in an effort to derive contextual meaning in order to supplement the proposed research (Merriam & Tisdell, 2016).

Stakeholders interviewed included architects, CM/GC project manager(s), the district superintendent and central cabinet office members involved in the project, the owner's project representatives, members associated with the educational specifications/ programming, project consultants, first tier subcontractors, and community representatives (see Table 9).

Definition of the Terms

Alternative Delivery Method: A selection method other than competitive, low-bid (Design-Bid-Build method) that generally considers other factors in addition to cost for the selection of a contractor.

As-built Drawings: Revised set of drawings/blueprints submitted by a contractor upon completion of a project. They reflect all changes made in the specifications and working drawings during the construction process, and show the exact final product/ outcome of all elements of the work completed under the contract

Change Order: A directive, usually authorized in writing by the owner, to alter or modify some aspect of a project. Such a directive is generally accompanied by an adjustment to the contract amount and/or the contract duration.

Constructability: A project design review that reflects the ease or difficulty with which the project can be built.

Construction Documents: The design documents developed to construct the project.

Construction Manager/General Contractor (CM/GC)/Construction Manager at Risk: A project delivery method in which the Construction Manager acts as a consultant to the owner in the development and design phases, but assumes the risk for construction performance, serving as the general contractor responsible for all trade subcontracts during the construction phase.

Design-Bid-Build: The "traditional" project delivery approach where the owner commissions an architect or engineer to prepare drawings and specifications under a

design contract, and when completed, separately contracts for construction by engaging a contractor through competitive bidding.

Design-Build: The system of contracting under which one entity performs both architecture/engineering and construction under a single contract with the owner.

General Conditions: The costs associated with on-site management and supervision of the work including the costs of insurance, bonds, incidentals, site safety, and other related miscellaneous items necessary to support the project.

Guaranteed Maximum Price (GMP): An arrangement in which an owner contracts with an entity to perform a fixed scope of work in exchange for a price that is guaranteed to not exceed a stated maximum price. The GMP will typically include a base cost along with several allowances, contingencies, and general conditions that may result in a final cost below the stated GMP. Depending on the contractual agreement, such savings may be returned to the owner or may be shared with the entity providing the GMP.

Owner: The entity for which the project is being designed and built for, and with which the architect and CM/GC firms will be in contract with.

Owner's Representative: An employee or contracted consult who acts on the owner's behalf during the construction project, reporting and responsible solely to the owner.

Prequalification: The process in which an owner or CM/GC, based upon financial, management, and other qualitative data, determines whether a firm is fundamentally qualified to compete for a certain project or class of projects.

Project Delivery System: The interaction and allocation of relationships, roles and responsibilities of project team members and the sequence of activities required for the deployment of a capital project (Konchar & Sanvido, 1998).

Procurement: The purchasing of design or construction services.

Request for Proposals (RFP): The document issued by the owner that describes the procurement process, forms the basis for final proposals, and may become an element in the contract. The RFP consists of proposal requirements, contract requirements, program requirements, and performance requirements.

Request for Qualifications (RFQ): The document issued by the owner prior to an RFP that typically describes the project in enough detail to allow potential proposers to determine if they wish to compete and requests limited statements of qualification. The RFQ forms the basis for selecting finalists in a two-phase or shortlisting process.

Retainage: A stated percentage of the overall contract amount that is withheld by the owner. This amount is generally used as an incentive for the contractor to complete the project in an expedient manner. It is generally returned to the contractor after final satisfactory completion.

RFI: Request for Information whereby a project stakeholder requires clarifying information in order to inform their work or response.

Schematic Design: The portion of the design phase, from 0% to approximately 30% completion of the design, in which the major features of the design are laid out.

Specifications: A qualitative description of the project and any additional information not present in the drawings. The technical specifications essentially describe

the quality of the various aspects of the construction work and project features, specify equipment, and provide greater detail as to specific components within a project.

Submittals: Information concerning products to be incorporated in a construction project that must be approved by the owner before they are procured and installed. This information may include samples, calculations, performance tests, mock-ups, and manufacturer's literature.

Substantial Completion: A designation of when a project is sufficiently finished to be occupied by the owner and used for its intended purpose. The duration of the project is typically measured against substantial completion.

Value Engineering: A procedure in which the contractor, through additional architectural and engineering design, reduces prices or increases scope, or both, enhancing value by determining the most cost-effective means of achieving the owner's objectives. Although often confused with mere scope reduction to reduce cost, it can be seen as a way to increase value to cost.

Summary and Organization of the Remainder of the Study

After many months of grueling pre-election efforts a district and her superintendent find themselves at a crossroads, their school construction bond has finally passed! All eyes are on them now, with millions of dollars at stake and the expectation to deliver on the promises made during the pre-election campaign; that a new school would be built on time, on budget, and to everyone's satisfaction. The district now stands at a pivotal crossroads, should they implement the alternative construction manager/general contractor method (CM/GC) over the traditional design-bid-build (DBB) or design-build (DB) options? Many studies have been performed analyzing traditional success criteria

such as schedule (on time) and cost (on budget) indicators related to the three models. However, just because a project comes in on time and on budget does not mean that the outcome will be positive from a stakeholder's perspective.

The first chapter served to establish a framework for the proposed research. It began by outlining the significant capital construction needs poised to be addressed over the coming years and the allowable models used to deliver on such improvements in Oregon. In addition, it highlighted the lack of evidence surrounding stakeholder satisfaction in relation to the various delivery models, a key component school superintendents and their boards must consider when deciding which to implement.

Chapter 2 begins with an examination and explanation of the theoretical framework for this study, grounded in stakeholder theory. Following, a conceptual framework is supported with a review of construction delivery models, foundational research applicable to this study, various selection criteria that influences district decision making, and concludes with an examination of the literature related to stakeholder relationships.

Chapter 3 discusses the research methodology, including the process used for subject identification, collecting, and analyzing the data. Trustworthiness of the data, ethical considerations, and limitations are reviewed in order to support the research approach.

Chapter 4 consists of an in depth review regarding data collection and analysis. Details are presented in both written and table summaries and include key findings stemming from the proposed research, including themes, sub themes, and focus group triangulation results.

Chapter 5 includes significant interpretations regarding research results. The chapter summarizes conclusions related to the research questions surrounding project experiences with the CM/GC model. In addition, recommendations related to further research and possible study limitations are explored.

Chapter 2: Literature Review

Introduction to the Chapter and Background to the Problem

Significant research reveals the propensity for contentious and adversarial relationships with the traditional, and most commonly selected DBB model (AIA, 2011; Carpenter, 2014; CMAA, 2012; Konchar, 1997; Rojas & Kell, 2008). With communities watching closely, it will serve critical that districts select a model that not only delivers on the traditional success indicators, but also ensures a process whereby positive stakeholder relationships and outcome are supported. Although less utilized than its traditional DBB counterpart (McGraw Hill Construction, 2014), the CM/GC delivery model appears well structured to support the constructive relationships many districts hope to achieve between project stakeholders (Carpenter, 2014; CMAA, 2012; FMI/CMAA, 2010; Mollaoglu-Korkmaz, Swarup, & Riley, 2013; Oregon State University, Construction Engineering Management Program [OSU], 2002; Rojas & Kell, 2008). Unfortunately, scarce research is available on this subjective criteria related to the CM/GC delivery system, offering limited insight upon which a district can use to inform their decision.

This study aimed to provide significant evidence to what amounts to a narrow body of research currently available related to the subjective experiences of stakeholders who utilize the CM/GC delivery model to provide for school construction project(s). Analyses of participant experiences provide future district decision makers with greater information on the matter to assist in their important delivery model selection.

A literature review will begin with an examination of the theoretical framework for this study, grounded in stakeholder theory. Analysis will begin with R. Edward

Freeman's pioneering contribution to the field. A transition will be made through literature, applying stakeholder theory to the construction field. A conceptual framework posited within the construction delivery field will begin with a review of the literature related specifically to the three construction delivery models, including foundational and current resources that compare and contrast DBB to CM/GC, primarily through objective performance indicators aforementioned. An examination of delivery model selection research in addition to risk aversion criteria will also be analyzed. Lastly, analysis of recent literature related to the subjective component of project stakeholder relationships will be examined.

Theoretical Framework

Stakeholder theory serves as the theoretical framework that guides this research (Merriam & Tisdell, 2016). Freeman and colleagues portend that stakeholder theory is, "…fundamentally a theory about how business works at its best, and how it could work," in order to manage business effectively to maximize value (Freeman et al., 2010, p. 9). The researchers elaborate further, asserting, "If stakeholder theory is to solve the problem of value creation and trade, it must show how business can in fact be described through stakeholder relationships" (p. 9). The direct link made by Freeman et al. between creating value through stakeholder relationships serves as the core tenet framing this research.

Stakeholder theory is rooted in the context that businesses have stakeholders, and those constituents have a stake in the success and or failure of that business (Freeman et al., 2010). Rather than business as usual, focusing on mere profits and losses, institutions and their leadership should intentionally emphasize and foster relationships between the stakeholders at large. Stemming back to his seminal work, Freeman (1984) defines

stakeholders as, "…any group or individual who can affect or is affected by the achievement of the organization's objectives" (p. 46). He points out that stakeholder theory represents, "…an abrupt departure from the usual understanding of business as a vehicle to maximize returns to the owner" (Freeman et al., 2010, p. XV). Developed nearly 40 years ago, the theory helped to offer a counter to the common capitalistic approach, where heavy focus on economic drivers often led to unethical decision-making, lack of social responsibility, and inattention to relationships within and between key constituencies.

In search for increased value, stakeholder theory broadens the business view from its historical economic driver in search of a different kind of value; that which is created through the relationships between stakeholders within and close to the organization. Freeman et al. (2010) suggests that, "…if we adopt as a unit of analysis the relationship between a business and the groups of individuals who can affect or are affected by it, then we have a better chance…" to deal with the inherent problems surrounding economic/capitalistic framing (p. 6). Referred to as the responsibility principal, it is a shift in mindset where business embraces the symbiotic relationship between stakeholders and the organization, placing their interests on creating value between them (Freeman et al., 2010).

The mental shift from economic as value creation to stakeholder relationship as value creation is pronounced. As identified by Freeman et al. (2010):

> The basic idea of creating value for stakeholders is quite simple. Business can be understood as a set of relationships among groups which have a stake in the activities that make up the business. Business is about how customers, suppliers,

> employees…, communities, and managers interact and create value. To understand a business is to know how these relationships work. And the executive's or entrepreneur's job is to manage and shape these relationships. (p. 24)

Like an interconnected web, each stakeholder is interdependent to the organization. As shown below in Figure 2, the firm or business stands at the heart of the organization, where each stakeholder is connected and important to the overall mission. As Freeman et al. (2010) states, "No stakeholder stands alone in the process of value creation. The stakes of each stakeholder group are multifaceted, and inherently connected to each other" (p. 27).

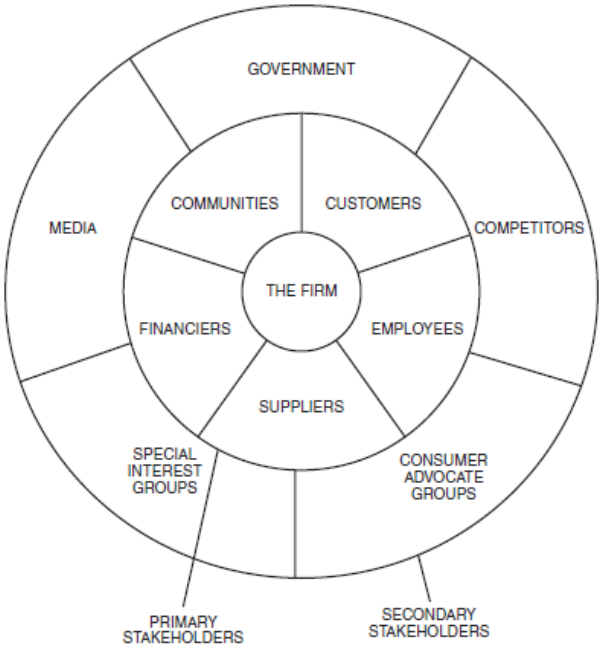


Figure 2. Creating Value for Stakeholders (Freeman et al., 2010)

A managerial philosophy, stakeholder theory provides organizational leaders the incentive they need to be clear about the relationships they must foster in order to deliver

on their core purpose (Freeman, Wicks & Parmar, 2004; Freeman et al., 2010). To do so requires leaders to, "…articulate the shared sense of the value [they hope] to create, and what brings its core stakeholders together…propel[ling] them forward..." in order to generate success (Freeman et al., 2004, p. 364). It necessitates intentional actions on behalf of the decision makers at the table to explicitly incorporate the needs, desires, wishes, and interests of those around them, ensuring a balance between value creation through relationships and the profitability of the organization or task at hand.

Although Freeman's (1984) seminal book, in addition to his more recent works, purports stakeholder theory onto a business model, such principals apply to situations such as shorter-duration organizations like those established during school construction projects. As Lundin and Söderholm (1995) reveal, a project can be considered a temporary organization or business. Although short-term in nature, lasting in most cases between one to three years, stakeholder theory can be applied to capital project teams in a similar fashion as business models, gleaning and advancing the decades of insight and analysis that Freeman and others have helped pioneer.

Considering project teams, like those assembled for school construction projects, applying stakeholder theory then portends that, "Individuals, groups, or entities, which may affect or be affected by the project [stakeholders] possess various sorts of resources (e.g., expertise, decision power, money goodwill, influential contacts, and so forth)" (Eskerod & Vaagaasar, 2014, p. 71). Through a lens of stakeholder theory, it will serve critical that the project team consider and interact with all stakeholders to create the shared value the theory lauds.

Making the transition from stakeholder theory and business to stakeholder theory and project, Eskerod and Vaagaasar (2014) suggest, "…that the focal organization (i.e., the project) should apply certain stakeholder management strategies based on the assessment of the stakeholder at hand" (p. 71). Their work provides a foundation for applying Freeman's body of research on stakeholder management strategies during a limited duration project. Eskerod and Vaagaasar make the case, calling on prior summarizations from Project Management Institute [PMI] (2008), that "The basic idea of project management is that the project management team can increase the possibility of project success by influencing stakeholders" (p. 72). Specifically, the researchers focus on the intentional interactions between the project management team and those in direct contact who can provide value to the overall project.

With limited assets available to any project team, both in time and resources, Eskerod and Vaagaasar (2014) recommend focusing on those stakeholders who fall under the category high harm and/or high help potential, rather than on those who may offer lower levels of help and/or risk for harm. The researchers recommend strategies that support win-win scenarios between project team and project stakeholders, rather than win-lose strategies, otherwise referred to as, disruptive strategies by Savage et al. (2010).

In order to create the environment and stakeholder relationships to support such win-win scenarios, Eskerod and Vaagaasar (2014) discuss the importance of trust between stakeholders. They call on what is referred to as high impact identification trust that is "…based on an emotional connection…because the actors understand each other's intentions, expectations, and desires. Typically, a high and mutual commitment between

the parties exists, as well as a good relationship that is intended to be a long-term one…" despite the project teams being temporary in nature (p. 74).

Their research followed the ongoing relationships between a project team and two stakeholders, the project main supplier and the project owner. Eskerod and Vaagaasar (2014) analyzed how the actions and behaviors from the lead project team influenced their relationships over the course of the project term. The project management team worked, "…to increase the trustworthiness of both the supplier and the project owner by increasing their knowledge" in order to build capacity that may be relied upon later down the road (p. 81). This approach resulted in trust that became thicker as the project ensued.

Through the application of stakeholder theory, findings established by Eskerod and Vaagaasar (2014) reveal that when project team members intentionally and purposefully consider, support, and involve key stakeholders, value is created through perceived increase in trust between the project owner and primary supplier. Unfortunately, feedback mechanisms were not initiated to the two stakeholders to confirm if their responses matched those from the project team. This lack of knowledge base leaves a void in the research as only the perspective of increased trust and value was measured from the perspective of the project team itself and not the subject stakeholders. This study ensured perceptions from all key stakeholders was sought and analyzed.

In 2015, Eskerod, Huemann and Savage deepened the application of stakeholder theory by presenting findings from case studies outside of the project management field in order to extend the field's understanding and consideration for application within. They discuss the desire of seeking a similar win-win scenario with stakeholders as aforementioned. Not without its challenges, however, Eskerod, Huemann and Savage

point out that, "…organizations, and especially projects as temporary organizations, face many stakeholders with interests that conflict with the interests of other stakeholders. Moreover, organizations have legitimate interests of their own that they must fulfill in order to survive" (p. 9). Such win-win outcomes can be increasingly challenging in shorter term projects, especially with the variety of stakeholders that often make up project teams. As noted, "This tension between limited project time and long term consequences makes the stakeholder management of and for projects such an interesting and fundamental question" (p. 9). This complex arrangement, and ability to search for relational value, highlight the critical aspect for their research.

As the researchers analyzed project stakeholder literature they identified four components whereby stakeholders are instrumental for project success; the project needs contributors, stakeholders are often the individuals who determine and evaluate project success, stakeholder resistance may lead to the lack of project success, and lastly, the project may affect stakeholders in both positive and negative ways.

A deep understanding and willingness to include stakeholders to ensure project success requires a thorough analysis and understanding of primary stakeholder perceptions. As Eskerod, Huemann & Savage (2015) points out, "…stakeholder analysis helps the project manager and the project team to see, in proper time, the project through more lenses—the project's lenses and the stakeholders' lenses—and to seek 'win–win' solutions rather than trade-offs" (p. 10). Moreover, when conflict does arise, such analysis would best be approached and understood as a network of interwoven persons and perspectives.

Eskerod, Huemann & Savage's (2015) case study highlights the important role of intentionality when analyzing and seeking to understand stakeholders within an organization or project. Although their findings reinforce how complex, connected, and environmental the circumstances can be, their research did not address suggestive approaches or tactics in order to support stakeholder integration and improved understanding.

Focusing specifically on stakeholder theory in the construction field, Yang, Wang and Jin (2014) set out to better understand decision-making processes project managers make in response to varying stakeholder attributes and behaviors. As they point out, "[prior] studies have advanced our knowledge about stakeholder-related factors on decision-making strategies..." (p. 74). However, "…none of them has done a robust analysis regarding stakeholders' attributes from construction practitioners' perspectives…," lending further support for the research at hand (p. 75).

To frame their work, Yang et al. (2014) identified four stakeholder attributes gleaned from prior research by Nguyen, Skitmore and Wong (2009); power (i.e., whether positional or relational in influence); legitimacy (i.e., stakeholders who have a contractual, legal or moral stake in the project); urgency (i.e., time sensitive drivers); and proximity (i.e., location from or level of connection to the project/team). In addition, stakeholder behaviors were also identified, framed as actions that result in either positive or negative implications on the success or outcome of a project (Nguyen et al., 2009).

The researchers utilized a mixed-method analysis that involved interviews, surveys, and case study application, in order to provide project managers a broader set of tools upon which to better understand stakeholder behaviors and attributes as well as the

decision-making influences that come from such perspectives (Yang et al., 2014). The researchers discovered that legitimacy played far less a roll than her counterparts when considering stakeholder influence, stakeholder power being the primary driver. Their research suggests that, "…the higher power a stakeholder has, the more urgent of a stakeholder's claim, the 'closer' a stakeholder is from a project, the gentler strategies might be used" (p. 87). This finding seems to support stakeholder theory, where a focus on relational values would be complimented by the collaborative approach professed. In addition, four types of behaviors were analyzed (i.e., cooperative potential, competitive threat, opposing position, and neutral), with cooperative potential being the trait most commonly observed, also appearing in line with theory (Yang et al., 2014).

The researchers conclude that "…to deal with stakeholders with a competitive threat or neutral attitude, project managers need to communicate and negotiate with them more…" (Yang et al., 2014, p. 87). As shown below in Table 1, compromise also appears well poised to deal with the three predominant attributes in order to secure a positive outcome, lending these findings in support of stakeholder theory tenets. In addition, a similar compromise approach and/or concession/adaptation tactic may also serve beneficial with those who are both cooperative and possibly threatening to the project.

Table 1

Stakeholder Attributes and Behaviors (Yang et al., 2014)

Correlation		Strategies			
		Hold	Defense	Compromise	Concession/ Adaptation
Attributes	Power	–	–	++	++
	Urgency	– –	–	++	+
	Proximity	–	+	++	+
Behavior	Cooperative potential	+	+	+	++
	Competitive threat	–	–	+	–
	Opposing position	–	++	+	–

Note. –– strongly negative; – negative; + positive; ++ strongly positive.

However, appearing contradictory to stakeholder theory, results from Yang et al. (2014) reveal that a defensive strategy may be best to deal with opposing positions. As noted, "The stronger a stakeholder disagrees with the project, the more a 'defense' strategy should be used…," which seems counter to theory tenets (p. 84).

Yang et al.'s (2014) findings provide powerful insight, not only for project managers/decision makers, but also for individual stakeholders themselves. As Eskerod and Vaagaasar (2014) and Eskerod, Huemann & Ringhofer's (2015) prior research found, intentional focus on stakeholder analysis and seeking win-win solutions is critical. The work by Yang et al. (2014) provides not only attribute and behavior approaches that stakeholders bring to the project/situation, but also provides insight into what response and/or approach may yield the most positive outcome. However, based only on one case study, in addition to a lack of account for project manager behaviors and attributes, further research like that outlined in this study is called for.

In order to advance project stakeholder management understanding, Turkulainen, Aaltonen, and Lohikoski (2015) focused their research around communication implications over a project's lifecycle. Utilizing the Qstock Music Festival as their case

study, the researchers studied modes of communication and its relation to effective management, pointing out that little research has been performed on the subject at hand.

To set the stage for their research, Turkulainen et al. (2015) called upon three of the four stakeholder attributes identified by Yang et al. (2014); power, legitimacy and urgency. Although proximity was not mentioned in their research as an effect of stakeholder salience (i.e., attributes), it seems logical that proximity was not analyzed based on the foundational analysis around project communication, necessitating proximal engagement.

The case study focused on stakeholder communication surrounding a music festival that took place in Northern Finland in July of 2014, analyzing interactions as they progressed through a project lifecycle; project concept/planning, project execution, and post project phase as noted below in Figure 3. The researchers found a correlation between the level of stakeholder salience (i.e., level of power, legitimacy and urgency) and the level of communication needs (Turkulainen et al., 2015). As concluded, "…less salient stakeholders pose low information processing needs and can be managed using impersonal communication modes, whereas highly salient stakeholders pose high information processing needs and require more advanced personal and group communication modes" (p. 86). Also of note, was that as stakeholder salience levels changed over the project phase as the level, frequency, and mode of communication also changed commensurate with their level of engagement (Turkulainen et al., 2015).

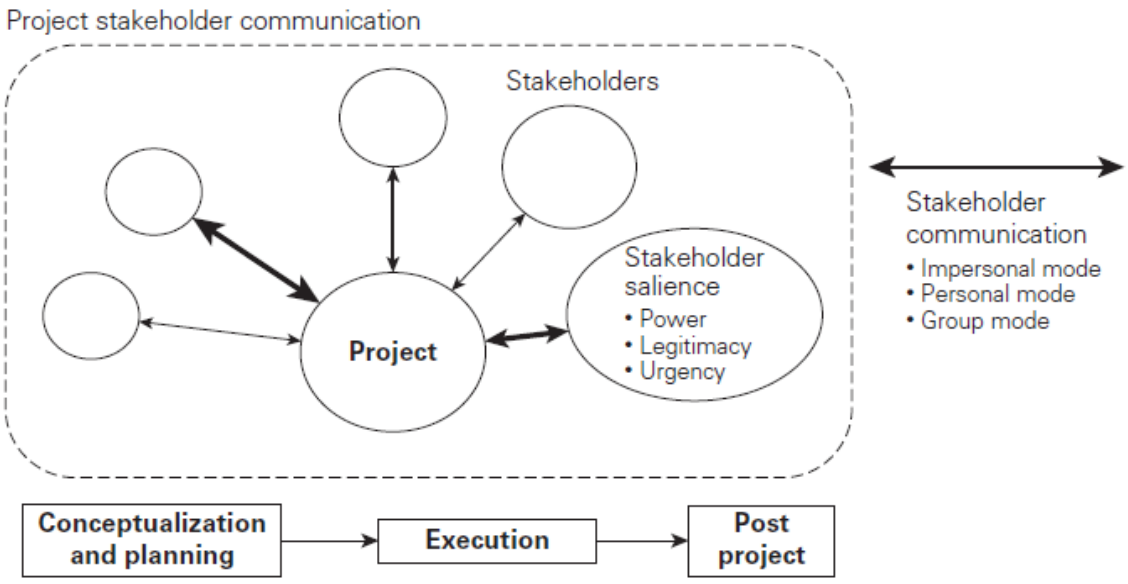


Figure 3. Project Stakeholder Communication (Turkulainen et al., 2015)

Whether impersonal communication (e.g., via social media), personal (e.g., face-to-face), or group modes (e.g., meetings), the study provides insights for project managers to consider customization of communication depending on stakeholder salience and timing.

Although the case study was not representative of a construction project, the short-term duration, level of complexity, and vast number of stakeholders closely aligned with those of a complex school construction program. Albeit significant to the limited body of current research on the subject of stakeholder communication, limitations in Turkulainen et al.'s (2015) empirical study provide for the need for additional exploration. Connections between the modes and frequency of communication and satisfaction of stakeholders' leaves many unanswered questions as organizations seek to better align practices in support of stakeholder theory tenets. Rather than management of stakeholders primarily considered in this analysis, organizations must seek to address

management for stakeholders approach, where needs are better met than simply "managed" (Eskerod, Huemann & Ringhofer, 2015; Freeman et al., 2007, 2010).

Adding to prior work from Lundin and Soderholm (1995) and Eskerod and Vaagaasar (2014), Eskerod, Huemann & Ringhofer (2015) set out to investigate whether stakeholder theory can offer insights into stakeholder management within projects. As many projects are laden with numerous stakeholders and perspectives, the researchers reveal a need for, "…a deep understanding of both the theoretical concept and the project as context is a necessity to move the field of project stakeholder management forward" (p. 43). Regardless of their individual attributes identified by prior research aforementioned (e.g., power, legitimacy, urgency, or proximity), Eskerod, Huemann & Ringhofer (2015) calls out the need for organizations, temporary or not, to consider stakeholders needs by identifying them, understanding their expectations and addressing them intentionally in order to ensure positive outcomes are best supported.

In their research, Eskerod, Huemann & Ringhofer (2015) concludes the need to apply stakeholder theory to projects, noting that, "Even though it [stakeholder theory] is a framework made for corporate stakeholder management, we claim that it can easily be used for project stakeholder management because a major complaint within project[s]…is that management is only paying lip service…" (p. 46). In their research, they also separate the management of vs. management for stakeholder approach and the criticalness of supporting the later to ensure a deep understanding of the needs, wishes and requirements of stakeholders with legitimate interests in the project. "A high extent of stakeholder inclusiveness can be expected within the management for stakeholder approach…," as pointed out by the researchers, leading to improved buy-in (p. 46).

A concern for project managers who focus on a management for approach is the possibility of spreading leaders too thin over too many stakeholders (Eskerod, Huemann & Ringhofer, 2015). As cautioned,

> …a managing for stakeholders approach, may make the representatives lose focus of those stakeholders the project is mainly dependent on... and giving them the impression that they are being heard, while in the end not being able to deal with their input on the project. (p. 50)

Limitations to their research, however, leave the industry in want for greater clarity towards the interactions between stakeholders, in addition to tracking the relationships throughout the different phases of the project to ascertain a deeper understanding of stakeholder theory implications on project teams.

As Freeman et al. (2010) professes, stakeholder theory has been developed over the last three decades to counter the historic trend from capitalistic drivers to that of value-creation, and indeed was developed intentionally to help leaders acknowledge and respond to the complex situations they face. Capital school construction projects are extremely complex and wrought with risk and potential controversy, and call for the consideration stakeholder theory portends in order to create shared value.

Conceptual Framework

Applying the theoretical framework of stakeholder theory, a conceptual framework will be described through a literature review that analyzes the three allowable construction delivery models, reviews two foundational studies applicable to the field, addresses factors informing delivery model selection by owners, incorporates risk

aversion influences, and concludes with current literature around stakeholder relationship within the construction delivery field.

Construction/Project Delivery Models Explained

Construction/Project Delivery in General

Hosseini, Laedre, Andersen, Torp, Olsson and Lohne (2016) utilize Miller, Garvin and Mahoney's (2000) well-established definition of project delivery as, "…a system for organizing and financing design, construction, operation and maintenance activities and facilitates the delivery of a good or service" (p. 262). Of the numerous methods being used to deliver facilities around the world, the three delivery systems most commonly employed in the U.S. construction industry, and the only three allowed for Oregon school construction, are design-bid-build (DBB), construction manager/general contractor(CM/GC) (or CM at-Risk), and design-build (DB) (Asmar, Hanna & Loh, 2013). To differentiate between the systems, Franz and Leight (2016) provide characteristics that help distinguish between the models. These include:

- Allocation of responsibilities for design and construction, often expressed in the number of contracts held by the owner;
- timing of involvement for the contractor, relative to the design process;
- procurement practices for soliciting bids or proposals from the contractor;
- selection criteria for hiring the contractor among competing firms; and,
- payment terms for the contractor, as specified in their contract with the owner. (p. 162)

Although DBB remains the most common delivery model used in the US, there is a growing consideration and use of both the DB and CM/GC models (McGraw Hill

Construction, 2014). In a recent survey of 340 owners, architects, and contractors, analysis of their feedback revealed that, "The future looks bright for Design-Build and CM at-Risk, with a high percentage of owners, architects and contractors expecting to see increased use of these delivery systems" (p. 4). Specifically related to school construction, "A strong majority of architects (62%) and contractors (59%) expect to see greater use of CM at-Risk project delivery for K-12 projects" (McGraw Hill Construction, 2014, p. 19). These results support similar conclusions identified by CMAA (2012) and Carpenter (2014), both portending an increase trend up in the utilization of CM at-Risk and DB, and a corresponding decline in the traditional and most common DBB. Figure 4 represents the most recent breakdown of project delivery for vertical facility construction in the US (CMAA, 2012):

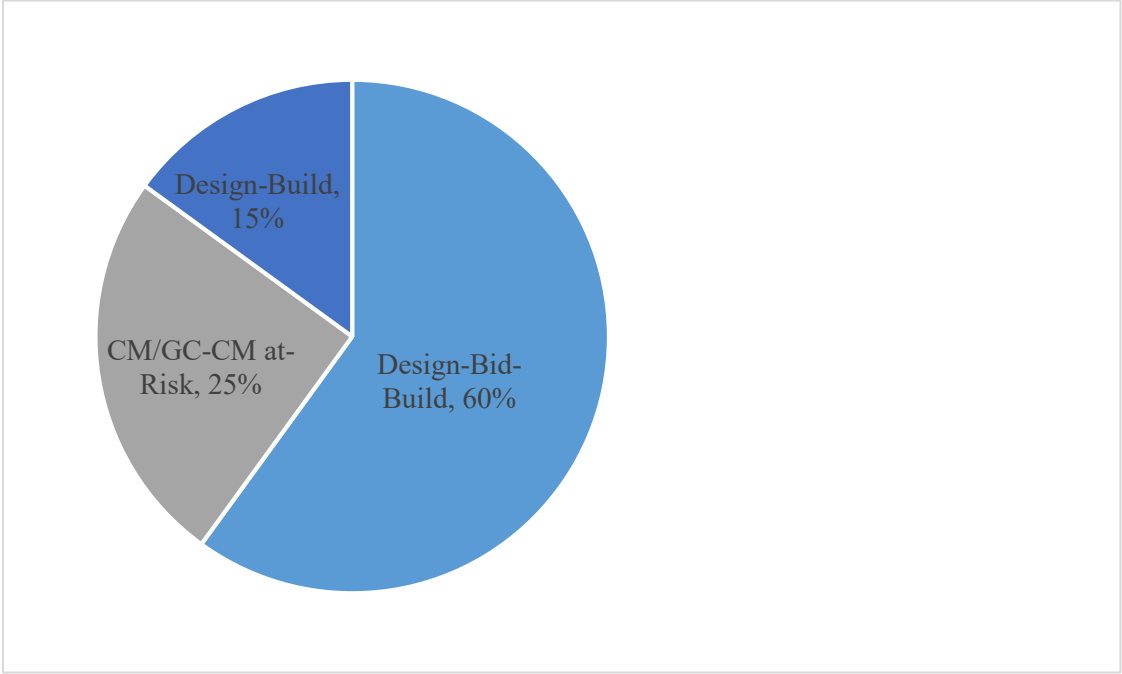


Figure 4. Project Delivery Model Utilization (CMAA, 2012)

Design-Build

Design-Build (DB) is a project delivery method that combines architectural and engineering design services with construction under one contract (CMAA, 2012). Used in about one-fifth of the US market for new building construction, the delivery model accounts for 24% of the US nonresidential construction (Djojopranoto & Benhart, 2017). Carpenter (2014) notes that one of the perceived benefits, "…is that the Design Build method provides the opportunity for the architect and contractor to work as a team from the outset allowing for more open, honest, and direct communications that can increase the opportunities for cost-reducing innovations," in addition to proposed time-saving attributes (p. 21). Generally, the contractors would involve themselves when the design is approximately 20% complete, whereby the designer and general contractor join forces and partner as the single point of contact for the owner (Asmar et al., 2013).

Many studies have been performed comparing DB with the Design-Bid-Build (DBB) delivery systems when it comes to traditional measures of project performance around cost, time and schedule. While some suggest there may be benefits, others have come to different conclusions based on research findings (Franz & Leight, 2016). For example, Hale, Shrestha, Gibson and Migliaccio (2009) found that DB projects took less time to complete with less time growth than their DBB counterpart did. Although a statistical significance was not found between the two, Hale et al. indicated that DB projects might be less expensive to build.

Four years later, Minchin, Li, Issa and Vargas (2013) set out to perform a significant comparison of DB and DBB to ascertain which of the two models delivered highway and bridge projects in Florida with the lowest cost and in the shortest time

period. The researchers concluded that, "…DBB projects performed significantly better in terms of cost and not quite as well in terms of duration…" compared to DB (p. 4). Their analysis indicated that, "…the DBB method outperformed the DB method for contractors' performance in meeting contract cost and for the accuracy of preliminary cost estimates…" while the duration results were less revealing, showing only a minimal advantage for DB delivered projects (p. 4).

Minchin et al.'s (2013) results add to a field of research that provides contradictory findings, where others prior have shown DB outperform DBB in cost and time measurements (Hale et al., 2009; Konchar & Sanvido, 1998). In addition, limited research has been performed related to subjective criteria related to the DB delivery model. Although analysis of the DB model is not proposed in this study, a broader understanding of the model's subjective experiences, in addition to improved clarity around its ability to deliver on traditional (cost, schedule and time) criteria is warranted.

Design Bid Build

Design-Bid-Build (DBB) is considered the traditional delivery model and is the most widely used and accepted project delivery method in use today in the US (Carpenter, 2014; CMAA, 2012; McGraw Hill Construction, 2014; Rojas & Kell, 2008). Many advantages have been purported for the DBB delivery model, including a well understood and established method with clearly defined roles for the parties, owner control over the process, schedule predictability, increased competition leading to favorable initial bid proposals, and initial cost certainty (Carpenter, 2014; CMAA, 2012; Rojas & Kell, 2008). However, many disadvantages have also been identified such as the promotion of adversarial relationships, lack of cooperation, lack of constructability with

the late on-boarding of the contractor, and increased likelihood for claims and change orders (Carpenter, 2014; CMAA, 2012; Rojas & Kell, 2008). Despite some of the potential drawbacks, 55% of owners today still describe their approach to construction delivery most similar to the DBB model (FMI/CMAA, 2010). Research performed by Rojas and Kell (2008) serves as seminal work in the field related to DBB and is covered later in this chapter.

Construction Manager/General Contractor (CM/GC)

Quite different from the DBB and DB processes, the CM/GC model (also referred to as Construction Manager at risk (CM at-Risk) or CMR in other states) utilizes a construction manager who assumes much of the risk delivering the project (AIA, 2011). Although the process includes a separate contract with the architect (similar to DBB), it differs in many ways. First, the CM/GC process allows for the selection of the contractor based on qualifications rather than solely cost like its DBB counterpart. Owners, in this case school districts, select the general contractor based not exclusively on price, but rather on a set of criteria established. Selection standards are identified and interviews often conducted in an effort to identify good fits between project team members and the contractor, and typically include locally-developed criteria that best align with project team goals, relationships, and unique project conditions (Sewalk et al., 2016; Williams, 2003). The below table summarizes the three models allowable in Oregon and their defining and typical characteristics as presented by Rojas and Kell (2008).

Table 2

Project Delivery System Summary (Rojas & Kell, 2008)

Project delivery system	Defining characteristics	Typical characteristics
DBB	• Three prime players: owner, designer, builder • Two separate contracts: owner-designer and owner-builder • Contract selection based on lowest responsible bid or total contract price	• Three linear phases: design, bid, build • Well-established and broadly documented roles • Carefully crafted legal and procedural guidelines • A lowest responsible bid that provides a reliable market price for the project • Contract documents that are typically completed in a single package before construction begins • Complete specifications that produce objective quality standards • Configuration and details of finished product agreed to by all parties prior to construction start
CMR	• Three prime players: owner, designer, builder • Two separate contracts: owner-designer and owner-builder • Contract selection based on aspects other than total cost	• Overlapping project phases are possible • Construction Manager (CM) is hired during design • Preconstruction services are provided by the CM • Specific contractual arrangement determines the role of players • Clear quality standards produced by the contract's prescriptive specifications
DB	• One contract between owner-design/builder	• Project-by-project basis for establishing and documenting roles • Continuous execution of design and construction • Overlapping phases: design and build • Two prime players: owner and design/build entity • Carefully crafted legal and procedural guidelines for public owners • Overall project planning and scheduling by the design/build entity prior to mobilization • Cost or solution is the basis for selection of the design/build entity

Often towards the later end of the design phase the construction manager establishes a guaranteed maximum price (GMP), providing the owner a not-to-exceed amount to deliver on the project. The GMP will typically include the cost to deliver the facility along with several owner agreed to allowances and contingencies necessary to support the general contractor's work which may include safety measures, travel and job site allowances, testing fees, and other mutually agreed upon conditions (CMAA, 2012). This pre-construction cost certainty is often viewed as a strong benefit of the CM/GC model (Carpenter, 2014; Rojas & Kell, 2008).

Despite research revealing possible advantages of CM/GC, and its permissible use for building construction in some 45 states, it still wanes in popularity compared to its DBB and DB counterparts, making up a mere 25% of the industry (Carpenter, 2014; CMAA, 2012). In Oregon specifically, CM/GC has been an allowable model since the

early 1980's and yet has not come close to matching its DBB counterpart in utilization (OSU, 2002).

Proponents site many benefits of CM/GC, including early on-board of the contractor that allows for constructability perspectives and input into the design phase. In addition, the ability to fast track early construction components is also supported (CMAA, 2012). Further analysis has revealed this alternative method may improve cost, quality, communication, and collaboration of key members (AIA, 2011; Carpenter, 2014; Konchar & Sanvido, 1998; OSU, 2002). Carpenter (2014) refers to multiple prior studies revealing that the CM/GC method, "…fosters a collaborative work environment among the owner, architect, and contractor project team…providing the opportunity for improved performance in terms of productivity, cost, time and project quality" (p. 161). A table from Rojas and Kell's (2008) seminal work summarizing their findings relative to the benefits of CM/GC is included.

Table 3

CM/GC Characteristics (Rojas & Kell, 2008)

Benefit to owner	Characteristics
Select the most qualified contractor, not the lowest bidder	• Qualifications-based selection
Reduction of design errors and omissions	• GC participation in design • Terms of the contract (GC assumes more risk)
Improved phasing plans	• GC participation in design
GC assumes more risk	• GC participation in design • Terms of the contract. • Potential for future work
Cost certainty during design (more accurate estimating during design)	• GC participation in design
Cost certainty during bidding and construction (guaranteed maximum price)	• GC participation in design
Reduced change orders	• GC participation in design • Terms of the contract (GMP)
Owner pays only cost of work plus fee	• Flexibility (CMR allows different contract pricing)
Improved schedule: Fast-track, phased bidding, etc.	• GC participation in design • Flexibility (multiple bid packages)
Collaboration, cooperation, team spirit, etc.	• GC participation in design • Potential for future work
GC better comprehends and supports Owner expectations	• GC participation in design • Potential for future work

Potential disadvantages and/or considerations have also been revealed with the CM/GC model. According to OSU (2002, p. ii), "The CM/GC method contains certain complexities and places unique demands on all project team members…," requiring a higher level of owner involvement and willingness to collaborate than its DBB and DB counterparts. In addition, conflicting results have provided an unclear foundation as to the benefits, or lack thereof, relating to CM/GC. For example, Williams' (2003) study of 215 publicly funded projects in Oregon concluded that there was no statistical significance between cost and schedule controls with CM/GC compared to its DBB counterpart, contradicting prior research performed by Konchar and Sanvido (1998). Similarly, Carpenter's (2014) work, while explained in greater detail further in this chapter, concluded that CM at-Risk (CM/GC) did not produce the benefits purported by advocates. In fact, the researcher found that, "…statistically significant results were not obtained through examination of risk, productivity, cost growth, and schedule growth metrics" (p. iii). Although Carpenter's findings provided conclusive evidence as to the positive impact CM at-Risk (CM/GC) had on product and service quality, he found that, "…these benefits will come at a significant increase in construction and project costs," further blurring research understanding of the model with contradictory findings (pp. 175-176).

Foundational Studies in the Field

Rojas and Kell's (2008) Comparison of DBB vs CM-at-Risk in NW Schools

In Rojas and Kell's (2008) "Comparative Analysis of Project Delivery Systems Cost Performance in Pacific Northwest Public Schools," they question whether the use of construction manager at risk (abbreviated as CMR in their work) benefits public school

construction, as many advocates propose. Utilizing empirical comparisons, the researchers analyzed 297 completed school construction projects in Oregon and Washington, and compared the difference between those delivered using CMR and those projects that incorporated the more traditional DBB approach.

Rojas and Kell (2008) provide a sound review of the momentum alternative project delivery models (CMR) are gaining in public construction projects. Touted by advocates, the researchers point out the industry's lay consensus that the benefits of CMR delivery are "Improved cost and schedule, reduced claims and litigation, improved project delivery speed, improved design and construction quality, and improved relationships among the project stakeholders" (p. 387). Emphasizing the relevancy of their research, they identify that there is limited empirical study on the matter, and note that what little research has been performed has been contradictory in their findings. While "…published studies by the Construction Industry Institute (1997), Konchar and Sanvido (1998), and the State of Washington Joint Legislative Audit and Review Committee (2005) provide some evidence that CMR have measurable benefits compared to DBB," they also note that other studies (Williams, 2003; Liu, 2004), "…provide contrary evidence that CMR may not necessarily result in improved cost and schedule performance" (Rojas & Kell, 2008, p. 387).

Rojas and Kell (2008) provide a comprehensive summary comparing the characteristics of both the alternative CMR model and more traditional DBB approach. While DBB benefits typically include "Competition, low initial construction price, transparency, and fairness…," others have also concluded that "The low bid is not necessarily the best value; the best contractor is not necessarily selected; design errors

and omissions result in cost overruns; and lack of teaming or collaboration between project participants" may serve as a drawback to its use (p. 388). CMR is often characterized by its ability to control costs, satisfying customers with construction outcome, ability to fast-track the project, and demonstrating a spirit of cooperation and partnership between owner, architect, and contractor. However, risks are also pointed out, such as the qualitative feel good benefits of CMR may serve detrimental and result in cost overruns (Rojas & Kell, 2008).

As stated in their study, "The primary objective of [their] research [was] to determine whether the CMR delivery method is meeting cost control expectations on Pacific Northwest public school projects" (Rojas & Kell, 2008, p. 392). With cost control analysis as their primary measure, the researchers focused on change order growth, whether the Guaranteed Maximum Price (GMP) held up, and which delivery model yielded the closest project cost compared to pre-bid estimates. The data used for the studies came from school construction in the state of Oregon and Washington. For Oregon schools, data was gleaned from a 2003 Ph.D. dissertation (Williams, 2003), resulting in 67 Oregon public school projects. In Washington, 234 school project subjects were used stemming from the date maintained by the State's Office of Public School Instruction (OSPI). Of the subject projects, 91% were DBB projects while 9% where delivered using CMR.

Rojas and Kell (2008) found that "…CMR projects did experience a lower average change order growth than DBB," reinforcing the industry expectation (p. 393). However, the statistical significance of their result did not hold up to scrutiny. As identified, "The results indicate the observed difference… is not statistically significant"

at a 95% confidence level with a p value of .23 (p. 393). The guaranteed maximum price, touted as a cost ceiling and threshold benefit of CMR was also analyzed. Rojas and Kell discovered that only six of the 24 school projects finished at or below their established GMP, debunking the cost-controlling measure where the average project exceeded the GMP by 4.74% by the end of construction. Finally, when analyzing overall project cost compared to estimates, the researchers found that DBB outperformed CMR by a significant margin (3.25% cost growth compared to 19.4% cost growth respectively) with a statistical significance of .05 (Rojas & Kell, 2008).

Although the conclusions reached by the researchers are supported by data, there are weaknesses with their findings. The number of school projects utilized (297), although large in scope, do not reflect an appropriate representation of CMR to DBB comparisons. For example, in their overall cost growth analysis, only six of the 222 schools used in their analysis were CMR. With such a small and limited resource, 6 schools lack sufficient enough data points to form a conclusion and findings to represent CMR projects in general. Furthermore, although their study focused on quantitative, empirical data, it failed to recognize the significant impact qualitative decisions could have on project outcomes. For example, Rojas and Kell (2008) concluded that the GMP performance did not help at controlling costs. However, what they failed to analyze was if the cost escalation was a result of the delivery model or, rather, owner driven by conscious choice. Was the cost escalation a result of the owner's desire to expand project scope? Did the establishment of a GMP actually incentivize the owner/district to expand on the project rather than hold the dollars in contingency, which is common in DBB

projects? Both questions, left unanswered, provide significant doubt as to the applicability of the conclusions made by Rojas and Kell and warrant additional study.

Carpenter's (2014) Comparison of the DBB and CM-at-Risk Models

Noel Carpenter, a graduate student at Clemson University, completed his dissertation in May 2014, entitled, "Comparison of the Design-Bid-Build and Construction Manager at-Risk Project Delivery Methods Utilized for the Construction of Public Schools." The foundation for his research sought to determine how the CM at-Risk project delivery method performed in comparison to the Design-Bid-Build method on school projects, looking closely at traditional performance measures. As the basis for his inquiry, Carpenter carried out research from 2012-2014 on 137 school construction projects in Florida, Georgia, North Carolina and South Carolina. He incorporated two data sets to inform his research. First, he reviewed historical documents related to school construction in the identified states. Second, he implemented a survey of district managers to garner feedback on the specific K-12 school projects upon which historical documents were available.

As stated by Carpenter (2014), "A review of the literature revealed that a limited amount of empirical research has been conducted on project delivery methods for the construction of public school projects" (p. 3). His study sought to provide important information to help not only support public officials inform future legislative decisions, but also to support district decision makers when selecting the most appropriate delivery model.

The foundation for his research was grounded in specific project success factors, focusing on the following measured attributes: cost variables, time variables, and quality

metrics. Unlike previous studies performed by preceding researchers whose studies were limited in scope (Rojas & Kell, 2008), or were not specific to public K-12 school construction projects (Konchar & Sanvido, 1998; Williams, 2003), Carpenter's work focused on a review of new, full-facility, K-12 school construction projects across multiple states.

A total 829 school construction projects were identified as possible subjects for analysis from 2006 to 2012 based on information obtained from the department of educations in the four identified states. Historical data was obtained by contacting districts directly to obtain copies of actual project documents; Construction Contract Agreement, Architect Contract Agreement, Notice to Proceed, Certificate of Substantial Completion, Final Construction Application for Payment, Final Architect Invoice/Billing, and Final Change Order once the project was completed. In total, 149 districts' data were obtained in the document collection mode where 37% were CM at-Risk and the remaining 63% were DBB, representing a far more robust number of CM at-Risk projects than prior researchers.

In addition, survey data was gathered with questionnaires administered to the district manager associated with the construction project. As stated by Carpenter (2014), "The survey was utilized to obtain reliable district manager perceptions of the product quality of the new facility and the quality of service provided by the construction and design teams during the design and construction process" (p. 74). The survey was based on a questionnaire initially developed by Konchar (1997) with some minor adjustments to fit the current research (Carpenter, 2014).

Carpenter (2014) was able to conclude a statistical significance ($p < .05$) on multiple cost and time criteria based on the historical data gathered. In addition, similar statistical significance was discovered in relation to quality, effectiveness and claims results stemming from the survey instrument. His findings reveal conflicting results based on the metrics analyzed. Although conclusive evidence showed that DBB method outperformed CM at-Risk when comparisons were made across all costs metrics, survey results showed CM at-Risk produced higher levels in both product and service quality (Carpenter, 2014). Carpenter determined that "Conclusive evidence does not exist to support the superiority of either of the delivery methods in terms of cost growth, time (schedule duration), time variance (schedule growth), claims, or warranty and callback performance" (p. 157).

Through surveying of CM at-Risk project managers, Carpenter (2014) discovered a high level of satisfaction related to a number of quality-based metrics measured and analyzed. From obtained results, conclusions were drawn that project managers expressed high levels of satisfaction related not only to overall quality, but also high levels of satisfaction with various building systems such as interior, exterior, and individual construction components. Similarly, high levels of satisfaction were obtained regarding overall construction team performance, in addition to high levels of project team communication and cooperation. Carpenter's analysis also found high levels of satisfaction with respect to communication and cooperation with the design team, and similar levels of cooperation and collaboration as an overall project team.

These results, as described prior, were obtained via a survey instrument administered only to the lead project managers to glean perceptions related to specific

quality-related questions posed by the researcher. Where Carpenter's (2014) study focused on feedback only from district project managers, this research broadened the scope of stakeholder perceptions to include various participants. Although critical in support of what amounts to a narrow body of research related to project delivery satisfaction criteria, the limited metrics utilized by Carpenter to measure the subjective aspects, in addition to the lack of different project team members analyzed, still leaves a significant void in the research. In order to provide district decision makers with increased information upon which to make their delivery model selection, additional examination is needed related to stakeholder satisfaction with the alternative delivery model CM/GC from various perspectives.

Delivery Model Selection

Selection of a project delivery method (PDM) is of critical significance and one this research project intends to inform. As pointed out by CMAA (2012), "… the project delivery method is one of the most important decisions made by every owner embarking on a construction project" (p. 1). In addition, they note that there will be advantages and disadvantages with each method, therefore "The owner needs to carefully assess its particular project requirements, goals, and potential challenges and find the delivery method that offers the best opportunity for success" (CMAA, 2012, pp. 1-2). However, the decision has become more difficult over recent years as alternative models such as CM/GC have come into utilization to address some of the inherent weaknesses with the traditional DBB model (CMAA, 2012). These dynamics have led to a situation that is wrought with, "…confusion among practitioners and frustration among researchers" (Franz & Leicht, 2016, p. 160). Although alternatives to the traditional DBB method

provide flexibility for owners, many are, "…overwhelmed with the number of options and struggle to identify a single, coherent delivery method" (p. 160). In an effort to provide clarity to the matter, a review of recent literature related to the selection process follows.

Noel Carpenter's (2014) dissertation provided insight into the selection consideration owners went through in determining CM at-risk vs. DBB delivery model when implementing school construction projects across four states. His research revealed that approximately 20% of the projects analyzed required the utilization of DBB by school district policy, leaving 80% of the districts open to select an alternative delivery model. Carpenter found that those districts with the greatest amount of flexibility in their decision making process were steering towards CM at-risk at a 23% higher rate than DBB (Carpenter, 2014).

Probing deeper into the process, Carpenter (2014) analyzed the criteria that influenced the selection process from the surveyed districts. He discovered that there were no statistically significant differences between the two models when probing construction managers regarding their methods and reason for project delivery selection (Carpenter, 2014). Owner managers noted that they believed that CM at-risk and DBB both offered benefits when seeking improved building quality, schedule, and reducing change orders and project costs. In addition, high importance ratings were also given to both models related to the reduction of disputes and claims, quality and design control, and team relations (see Figure 5).

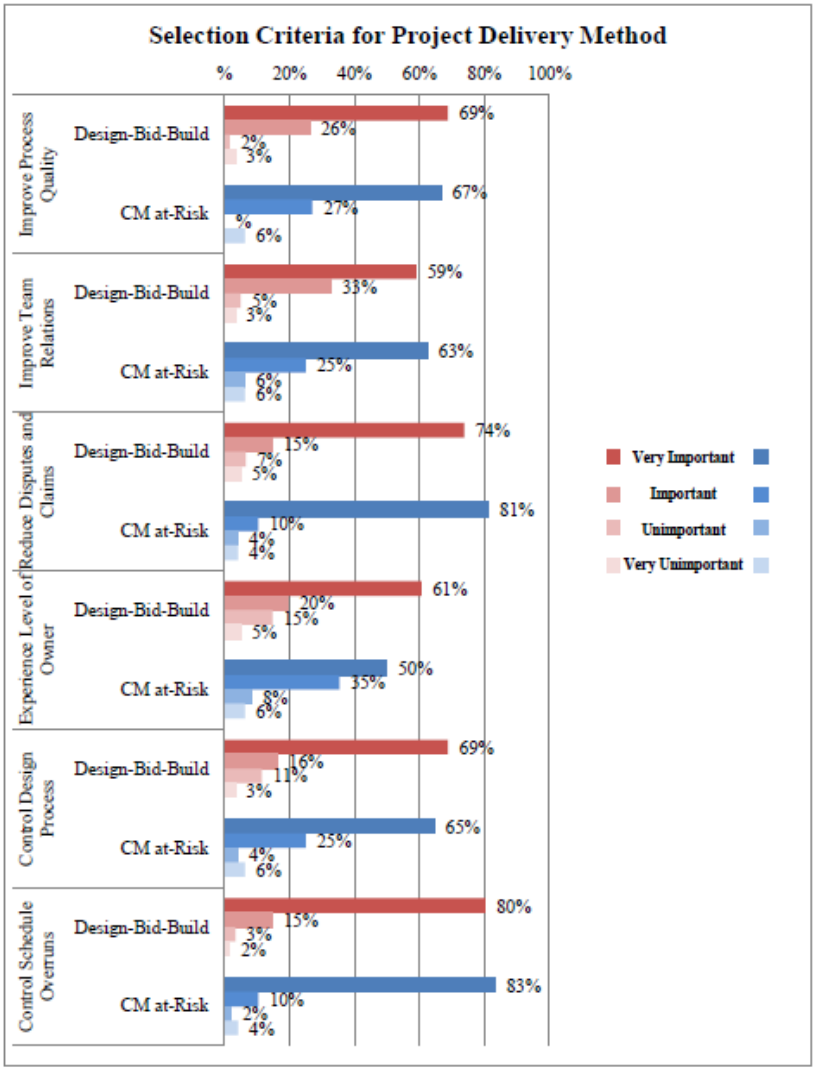


Figure 5. Selection Criteria for Project Delivery Method (Carpenter, 2014)

Although analysis of selection between CM at-risk and DBB was performed, Carpenter's study only narrowly scratched the surface related to selection criteria around project satisfaction drivers. No inquiry related to qualitative reasoning was probed; no question related to project delivery choice being influenced by the desire to ensure overall positive project experience. Although a question around team relations was probed revealing that both CM at-risk and DBB owners responded similarly rating a

strong level of importance to the criterion, his study leaves the field in want for greater insight into the experiences sought and/or anticipated specifically related to CM/GC.

Rather than owner selection based on prior experience or other incidental criteria, Bayraktar, Hastak, Gokhale and Safi (2011) set out, among other objectives, to develop a decision making selection tool for project team members. Referred to as a cost-schedule trade-off tool (CSTT), the researchers sought to identify, "…the optimal group of techniques in various project phases to achieve a specific cost-schedule trade-off goal in line with the performance objective for the project" (p. 645). Intended to benefit owners and others on the construction team, many aspects that influenced project cost and schedule were reviewed, informed by literature review, surveys, and impact assessments on five different case studies.

Survey results revealed that, when considering a model, "…owners have to change their paradigms and put more emphasis on cost control and cost reduction at the expense of schedule" (Bayraktar et al., 2011, p. 647). Among some of the cost control characteristics identified by respondents, emphasis on team building, partnering, and pre-project planning were initially acknowledged. In addition, when asked to rate the top drivers found to have the greatest impact on cost, such actions as executive sponsorship, owner need, and owner commitment were discussed. Some of the greatest barriers included unclear project objectives, lack of alignment and poor planning (Bayraktar et al., 2011). When asked what types of projects would benefit the most by taking into account the aforementioned cost controlling measures, respondents noted that, "…large complex projects with interrelated subcontracts…would benefit the most" (p. 647).

Case studies were then performed which included face-to-face engagement with multiple project team members from owners, designers, contractors and others. Information gleaned from the engagements, in addition to the literature review and surveys, permitted the researchers the ability to generate a cost-schedule trade-off tool, an MS Excel-based tool that included 23 drivers identified by the researchers to have significant project impacts. As proposed, team members would complete the tool prior to inception. Based on their desired project outcome the interface would then rank the recommended project techniques in terms of effectiveness, which may then be used to select the ideal delivery model (Bayraktar et al., 2011).

Many of the techniques identified to support cost and schedule success are deeply embedded in the fundamental makeup of the CM/GC process. Effective communication, pre-project planning, constructability, and team-building and partnering thread throughout the successful indicators developed by the researchers. As noted, "…construction manager at risk and design/build would possibly provide higher potential for team integration or constructor involvement as compared to design/bid/build" (Bayraktar et al., 2011, p. 654). Although the researchers did not specifically segregate out project delivery methods in their research, their conclusions drawn support many of the tenets lauded in the CM/GC process specifically around team building, communication, and early involvement of the contractor.

McGraw Hill Construction implemented a comprehensive survey of architects, contractors, and owners in 2014 in an effort to better understand and gauge current and future construction delivery model selection from each of the respondent fields. Among many of the artifacts reviewed, key drivers and obstacles facing delivery model selection

were evaluated. Of note, the researchers found a disconnect between what architects and contractors perceived were the key drivers informing owner project delivery method selection from what actually influenced their decision making. While they assumed schedule and cost were top influencers, in fact owners were equally or more concerned with quality and liability/risk aversion (McGraw Hill Construction, 2014). The following table represents the key drivers and biggest obstacles that influenced project delivery selection from the three stakeholder perspectives.

Table 4

Drivers and Obstacles to Project Delivery Selection (McGraw Hill Construction, 2014)

DRIVERS

	Selected as Influential by Highest Percentage	Top Ranked	
	Owners	Architects	Contractors
Design-Bid-Build	1. Maximize Budget 2. Reduce Cost	1. Reduce Project Cost 2. Maximize Value of Work for the Budget	1. Reduce Project Cost 2. Maximize Value of Work for the Budget
Design-Build	1. Maximize Budget 2. Concerns About Risk/Liabililty	1. Reduce Project Cost 2. Reduce Construction Schedule	1. Reduce Construction Schedule 2. Reduce Project Cost
CM-at-Risk	1. Improve Quality 2. (tie) Reduce Project Cost/ Maximize Budget	1. Reduce Construction Schedule 2. Maximize Value of Work for the Budget	1. (tie) Owner Concerns About Risk/Liability/ Maximize Value of Work for the Budget

OBSTACLES

	Selected as Influential by Highest Percentage	Top Ranked	
	Owners	Architects	Contractors
Design-Bid-Build	1. Too Few Checks and Balances 2. (tie) Higher Contract Costs/ Additional Cost Due to Length of Contract	1. Higher Cost Contracts 2. Additional Cost Due to Length of Contract	1. Owner Unfamiliar With Delivery Method 2. Higher Cost Contracts
Design-Build	1. Lack of Familiarity With Delivery System 2. (tie) Higher Contract Costs/ Too Few Checks and Balances	1. Too Few Checks and Balances 2. Owners Unfamiliar With Delivery System	1. Owners Unfamiliar With Delivery System 2. Lack of Owner Interest
CM-at-Risk	1. (tie) Too Few Checks and Balances/ Lack of Familiarity With Delivery System/ Additional Cost Due to Length of Contract	1. Owner Doesn't Benefit From Competitive Bidding 2. Higher Cost Contracts	1. Owner Unfamiliar With Delivery Method 2. Owner Doesn't Benefit From Competitive Bidding

As noted by McGraw Hill Construction (2014) in their findings, among architects and contractors who regularly use the alternative delivery system, "…there is strong agreement in the perception of its [CM-at-risk] benefits in the building sector" (p. 23). While they agreed that the CM-at-risk method was supported due to its establishment of a GMP as well as scheduling/phasing support with early on-boarding of key players, owners were more drawn to the delivery model because they felt improved quality would come from the collaborative model (McGraw Hill Construction, 2014). Although owners also noted that maximizing budget/reducing costs could also be experienced with CM-at-risk projects, proponents "…argue that improved quality accrues from having contractors participate in preconstruction decisions while maintaining two separate design and construction contracts with the owner" (p. 25).

Obstacles affecting greater utilization of CM-at-risk were also explored. From the owner's perspective, one of the greatest hindrance to selecting CM-at-risk had to do with the owner's lack of awareness with the delivery system (McGraw Hill Construction, 2014). Forty-three percent of owners agreed that lack of familiarity, too few checks and balances, and additional costs due to length of contract, all served as obstacles prohibiting future expansion of the delivery system. Coincidentally, architects and contractors agree that owners' lack of experience with the model also serves as one of the top three obstacles from their perspectives (McGraw Hill Construction, 2014). Other top inhibitors included lack of competitive bidding and higher cost contracts that may be experienced as a result of the delivery model.

The research performed by McGraw Hill Construction (2014) supports the need for both a deeper understanding around owner expectations as well as a better

understanding of the process in general. Ranked as one of the top considerations for selecting CM-at-risk, owners look for quality through collaboration was well articulated. This research carried this question further through a deeper analysis of stakeholder relationships and how value may be experienced through the project delivery model. Likewise, this research provides greater context to the CM/GC process that clearly remains abstract to many owners who lack experience and understanding of the model itself.

Hosseini et al. (2016), through a literature and document case study approach, sought out to identify general criteria for selecting a project delivery method (PDM) in addition to formulating specific principles to use for a large infrastructure project. As the researcher's point out, in many cases the PDM selection is often made by owners, "… without a deep exploration of the strengths and weaknesses of each method, or any regard to the influencing success factors and characteristics of each project" (p. 261). As projects become ever more complicated, shaped by increasing complexities of stakeholders and demands, the need for owners to intentionally focus on what the project's specific needs are, referred to as procurement selection criteria (PSC), will serve critical (Hosseini et al., 2016).

As the researchers state, "The selection of an appropriate PDM is the basis of success in every construction project and has never been an easy job due to the characteristics of procurement systems" (Hosseini et al., 2016, p. 263). Making a complex situation even more so, "A PDM that can lead a project to success in some aspects may lead a project to failure under different circumstances…," requiring owners to carefully consider the factors that inform the selection criteria (p. 263). A considered

approach, rather than simply selecting a PDM that resonates with owners because of prior use or comfortability, owners should focus on the specific needs of the project and use those factors to inform the PDM selection. Hosseini et al. recommend owners carefully consider their needs, the unique project characteristics, and the external environment (e.g., stakeholders), and initiate a deliberate procedure that aligns such project need criteria (PSC) with the appropriate method (PDM).

Although literature review revealed common threads of success criteria, each project is unique and must be carefully considered on its own merits. As concluded by Hosseini et al. (2016), "There is a need to adapt the selection criteria for each individual project… In addition, it is important to explore the interrelationship between selection criteria, since one criteria may exert on the others" (p. 265). Their findings highlight the need for this research to ensure that a delivery model that supports salient stakeholder experiences be considered when informing a PDM selection.

Risk Aversion

Project risk has been defined as "…an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives" (PMI, 2008, p. 446). Risk can take many forms, whether it be cost, litigation, schedule, safety, or other factors. In understanding such implications, an owner must select a delivery method that they believe is best situated to help manage and control these risks (Carpenter, 2014). However, since each of the delivery methods maintains a different level of risk, and the levels of risk vary with the level of control held by either the owner or contractor, risk avoidance can be a tricky situation (CMAA, 2012).

In 2012, researchers Krane, Olsson and Rolstadås studied the interaction between owners and projects management team members on seven large projects. As reviewed, different stakeholders prioritize risks differently. While the project management team may be more interested in meeting time and budget targets, project owners may prioritize different project outcomes. Through the study, Krane et al. sought to better understand what brought about conflicts on teams and how they could best be avoided.

The researchers call out stakeholder relationships as central to controlling risk. As noted, "…the relationship between stakeholder management and risk/uncertainty management is significant…" (Krane et al., 2012, p. 56). They classify project risks into three levels: operational risks, typically under the purview of the project manager; short-term strategic risks, classified as the project's effects towards the owner; and long-term risks, affecting societal and sustainability implications (p. 58). Based on interviews of key stakeholders, in addition to document data sources, approximately 1,550 risk issues were identified, with 9% falling under short-term and 91% under operational (p. 60).

In an effort to identify how relationships between owners and project managers may help alleviate the experienced risks, conflicting input was received. While one owner's representative, "…strongly argued for close relationships between the roles, in many ways even integrating them…, another project owner's representative strongly opposed such a linking of the roles, insisting that there had to be a clear separation…" (Krane et al., 2012, p. 61). However, the researchers conclude that closer cooperation between the two parties will reduce risk, going so far as to state, "For the success of most projects, there will be a need for alignment of the project owner's interests and the project management team's interests and trust between the two" (p. 63).

Their summary findings support many of the tenets associated with the CM/GC delivery model. The researchers concluded that close cooperation, trust and proactive attitudes between participants is critical at avoiding risk (Krane et al., 2012). In addition, a holistic view of the project was also pointed out, where the researchers conclude that keen focus on operational risk management is realized when there is close connection between project owners and management team members (Krane et al., 2012), a professed attribute of the CM/GC model.

McGraw Hill Construction (2014) recommends one of the best ways to mitigate risk is to select a delivery system that best aligns with project priorities, supporting Hosseini et al.'s (2016) project selection criteria approach. The most commonly utilized PDM, the authors identify DBB as being in the spectrum's mid-zone for risk, "…offering owners a high degree of control over the design…with roles of each party clearly defined" (McGraw Hill Construction, 2014, p. 31). However, due to the lack of constructability, costing during the design phase, and that the "…compartmentalization of parties and functions can generate an adversarial, rather than collaborative, culture," risk is inherent within the DBB model simply by design (p. 31). In their 2014 study, McGraw Hill Construction compared the perceived risk associated with the three primary delivery models from the perspective of architects and contractors. Although contractors did reveal a preference for Design-Build over CM at-Risk (CM/GC) and DBB with respect to risk, both architects and contractors identified CM at-Risk as being more advantageous than DBB to reduce tendency for litigation (McGraw Hill Construction, 2014).

Though the McGraw Hill Construction (2014) study included a laudable number of contractors and architects in their analysis (n=230), their methodology leaves room for

significantly more data. For example, no perspective from owners was considered to ascertain risk aversion or perception. Since it is believed that the collaborative approach of CM/GC may lead to reduced risk due to the allied relationship between the owner and contractor, in addition to the teaming process and integration with the architectural firms, perspectives from owners will serve critical in shedding light on this important subject (Carpenter, 2014; OSU, 2002).

Carpenter (2014) concludes that the selection of the delivery method made, and the subsequent specifics within the terms, "…solidifies the owner's beliefs regarding the transfer of risks and responsibilities among the various parties involved with the project" (p. 25). When he analyzed the effectiveness of CM at-risk vs. DBB his results were revealing in relation to many of the artifacts characterized as risk-related attributes. He found that,

> A significantly larger percentage of responses were provided in the Very Effective category by CM at-Risk managers than were by Design-Bid-Build managers for all questions regarding: Reducing Cost, Controlling Change Orders, Reducing Schedule Duration, Controlling Schedule Overruns, Improving Building Quality, Improving Process Quality, Improving Project Team Relations, Controlling the Design Process, and Reducing Disputes and Claims. (p. 145)

Most notably, managers rated CM at-Risk at 59% Very Effective at reducing disputes and claims compared to 42% for DBB, a notable distinction between the two (Carpenter, 2014). Similarly strong results (61% to 35%) were also realized for CM at-Risk's perceived effectiveness at controlling change orders compared to DBB.

Although Carpenter (2014) did not find a statistically significant difference between the two related to the number of cost and dispute claims realized, his results do reveal that project participants perceive CM at-Risk to be more effective at limiting commonly perceived project risks.

Researcher J. Thomas Frantz (2014) analyzed the risk of capital construction not through the lens of project drivers such as claims and disputes, but rather through the lens of risk of ones' career and success as a district leader entrusted to manage and oversee such complex projects. As he points out,

> …few superintendents have the background necessary to manage a major building project. The construction of new school facilities or renovations of existing ones has been responsible for the professional demise of some superintendents after a building project became an explosive community issue. (p. 384)

He identifies that limited exposure to the topic is most often the case for most superintendents in their training programs; most of what is learned when on the job ends up being through trial and error (Frantz, 2014).

The researcher offers suggestions that superintendents may consider when embarking on capital projects in order to avoid many of the risk situations. Though he points out that there is no simple recipe for success, "…there are effective methods that a superintendent may employ when preparing to embark on a construction project in a school district" (Frantz, 2014, p. 385). When it comes to employing a construction management firm, Frantz highlights the importance of having someone on the ground that maintains the construction knowledge and who can partner with architects and engineers by proactively anticipating problems. As noted, "…a construction management

firm…may be one of the main reasons a superintendent enjoys a trouble-free construction period" (p. 391).

Although not quantifying his findings via common risk traits, nor identifying specific project delivery models, Frantz makes a compelling case for the use of CM/GC. The researcher correctly calls out an often-overlooked characteristic; that most school superintendents have minimal experience and/or training to successfully oversee capital construction projects. In order to reduce the risk of projects going awry, the researchers recommends incorporating a trained construction manager that can cooperate with project team members in order to avoid and respond to project issues when they arise, an inherent strength and core component of CM/GC. This conclusion is supported by Krane et al. (2012), McGraw Hill Construction's (2014) findings, and Carpenter's (2014) research.

Success Factors

As noted by Rashvand and Majid (2014), when referencing Baccarini (1999), "To date, there are no consistent interpretations or standardized definitions of the term project success," making it extremely difficult to identify what constitutes project achievement (p. 11). Although measures such as cost, schedule and quality are often considered primary drivers for any successful project, subjective measures around project experiences from different stakeholders should also be considered (Carpenter, 2014; Khosravi & Afshari, 2011). Although seminal work by Chan, Scott, and Chan (2004) revealed a robust summary of project success factors (see Figure 6), limited research has been performed in relation to the human-related, subjective factors as covered in this research project.

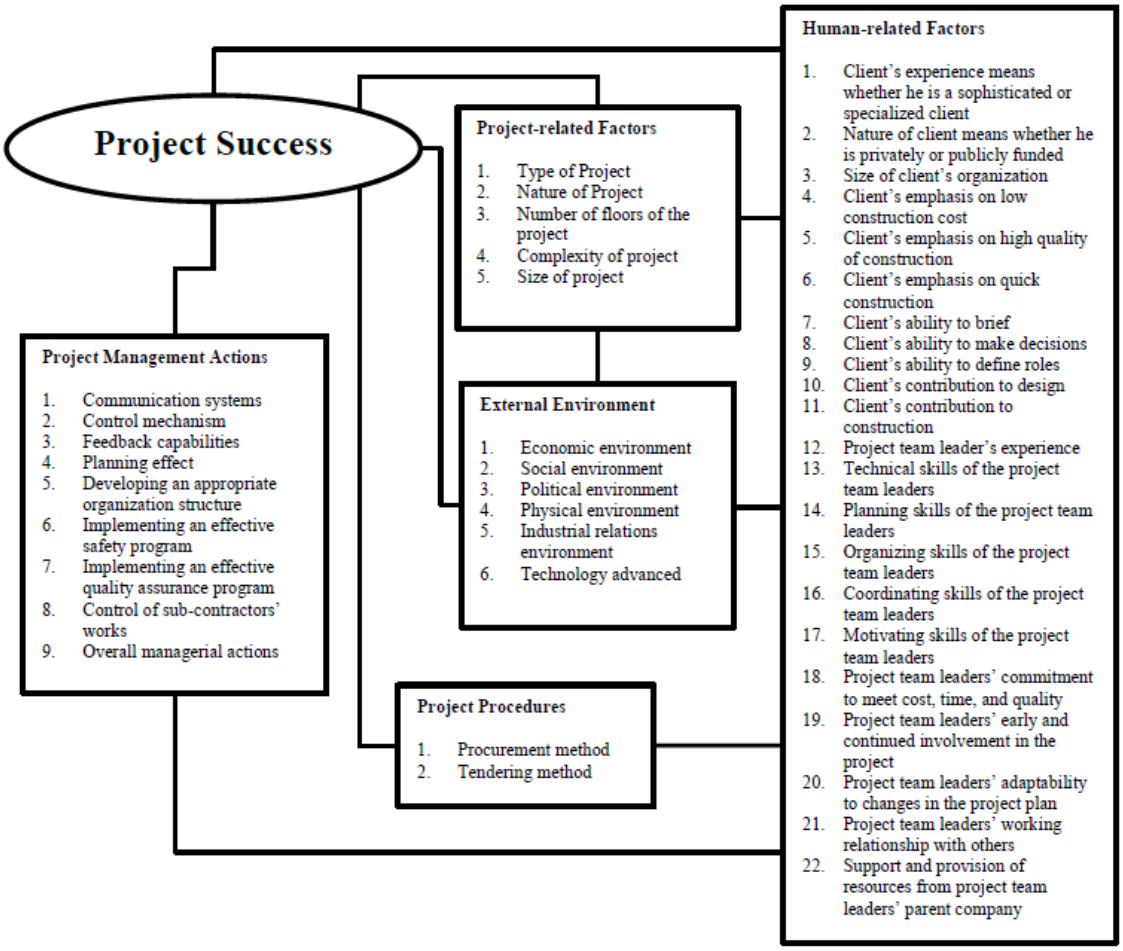


Figure 6. Factors Affecting the Success of a Construction Project (Chan et al., 2004)

In 2011, Khosravi and Afshari set out to develop a success measurement model for construction projects. Their literature review revealed a dynamic understanding of project success; from technical success in the 1960's; to time, budget and quality factors coming into play in the 1980's; followed by the consideration of customer satisfaction considerations being most recent. Incorporating many of the current and historical success factors, the researchers surveyed 20 project managers to ascertain the perceived impact individual success criteria, narrowing an initial list of 10 criteria down to 6 (Time Performance, Cost Performance, Quality Performance, Health and Safety, and Client

Satisfaction). The researchers returned to the field, probing project stakeholders to then weigh the importance of each of the finalist criteria.

Khosravi and Afshari (2011) discovered that although the "iron triangle" of time, cost and quality still prevailed, client satisfaction rose to the 4th influential success criteria, surpassing health, safety and project environment factors and nearly matching quality influences (see Table 5 below). Their research findings beg for greater understanding around client satisfaction and the inclusion of a project delivery model, such as CM/GC, that may serve to support such owner fulfilment.

Table 5

Project Success Criteria (Khosravi & Afshari, 2011)

	Project Success Criteria	Mean Rank	Corresponding Weighting
1	Time Performance	3.141	0.209
2	Cost Performance	3.5	0.233
3	Quality Performance	2.986	0.199
4	HSE	2.587	0.173
5	Client Satisfaction	2.783	0.186

A deep dive into project critical success factors (CSF's) was performed by Kog and Loh in 2012, identifying ten CSF's from a list of 67 based on input from various construction professionals. The researchers limited their scope of CSF's to those impacting schedule, budget and quality. Of significance was that although four trends were identified among the various project experts (architects, civil/structural, and mechanical/electrical engineers), great variation in viewpoints were expressed related to the impact and/or importance of individual CSF's based on their respective views. As the researchers point out, "… [this] present study has shown that CSFs identified in

previously published studies are dependent on the professional background of the respondents" (p. 526).

Although viewpoints varied based on stakeholder field, Kog and Loh (2012) discovered four primary factors when considering the collective results from project professionals; "…constructability, adequacy of plans and specifications, project manager competency, and realistic obligations/clear objectives" (p. 526). The results of Kog and Loh's work reinforce the importance of the project manager's role, competency, and commitment to overall project success. In addition, the researchers also conclude that, from architectural professional viewpoints, "…the human factors, particularly the quality of the consultant and contractor, are crucial to achieving project success" (p. 527).

The findings from Kog and Loh (2012) related to the project manager's role and quality of contractor, appear to support the CM/GC delivery model. While input was not sought from project owners in their study, it is evident that CM/GC's intentional early onboarding of project management, in addition to the flexibility to select the general contractor based on more than factors than just low cost, appears to support project success criteria.

Haponava and Al-Jibouri (2012) set out to design project indicators to help inform work performance during a project, rather than post project analytics found in most success criterion. As pointed out by the researchers,

> One of the main the shortcomings of existing KPIs is the fact that almost all KPIs used in construction are 'lagging' measures. That is to say, the indicators are mostly used for review purposes after a project is completed and, therefore, they

> do not offer the opportunity for control during the project development and execution. (p. 141)

As an alternative, the researchers sought to identify measures that could influence the project while it is progressing to help ensure success. In addition, aspects other than the traditional indicators of time, cost and quality were considered.

The researchers proposed a process that includes key performance success indicators be evaluated on a process quality and process completeness scale as the project progresses through construction stages (Haponava & Al-Jibouri, 2012). As outlined in Table 6, KPI's are intentionally called out so that project stakeholders can evaluate each objective intentionally. A focus on managing client requirements is also identified that introduces a framework that flows from the elicitation of client requirements, to understanding them, to managing them (Haponava & Al-Jibouri, 2012).

Haponava and Al-Jibouri's (2012) process-related project success consideration broadens not only the traditional cost-schedule-quality indicators, but provides an intentional framework to implement during each stage of the project. Significant focus on many project aspects such as alignment of stakeholder requirements in the pre-project stage, to identification of project value and collective consensus during the design phase, to intentional management of internal and external stakeholders during construction, seem well supported with the CM/GC collaborative model. Although specific delivery models were not under consideration in their analysis, the main sub processes identified by the researchers align with CM/GC's stakeholder involvement and communication goals.

Table 6

Key Project Indicators (Haponava & Al-Jibouri, 2012)

Stages	KPIs	Main subprocesses
Preproject stage	Problem definition	Identifying the initial problem of the project, the level of urgency, and the possible ways to solve it
	Management of client requirements	Managing the identification and analysis of client requirements
	Management of design solution	Managing the generation and comparison of possible project alternatives to meet the client requirements
	Alignment of stakeholders' requirements	Finding a compromise between the requirements of the different stakeholders involved in the process for the stakeholders to achieve common objectives
	Stakeholder involvement	Involving the "right' stakeholders at the "right" time
Design stage	Management of design interactions	Managing the interactions between different design disciplines
	Management of project value	Defining the value for a client in meeting a perceived need by establishing a clear consensus about the project objectives and how they can be achieved
	Control management program	Observing the design process so that the potential problems can be identified in a timely manner and corrective action can be taken when necessary to control project execution
	Management of project requirements	Managing the requirements of the project's products and product components and identifying inconsistencies between these requirements and the project plans and work products
Construction stage	Management of internal and external stakeholders	Organizing and coordinating interactions between different internal (for example, subcontractors and suppliers) and external (for example, client and surroundings) stakeholders
	Management of time and costs	Ensuring that any potential effects on project time and costs are identified early to provide adequate forecasting and timely control and feedback information
	Quality management	Ensuring that all activities necessary to develop and implement a service are effective and efficient with respect to a process system and its performance
	Information management	Organizing and controlling the structure, processing, and delivery of information from one or more sources, and the distribution of that information to one or more groups of stakeholders

Rashvand and Majid (2014) broadened the customary lens of success criteria, specifically calling out the importance of client satisfaction as a measurement of project performance. As discussed, "Successful performance measurement criteria cannot be limited to meeting just the three traditional criteria," where consideration must be given to the subjective nature of clients (p. 10).

While some research has been performed related to human-related factors, the researchers point out the difficulties related to narrowing down project success indicators. While one stakeholder, the owner for example, may determine the project a success, the contractor, on the other hand may not (Rashvand & Majid, 2014). This begs the need, as

pointed out by the researchers, to shift success criteria from the myopic project level to the stakeholder level (Rashvand & Majid, 2014).

Based on extensive literature review of 33 prior studies, the researchers discovered that both clients (integral members of the project team) and customers (external project users) expressed many similarities in their success criteria responses (Rashvand & Majid, 2014). Project expectation topped the list for client constituencies, highlighting the weight that should be given to these criteria when attempting to ensure project success. A clear understanding from stakeholders regarding expectations must be given due attention to ensure, from owners to architects, and project managers to contractors, that project deliverables align with anticipated outcomes. In addition, attention to client communication and perception also rounded out the top success factors.

Although the researchers did not analyze direct project delivery model influences, all three top success criteria would appear complimented by the collaborative and communicative CM/GC process. In addition, commonly held standards such as profitability, dispute resolution, and even competency, lagged as client-related success drivers. These research findings demonstrate the importance of better understanding stakeholder experiences and provide a calling for further analysis.

Carpenter's (2014) research calls out the traditional success criteria often based on cost, schedule and quality measures. As noted, "…client satisfaction (subjective measure) may be improved by a perceived increase in cooperation and communication instilled by the collaborative properties of alternative methods" like CM/GC (p. 32). In an effort to broaden the field's understanding of project success, in addition to the more

traditional factors, Carpenter surveyed district manager perceptions to gauge quality of workmanship as well as quality of service provided by the project team members. He found statistically significant differences in not only project/product quality, but also service quality with the construction, design, and project team outcomes with CM at-Risk compared to DBB projects (Carpenter, 2014). As shown in Figure 7, collaboration, cooperation, and overall service quality is significantly more favorable when comparing CM at-Risk with DBB methods. Carpenter concludes:

> Evidence has been provided by this research showing that the collaborative properties of CM at-Risk performed at significantly higher levels than did those of Design-Bid-Build. District construction manager responses to survey questions specifically focused at the collaboration and cooperation of the construction team, design team, and project team produced significant positive results in favor of CM at-Risk. Additionally, product and service quality were shown to be superior for CM at-Risk with significant differences in all areas except for design team capture of owner vision and providing clearly defined documents. (p. 162)

However, when analyzing traditional success factors the CM at-Risk method was not able to produce performance enhancements in the areas of cost, time, and risk (Carpenter, 2014, p. 163). Findings show that CM at-Risk had significantly higher original and final project costs and yielded no significant difference in project schedule duration or dispute/claim risks (Carpenter, 2014).

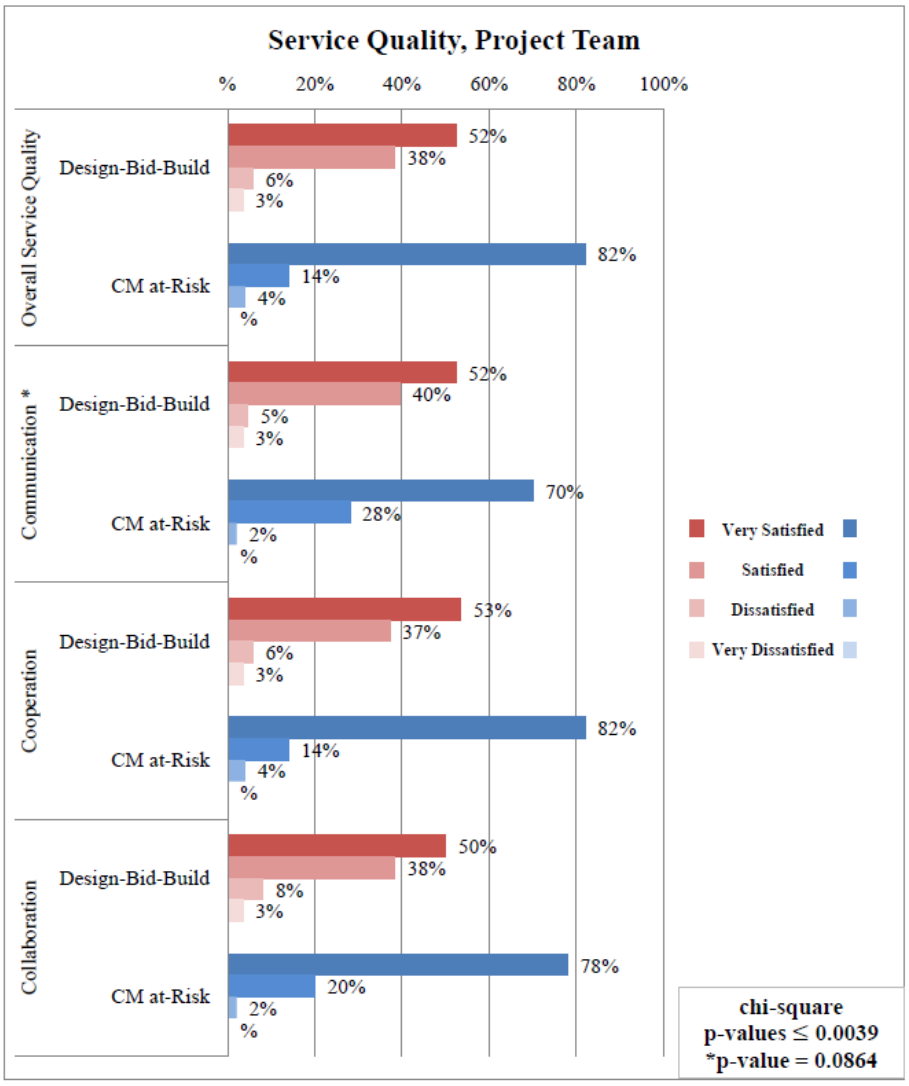


Figure 7. Project Team Service Quality

McGraw Hill Construction's (2014) research included a number of findings related to the success factors experienced with CM/GC as well as the more traditional DBB and DB delivery models. The researchers analyzed the traditional cost and schedule components based on feedback from owners, contractors, and architects. In terms of cost, owners noted that their CM at-Risk projects finished under budget at a higher rate, however architects and contractors differed, architects leaning towards DBB and contractors towards DB for cost controlling influences (McGraw Hill Construction,

2014). In terms of schedule, CM at-Risk owners noted their projects were completed on time at a higher rate, while DB projects revealed the greatest propensity to be ahead of schedule. However, both architects and contractors agreed that DB was the most advantageous for schedule, followed by CM at-Risk (McGraw Hill Construction, 2014).

In addition to the traditional success measures, team satisfaction was also surveyed. CM at-Risk revealed a 97% satisfaction rate by owners, compared to an 80% and 77% rate for DB and DBB respectively. According to their findings, "60% of owners that had done a CM at-Risk project report being very satisfied, which is at least 20 percentage points higher than the owners who did projects using other delivery systems" (McGraw Hill Construction, 2014, p. 42). However, response rates from contractors and architects differ, with a higher majority of architects showing indifference to project delivery influencing satisfaction, while contractors revealed a preference for DB (43%) vs CM at-Risk (23%), followed by no preference (19%) and DBB (11%).

Table 7

Project and Process Benefits (McGraw Hill Construction, 2014)

	Benefits Achieved	Selected by Highest Percentage as Best Delivery System to Achieve Benefit	
	Owners	Architects	Contractors
Design-Bid-Build	• Cost: 67% on Budget; 27% Under Budget • Schedule: 67% on Time; 13% Ahead of Schedule • Satisfaction: 40% Very Satisfied	1. Reducing Project Cost 2. Improve Construction Quality	1. Reducing Project Cost 2. Less Value Engineering
Design-Build	• Cost: 67% on Budget; 23% Under Budget • Schedule: 73% on Time; 20% Ahead of Schedule • Satisfaction: 37% Very Satisfied	1. Reduce Project Schedule 2. (Tie) Less Value Engineering/ Fewer Change Orders	1. Improve Communication Between Team Members 2. Reduce Change Orders
CM-at-Risk	• Cost: 60% on Budget; 33% Under Budget • Schedule: 77% on Time; 7% Ahead of Schedule • Satisfaction: 60% Very Satisfied	1. Improved Communication Between Team Members 2. Improved Construction Quality	1. Improved Productivity 2. Reducing Project Cost

The results from McGraw Hill Construction (2014) reinforce the need for additional analysis related to project experience with the CM/GC model. Conflicting viewpoints from owners, architects, and contractors necessitates further study to confirm

if the findings surrounding delivery model experience are isolated to this study or if the degree of experiences differs at similar rates based on a case study analysis.

As Williams (2016) notes in his recent conclusion, "Both research and practice have been moving away from a simplistic definition of project "success" as meeting cost, schedule, and performance targets, to a more multi-dimensional definition, involving both objective and more subjective criteria" (p. 97). Analyzing the effects of various success drivers, the researcher sought to identify the connectedness and root causes that lead to project success through an in depth case study analysis (Williams, 2016).

The researcher found that project success is a highly complex and multi-dimensional (Williams, 2016). The culture of the organization, one-team mentality, positive relationships with subcontractors, constant engagement with project customers/owners, and good community relationships with external stakeholders, supported overall project success (Williams, 2016). As noted by Williams, "It is important for the community that what is left is a legacy, not just a building," and the impacts stemming from the experience can have a lasting effect (p. 108).

To that end, the researcher suggests emphasis be placed on the project leadership aspects such as culture, communication, and stakeholder engagement (Williams, 2016). Similarly, he suggests moving beyond a simple commercial lens, focusing rather on collective needs and values, supporting a single team concept, avoiding the, "…frequent fragmentation of design, building, and [facilities turnover])…" that often plagues many projects (p. 110). Implementation of the CM/GC delivery approach appears well positioned to align with many of Williams's recommendations.

Stakeholder Relationships

As referenced by Krane et al. (2012), when referring to work performed by Turner and Mueller (2004), "Project success depends, among other factors, on the ability to successfully manage the interaction between the key stakeholders—namely, the project owners and management team of each project" (p. 55). An understanding around how stakeholder relationships influence projects and their respective success serves critical and central to the theoretical framework that grounds this research.

Anderson, Patil, Gibson and Sullivan (2004) analyzed three case studies in order to better understand the owner-contractor relationship in order to offer suggestions upon which to enhance the working process. As discussed, maximizing stakeholder relationships serves integral if project participants wish to better their chances of project success. By improving on the current owner-contractor work structure (OCWS), developed originally in 1997 by the Construction Industry Institute, the researchers proposed a revised approach to support improved stakeholder relationships.

There exists limited information available to provide owners or project participants with recommendations around relationship considerations that would serve to benefit overall project success (Anderson et al., 2004). This was reinforced by the researchers when interviews revealed that most owners lacked an understanding about their roles and appropriate level of involvement in their projects (Anderson et al., 2004).

Applying a revised OCWS to individual case studies the researchers found it supported critical project stakeholder relationship tenets. Namely, it reinforced alignment between participants, helped define stakeholder roles and responsibilities, supported increased communication with key subcontractors, ensured common language between

participants, and helped clarify project expectations from various viewpoints (Anderson et al., 2004). Incorporating these critical relationship components strategically called out in the revised OCWS will serve useful in developing and executing successful capital projects in addition to determining which are best supported by the CM/GC model.

In order to better understand stakeholder roles and relationships and their impacts on construction cost overruns Doloi (2013) identified that the client's role and responsibility in helping facilitate a productive project environment is important. Eight critical factors were identified that resulted in significant effect, many related directly to the interactions and relationships between key project leaders. The researcher discovered that relationships between project participants was one of the most important factors to a successful project outcome (Doloi, 2013). As noted, communication and personal rapport can lead to reduction in time and overall project costs, two of the core success factors commonly identified for construction projects (Doloi, 2013).

Although additional aspects were identified by Doloi (2013) as having notable effects on addressing cost overruns, project stakeholder relationship through communication and team due diligence supported the conditions necessary for improved results. As reviewed, "…a positive relationship between laborers and management is highly significant for promoting a conducive working environment, which potentially contributes toward high productivity in projects" (p. 277). Ensuring effective communication, stakeholder participation and effective coordination, responsibility, and conducive labor relations were all identified as factors to be implemented in order to achieve project success (Doloi, 2013).

Mollaoglu-Korkmaz et al. (2013) analyzed the impacts of project delivery methods in relation to project integration and outcomes relating to sustainable, high performance buildings. The researchers analyzed how the project delivery method (DB, DBB and CM at-Risk), either supported or inhibited project goals and team integration. Method and timing of communication, onboarding of team members, and chemistry among project members were discussed. Although Mollaoglu-Korkmaz et al. compared team integration with specific sustainable building outcomes, the transferability of their findings would appear to support general school construction projects as well. They discovered that CM at-Risk, in addition to DB, yielded high levels of integration as is commonly assigned to the project delivery models, compared to their DBB counterpart (Mollaoglu-Korkmaz et al., 2013).

In summary, the researchers discovered that CM at-Risk, in addition to DB are more prone to project success due to their integration levels associated with the delivery models, likely yielding improvements in sustainability goals, in addition to time, budget, and quality metrics (Mollaoglu-Korkmaz et al., 2013). Additional lessons learned were also reaped from their analysis, supporting the critical role team selection can play, the researchers recommending a thorough selection process, like that inherent in CM/GC, be used to ensure participants are good fits related to stakeholder/team relationships (Mollaoglu-Korkmaz et al., 2013). However, as discussed in their findings, a need for additional research related to project delivery attributes and their relation to project outcomes is warranted, supporting this research study (Mollaoglu-Korkmaz et al., 2013).

When implemented, project partnering through collaborative relationships may serve to improve project performance and reduce risks (Mollaoglu, Sparkling, & Thomas,

2015). Despite literature that supports the constructive impacts positive stakeholder relationships may play, many in the field still find themselves fragmented and isolated within their professional roles. Mollaoglu et al. set out to identify the barriers that prohibit the productive relationships that research portends impactful. Although the benefits of partnering have been identified as early as the 1980's, and being recognized as a best practice by such organizations as the Construction Industry Institute, it still wanes in actualization in the field today (Mollaoglu at al., 2015).

An exhaustive literature review reinforced the need for improved communication, trust, teamwork, and similar relational factors in order to support high project satisfaction and outcomes (Mollaoglu et al., 2015). Referred to as project partnering, the researchers call out many characteristics that are prevalent in the CM/GC delivery model. Early involvement of contractors, joint subcontractor selection, and collaborative contract clauses were highlighted (Mollaoglu, et al., 2015). However, despite the proposed benefits, the behaviors still appear limited in the field, where adversarial tendencies inherent through the competitive bidding process run common, supporting win-lose situations rather than win-win (Mollaoglu et al., 2015).

The researchers identified a number of barriers that prohibited the successful partnering relationships lauded by field experts, including cultural barriers, organizational-program barriers, project team barriers, and legislative-governance barriers (Mollaoglu et al., 2015). As discussed, "For partnering to be a success, inter-organizational project teams consisting of owners, designers, contractors, and subcontractors must share common goals and objectives illuminating an environment of

trust and commitment to the partnership" (p. 74). These attributes identified, many of them central to partner relationships, are those that are purported by the CM/GC model.

In summary, the researchers found that project team-related barriers yielded the greatest area for relational improvements, while cultural barriers, such as trust and mentality of stakeholders, were the greatest inhibitors (Mollaoglu et al., 2015). They highlight that partnering that boosts team integration, like that found in CM/GC, which brings the three primary stakeholders together (owner, architect and contractor), would serve to help address some of the biggest barriers (Mollaoglu et al., 2015).

Completing the literature review related to stakeholder relationships, Hatmoko and Khasani (2016) recently compare the performance of government and private clients (e.g., owners) in construction projects. From the perspective of the contractors, the researchers highlight the roles that clients play, serving as vital team members during the construction process. Reinforcing the conclusions of Frantz (2014), who noted the limited experience superintendents often bring to the construction team table, the researchers found that almost 95% of construction clients typically have limited knowledge and experience with the field (Hatmoko & Khassani, 2016). Such limited experience as to the roles they play, and the impacts their interactions may have on project stakeholder relationships, begs for improved understanding.

Although contractors found clients from both government and private fields to be good, a clear desire for increased proficiency is still desired (Hatmoko & Khassani, 2016). Twenty-nine performance variables were considered, and while most differences were not statistically significant, in general, private clients performed slightly better than their government counterparts. As noted by the researchers, "…a project's success is also

largely dependent on the client's knowledge and skills…" (p. 91). If clients, especially those in government, can improve their skills and understanding related to construction projects and operations, improved outcomes related to stakeholder relationships and delivery of the project will be improved (Hatmoko & Khassani, 2016).

Summary and Integration

Laying the foundation for stakeholder theory, Freeman (1984) and Freeman et al. (2007, 2010) provide a lens through which businesses can rethink their approach towards value-creation through relationships and interactions rather than simple economics. Although historically a business-related concept, applying stakeholder theory to construction programming is both a logical and prudent consideration, allowing project stakeholders the opportunity to incorporate the principles and reap the benefits lauded by theory experts (Eskerod & Vaagaasar, 2014; Lundin & Söderholm, 1995). Although a deep knowledgebase around stakeholder theory and business has been established over the last three decades, limited research has been realized relating the theory to application within the construction field.

Through a stakeholder theory approach, Eskerod and Vaagaasar (2014) and Eskerod, Huemann & Ringhofer (2015) carried this pioneering concept forward, calling for the critical importance of intentionally analyzing stakeholders in construction projects. However, limited feedback from only select project team members provided a narrow lens upon which to draw conclusions. Yang et al. (2014) helped make sense of stakeholders with varying project attributes and potential approaches, while Turkulainen et al. (2015) take it a step further by researching communication modes and strategies based on specific stakeholders and their levels of involvement during and throughout the

phases of the project. Unfortunately, Yang et al.'s (2014) research was limited to one case study and failed to consider the perspective from project managers, while Turkulainen et al. (2015) focused only on one stakeholder aspect (communication) that stemmed from a non-construction related event.

Most recently, Eskerod, Huemann & Ringhofer (2015) made a strong case for the solicitation of stakeholder theory to projects, calling for the application of a management for approach in order to improve stakeholder inclusiveness, among other factors. However, limitations to their research regarding broad levels of stakeholder perspectives still leaves the field in want for improved data. This research study adds significant depth to stakeholder theory application within the construction field, calling on first-hand experiences from varying key project participants within the CM/GC delivery model; a delivery method purported to enhance salient relational tenets.

Application of stakeholder theory to the conceptual framework of CM/GC projects further highlight the importance of the research at hand. Although momentum away from traditional models like DBB towards the CM/GC delivery model is forecasted, limited research is available to assist and inform owners regarding the experiences with the model (Carpenter, 2014; CMAA, 2012; McGraw Hill Construction, 2014; Rojas & Kell, 2008). While many believe CM/GC offers benefits worthy of consideration, (AIA, 2011; Construction Industry Institute, 1997; Konchar & Sanvido, 1998; OSU, 2002; Rojas & Kell, 2008; State of Washington Joint Legislative Audit and Review Committee, 2005) conflicting findings have led to a lack of clarity related to the alternative model (Carpenter, 2014; Liu, 2004; Williams, 2003). In addition, seminal studies comparing CM/GC to DBB, both by Rojas and Kell (2008) as well as Carpenter

(2014), left significant questions to be answered, with limited data sets, conflicting results, and narrow scopes related to subjective project stakeholder experiences, further supporting the need for deeper understanding.

Although one of the most important aspects to a project's success, delivery model selection can be a confusing process, made far too often by owners who lack experience, background and understanding (CMAA, 2012; Franz & Leicht, 2016; Hosseini et al., 2016). Despite some progress made to assist owners in their decision, such as Bayraktar et al.'s. (2011) CSTT tool and Carpenter's (2014) findings, the decision making process is still void of clarity and sufficient information. Furthermore, conflicting viewpoints from various team members regarding delivery model selection, and how best to relate project success criteria to specific project delivery models, still exist (Hosseini et al., 2016; McGraw Hill Construction, 2014). A broader understanding of project experiences from key project stakeholders, in addition to document reviews that may inform district decisions to implement CM/GC, was explored in this research and adds valuable information to the field.

In addition to an improved understanding around drivers associated with CM/GC selection, risk aversion is another important factor requiring further exploration. A critical aspect to be considered when delivering on any capital campaign (Carpenter, 2014; CMAA, 2012; FMI/CMAA, 2010; Krane et al., 2012; McGraw Hill Construction, 2014), a better account of project team experiences with risk when implementing capital efforts utilizing CM/GC was considered.

Although Krane et al. (2012) concluded that closer cooperation among team members will reduce risk, input from select project members during his study

contradicted their conclusion. Mixed reviews relating CM/GC to risk experience were also revealed in McGraw Hill Construction's research, with contradictory viewpoints from architects and contractors, while lacking any data from the owners' perspective (McGraw Hill Construction, 2014). Carpenter carried the risk analysis further in his study whereby project participants concluded that CM at-Risk was a more effective delivery model in limiting such threats (Carpenter, 2014). However, he found no statistically significant difference between CM at-Risk and DBB related to risk aversion when he attempted quantitative analysis of his data (Carpenter, 2014). Of significance, his measured variable was isolated to very limited cost and dispute claim data points, an extremely narrow view of the many possible risk drivers with construction projects.

As mentioned by Frantz (2014), school construction can be a career jeopardizing experience for any superintendent, especially if the project goes awry. Despite prior efforts to gain a better understanding around risk experiences with CM/GC, the data is both contradictory and limited as aforementioned. Critical feedback from all project stakeholders regarding their experiences with their CM/GC projects will help better define risk-related experiences when implementing the alternative delivery model.

Just as risk factors best be avoided, every superintendent, their school board, and community wish for their project to be successful in the end. However, what defines project success, and does success look different depending on the viewpoints from different project stakeholders? Significant research has been performed on the traditional success factors associated with CM/GC (cost, time, and quality). In addition, success models have been created (Khosravi & Afshari, 2011), critical success factors identified (Kog & Loh, 2012), process-related KPI's developed (Haponava & Al-Jibouri, 2012),

and project expectations analyzed (Rashvand & Majid, 2014). However, limited research related to project stakeholder experiences with CM/GC still plagues industry understanding. Although varying levels of stakeholder surveying and analysis have been implemented (Carpenter, 2014; McGraw Hill Construction, 2014; Williams, 2016), additional data will serve essential to shed broader light on the results regarding project success with CM/GC.

Finally, salient to stakeholder theory is the field's need for an improved understanding regarding relationship experiences between team members when implementing CM/GC. Improved modeling (Anderson et al., 2004), relating relationships to cost drivers (Doloi, 2013), and demonstrating how positive relationships benefit sustainable building outcomes (Mollaoglu-Korkmaz et al., 2013), have all shown that positive project relations are critical to outcomes. However, scarce research is available that provides relationship experiences directly related to the CM/GC model. Although the industry continues to tout its likelihood for improved relationships based on the design and arrangement of team members (AIA, 2011; Carpenter, 2014; CMAA, 2012; McGraw Hill Construction, 2014; Rojas & Kell, 2008; Sewalk et al., 2016; Williams, 2003), limited first-hand experiences of implementers is available. This research project deeply analyzes stakeholder interactions in an effort to describe the relationship experiences between project team members.

Chapter 3: Methodology

Introduction

This chapter reviews the research methodology and processes utilized to describe the experiences of a school district in Oregon who recently completed a capital school construction project utilizing the CM/GC method. A bounded case-study approach, a specific site was intentionally identified, participants selected and interviewed, and pertinent documents reviewed in order to address the research questions posed.

Chapter 3 begins with a review of the problem statement, followed by the research questions that ground this study. A thorough review of the research methodology and design will be explained, followed by site and population identification and sources of data used for analysis. Trustworthiness of the data and review of specific procedures implemented, in addition to ethical considerations and limitations will be discussed.

Statement of the Problem

Nationwide, an estimated $197 billion is needed to address infrastructure improvements across K-12 school campuses (Alexander & Lewis, 2014). In an attempt to address those needs in the state of Oregon alone, over $2.2 billion worth of school construction were approved through local school levies in the last six biennia (Oregon School Capital Improvement Planning Task Force and Portland State University, Hatfield School of Government, Center for Public Service, 2014). Without a clear understanding of the subjective experiences associated with the varying project delivery approaches, districts are making selection decisions void of critical information, leaving billions of taxpayer dollars to chance. As Oregon school systems prepare for their capital

construction initiatives it will be critically important that their selection of project delivery method is an informed one (Sewalk et al., 2016). As they weigh different options available to them through statute, consideration towards a model that promotes high satisfaction from project stakeholders should be contemplated. Often with millions of dollars at stake, the trust of their taxpayers in the balance, and the implications and consequences if school construction project outcomes are not positive, the decision over project delivery is paramount.

Although prior research has been performed related to CM/GC projects, the research has been focused primarily on quantitative analyses focused heavily on cost and time variables (Carpenter, 2014; Konchar, 1997; Kulkarni et al., 2012; Rojas & Kell, 2008; Williams, 2003). The limited data related to project experience that does exist focuses heavily on project quality outcomes, providing only a cursory glimpse into stakeholder experiences related to the entire CM/GC process (Carpenter, 2014; Konchar, 1997; Williams, 2003). As a result, scarce research has been performed analyzing subjective stakeholder satisfaction and experience, critical components of any project's overall success (Rashvand & Majid, 2014).

Research Questions

This research aims to provide critically important information as it sets out to describe and interpret the experience of an Oregon school district who has recently implemented CM/GC to deliver their new capital school project. The results obtained will allow future district decision makers' greater insight into the CM/GC process to help them determine if the alternative delivery model is best suited to support their district's future construction project.

The primary research question that guided this qualitative study was:

R1: What are the experiences of a school district who implemented the construction manager/general contractor delivery model for their new school construction project in Oregon?

Additional research questions were:

R2: How do stakeholders describe their actual experiences with CM/GC versus their anticipated experiences?

R3: What aspect(s) of the CM/GC process did stakeholders find valuable to their experience?

R4: What aspect(s) of the CM/GC process did stakeholders find least valuable to their experience?

Research Methodology

To gain a substantive understanding around the experiences of stakeholders who utilized the CM/GC model to deliver their new capital construction, a qualitative research approach was implemented. Although prior research on similarly delivered projects has been accomplished, focus has been solely on quantitative analytics and/or performed limited survey analysis upon which to deeply understand and interpret stakeholder experiences (Carpenter, 2014; Konchar, 1997; Kulkarni et al., 2012; Rojas & Kell, 2008; Williams, 2003). While quantitative cause and effect relationship events identified in former research have yielded insights into the subject, they have lacked the ability to richly describe and interpret the salient stakeholder experiences realized when implementing the CM/GC delivery model. Such understanding can only be attained through qualitative methodology.

In order to provide sufficient levels of descriptive data to address the research questions identified in this study, a qualitative approach was implemented. Such application provides pioneering insight for user generalizability as meaning is constructed from specific participants (Merriam & Tisdell, 2016). Although qualitative studies can include mixed-methods, this research is grounded in a pure qualitative approach. In a search for meaning and understanding through deep analysis and observation, the researcher provides richly descriptive analysis through qualitative inductive investigative means and methods (Merriam & Tisdell, 2016)

Research Design

An ethnographic study is a qualitative research design used for, "…describing, analyzing, and interpreting a culture-sharing group's shared patters of behaviors, beliefs, and language that develop over time" (Creswell, 2015, p. 466). An ethnography is intentionally conducted when a researcher studies a specific group in order to provide improved understanding of a larger issue at hand (Creswell, 2015). Focusing on one or more specific groups that serve representative of a larger population, ethnographic research can therefore be used to support rational assumptions conclusive for a larger population.

Many forms of ethnographic research design exist. When a researcher focuses on a specific concept, event, or activity involving individuals, it is considered a case study (Stake, 1995). This research consisted of a bounded case study that included a school district in Oregon who recently implemented the CM/GC model to deliver their new school construction project (Merriam & Tisdell, 2016).

A qualitative case study design was chosen to allow for a holistic description and analysis related to specific stakeholder experiences when implementing the CM/GC model (Merriam & Tisdell, 2016). As Yin (2014) notes, "A case study is an empirical inquiry that investigates a contemporary phenomenon (the 'case') within its real-life context" (p. 16). Only through such qualitative case study approach can a comprehensive review of the phenomenon (CM/GC process) be profoundly contemplated through the experiences of stakeholders within a specific project. An instrumental case study, this research serves to illuminate the CM/GC issue at a specific site in order to provide an in-depth understanding of stakeholder experiences when implementing the model (Creswell, 2015).

Study Population and Sample Selection

Purposeful sampling was the process called upon to identify the site selection and sample population in this research project. Purposeful sampling is initiated when an investigator, "…wants to discover, understand, and gain insight and therefore must select a sample from which the most can be learned" (Merriam & Tisdell, 2016, p. 96). As a qualitative case study research project, two levels of sampling were necessary; the selection of the specific case site in addition to the participants to be included in the study (Merriam & Tisdell, 2016). The typical sampling approach utilized to identify the school district case site as well as project stakeholder populations to interview will be defined and explained (Creswell, 2015).

To identify a suitable case site, school districts in Oregon who recently completed a new capital school construction program utilizing the CM/GC method were identified. Recency has been recognized as reaching substantial completion on a construction

project within one year from the time of interview. Project duration lapse in excess of one year will be excluded to ensure credibility to the data gathered from those interviewed, where excessive time lapse may limit the detailed recollection and reflection of experiences sought in this research (Merriam & Tisdell, 2016).

Utilizing information gleaned from the Oregon Department of Education and Oregon School Boards Association, with assistance from statewide data from Washington State, prospective school district sites in Oregon were identified for consideration. Assurance of delivery model utilized, recency of project completion, and scope/size of project were scrutinized to ensure a case site that lends itself to support generalizability and transferability for future district decision makers (Merriam & Tisdell, 2016).

Since Oregon statute requires school districts to implement one of the three allowable construction delivery models, purity of model selection and delivery was easy to ascertain once districts were identified as having implemented a capital project. Individual district contact and confirmation was necessary to ensure the utilization of the CM/GC delivery model rather than its DBB or DB counterparts.

The Oregon Department of Education maintains a limited facility record of school construction projects resulting from a grant database that outlines select districts who have applied for construction assistance through the state program (see Appendix A). Grants from 2015 through 2016 are available, lending themselves to meet the project completion timeframe. In addition, it denotes the total allowable construction costs and type of school construction (e.g., square feet of project, a new building, a remodel project, an addition, procurement and placement of a portable). However, only districts

who have applied or are eligible for state assistance are included in the database, leaving out additional potential sites for consideration. In addition, the database does not indicate specific delivery model utilization and lacks specific project details such as substantial completion date to determine project completion recency.

To ensure a comprehensive list of all available school districts for consideration, further investigation was implemented that identified all Oregon districts who passed successful bond measures to support capital construction during the specified time period. Bond measure success is a prerequisite in order to provide the operating capital necessary to construct new school campuses. The Oregon School Boards Association maintains a comprehensive list of all school district levy election results dating back to 1997 on their website (OSBA, 2018). Potential school districts for consideration would be those who successfully passed a school bond from 2015 through 2016, allowing sufficient time for design, bidding, and project completion, without exceeding the one-year recency criterion. A searchable database revealed 27 prospective school districts (see Appendix B) who passed a bond measure in excess of $10 million, later explained as a minimum threshold for site project size scope.

To support the research questions, as well as case transferability for future readers, project scope was also be considered in case study selection. Only new school construction projects were reviewed, eliminating renovation, remodels, and other smaller-scale improvements. In addition, appropriate sized projects that reflect typical Oregon new school infrastructure were also identified. These parameters delivered suitable projects for consideration, representative of schools by size and requisite project costs for new school construction, for transferability purposes.

Although no prototypical elementary or secondary school square-foot-size-per-student is identified in the state of Oregon, its state neighbor to the north, Washington State, has analyzed median square foot allocation per student (OSPI, 2017) in addition to construction costs associated with CM/GC (referred to as GC/CM in Washington State) (OSPI, 2018). Utilizing average school enrollment for Oregon schools, coupled with square foot and cost allocations from Washington State, general parameters for case study site selection criteria were developed.

For the years 2015-2016, the average square foot for construction cost in Washington State was $327 for GC/CM-delivered new construction and modernization projects (OSPI, 2018). A recent study completed by OSPI reveals statewide median square feet per student for new and existing buildings maintain 115 square foot per elementary school, 148 at middle school, and 173 square foot per high school student (OSPI, 2017). A review of the 2015-16 fall membership report from the Oregon Department of Education reveals an average elementary school enrollment of 394 (901 largest), 543 for middle school (1,441 largest), and 711 for high school (3,179 largest) (Oregon Department of Education, 2017).

Assuming similar construction costs and student allocation per square foot between Oregon and Washington schools, ratio factors were then assigned to allow for differences between the states to capture scope variance. An arbitrary, but logical ratio ranging from 75% of average enrollment to 75% of maximum reveals square foot and project cost ranges that will be used to identify potential case study sites (see Table 8).

Table 8

Case Study Site Selection Criteria

School Type	75% Avg. Student Population / 75% Max (ODE, 2017)	Square Foot Allocation per Student (OSPI, 2018)	Square Foot Range of School	Cost per Square Foot (Avg.)	Project Cost Range of School
Elementary	296 / 676	115	33,982 - 77,711	$327	$11.1M - $25.41M
Middle	407 / 1080	148	60,273 - 159,951		$19.7M - $52.3M
High	533 / 2384	173	92,252 - 412,475		$30.2M - $134.9M

Once recency requirements and site criteria (size and cost) were met, consideration was given to ensure that project stakeholders were willing to participate in the study from the qualifying sites. Affirmation that at least 15 participants, representing various project stakeholder views, were willing and accessible in order to achieve sufficient saturation and redundancy was necessary (Merriam & Tisdell, 2016). Stakeholder willingness to participate was crucial to ensure an information-rich environment in order to provide sufficient data to answer the research questions (Patton, 2015).

The second stage of the purposeful sampling comes in the form of the specific case study participants to be included in the study (Merriam & Tisdell, 2016). Participant selection, in the form of project stakeholders, has been informed by the nature of the construction programming. Stakeholders interviewed included architects, CM/GC project manager(s), the district superintendent and central cabinet office members involved in the project, the owner's project representatives, members associated with the educational

specifications/programming, project consultants, first tier subcontractors, and community representatives (see Table 9). This provided a broad representation from the key project constituents, in addition to others highly involved in the CM/GC process. The table below identifies interview subjects.

Table 9

Interview Participants

Architect Representatives	Contractor/Other Representatives	Owner Representatives
Principal in Charge	CM/GC Project Managers	Superintendent and Central Office Officials
Design Project Manager	Primary Subcontractors	Owner's Project Representatives
Project Architects	Chamber of Commerce/Community Representatives	Education Specifications Planning Members
Design Consultants		

Sources of Data

Sources of data for this research project consisted of individual participant interviews, supplemented by primary project documents, and triangulated with a focus group interview (Merriam & Tisdell, 2016). Observations were not included in this qualitative case study as case study stakeholder engagements, interactions, and activities will have long since ceased due to the selection of a district site that has already concluded the substantial completion phase of the construction project.

One on One Interviews

Key project stakeholders from the case study were identified and interviewed, one on one, in person or over the telephone due to schedules and distances between the

stakeholder and the non-observer role of the researcher (Creswell, 2015). The interview process allowed for a deep understanding of the stakeholder's reflection and was necessary since observation of the construction processes and interactions were not possible (Merriam & Tisdell, 2016). Interviews were recorded and transcribed to ensure researcher bias did not influence data collection. Digital transcription was performed using Trint© artificial intelligence software and then manually validated using the real-time voice to text interface to ensure accuracy of the transcribed data (Merriam & Tisdell, 2016).

A semi-structured interview approach was used to glean open-ended responses, but also specific enough to provide pertinent information to address the research questions posed (Creswell, 2015). An interview guide (see Appendix C) was developed by the researcher that elicited specific information while also allowing for an opportunity for open-ended responses. A mix of various questions ranging from background, observation, and opinion were interwoven into the guide, allowing those interviewed to respond to their experiences throughout the entire construction project, from inception through completion.

Careful consideration was given to the development of the interview guide to ensure neutrality of the questions, in addition to probing the interviewed about actual versus perceived experiences in an effort to uncover rich and descriptive accounts (Merriam & Tisdell, 2016).

Focus Group Interview

A focus group interview was conducted, supporting both reliability and trustworthiness of the findings (Merriam & Tisdell, 2016). The researcher, serving as the

moderator, use the aligned, pre-determined questions, to help establish a permissive environment for discussion while supporting reliability and reducing the possibility of researcher bias (Krueger, 2002). Three focus group interview participants were selected, an architect representative, contractor representative, and an owner representative (see Table 9), providing a purposeful sampling of project participants (Creswell, 2015; Merriam & Tisdell, 2016). The focus group interview occurred over a phone bridge due to participant schedules and distance between the researcher and the subjects. The focus group interview was recorded, allowing the researcher the ability to moderate the interaction. Following the interview, a digital transcription was performed using Trint© artificial intelligence software and then manually checked for accuracy using the real-time voice to text interface (Merriam & Tisdell, 2016).

As recommended by Creswell (2015), a limited number of general questions were posed to the group in order to elicit responses from all participants. A constructivist process, the focus group interview allowed participants the opportunity to, "…share their views, hear the views of others, and perhaps refine their own views in light of what they heard" (Hennink, 2014, pp. 2-3). The following two questions were posed to the group:

1. Describe your experience with this project.
2. Did your actual experience differ with your anticipated experience?

At the end of the focus group interview, a concluding question was asked of all interviewees:

3. Would you recommend the model to others?

Documents

Documents were also collected and analyzed to support the research with multiple primary sources of information (Merriam & Tisdell, 2016). Select documents obtained consisted of public records associated with the case study project, primarily agency records and pertinent project materials. Documents collected and analyzed included: school board meeting minutes and actions surrounding the district's decision to implement the CM/GC process, advertisement and procurement documents around the district's search and selection of the general contractor and architect, artifacts related to the educational specifications programming for the project, notes and artifacts surrounding possible dispute resolution phenomena, presentations to Board, staff and community made by representatives of the project team, varying project documents such as punch list, budget, and schedules, and proposals submitted by firms as a part of the selection submittal process

A qualitative content analysis of the documents was performed in an effort to derive contextual meaning in order to supplement the information gleaned from interviews (Merriam & Tisdell, 2016). Through careful scrutiny, the researcher sought out meaning, expression, and communicative understanding from the various documents collected (Krippendorff, 2013).

Trustworthiness of the Study

Qualitative research is shaped both by the data gathered and by the accompanying analysis that ensues (Merriam & Tisdell, 2016). However, to ensure trustworthiness of findings, there must be a level of rigor and scrutiny throughout the research project, requiring ethical behavior and practices from the researcher (Merriam & Tisdell, 2016).

As noted, “What makes experimental studies …trustworthy is the researcher’s careful design of the study, applying standards well developed and accepted by the scientific community” to ensure that confidence from readers can be maintained (p. 238).

Krefting (1991) identifies specific strategies and a number of criteria to consider implementing when a researcher seeks to establish trustworthiness with their qualitative work. Specifically, she calls out credibility, transferability, dependability and confirmability as core considerations for qualitative researchers to incorporate to ensure worthiness and merit of their work (Krefting, 1991).

Credibility was addressed by incorporating three different measures. First, accountability through triangulation was met by incorporating a focus group interview to ensure the accuracy of the findings (Creswell, 2015). Since observation of the project was impossible, utilizing multiple sources of data (e.g., interviews, focus group, and pertinent documents) provided a, “…powerful strategy for increasing the credibility or internal validity…” of this research (Merriam & Tisdell, 2016, p. 245). In addition to triangulation, ensuring sufficient time was spent with interview subjects was considered so that the prolonged engagement resulted in accurate and thorough reflections from the interview participants (Krefting, 1991). Researcher reflexivity was addressed. Prior personal experience with construction delivery models by the researcher was identified and bracketed to ensure personal bias and assumptions did not prejudice research processes or conclusions (Merriam & Tisdell, 2016).

Credibility was also ensured by carefully planning the interview process. As Krefting (1991) notes, credibility is supported “…when interviews…are intentionally consistent, that is, where there is a logical rationale about the same topic in the same

interview…" (p. 220). Interviews were digitally recorded to ensure that research bias in data collection did not occur. Following the interview process, automated transcription of the digital file was performed and then manually reviewed using the software's real-time audio transcription accuracy-ensuring process.

Although the nature of this research resides as a qualitative case study, transferability considerations have been incorporated to support generalizability for future readers and their respective settings. As Merriam and Tisdell (2016) note, "a single case…is selected precisely because the researcher wishes to understand the particular in depth, not find out what is generally true of the many" (p. 254). However, careful consideration was given to the site selection process to ensure the subject district chosen for the case study was representative of typical new school construction projects in Oregon. Careful attention to school size, population, and construction cost was addressed to ensure the case study project is characteristic of the greater population at hand, supporting generalizability (Krefting, 1991; Merriam & Tisdell, 2016;).

Dependability, the consistency of the findings, as well as confirmability, relating to the logicalness of the researcher's conclusions, was supported by the thoroughness of the methods implemented and explanation thereof (Krefting, 1991). As noted by Krefting, "…dense description of methods…" is critical in creating an auditable trail for readers and researchers to follow so that they can track methodology in order to understand how and why decisions were made and conclusions drawn (p. 221).

Data Collection Procedures

Once a district had been identified for case study selection, stakeholder interviews and document collection immediately ensued. One on one interviews occurred in person

or over the phone due to schedule and distance limitations. Interviews were recorded and then uploaded via a password-protected web hosting transcription platform called Trint©. This application uses state-of-the-art artificial intelligence to digitally transcribe audio files. It then allows the researched to manually check the entire transcription using a real-time voice-to-text editing process to ensure accuracy, as well as assign confidential names to participants. Transcriptions were then downloaded to the researcher's password-protected file storage system for analysis. Interview lengths varied between participants, averaging thirty minutes, and incorporated the semi-structured approach and interview guide established (see Appendix C).

A moderated focus group interview occurred over a phone bridge due to the schedules and distances between the researcher and the subjects. The session was digitally recorded, allowing the researcher the ability to moderate the session. Following the interview, the same process to transcribe and ensure accuracy were implemented using Trint© technology and password-protected measures.

Document collection and duplication began promptly following case study site selection. An initial review of available public documents ensued by scrubbing the district's webpage for specific resources available. Many school districts, including the selected site, now utilize digital interfaces such as BoardBook© to archive their official school board meeting documents, minutes, and official activities. School board meeting minutes and action surrounding the district's decision to implement the CM/GC process, presentations made to the board during board meetings related to the project, public testimony provided, in addition to advertisement and procurement documents surrounding the district's search for the architect and general contractor, were available

electronically.

Following the collection of available internet retrieved documents, a list of remaining sources still desired was compiled. Through request through the owner's contracted representative, documents were sought and digitally provided. Documents collected through both measures included: school board meeting minutes and actions surrounding the district's decision to implement the CM/GC process, advertisement and procurement documents around the district's search and selection of the general contractor and architect, artifacts related to the educational specifications programming for the project, notes and artifacts surrounding possible dispute resolution phenomena, presentations to Board, staff and community made by representatives of the project team, varying project documents such as punch list, budget, and schedules, and proposals submitted by firms as a part of the selection submittal process.

Data Analysis Procedures

As Merriam and Tisdell (2016) point out for qualitative research, "…the final product is shaped by the data that are collected and the analysis that accompanies the entire project" (p. 197). Since qualitative data analysis rests primarily on accurately identifying themes and patterns within the available information, careful scrutiny and vigilant procedures were incorporated to ensure management, organization, and appropriate analysis techniques. As pointed out, "…attention to data management is particularly important under these [case study] circumstances" (p. 233).

An inductive methodology was used to analyze and make sense of the collected data (Merriam & Tisdell, 2016). As reviewed prior, data collected consisted of recorded interviews, both one on one and focus group, and requisite primary documents obtained.

Interviews, recorded and initially transcribed by voice recognition software, were carefully reviewed and edited for accuracy by the researcher utilizing the Trint© interface. Basic analysis began with an initial read, followed by an open category coding of the data in order to begin to elicit initial concepts within the data sets. This process was ongoing to ensure active and timely review of the data as it became available (Merriam & Tisdell, 2016). Documents were also scanned in similar fashion where pertinent and recurring data assets were initially coded.

Once open coding was accomplished for both interview and document data sets, the two lists were merged together and axial coding ensued in order to group initial codes into draft categories through constant comparative methods, utilizing Microsoft Word© as an organizational instrument (Merriam & Tisdell, 2016). Moving from inductive to deductive, the researcher then began to test the category schematic against the data and continued to refine based on findings and information (Merriam & Tisdell, 2016). Categories, responsive to the research at hand, were then named and displayed in the form of a chart.

In order to support such careful methods, the researcher used, as a guide, what Creswell (2015) refers to as a six-step method, used frequently by qualitative inquirers to analyze data, which includes:

1. Preparing and organizing the data for analysis
2. Explore and code the data
3. Coding to build description and themes
4. Represent and report qualitative findings
5. Interpret the findings

6. Validate the accuracy of the findings. (p. 261)

Creswell (2015) delineates coding as "the process of segmenting and labeling text to form descriptions and broad themes in the data" (p. 242). The basis for this process, which the researcher followed, included:

1. Initially reading through text data (many pages);
2. Dividing the text into segments of information (many segments of text);
3. Labeling the segments of information with codes (30-40 codes);
4. Reducing overlap and redundancy of codes (codes reduced to 20);
5. Collapsing codes into themes (codes reduced to 5-7 themes). (p. 243)

Ethical Considerations

As pointed out by Merriam and Tisdell (2016), "to a large extent, the validity and reliability of a study depend on the ethics of the investigator" (p. 260). After receiving approval from Concordia University Chicago through the IRB process, strategies offered by Creswell (2015) were incorporated into this research project to address ethical practices. Such measures included:

- Clearly articulating the purpose and intent of the study before seeking informed consent
- Protecting the anonymity of individuals by assigning non-identifiable attributes to personal artifacts such as recorded interviews and transcriptions
- Maintaining confidentiality and carefully safeguard the data at all times
- Being careful to avoid coercive or pressuring techniques

Furthermore, ethical considerations were incorporated when interpreting and writing the research results. The researcher reports the findings honestly, ensuring

personal bias did not affect results. At the conclusion of the research project, all gathered data was destroyed.

Limitations

Limitations advanced by this research are primarily influenced by generalizability efforts made by readers and future researchers. As a qualitative case study, external validity may be affected due to the specific nature of the bounded case and subjects (Merriam & Tisdell, 2016). Although specific measures were taken to ensure case study site selection represented a typical school district size and project scope in Oregon, readers must understand that every project is unique. Therefore, experiences revealed in this research project may or may not predicate other district experiences due to the subjective nature of the case project and specific participants involved within.

Additionally, small sample sizes within the case may also lead to limitations (Creswell, 2015). Although 12 interviews and a focus group of three stakeholders were utilized, the subjects represent different points of perspective from a broad stakeholder group. While reflective of the entire project team, drawing transferrable conclusions from individual project perspectives, say from the superintendent's, will be limited, as there will only be one interviewed subject.

Finally, although the interview guide and central research questions all seek to understand stakeholder experiences with the CM/GC process, the researcher cannot rule out other variables that may influence the experiences of those interviewed. For example, lack of experience with the CM/GC process from key project stakeholders, or interpersonal relationship issues between members, may affect how they perceive the CM/GC method. In addition, external influences such as project challenges due to

budget, weather, or site conditions, although not a product of the CM/GC process, may also effect stakeholder perception of the process in general.

Summary

In order to thoroughly explain the experiences associated with a district who implemented the CM/GC process to deliver their new school construction, a qualitative ethnographic case-study approach was chosen. Scrutiny to study population and sample size was implemented, ensuring that project recency, scope, and stakeholder participation were sufficient to address the research questions and reader generalizability. Careful attention towards the interviews conducted and documents acquired was given, incorporating transcriptions from recordings and processes to ensure accuracy. Furthermore, strategies to support trustworthiness of the research, including credibility through focus group triangulation, interview attentiveness and researcher reflexivity was incorporated.

Analysis of the gathered data included inductive methodology techniques to code and merge data sets in order to arrive at pertinent categories through constant comparative analysis. Sufficient detail was provided, allowing readers to understand themes drawn, but also sufficient to identify the limitations inherent in the findings. Meanwhile, procedures to ensure ethical considerations were consistently monitored through the entire project.

Chapter 4: Data Analysis and Results

Introduction

The purpose of this study was to explore stakeholder experiences stemming from an Oregon school district who recently utilized CM/GC to deliver their new school construction project. Results obtained are intended to provide future district decision makers with increased information upon which to make an informed construction delivery model choice when completing their capital school construction project.

A case study project was identified that met the recency, size and cost criteria. Project stakeholders were contacted and one on one and focus groups interviews accomplished. Additionally, documents were obtained to supplement the data gathering methodology. This data was collected with the intention of answering primary and additional research questions.

The primary research question that guided this qualitative study was:

R1: What are the experiences of a school district who implemented the construction manager/general contractor delivery model for their new school construction project in Oregon?

Additional research questions were:

R2: How do stakeholders describe their actual experiences with CM/GC versus their anticipated experiences?

R3: What aspect(s) of the CM/GC process did stakeholders find valuable to their experience?

R4: What aspect(s) of the CM/GC process did stakeholders find least valuable to their experience?

This chapter analyzes the experiences of 15 project stakeholders as they reflected on the elementary school construction project they participated in, delivered under the CM/GC model. Twelve were interviewed one on one, three participated in a focus group to support trustworthiness through methodological triangulation, and select documents were analyzed to deepen research findings. The interview and document data revealed the perceived experiences from the various stakeholders who all participated in the delivery of a new elementary school utilizing the CM/GC process. The remainder of the chapter provides information regarding the project site, the participants, the data collection process, the analysis of that data, and a conclusion.

Project Site

The project selected for this bounded case study was an Oregon elementary school site that reached substantial completion in 2018. Coming in just under $20M in overall project cost, the approximately 75,000 square foot, 650 student capacity elementary, fell within the student population and square foot size identified for this research study.

Table 10

Case Study Criteria

School Type	75% Avg. Student Population / 75% Max (ODE, 2017)	Square Foot Allocation per Student (OSPI, 2011)	Square Foot Range of School	Project Cost Range of School (OSPI, 2018)
Elementary	296 / 676	115	33,982 - 77,711	$11.1M - $25.41M

Participants

Twelve stakeholders who were involved in the project were interviewed. Of those interviewed, representatives from the owner, contractor/community, and architect/design team were represented. A summary of the participant's role with the project, prior construction experience, and experience with CM/GC is outlined below and summarized in Table 11.

Stakeholder #1

Stakeholder #1 served as the district's (i.e., owner's) senior project manager and an employee of the contracted project management firm. Their firm was hired initially to assist in pre-bond planning and later was acquired through a competitive process to serve as the owner's representative through the entire project. The stakeholder has been with the firm for five years and has been in the facilities and operations field for many years prior. This was their fourth CM/GC project they managed in the last five years and the largest CM/GC project they had overseen independently. Stakeholder #1 was deeply involved in the project from the pre-bond planning stage through pre-construction stage, then served in more a supervisory role once construction began, overseeing the onsite project manager (Focus Group Stakeholder #1) from their firm.

Stakeholder #2

Stakeholder #2 serves as the superintendent of the school district. They had been hired, in part, to help the district develop and pass a bond measure. Stakeholder #2 has been a superintendent prior, in addition to serving as a principal and classroom teacher. They participated in the pre-bond/election process, were involved in the selection of the project manager, architects, and contractor. In addition, they participated in monthly

meetings throughout the construction process. This was their first major school construction project they had participated in, their only other facility experience being the development of a bus barn in a former district.

Stakeholder #3

Stakeholder #3 serves as the principal of the elementary school that is the subject of this study, and served in the planning principal role prior to and during construction of the school. They were a part of the pre-bond planning and election processes, attended nearly every construction meeting, and were intimately involved in the educational programming throughout construction. Prior to assuming the planning principal/principal role, Stakeholder #3 was a former principal in another school within the district and special education director prior to that. Although Stakeholder #3 did not have any formal school construction experience prior to this project, they did have some level of exposure through their family's profession, managing private construction projects.

Stakeholder #4

Stakeholder #4 serves as the district's director of business and operations. Prior to that, they had served as a principal in the district. They were involved in pre-election efforts, planning, and assumed financial oversight over the program upon bond passage. Stakeholder #4 spent significant time researching bond programming with regional districts, was involved in the selection of the project management team, architects, and contractor, and was intimately involved during all phases of construction. This project served as stakeholder #4's first experience with any significant capital construction program.

Stakeholder #5

Stakeholder #5 was the senior project manager for the contractor, overseeing the construction of the elementary school. They were heavily involved with the project from preliminary project planning through close out, and intimately involved during the pre-construction CM/GC consulting work. Once construction began, they assumed a higher-level management role, while the project superintendent (Focus Group Stakeholder #2) managed the day-to-day onsite work. Stakeholder #5 has been in the construction field for almost 20 years, with the vast majority of their experience managing public and private CM/GC projects.

Stakeholder #6

Stakeholder #6 served as the principal architect for the school project. They were involved from pre-bond planning through the completion of the facility. Stakeholder #6's most focused involvement was during the pre-bond and pre-construction planning. Once groundbreaking commenced, they shared day-to-day site responsibilities with their firm's project architect (Focus Group Stakeholder #3). They have over 20 years' experience in the field, the last eight heavily focused on school projects. Stakeholder #6 has served as either a principal or a support architect on a number of elementary through high school projects over their career. Prior to this project, they have been involved in two school CM/GC projects and a number of private CM/GC projects. Stakeholder #6's architectural firm partnered with another firm (Stakeholder # 10) on this project to assist with the design work.

Stakeholder #7

Stakeholder #7 was a community member who served as the chamber of commerce director for the city in which the school was constructed. This stakeholder had significant roots in the community and school system having been born and grown up in the subject community. Stakeholder #7 and their family moved back to the community to assume the chamber director role about the same time groundbreaking activities began on the site. They were heavily involved in coordinating a number of activities with the district, the district's contracted owner's representative, and general contractor throughout the construction of the facility. They helped organize promotional activities for the contractor and owner's representative and coordinated a number of programs with the district, including the ribbon cutting community celebration. This was this stakeholder's first involvement in a major construction program.

Stakeholder #8

Stakeholder #8 served as the assistant superintendent for the district. They participated as one of the core district team members during pre-bond and pre-construction programming. This was their first experience with a capital project. Stakeholder #8 participated in the selection of the owner's representative and architect. They were intimately involved with the project through mid-construction of the facility up to the point where they assumed another position in a different school district. This stakeholder's entire career has been in public education, serving multiple district office roles, principalship, and teacher.

Stakeholder #9

Stakeholder #9 is an owner of an electrical engineering firm. They and their firm served as the lead electrical engineer on the school project. They were involved from pre-construction planning through project completion. This stakeholder maintains 30 years of engineering experience. Their familiarity spans both the private and public sectors but for the last twelve years, the majority of their work has been with schools. They have had extensive experience with the CM/GC process, where about 90% of their Oregon work has utilized the model. On this project, as is customary for nearly all school construction projects, they served as a primary consultant to the lead project architect (Stakeholder #6) through a standardized AIA consultant agreement.

Stakeholder #10

Stakeholder #10 served as the design architect and is the original partner for their architectural firm. Their firm was contracted under the principal architect (Stakeholder #6) to deliver the bulk of the finalized design work and subsequent construction documents. They have partnered with the principal architect on a number of prior projects in similar fashion. Stakeholder #10 participated in pre-construction coordination where they received pre-bond design charrettes from the principal architect and refined them into final design documents. Their involvement was less pronounced once construction began, where the principal and project architect assumed most of the daily responsibilities due to Stakeholder #10's distance from their office to the project site. Stakeholder #10 has been extensively involved in CM/GC projects, implementing one of the first public CM/GC projects in Oregon in the early 1990's. About 85% of their firm's work is education related and of that, about 75-80% is CM/GC.

Stakeholder #11

Stakeholder #11 served as the landscape architect for the project and is an employee in the firm of the principal and project architects (Stakeholders #6 and Focus Group Stakeholder #3). They began involvement during the pre-construction stage and supported the project through completion. Stakeholder #11 managed site design meetings and produced the construction documents for all of the site work, playground, and associated playfields. They have been an architect for about 15 years and been with their current firm for the last ten. Their career initially focused heavily on private and commercial design work but have shifted primarily to school and education design work the last five years. They have been involved in a number of DBB school projects and this was their first experience with CM/GC.

Stakeholder #12

Stakeholder #12 is the owner of an excavation construction company and served as the primary civil subcontractor on the project. They worked under contract under the CM/GC firm. Stakeholder #12 was involved in all of the site preparation, civil, utility trenching, footing/foundation excavation, and earthwork of the school site, adjacent ballfields and playfields. They have owned their company for the last five years and have been involved in the construction industry for 30 years. They have participated in a number of school construction civil projects before and several CM/GC delivered private projects previously.

Focus Group Stakeholder #1 (Owner's Representative)

This stakeholder served as the owner's contracted on-site project manager/ representative during the construction phase of the program. They worked under the

direction of the Owner's senior project manager (Stakeholder #1). While the senior project manager was involved in the pre-bond and pre-construction planning, this individual assumed project involvement just prior to bidding the work. They were the primary point of contact throughout the entire construction project through closeout and punch list activities. This stakeholder maintains over 40 years of construction experience, including involvement in over a dozen school construction programs in recent years. Most of their experience prior to this project revolved around design-bid-build delivery models, this project being their second CM/GC project while serving in the owner's project manager role.

Focus Group Stakeholder #2 (Contractor/Other Representative)

This stakeholder served as the construction superintendent for the CM/GC contractor for the project. They became involved in the project on the latter end of the pre-construction phase and was responsible for the onsite construction of the facility. This stakeholder maintains nearly 30 years of construction experience and has served in this role for numerous CM/GC school construction projects over their career.

Focus Group Stakeholder #3 (Architect Representative)

This stakeholder served as the project architect, working under the direction of the principal architect (Stakeholder #6) and in coordination with the design architect (Stakeholder #10). They were involved from pre-bond planning through project completion. They have been with the principal's firm for over ten years and maintain nearly 20 years' experience as an architect. Before this project, they had experience with CM/GC and school-related projects, as well as a significant repertoire of private and public DBB delivered projects.

Table 11

Study Participant Characteristics

Interview/ Stakeholder	Role	Prior Experience With Capital School Construction	Prior Experience with CM/GC
1	Owner's Senior Project Manager	Yes	Yes
2	District Superintendent	No	No
3	Planning Principal	No	Limited to family business
4	Director of Business and Finance	No	No
5	Project Manager for Contractor	Yes	Yes
6	Principal Architect	Yes	Yes
7	Community Member-Chamber of Commerce Director	No	No
8	Assistant Superintendent	No	No
9	Electrical Engineer	Yes	Yes
10	Design Architect	Yes	Yes
11	Landscape Architect	Yes	No
12	Primary Civil Subcontractor	Yes	Yes
FG1	Owner's Project Manager	Yes	Yes
FG2	Construction Superintendent	Yes	Yes
FG3	Project Architect	Yes	Yes

As seen on Table 11, a wide representation from owner, contractor, and design stakeholders was intentionally represented. Careful consideration was given to identify both stakeholders for interview as well as focus group participants. All subjects were heavily engaged in the school construction project from their representative professional role and all served as voluntary participants for the study. Of the five interviewed representing the owner category, only the contracted owner's senior project manager and manager maintained prior experience with CM/GC and school construction. All three district employees involved on project team had no professional experience with either school construction or the CM/GC process. Stakeholders from the contractor/community category all maintained CM/GC delivery and construction experience apart from the one community-related stakeholder who served as the President of the Chamber of Commerce. Finally, architect representatives, which included one primary sub consultant, had been involved in numerous CM/GC and school construction projects prior.

Document Collection

Documents were collected and analyzed to support the research with multiple primary sources of information (Merriam & Tisdell, 2016). Over 30 documents were collected and analyzed that included: school board meeting minutes and actions surrounding the district's decision to implement the CM/GC process, advertisement and procurement documents around the district's search and selection of the general contractor and architect, artifacts related to the educational specifications programming for the project, notes and artifacts surrounding possible dispute resolution phenomena, presentations to Board, staff and community made by representatives of the project team, varying project documents such as punch list, budget, and schedules, and proposals

submitted by firms as a part of the selection submittal process. A qualitative content analysis of the documents was performed in an effort to derive contextual meaning in order to supplement the information gleaned from stakeholder interviews (Merriam & Tisdell, 2016). Table 12 identifies the final documents incorporated into the theme and sub themes of this research project.

Table 12

Document Artifacts

Document	Description
Document 1: CM/GC Findings of Fact	The Findings of Fact is a required public notice school districts in Oregon must produce in order to implement the CM/GC process. It requires board authorization by resolution, and outlines the key reasons a specific district wishes to consider the alternative contracting method. Public advertisement in papers of record and public hearing are required before final board approval.
Document 2: CM/GC RFP	This document was the Request for Proposal (RFP) issued by the district in its search for the CM/GC firm. It requires public advertisement, details the specific criteria the district is seeking in and from its CM/GC, how it will select semi-finalists, and the processes used to determine the successful CM/GC firm.
Document 3: Project Manager RFP	This document was the Request for Proposal (RFP) issued by the district in its search for their project manager. It requires public advertisement, details the specific criteria the district is seeking in and from its project management firm, how it will select semi-finalists, and the processes used to determine the successful project management firm.
Document 4: Board Update	This document was the October, 2016 monthly report to the board that summarized key accomplishments. It was included in the public board minutes as an artifact of public record.
Document 5: Board Update	This document was the November, 2016 monthly report to the board that summarized key accomplishments. It was included in the public board minutes as an artifact of public record.
Document 6: CM/GC Contract	This document served as the formal AIA contract between the selected CM/GC firm and the district. It outlines, in detail, the roles and expectations of each entity and serves as the legal, binding contract. It is a comprehensive document that details all aspects of the relationship during pre and post construction, including payment, contingency access, and dispute resolution processes.

Process for Collecting Data

The process for collecting data began with the identification of a school district site that met the case study criteria (see Table 10). Initial interview subjects' representative from the three stakeholder categories (see Table 9) were initially identified though outreach to the district's superintendent (Stakeholder 2) and contracted owner's senior project manager (Stakeholder 1). The superintendent provided additional interview subjects to consider (Stakeholders 3, 4, and 8) and the senior project manager recommended engaging Stakeholders 5, 6, 7, 12 and Focus Group 1. From there, the Principal Architect (Stakeholder 6) provided contacts for Stakeholders 9, 10, 11 and Focus Group 3. The project manager (Stakeholder 5) identified Focus Group 2 as an additional interview subject.

All interview subjects were contacted by phone, the research project explained, and the Statement of Informed Consent (see Appendix E) reviewed. All voluntarily agreed to participate in the research study. Once signed consent was received, either face-to-face interviews or interviews over the phone were arranged to accommodate stakeholder distance and schedules. Five interviews were conducted in person, and the remaining seven and focus group interviews were conducted over the phone. All subjects consented to having the interview recorded using a handheld device that would later be uploaded for transcription into Trint©.

Prior to interviews, a trial interview using the interview guide (see Appendix C) was administered to a local school district facility director. This director was intentionally chosen to mimic likely participant stakeholders, maintaining prior experience in capital

school construction and familiarity with the CM/GC process. No refinements to the questions or guide were made based on feedback from the field test.

During the 12 stakeholder interviews, the semi-structured interview guide provided an opportunity to gain a deep understanding of project stakeholder experiences. The approach helped provide for opportunity to glean open-ended responses, but also to provide information to specific questions posed (Creswell, 2015). Depending on the individual interviewed, some questions were not fully answerable based on the professional background, prior experience, or role the stakeholder maintained in the project. As outlined in Table 11, for some stakeholders this was their first experience with the CM/GC model and/or school construction, limiting their ability to respond to some prompts specific about prior experience with the model. Additionally, for others, the point in time when they became affiliated with the school project influenced their ability to describe some processes such as the selection of key team members. For example, the Chamber of Commerce Director (Stakeholder 7) did not assume her role in the project until right after groundbreaking.

Following the interview guide, the researcher asked the questions chronologically as identified in Appendix C. However, there were times when those interviewed elaborated on their experiences, especially during open-ended questions. The researcher allowed the stakeholders to respond freely, in addition to probing the interviewed about actual versus perceived experiences in an effort to uncover rich and descriptive accounts (Merriam & Tisdell, 2016). At times, this resulted in interview responses that did not chronologically coincide with the prescribed interview guide. However, careful

consideration by the researcher was given to ensure that all pertinent questions were asked during the engagement.

The focus group interview was framed around three specific questions as identified in Appendix C. Unlike the 12 stakeholder interviews, the focus group interview was intentionally designed to be more free flowing, allowing stakeholders to engage between and with each other. Since the session was being recorded, it permitted the researcher the flexibility to actively facilitate the interaction. Minimal prompting was needed by the researcher, where all three individuals responded freely to the questions, often building off each other's comments. There were many instances when focus group participants interacted with each other extensively, offering anecdotes and experiences to either compliment or offer a differing view than their counterpart. This generated deep contextual data upon which to draw.

At the express permission of all participants, all interviews were recorded and transcribed to ensure researcher bias did not influence data collection. Stakeholder participants were labeled as Interviews 1-12 and/or Focus Group participants 1-3 to ensure anonymity. Individual identifiers were also removed, such as specific names of companies, contractors, and details that would identify the location of the case study site. Interviews occurred between February 7, 2019 and April 30, 2019.

Process for Analyzing Data

This research incorporated an inductive methodology to analyze and make sense of the collected data (Merriam & Tisdell, 2016). Data were examined from interviews, supported by pertinent documents, and triangulated with a focus group interview, in order to identify and later make sense of patterns and relationships (Merriam & Tisdell, 2016).

Utilizing Creswell's (2015) six step process as a guide, the following research actions were implemented:

Table 13

Data Analysis Steps

Steps	Processes
Preparing and organizing the data for analysis	Interviews, initially transcribed by voice recognition software, were then carefully reviewed and edited for accuracy by the researcher utilizing the Trint© interface.
Explore and code the data	Additional reading following edited transcription. Initial identification of rich and descriptive accounts from transcriptions and data sets.
Coding to build description and themes	Coding of data sets into themes and sub themes based on collected evidence.
Represent and report qualitative findings	Description, both verbal and visual, created to explain the findings.
Interpret the findings	Create understanding from findings and provide additional recommendation for further research.
Validate the accuracy of the findings	Validate trustworthiness and credibility of findings through data triangulation utilizing a focus group interview.

Generally, preparing and exploring the data occurred immediately following stakeholder interviews. Recorded sessions were uploaded and initially transcribed by voice recognition using Trint© software. Draft transcripts were then carefully reviewed and edited for accuracy utilizing the real-time Trint© interface that provides audio-to-text, real-time confirmation for the researcher. This process not only ensured the accuracy of the transcription, it allowed the researcher to begin exposing themselves to words, phrases, and rich descriptions that would later be identified for further review. Following

transcription verification, an additional re-read of the interview was performed and background information from each interview was assimilated in order to provide stakeholder and focus group participant information.

Basic analysis of the remaining transcripts began by open category coding of the data utilizing the built-in Trint© highlighting feature. This permitted the researcher to identify, line by line, segments of transcript for deeper analysis. This open coding process took place for all 12 stakeholder interviews immediately upon transcription of the final session. The open code data from each transcript was then downloaded into Microsoft Word© through the Trint© download interface, providing both a time stamp of the interview segment as well as the accompanying interview participant who provided the specific data.

Upon beginning code analysis, the researcher began by implementing Creswell's (2015) recommendation of "….segmenting and labeling text to form descriptions and broad themes in the data" (p. 242). The basis for this process, which the researcher implemented, included:

1. Initially reading through text data (many pages);
2. Dividing the text into segments of information (many segments of text);
3. Labeling the segments of information with codes (30-40 codes);
4. Reducing overlap and redundancy of codes (codes reduced to 20);
5. Collapsing codes into themes (codes reduced to 5 – 7 themes). (p. 243)

Once open coding was accomplished for both interview and document data sets, the two lists were merged together and axial coding ensued in order to group initial codes into draft categories through constant comparative methods, utilizing Microsoft Word© as

an organizational instrument (Merriam & Tisdell, 2016). Moving from inductive to deductive, the researcher then began to test the category schematic against the data and continued to refine data based on findings and information to arrive at themes (Merriam & Tisdell, 2016). Seven themes were identified based on the open coding of the data:

1. The Ideal Project
2. Reasoning and Prior Understandings
3. Project Successes
4. Project Challenges
5. Delivery Model Influences
6. Reflections
7. Lessons Learned

Once themes were identified, the process of collapsing and organizing themes into sub themes ensued. Using a digital version of the cutting and sorting process (Ryan & Bernard, 2003), the researcher utilized color-coding of text lines from transcripts and documents through a constant comparison method in a digital version of Ryan and Bernard's versatile and effective cut-out pile sorting technique (see Appendix F). Twenty-one sub themes were identified as outlined in Table 14.

Table 14

Themes and Sub Themes

Themes	**Sub Themes**
1. The Ideal Project	1.1.1 Traditional Success Indicators-On Time and On Budget 1.1.2 Importance of Public Accountability and Perception 1.1.3 Owner Pleased with Experience 1.1.4 Owner Pleased with Product
2. Reasoning and Prior Understandings	2.1.1 Relationship Focused 2.1.2 Lack of District Capacity 2.1.3 Importance of Local Outreach
3. Project Successes	3.1.1 Positive Outreach and Engagement 3.1.2 Pride of Project 3.1.3 Felt Listened To 3.1.4 Team Feeling
4. Project Challenges	4.1.1 Typical 4.1.2 Managing Risk-Contingency 4.1.3 Minimal Challenges
5. Delivery Model Influences	5.1.1 Supported Project Success 5.1.2 Fostered Communication
6. Reflections	6.1.1 Favorability Towards Model 6.1.2 Selecting the Right People 6.1.3 Supported Positive Relationships
7. Lessons Learned	7.1.1 Establishing Clarity – Risk and Expectations 7.1.2 Importance of Positive Relationships

The same analysis process used to identify themes and sub themes in the interview data set was then applied to the focus group data. Three themes and four sub themes were identified from the focus group interview as see in Table 15.

Table 15

Focus Group Triangulation

Themes	**Sub Themes**
1. Project Successes	1.1 Project Was Successful 1.2 Good Collaboration
2. Project Challenges	2.1 Risk-Mason Subcontractor
3. Project/General Reflections	3.1 Clarity of Roles/Expectations

Findings

To explain the experiences of a district who implemented the CM/GC process to deliver a new school, 12 stakeholders were interviewed. Representing a broad array of participants who maintained varying professional experiences and affiliations with the project, a comprehensive data set was available for interpretation. Seven themes and 21 sub themes were discovered.

According to Creswell (2015), "qualitative research is interpretive research," requiring the researcher to make sense of the findings (p. 256). Before making sense of the data, reporting the data in a way that constructs a narrative of the findings is necessary (Creswell, 2015). A narrative discussion format is used to accomplish this task whereby excerpts of richly descriptive data, from interviews and supplemented by documents, is used to support the theme and sub themes identified during the coding process.

Theme 1: The Ideal Project

Every stakeholder, regardless of their prior experience with capital school construction, was able to describe what an ideal school project meant to them when asked

to respond to the prompt, "Describe what a successful school construction project means to you." This theme was then categorized into four different sub themes based on the interview and document coding. Interviewed stakeholders represented participants from three varying project categories; owner, architect and contractor/other, where the following pertinent findings were revealed.

1.1.1 Traditional Success Indicators - On Time and On Budget

Despite the implications surrounding the qualitative experiences sought in this research study, participants when asked about ideal successful project outcomes, gravitated towards historically quantitative success indicators of on time and on budget. Stakeholder 1 reported succinctly:

> Well in short, on time on budget.

Stakeholder 5 reported:

> A guarantee that we're going to get a project that's designed within the budget to start with… was it open before or was it open on time for kids to come back to school. So on time right. And then did it meet the owner's budget restraints.

Stakeholder 8 reported similarly to Stakeholder 1:

> Well on time and on budget, the big basic part.

Document 1 identified that one of the motivating factors around utilizing the CM/GC process from the district's Findings of Fact, noted:

> With the CM/GC's participation in this phase of the project, they will offer suggestions for cost savings and improvements to the design. With the benefit of this knowledge, the CM/GC will be able to guarantee the maximum price paid by the District for the projects... As a result, the projects are more likely to be

completed on time and on budget. In addition, fewer change orders reduce project management costs for both the District and the contractor.

1.1.2 Importance of Public Accountability and Perception

An additional sub theme related to ideal projects centered around accountability districts have to their public, and the accompanying community perception when passing and delivering on a capital bond measure. The following salient comments were shared. Stakeholder 2 reported:

> That's what a good project looks like to me. You're able to look at your public in the eye on the street and say you supported us financially through your property taxes and we did what we said we were going to do.

Stakeholder 4 reported passionately that public accountability for the wise use of their tax dollars is paramount over profits and other indicators:

> I think the district needs to be able to be in a spot where they know that the tax dollar money has been paid and it's been paid correctly and that while the contractor is going to make a profit they should make a profit. You know we are not in charge of that making a profit. That's not my problem.

Stakeholder 5 described the importance of engaging in and with the community, reporting:

> There's a lot of things we take pride in engaging with the communities that we work in. So yeah, that means a lot of things. That means joining in the chamber and participating in their events… At the end of the day what we want is, is a community that says you know I'm glad that we selected that contractor or I'm glad they were here… Then the more intangible is the relationships that were

developed were those positive. And then we somehow leave a mark or we're able to engage and connect with the community on the levels that we wanted to.

1.1.3 Owner Pleased with Experience

Overall satisfaction with the construction delivery experience was also identified by various project stakeholders, both from the owner's perspective as well as those from the other project participants.

Stakeholder 6 reported:

> We also want our clients to feel like they were a part of the design process. It's not really about us. When we walk away that are our clients to be pleased [with our design process].

Stakeholder 9 reported:

> We've got a general contractor or a construction manager that really likes working with us or we've got that district superintendent or a maintenance director really likes working with us.

Stakeholder 12 reported:

> That success is, at the end of the project, [when] the school district and the contractor are still on good terms.

1.1.4 Owner Pleased with Product

Finally, success was defined as the owner being pleased with the delivered product (e.g., school).

Stakeholder 5 reported:

> The facility is, hopefully is, going to be watertight and serve kind of a long term needs of the client…and in a state that they could effectively learn and then and do their business.

Stakeholder 6 reported:

> It's not really about us. When we walk away that are our clients; if we walk into a building and our clients are and people who are involved are taking ownership of the design to us that's, that's a success.

Stakeholder 9 reported:

> [Success is when] the owner at the end of the day is satisfied with the systems they have and we get the next project…So our success entirely depends on owner architect and contractor satisfaction.

Stakeholder 11 reported:

> [Success is when] the client's happy, the staff is happy, the people that are utilizing that building and that are living in that building are happy…meeting all the needs.

Theme 2: Reasoning and Prior Understandings

One of the critical aspects related to delivery model experience stems from the process and understandings used to frame the selection; the underlying reasons, expectations, and background as to why the model was chosen (CMAA, 2012). Representatives from the architects, owners, and contractors provided salient data surround the district's reasoning to choose the CM/GC model to deliver their new elementary school. Three sub themes emerged.

2.1.1 Relationship Focused

Stakeholder 1 noted that not only did the district go into the project expecting it to be relationship focused, they saw that as one of their paramount duties to foster such engagement. They reported:

> For the District there were a handful of reasons, the biggest of which and I think is they wanted something that was far more relationship based or the ability to bring a partner to the table who was going to be truly a partner in the process and not just sort of a third party. They wanted somebody that wanted to be part of something bigger than themselves…And so they wanted to bring in that real sense of community and partnership in. Essentially leaving the community better than we found it…I think it's important to know you're ultimately building a school for kids, which quite honestly is the best asset for any community. And part of again my role is ensuring that that is intrinsic for everyone. If you come to the table and you don't want to be there to benefit kids, go work somewhere else, or right, go hard build out a project somewhere else…If you want to be part of something that's bigger than just a construction project and you know especially again going back to the kid piece.

Stakeholder 4 reported:

> You know the other part of the CM/GC which you know…is that it does have a reputation and feelings. You know hard bid is similar but not the same. You know the whole CM/GC deal is supposed to be, we're all warm and fuzzy at the end of the deal.

Stakeholder 8, when commenting on the selection of consultants for their CM/GC team, identified the importance of the interaction and attention required, noting:

> I think the, the kind of the consensus was that the CM/GC model offered a lot of benefits…one of the bigger appeals is there's a more interactive process… [and] the other lead outfit I think was like out of Tacoma and it was a really large firm and the feeling was that we would just kind of be small potatoes and really maybe not get all of their attention.

Stakeholder 10 reported:

> That they (the district) realized that our process is highly stakeholder collaborative.

Document 1 specifically called out the expectation of improved relationships as a driving factor to implement CM/GC, noting:

> The CM/GC will be able to obtain a complete understanding of the District's needs, the architect's design intent, and the scope of the project and the operational needs of the District by participating in the development of the design documents…Contracts with the CM/GC are designed to create a better working relationship between all parties resulting in reduced risk to the contractor.

Document 3 noted:

> The firm or individual will represent the District's interests throughout all phases of the work. The District expects that representative(s) of the management firm, partnership, or individual will develop and maintain a cooperative team approach with all other parties associated with the projects throughout all phases of the work.

Document 3 also noted, in the 100-point rating scale regarding project manager selection criteria, 15 points were awarded to project approach, requiring prospective firms to respond to their team-oriented approach to project management:

> Approach (15 points) Provide a general discussion of your management philosophy. Include a description of your firm's involvement from the planning phase through the completion of K-12 construction projects. Provide specific examples of your methods to insure quality, budget and schedule control utilizing inclusive, team-oriented processes.

Document 6 specifically called our relationships of project team members, noting:

> Relationship of the Parties: The Construction Manager accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Construction Manager's skill and judgment in furthering the interests of the Owner…The Owner agrees to furnish or approve, in a timely manner, information required by the Construction Manager.

2.1.2 Lack of District Capacity

Many of the stakeholders interviewed, regardless of their affiliation with the district, noted the owner's lack of capacity when it came to knowledge and experience with capital construction and the management of projects.

Stakeholder 2 reported:

> My knowledge and understanding was that our school district, being the size that it is, did not have the level of expertise that was demanded for this job. Therefore

> those firms that had been involved with this, in primarily school construction, just made so much sense to us it…We don't have the time, the expertise.

Stakeholder 4 reported bluntly:

> So when, you, you know when you start a new building project it was an eye opener for me right…We're like we have no idea. You tell us.

Stakeholder 6 reported:

> They felt like with the complexity of all of those, both in terms of the number of projects and the budgets into some of the phasing, that would have to happen that the CM/GC would be able to better help them manage and navigate through that.

Document 3 noted, in the RFP for project management, that the district required an extensive level of services from their management firm:

> Services Required: Act as District's representative during all designated phases of the capital projects…Provide management to ensure compliance with all public entity rules and regulations… Develop an overall management plan for the projects to include a preliminary master schedule, critical dates, preliminary contracting strategy, and other pertinent issues…Assist the District in coordination, research, report preparation, and other tasks required for project execution.

2.1.3 Importance of Local Outreach

The local outreach sub theme includes both engagement with the community at large, but also, more specifically, outreach to local contractors and vendors.

Stakeholder 1 reported:

> And that was something that the district very much felt was a strong part of the community's desire was a reinvestment in local.

Stakeholder 3 called on a specific instance involved in architect team selection. They revealed how the successful architect selected valued input from the community around tree protection, while the other, who was not selected, chose to disregard the community's input:

> The community. That was another big thing for us was you know people were concerned about cutting down trees and when that all came out. One architect saved the trees. The other one didn't. Well that was huge for this community.

Stakeholder 5 reported:

> The CM/GC process affords us to start early with the outreach process or the solicitation process and we can get these projects on subcontractors or group of subcontractors radar before maybe they would typically know about it.

Stakeholder 8 reported:

> With the architect selection it was more kind of the combination of that they have, they've done work like we were asking and that they had kind of a broader local representation…Similar sort of thing just in terms of local-ish connection. They did a good job of speaking to how they were going to bring local subcontractors and make that a priority…and had some local experience and knowledge. And so that kind of helped tip it over for them (the architects)…That was part of the rationale in terms of our timelines for bringing you know [the owner's representative] and [CM/GC] onboard as we wanted to get folks locked in as soon

as possible because we knew that it was going to get tighter and tighter as time progressed.

Document 1 noted, in the public Findings of Fact required to utilize the CM/GC method, that:

> There is often a large gap in the knowledge between contractors on being able to properly implement these safety requirements and maintain good public relations. Through the CM/GC selection process, the District will be able to select a contractor who understands the Districts goals and who is committed to fully implement a comprehensive safety and communication plan.

Document 2 noted, in the 100-point rating scale regarding CM/GC selection criteria, 15 points were awarded to local issues and 20 points to project safety and communication plans as described:

> Local Issues (15 points): Describe your firm's knowledge of local construction conditions, local labor market and local/regional subcontractors and suppliers. Explain how you will use this knowledge to benefit the project.
>
> Project Safety and Communication Plan (20 points): Provide a sample plan to demonstrate communication outreach strategies to Community, Students and District Staff regarding work in the occupied facilities.

Document 3 noted when describing needs from a project manager that:

> (The project manager will) assist the District in communicating with its staff, community, and news media to enhance understanding and develop ongoing support for the projects.

Document 3 noted, in the 100-point rating scale regarding project manager selection criteria, 20 points were awarded to local involvement as described:

> Local Involvement (20 points) Describe your understanding of the locality of the project site, geographic proximity to the project site, and the unique considerations of the Eastern Oregon area. Describe your firms plan to help maximize the economic impact on the local community. Provide specific example of your track record.

Theme 3: Project Successes

When asked to describe specific project successes, if any, a wide variety of input was received from the 12 interviewed stakeholders. Four sub themes were identified representing primarily subjective experience descriptions from the various project participants.

3.1.1 Positive Outreach and Engagement

Stakeholder 1 reported:

> We hosted several rounds of public outreach to either local suppliers you know, be it local auto parts or even heavy equipment suppliers, anything of that nature, to painting to the sub shop…We had a lot of outreach…But again back to the subjective piece that just really from a community perspective it was very successful community wide…I would say quite honestly for, the for both of the groundbreaking and the ribbon cutting you know the kind of the bookends there were probably I would say three to four hundred people at a groundbreaking ceremony. I can't remember the last time any program I went to where you had the community turn out.

Stakeholder 2 reported:

> So it was it was good for our board. And it was, you know, you could ask, you know questions and whatever. And like I said they ran them (owner's representative) you know, there was a more of a presentation to the board and engagement and board with it…I think the board really liked the way we did that second meeting because they got to ask questions and it was always good…When we had to, we had groundbreaking there was probably I would actually go so far to say there might have been 200-250 people here. And then when we when we christened it, it was probably three or four hundred people… I think you know our experience with that situation and the way people have looked at this school and the way I was treated I have to believe is unique.

Stakeholder 5 reported:

> We hosted open houses to engage with the community or local subs and suppliers. It affords you an opportunity to market the project I guess to a degree that you wouldn't otherwise have in the hard bid world…A lot of new subs that we hadn't worked with before and formed some good relationships and worked well with.

Stakeholder 8 reported:

> I mean the communication piece went really well. One of the strengths was that I mean you know [the business manager] was the lead from the district.

3.1.2 Pride of Project

Stakeholder 1 reported:

> I mean literally had people in tears saying that I never thought I would see that …Just kind of blows you away it's something that you, you know we take for

> granted …You have longtime community members literally in tears at how excited they are.

Stakeholder 2 reported:

> Just to see the building and how it is, that, you know, shining castle compared to the rest of the community. I mean you look at that, the nicest building…Passers through told me that they looked over and saw the school and went, oh my God. And they pull off the road to gaze at what a beautiful building… And I'm not exaggerating when I say I've had well into 75 to 100 people come up to me at one time or another thank me and say I never thought I would see that.

When reminiscing about a community member who donated a wagon to Stakeholder 2 when he went to purchase one for the new building, they noted the following about the interaction:

> He said you know I grew up in this community. I never thought I would see what, what you've done. And, and, and you know I mean granted it's a 30 40 dollar item I mean it's not that big a deal. But I was just I was awestruck. But he put it in the back of my pickup and said thanks and didn't charge him for the item in appreciation for the school.

Stakeholder 3 noted:

> I think what I'm most proud of is how proud this community is of this building… and the pride the community has in it.

Stakeholder 7 noted:

> I've never seen anything more impressive I don't think my life. It was so comprehensive and extensive and it just blew my mind…I just remember seeing

this school going up and thinking how I never thought construction looked beautiful before…And I just remember thinking how beautiful the construction was on the school…I just remember thinking like this is going to be so beautiful and this is this is exactly what we need…And it smelled so good, it was shiny and beautiful with everything was just state of the art…And it was really what this community needed…I know that the building at this school has really opened up our community to inviting more families to move in.

Stakeholder 9 noted:

> To us that was some of the satisfaction is seeing the owner come back to us and say wow, this is really neat.

Stakeholder 12 noted:

> It was humbling. So for us just getting our name on the project was, was a success for us being involved with it…I gotta tell you it even surprised me how good it went…It was a real shot in the arm for us…When you stand back and look at everything that went in that thing and just 16 months I mean the coordination is, as long as I've been, been doing it, it still amazes me how it all comes together.

3.1.3 Felt Listened To

Stakeholder 3 reported:

> But as far as me bringing up concerns to the contractor they addressed those immediately or explained their why for why it needed to be a certain way…They listened to me. I said you cannot put grates in drainage areas where my kids can stick their hands in there because my kids are going to stick their hands in there. They're kids…They would build little models for us of what it was going to look

like, what it was going to see, what we were going to what we could expect. I mean that's from the bricks. I mean they put bricks, the CMU's together. They sprayed water on them for us so we could actually see when you put the sealant on there…I mean I feel like we got enough feedback from the community and really tried to listen to them equally as the contractor listened to us…we were very intentional as a team to go through and make the decision and when I say the team it was [the owner's representative], myself the contractors the architects.

Stakeholder 4 reported:

> I felt like we had a really good back and forth. If I didn't like something they said you know I'd at least give them the opportunity to make it right.

Stakeholder 10 reported:

> And we basically put our foot down and said you do not want to do this…Those were things that I think worked really well in in the end.

Document 4, a School Board Update, noted:

> The Design team is nearing the end of Schematic Design, and working with the District's Core Team to finalize some of the design details (i.e., Parent Drop Off, Collaboration Spaces)…Focus Group Workshops: the next round of Focus Group Workshops is scheduled for 10/27, and should allow the Design Team to review the current Design and various options through the Focus Groups for input and discussion.

Document 5, a School Board Update, noted:

> After several rounds of Focus Group workshops, ongoing discussion with the Core Team, and much hard work, the Design Team is anticipating completion of

the Schematic Design (SD) phase the end of this week; this will essentially craft the total square footage and design elements of the building, and allow the Design Team to now move into Design Development (DD) and start quantifying types of materials, specifics to mechanical and electrical systems, etc.

3.1.4 Team Feeling

Stakeholder 1 reported:

> It'll be this May, will be three years since the district passed its bond and you know when you can still get everyone together in a room and everybody's on speaking terms with one another I view that as a success…Overwhelmingly I would say this project has been very successful.

Stakeholder 3 reported:

> I personally felt like it helped just because I knew that [the owner's representative name] and [owner's representative name], those guys were in on my side.

Stakeholder 6 reported:

> We ended up as a team delivered probably more project and what was originally planned…So it's like a momentum. Some good momentum there for [the district]. It's pretty cool…I think the relationship and collaborating with [the architects] and the rest of the team and the owner I think that was fairly successful.

Stakeholder 8 reported:

> So I think that that was a real benefit of that model is you had three people with a very similar vested interest in the success of the project.

Stakeholder 11 reported:

> I really appreciate the client wanting to have fun…They were willing to add more back…That's the best part of that project was just the relationships. Everybody was very open and excited about the project…It's the whole team…Everything went very smoothly and everybody is on good terms…The contractor on site foreman was very responsive…It was a great project and it went really well. Hopefully the strong relationship we have with them continues.

Stakeholder 12 reported:

> You know honestly I, I really liked it…I thought [the project] just went really slick. Yeah there were changes, there were things we had to work through. You know to me it felt like the changes flowed a lot easier and I thought it made for everybody being a lot happier campers at the end of the day. Not just [the superintendent] and [the business manager] but [the CM/GC] and all the subcontractors…It went really well I thought. You know the owners and the owner rep were very, very involved, which was helpful.

Theme 4: Project Challenges

Project challenges identified by stakeholders yielded far fewer instances and data sets than the successful probes. Three sub themes were identified related to project challenges experienced by the various stakeholders engaged in the project.

4.1.1 Typical

Stakeholder 1 reported:

> Similar to what you would see with any new, new construction project there was a little bit of a disconnect among some of the subcontractors on the mechanical side of the house. But we've since resolved that…Every construction project is

challenging, scheduling and keeping you know kind of keeping the hammer down a little bit. But I mean nothing that I would say is abnormal from any construction project.

Stakeholder 5 reported:

Every big construction project has had its challenges and have the successes but at the end of the day I think we checked, checked all those boxes.

Stakeholder 9 reported:

Access control is always a challenge on every project. So I wouldn't say that stood out any more than another but it helped us develop a new plan of attack on how to deal with access control…They had some site issues originally.

4.1.2 Managing Risk-Contingency

Stakeholder 1 reported:

I do think you know again just not to put too fine a point, the use of contingency has definitely been, that probably has been, our biggest challenge.

Stakeholder 2 reported:

I think the biggest challenge was the you know final negotiating stages and the contingencies as part of the project where you know the, the individual contractor had a contingency and if I were to speculate I don't know this. I don't think some of the people made as much money.

Stakeholder 4 reported:

It came to us having a lawyer write a letter. And this is how it's gonna be" when referring to the management of the contingency.

Stakeholder 6 reported:

> The way the contract itself was written there it was very loose in terms of how the CM/GC could spend contingency money…I understand the contractors have risk and so needs to be fair in that case it was tilted a little bit too far in their favor and there wasn't maybe wasn't as much accountability as there should have been or could have been.

4.1.3 Minimal Challenges

Stakeholder 1 reported:

> There was a little bit of a disconnect among some of the subcontractors on the mechanical side of the house. But we've since resolved that.

Stakeholder 2 reported:

> I mean I think, I think if you talk to the teachers at [the project] I think the air conditioning and some of those things. Some of those took longer than they would have liked. I mean we did, you know, we, you know in September we didn't have as much air conditioning. But realistically in the grand scheme of things, very small issues.

Stakeholder 8 reported:

> I don't really recall any major ones…[there] was a lot of that kind of what if scenarios so that if something did come up we at least weren't starting from scratch.

Stakeholder 9 reported:

> There weren't a whole lot of challenges on that one.

Theme 5: Delivery Model Influences

When asked if they thought that the specific delivery model utilized (CM/GC) affected project success or failures, only sub themes surrounding positive impacts were identified in the data sets.

5.1.1 Supported Project Success

Stakeholder 1 reported:

> And I think that the CM/GC process really lends itself to supporting that mentality and that vision…Was far more of a team approach because you could choose to lay all the cards on the table or just have dialogue around it. There wasn't sort of a well I'm only going to show you so much because you're not really a partner if that addressed your question.

Stakeholder 4 reported:

> I think it did help. We had a couple of hiccups that, which in construction are always gonna have some hiccups. We had a major hiccup with a mason. Our mason went bankrupt on us. But it definitely helped the process because we were able to have them sitting at the table.

Stakeholder 8 reported:

> I think it helped. I mean I don't have a frame of reference for the other model but this seemed to be pretty smooth where one of the nice part about [the owner's representative] is they were sort of the bridge.

Stakeholder 12 reported:

> I think I think it definitely helped…I just, I thought it was a good deal.

5.1.2 Fostered Communication

Stakeholder 1 reported:

> But again you come together as a team and just kind of put it all out on the table and you talk through it. And that's versus like a hard bid or you know kind of a traditional designed to build bid build approach.

Stakeholder 4 reported:

> Have[ing] them sitting at the table with [the architects], making small changes or suggestions. It's definitely speeded up the process. I'm not sure that it made it less expensive but I know it didn't increase the pricing.

Stakeholder 8 reported:

> Obviously you've got to have good folks but it can help with bridging those potential miscommunications…Kind of knowing you know knowing when to call B.S. on when, when the contractors say and say, well no that's not really the case. So an advocate kind of both ways. And so I thought that was a real positive aspect of it.

Stakeholder 12 reported:

> The owners are more in tune with what's going on…And I just I thought it was a good deal myself.

Theme 6: Reflections

All stakeholders were asked questions pertaining to their overall reflections of the model; would they recommend it, what caveats if any would they offer, and any other observations based on their project experience?

6.1.1 Favorability towards Model

Stakeholder 1 reported:

> I would say overwhelmingly supportive. You know I wouldn't hesitate to use that model again.

Stakeholder 2 reported:

> You know I would recommend it to others.

Stakeholder 4 reported:

> But I think would I go down that road again. I think I would…I think I would recommend it.

Stakeholder 6 reported:

> You're talking to somebody who's going to be an advocate for CM/GC and has been an advocate… So I would do it again on [the project].

Stakeholder 10 reported:

> I think it was probably almost essential…[The owner's rep] just didn't think they were gonna get anybody there. So I think that provided the client an assurity that that this kind of building could be built…It is highly beneficial we, we would generally prefer it…We generally recommend it.

Stakeholder 11 reported:

> It definitely can be a benefit when you have a whole campus and when you have a large campus or when you have a lot of projects…I would definitely recommend it because, you know a school superintendent is trained to be a school superintendent not a project superintendent on a job. So, so having the owners rep there. I think it's a good deal myself from what I've seen of it.

6.1.2 Selecting the Right People

Stakeholder 1 reported:

> Yeah. Again I think that qualification space is a huge component of it (when referring to the selection of the contractor)…So I think to that extent there's far more transparency in how the contractor is approaching the cost side of the house to the qualifications piece.

Stakeholder 5 reported:

> It's been the customers who treated the CM/GC like a hard bid project than a collaborative project…Again if you're, if you're, in my experience for dealing with clients and owners reps and design teams that understand the process, understand the contract, it can be a pretty seamless process without a lot of built in negatives or problems…I think the contractors input on early phases of design really helps to drive, drive the design towards the owner's desire budget.

Stakeholder 6 reported:

> I think the sophistication of the client matters to understanding what CM/GC is and what it's going to do for them because they're, you know, they're, they're going to have be having this interaction with the contractor and if they maybe don't really understand what that means…With CM/GC you have another player at the table. Another influence, another personality to deal with and you know you've got all these people sitting around the room and we all like to think they have the client's best interests in mind but we also have our own interests in mind right. We're in business going to make a profit. And so you know everybody's trying to navigate, navigate through that, so it just it's another entity for the owner

to have to manage. And if they're not prepared for that it may not be beneficial for them…I think they really need and understand what they're getting into and understand and really understand what CM/GC means.

Stakeholder 9 reported:

Before you take the lowest we ask that you go out and you verify all their certifications…At the end of the day (with CM/GC) we end up getting somebody that's certified they're qualified to do the work and it's just a better process for us… But in the low bid situation typically we've got you know, we're at the mercy of who wins this thing. So. So that's sort of where the CM/GC process comes into play on why we think it's a good thing versus the low bid version.

Stakeholder 10 reported:

From the client side who you have in the early stages is really important. And but then it's really who's managing the project…The other factor is the marketability to get subcontractors to bid on a project…How much effort do you get from the contractor side is, is heavily dependent on the contracting firm…For us it's a little bit of a black box we can go into one project and be getting stuff left and right from a contractor and other one not much at all.

Stakeholder 11 reported:

It just depends on the personnel and the people. It doesn't matter how a projects managed. It's all about the people and how they're managing it and what they're doing… I didn't feel like they delivered on anything really till bid time…They didn't really provide numbers…Everything went like a typical (DBB)

> project…Yeah I did expect them to be more involved up front with more design decisions or to provide cost estimate or running numbers.

Stakeholder 12 reported:

> Right there is a huge bonus because they're (the district) picking firms that they know have a good reputation…That's probably one of the biggest advantages I see for the owners side having a little control over who you get to work with…You've got to have a team of guys that really know and trust…If that school isn't open first day of school it's, it's horrible for the school district for the community for the contractor. You know you've got a team that really can, can flow and must make that many things happen that fast.

Document 1 noted, in the public Findings of Fact required to utilize the CM/GC method, that:

> The Board finds that the CM/GC method is necessary to take advantage of specialized expertise of the contractor…Utilizing the CM/GC process will allow the District to select a contractor who has a proven track record and capacity to successfully complete complex K-12 construction projects, both new construction and major renovations of existing and operating educational facilities.

Document 2 noted, in the 100-point scale to select the CM/GC, which 20 points were assigned to specific key personnel. They required proposers to:

> Provide an organizational chart showing your proposed staff…Provide detailed resumes for all staff shown on the project organizational chart, including length of time with the firm, relevant experience in Oregon Public CM/GC projects and relevant K-12 experience.

6.1.3 Supported Positive Relationships

Stakeholder 1 reported:

> (The CM/GC model helps) ensure that there are the values that the owner or the public agency holds true.

Stakeholder 5 reported:

> I know I think, I think the big ones are the relationship…So I think if you're, if you're dealing with clients that maybe want something different on a more collaborative relationship then this is a method to, to use… It affords the opportunity to build the relationship early with the entire team.

Stakeholder 7 reported:

> There were never any hang ups that kept the community on pause or on hold it was just so smooth. It was just done very, very well. From what I could tell it's great.

Stakeholder 9 reported:

> The benefit is that they're a team player. They're on the team from the start…Good contractors, good construction managers you know, form a great team a cohesive team that they're involved all the way through the process. We've had bad ones that aren't team players and they're no better than low a low bidder and in that case…The more team player they are the better it works out.

Stakeholder 10 reported:

> I think it is a good thing that CM/GC can do…Like the fact that the people that we're working with we've gotten to know during design…They know more of the owner's intentions which I think is really key. People that really understanding the

process is the dynamic between an owner and a contractor is actually where most of the friction can exist in a hard bid situation…In this case the CM/GC because you spent a year together with an owner and you're kind of you know part of the triad I guess you feel like hey I'm invested…It's just again it's a people thing…So I think the dynamics are definitely typically much better in the construction period. So we like that.

Theme 7: Lessons Learned

Finally, stakeholders were asked to share any lessons learned, advice, or other comments related to their experience with CM/GC on the current project. Would they do anything differently, were there any regrets or instances they would like to go back in time and redo if they had a chance? Such were the probes initiated during the interview process.

7.1.1 Establishing Clarity – Risk and Expectations

Stakeholder 1 reported:

> We probably should have been a little bit more rigid on contingency moneys and what's an acceptable use…So I think from your perspective the lessons learned particularly with CM/GC is ensuring that you have good language about the use of contingencies the uses of allowances and unspent moneys for allowances being returned to the owner.

Stakeholder 3 reported:

> Making sure that they're, they understand that this is our building it's not their building and we're the ones that are going to use it. And while they're the experts on the construction side of it. We're the experts on what kids are going to do and

how kids are going to function in that environment and making sure that they understand that piece.

Stakeholder 4 reported:

So here's the deal with the contingency. I would now go into it with the understanding that contingency is gone. That contingency is not mine. I will never get any of those dollars back. So if I did another CM/GC which I would I would make that contingency very low. Because all your cards are on the table…I would make sure everybody sits around the table understands that this is what it (contingency) is going to be used for.

Stakeholder 6 reported:

The way the contract itself was written there it was very loose in terms of how the CM/GC could spend contingency money. And that was, and that was a live and learn that I think others have agreed to as well.

Stakeholder 10 reported:

It's pretty loosey, CM/GC agreements. You know you're going to provide this service. Well what exactly does that mean?...CM/GC agreements you know there's a lot of interpretation…Little probably more clarity on what, what is the role of the CM/GC and what is a what do they actually do what is their dedicated time.

7.1.2 Importance of Positive Relationships

Stakeholder 3 reported:

I would say kind of like what I was saying just that a good solid relationship.

Stakeholder 4 reported:

> I think the big takeaway was just the opportunity of having the architect and the contractor sitting side by side with the owner and us being able to the contractor being able to say OK architect that's really pretty. But you know you make this small change and it saves an incredible amount of money and or time.

Stakeholder 6 reported:

> Really at the end of the day, it's what really seems to matter is this the attitudes and the philosophies of the people who are at the table regardless of the contracting method. I mean the contracts do matter. They do what they do and how things are written but usually when you get to the point of starting to get it and pull out the contract language it's not a good thing.

Focus Group

Focus group participants engaged over three question prompts, elaborating on and with each other. Three themes and subsequent sub themes were discovered.

Theme 1: Project Success

Similar to stakeholder interviews, focus group participants were asked to describe specific project successes, if any. In similar fashion to their project stakeholder counterparts, all three members elaborated on project success.

1.1 Project Was Successful

FG 2 reported:

> I think the end product was a nice product.

They also elaborated, on a 1-10 scale, noting the following:

> 7, could have been an 8 out of 10 (impacted by a mason subcontractor as described below in challenges). And you know I think I think their end product. It was a successful project you know.

They also went on to note,

> I well second what [FG 3 said when they noted project success]. I thought it was a great collaborative experience and I think the client was ultimately happy with their end product.

FG 3 reflected about their enjoyment working with the other two, noting:

> I just, you know, just to [FG 2] and [FG 1], I really enjoyed working with both of you and hopefully work in the future. Overall I thought the process went well.

FG 1 reported:

> It's a valid delivery method and I was glad to experience it. I'm glad I worked with [the CM/GC] on it.

1.2 Good Collaboration

Significant data revealed a strong collaborative effort between project team members throughout the project. Some of the more salient comments are outlined below.

FG 3 reported:

> I thought it was collaborative. I thought once we got into construction it did seem to go well. There was a good amount of collaboration, and thoughtfulness, and outcome.

FG 2 reported:

> Yeah, I agree [With FG 3 about being collaborative]. We had weekly meetings, got to know each other on a professional basis and then a little bit on a personal

basis…The team worked well together once everybody was fully engaged and fully involved in the project…It was definitely a collaborative effort.

FG 1 Reported:

We had a real good collaboration.

Theme 2: Project Challenges

Similar to the stakeholder interviews, limited project challenges were identified compared to successes. The salient challenge that resulted in prolonged engagement between focus group participants stemmed around a mason subcontractor who went bankrupt part way through the construction project. This challenge was identified as a sub theme in the stakeholder interviews in 4.1.2 Managing Risk-Contingency and 7.1.1 Establishing Clarity-Risks and Expectations. This challenge impacted all three focus group participants, placing budget, schedule and project pressure on all three.

FG 1 Reported:

I think everybody lost when, when that contractor went under.

They went on to discuss risk related to issues like this. FG noted,

You're putting the risk, some of the risk, on the owner (with CM/GC) where it properly should be instead of the contractor who has to put in costs for that. This risk issue is one I can talk a lot of time on. Realize that (with CM/GC) you're, you're putting your trust totally in the contractor and with that trust you also leave yourself quite exposed to, to some additional cost issues. And well just this just additional exposure.

FG 2 Reported, when reflecting on the decision to hire the mason:

> I don't think that was solely our decision because he was several hundred thousand dollars less (than the next lowest bidding mason). And so, it was, it was not solely our decision to go with that contractor because we had a history with that contractor. But, the reason we did was because of the value that thought we were getting.

FG 3, when referencing the challenge with the mason subcontractor noted:

> I mean with any job there's frustration.

Theme 3: Project/General Reflections

Focus group participants were asked to provide insight related to lessons learned and feelings around utilizing the CM/GC method. A salient sub theme, pertinent to the project itself and CM/GC in general was identified. Similar to sub theme 7.1.1 Establishing Clarity-Risk and Expectations, comments surrounding the role of the CM/GC were identified by FG 1 and FG 3.

Clarity of Roles/Expectations

FG 3, when describing the CM/GC's role in early design input, reported:

> This is kind of similar I guess frustration we have had at the CM/GC, but overall this is the same kind of experience we have had with it. You know during design, there's some collaboration. We wish there would be a little more. And then you know, during construction, usually it goes better, when a contractor is fully vested and involved, that's when it really starts to progress…that's our frustration because now it's already in construction and there's some things we can't do.

FG 1, when building off FG 3's comments, reported:

> Yeah I was disappointed in the contractors input into the design but that's a difficult role to take when you're typically a bid build contractor.

They also noted, when discussing roles and responsibilities,

> It is always a matter of identifying expectations. Part of the owner, those expectations are still necessary to be defined whether, it's a bid build or a CM/GC.

FG 2, an employee for the CM/GC firm, attempted to explain their company's lack of involvement early on, stating:

> I mean, for the most part, the purpose of the CM/GC process is to be able to help with design. And you know, but we're limited as a contractor. I mean, we don't go in and change their design…we try and value engineer it and maybe you can save some money here or, or you know…

Conclusion

This study focused on describing stakeholder experiences stemming from an Oregon school district who recently utilized CM/GC to deliver their new school construction project. The rationale was to provide district decision makers with increased information upon which to make an informed construction delivery model choice when completing their capital school construction project. Twelve project stakeholders were interviewed, three participants engaged in a focus group interview, and pertinent documents were analyzed. From the data, seven themes were identified and 21 sub themes discovered, addressing the posed research questions.

The primary research question sought to understand and answer realized experiences utilizing the CM/GC model. Rich, descriptive artifacts were uncovered in both interview and document analysis. Experiences of both success and challenges were

identified. Project successes related to positive outreach and engagement, pride of project, perception of being listened to, and a feeling of "team" were identified. Project challenges, less in frequency and intensity when compared to successes, were also uncovered. Although data revealed that stakeholder experiences of the challenges were typical of construction programs and minimal in scope, they did experience obstacles in managing risk, specifically related to contingency access.

An additional research question sought to be answered dealt with anticipated verses actual experiences with the delivery model. Data gleaned revealed that stakeholders entered into the model expecting it to deliver positive relationships, to provide the necessary support due to lack of district capacity, and be able to offer pertinent local outreach. Actual experiences revealed that the model supported project success and fostered effective communication.

The final research questions focused on attributes of the CM/GC model that were most and least valuable to project stakeholders. Both reflections and lessons learned themes were identified. Data revealed favorability towards the model, the importance of selecting the right project team, and the positive relationships the model fosters. A consideration addressed in a lessons learned analysis revealed potential pitfalls for projects, ensuring that clarity is established when addressing risk as well as team member expectations.

In addition to interviews and document analysis, a focus group interview was conducted in order to support reliability and trustworthiness of the findings. Consistency in data were discovered. Project success and collaboration were revealed from the three participants when reviewing their actual experience with the model. In addition, project

challenges surrounding risk from a primary subcontractor revealed a challenge faced by all three subjects. Finally, clarity of roles and expectations were identified as a reflection surrounding the CM/GC model.

The following chapter will include a discussion and interpretation of the findings, implications for further research, and conclusion.

Chapter 5: Discussion and Conclusions

Introduction

Nationwide, an estimated $197 billion is needed to address infrastructure improvements across K-12 school campuses (Alexander & Lewis, 2014). In an attempt to address those needs in the state of Oregon alone, over $2.2 billion worth of school construction were approved through local school levies in the last six biennia (Oregon School Capital Improvement Planning Task Force and Portland State University, Hatfield School of Government, Center for Public Service, 2014). As Oregon school systems prepare for their capital construction initiatives it will be critically important that their selection of project delivery method is an informed one (Sewalk et al., 2016). Often with millions of dollars at stake, the trust of their taxpayers in the balance, and the implications and consequences if school construction project outcomes are not positive, the decision over project delivery is paramount.

Although prior research has been performed related to CM/GC projects, the research has been focused primarily on quantitative analyses focused heavily on cost and time variables (Carpenter, 2014; Konchar, 1997; Kulkarni et al., 2012; Rojas & Kell, 2008; Williams, 2003). The limited data related to project experience that does exist focuses heavily on project quality outcomes, providing only a cursory glimpse into stakeholder experiences related to the CM/GC process (Carpenter, 2014; Konchar, 1997; Williams, 2003). As a result, scarce research has been performed analyzing subjective stakeholder satisfaction and experience, critical components of any project's overall success (Rashvand & Majid, 2014). This study was intended to broaden the field's understanding of the phenomenon, providing future district decision makers with

increased information upon which to make an informed construction delivery model choice when completing their capital school construction projects.

Included in this chapter is a brief summary of the study followed by a discussion of the results as they relate to the research questions. In addition, a broader connection with the research reviewed in Chapter 2 will be explored. In light of the findings, an examination of the theoretical framework will be discussed, strengths and weaknesses addressed, and recommendations for continued research offered.

Summary

This research consisted of a bounded case study of a school district in Oregon who recently implemented the CM/GC model to deliver their new elementary school construction project. Selection of the site was intentionally identified to ensure that the project scope and participant willingness to engage in the research provided the purposeful sampling necessary to address the research questions (Merriam & Tisdell, 2016).

The sampling method identified for the research project was grounded in typical sampling (Creswell, 2015). Twelve project stakeholders participated in one on one interviews using a semi-structured interview guide. Interviews were recorded and transcribed. In addition, a focus group interview with three stakeholders was also conducted. The focus group interview occurred over a phone bridge and was also digitally recorded and transcribed. Project documents were also collected and analyzed to supplement the research with multiple primary sources of information (Merriam & Tisdell, 2016). Results and analysis were intended to answer the following research questions:

Primary Research Question:

R1: What are the experiences of a school district who implemented the construction manager/general contractor delivery model for their new school construction project in Oregon?

Additional research questions:

R2: How do stakeholders describe their actual experiences with CM/GC versus their anticipated experiences?

R3: What aspect(s) of the CM/GC process did stakeholders find valuable to their experience?

R4: What aspect(s) of the CM/GC process did stakeholders find least valuable to their experience?

Discussion and Interpretation of Findings

Since Freeman's (1984) ground-breaking contribution to the concept nearly 35 years ago, stakeholder theory has influenced organizations to broaden their measurement of success from simple economics, focusing more attention on value creation (Freeman, et al., 2010). As stakeholder disappointment continues to be a root problem within construction projects, understanding how primary participants approach, are involved, interact, and make decisions during capital school campaigns will serve instrumental in ensuring value and satisfaction is supported (Eskerod, Huemann & Ringhofer, 2015).

Selection of a project delivery method (PDM) can have a profound impact on project success and is of critical significance and one this research project set out to inform. As pointed out by CMAA (2012), "… the project delivery method is one of the most important decisions made by every owner embarking on a construction project" (p.

1). However, a vacuum exists in literature related to critical qualitative factors such as stakeholder experiences with specific delivery models, including CM/GC (Rashvand & Majid, 2014). To that end, a conceptual framework, built around the relationships and perspectives from project stakeholders was applied to better understand the experiences resulting from the application of the CM/GC delivery model at a specific case study site.

Four research questions were developed, findings presented, and analysis made, in order to provide future district decision makers with increased information upon which to make an informed construction delivery model choice when completing their capital school construction project. Seven themes and 21 sub themes were discovered from the interview and document research (see Table 14). Following are the interpretations of the findings.

R1: What are the experiences of a school district who implemented the construction manager/general contractor delivery model for their new school construction project in Oregon?

Few studies have analysed critical qualitative factors such as stakeholder experiences implementing construction delivery models, providing scarce resources upon which school district leaders can draw upon to help inform which delivery model might best suits their needs (Rashvand & Majid, 2014). Without a clear understanding of the subjective experiences associated with the varying project delivery approaches, districts are making selection decisions void of critical information, leaving billions of taxpayer dollars to chance. As they weigh different options available to them through statute, consideration towards a model that promotes high satisfaction from project stakeholders should be contemplated. Often with millions of dollars at stake, the trust of their

taxpayers in the balance, and the implications and consequences if school construction project outcomes are not positive, the decision over project delivery is paramount.

Before reflecting on their perceived project experiences, stakeholders were asked to define what a successful school construction project meant to them. As Williams (2016) notes in his recent research, "Both research and practice have been moving away from a simplistic definition of project "success" as meeting cost, schedule, and performance targets, to a more multi-dimensional definition, involving both objective and more subjective criteria" (p. 97). Although the traditional "on time and on budget" indicators were mentioned from representatives from all three stakeholder categories (i.e., owner, architect, contractor/other), subjective measures were also detailed around quality, experience, and public accountability/perception.

Khosravi and Afshari (2011) referenced the "iron triangle" of not just cost and time to describe project success, but also owner satisfaction with the quality of the building. In fact, in their research, client satisfaction rose to the fourth most influential success criteria. Their findings were supported in this case study, where owner satisfaction with the product (the school) was a sub theme that emerged. As one stakeholder stated, success is when, "the client's happy, the staff is happy, the people that are utilizing that building and that are living in that building are happy." One interviewed went as far as to define success as when the owner is so happy with their building and components in the end that they seek them out for their next project; a repeat customer. As they noted, "…our success depends entirely on the owner, architect and contractor satisfaction [with their new school]."

In addition to owner satisfaction with the end product, a supplementary sub theme related to defined project success focused on the owner's satisfaction with the experience itself. As discussed by Rashvand and Majid (2014, p. 10), "Successful performance measurement criteria cannot be limited to meeting just the three traditional criteria," where consideration now must be given to the qualitative experience of clients during the process. In salient terms, one stakeholder defined success when, "…at the end of the project, the school district and the contractor are still on good terms," reinforcing the critical aspect that success is more than just schedule, time and quality of building; it is also about experience. What can amount to a multi-year relationship between the parties, a positive experience must be factored in when reflecting on the success or lack thereof during a project (Carpenter, 2014; Khosravi & Afshari, 2011).

Lastly, the importance of positive public accountability and perception was also revealed as critical to an ideal project outcome. This comes as little surprise. Bond measures necessary to support capital improvements require public approval and are paid directly by local voters through tax assessments on their property. As they should, constituents expect that their tax dollars are being used efficiently and appropriately. Millions of dollars are at stake and scrutiny lurks around every corner. In fact, "The construction of new school facilities or renovations of existing ones has been responsible for the professional demise of some superintendents after a building project became an explosive community issue" (Frantz, 2014, p. 384). Not surprisingly, the district superintendent, highly engaged in pre-bond outreach and ultimately responsible for the district, defined a successful project when, "You're able to look at your public in the eye

on the street and say you supported us financially through your property taxes and we did what we said we were going to do."

Careful consideration was given to the development of the interview guide in an effort to uncover rich and descriptive accounts of stakeholder experiences (Merriam & Tisdell, 2016). Twelve sub themes were discovered that described stakeholder experience when implementing CM/GC to deliver their new elementary school facility. These experiences were aligned with four themes; project successes, project challenges, delivery model influences, and reflections.

Project Successes

When asked to describe their experience with this project, all 12 stakeholders interviewed, including the three focus group participants, described substantial levels of project success. As noted by Rashvand and Majid (2014), when referencing Baccarini (1999), "To date, there are no consistent interpretations or standardized definitions of the term project success" (p. 11). This held true for this research project as well, as varying levels of descriptors were used to describe the project as being successful. However, four sub theme success experiences were identified, including positive outreach and engagement, pride of project, felt listened to, and team feeling.

As noted by Williams (2016), "It is important for the community that what is left is a legacy, not just a building," and the impacts stemming from the experience can have a lasting affect (p. 108). The "positive outreach and engagement" sub theme identified in this research supports William's understanding. Engagement between the CM/GC and local subcontractors, intentional community involvement and outreach with organizations like the chamber of commerce, and explicit involvement of key internal and external

stakeholders were common threads from interviews. Positive outreach, all the way down to the local sub sandwich shop was discussed as an example of such coordination. In addition, multiple stakeholders addressed the attendance at the ribbon cutting ceremony as a benchmark of this success criterion. One subject, who has attended many such ceremonies during their career noted, “I can't remember the last time any program I went to where you had the community turn out [to that degree].”

“Pride of project” was also a described success experience from stakeholders. Multiple interview participants from all three groups identified how proud they and the community were of the project. From community members in tears of joy to a chamber director noting the facility’s legacy impact to a local subcontractor still reveling in the experience of how it all came together so well, the pride of project was powerful. Most revealing, however, was the story the superintendent shared when he went to purchase a wheelbarrow at the local hardware store to pack orange cones around the campus just before the first day of school. He gleaned with pride when he relayed the story of how the store clerk, who had been a community member all his life, loaded up the wheelbarrow in the back of his truck and would not let the superintendent pay for it. As the school leader noted, the clerk said “…you know I grew up in this community. I never thought I would see what, what you've done.”

“Felt listened to” was the third sub theme under project success used to describe stakeholder experience. Focus group outreach, workshops held and day-to-day interactions with school employees, the feeling that team members were being listened to was a thread that consistently emerged from project stakeholders. The school planning principal provided a telling example when dealing with a playground design flaw they

identified. The principal recalled a time when they noted to the architects, "…you cannot put grates in drainage areas where my kids can stick their hands in there because my kids are going to stick their hands in there. They're kids." Although a common design component in playgrounds, the architects heeded the input and changed their design solution to address the principal's concern.

The final project success experience was "team feeling." As referenced by Krane et al. (2012), when referring to work performed by Turner and Mueller (2004), "Project success depends, among other factors, on the ability to successfully manage the interaction between the key stakeholders—namely, the project owners and management team of each project" (p. 55). Healthy interactions between key project stakeholders was the basis of the team feeling identified. Although Merriam-Webster defines team as "a number of persons associated together in work or activity," stakeholders described their CM/GC experience with much more significance. Descriptors such as "those guys were on my side," there were "people with a very similar vested interest in the success of the project," and when one stakeholder referred to the team interaction between members they noted, "I thought it made for everybody being a lot happier campers at the end of the day."

Project Challenges

As pointed out by Krane et al., (2012), close cooperation, trust and proactive attitudes between participants is critical to avoiding risks and challenges. Despite success criteria realized surrounding such proactive attributes, experiences related to project challenges were identified by stakeholders. However, such obstacles were both less frequent and intense than the successes aforementioned. Three sub themes addressing

project challenges consisted of them being typical to other projects, challenges around managing risk especially regarding the use of contingency, and the overall feeling that the challenges were minimal.

Regardless if this was the stakeholder's first school construction project, or one of many over their career, they identified challenges as being both minimal and typical for projects of this scope. As one stakeholder noted, "Every big construction project has its challenges," while another went on to say, "Every construction project is challenging… But I mean nothing that I would say is abnormal [when referencing the project]." When probing deeper during the interview process for specific details, experiences, and artefacts related to challenges, even when provided extensive wait time for response, many stakeholders could either not come up with specific experiences or struggled to find salient examples. One noted that some of the air conditioners weren't fully operational during the start of school, but went on to say, "But realistically in the grand scheme of things, [these were] very small issues."

The one specific challenge that threaded across all three stakeholder groups, in addition to focus group participants, surrounded an incident regarding risk management, specifically regarding the CM/GC's use of project contingency when a mason subcontractor went bankrupt midway through the construction effort. Krane et al. (2012) classifies project risks into three levels; operational risks, typically under the purview of the project manager; short-term strategic risks, classified as the project's effects towards the owner; and long-term risks, affecting societal and sustainability implications (p. 58). In alignment with their research, where 91% of risks fall under operational, this case study too experienced such an operational risk (p. 60).

When the mason subcontractor went bankrupt this placed financial pressure on the CM/GC contractor and their budget. Included in all CM/GC AIA contracts between the owner and the CM/GC is a contingency allowance for unforeseen circumstances such as this one experienced. However, the interpretation as to whose money the contingency is, and how it is to be allocated, resulted in a struggle between the CM/GC and the owner during this event. Carpenter (2014) points out that risk avoidance can be a tricky situation, especially provided that delivery methods maintain a different level of risk, and the levels of risk vary with the level of control held by either the owner or contractor. In CM/GC, this is often considered a shared-risk responsibility. Although the cooperation, trust and proactive attitudes between participants was evident in order to avoid such risk, this financial engagement found the two parties at odds (Krane et al., 2012). Lack of detailed language in the contractual agreement surrounding access to contingency, and failure to clearly articulate how contingency was to be handled prior to project inception, served to fester this matter into a project challenge. As noted by a district stakeholder, "It came to us having a lawyer write a letter" in order to resolve the matter and how it was going to be handled.

Delivery Model Influences

As pointed out by CMAA (2012), there will be advantages and disadvantages with each method, therefore "The owner needs to carefully assess its particular project requirements, goals, and potential challenges and find the delivery method that offers the best opportunity for success" (pp. 1-2). Two sub themes related to delivery model influences were discovered in the research; that the model supported overall project success and that it fostered communication.

As noted by Mollaoglu et al. (2015), for projects to be a success, "…inter-organizational project teams consisting of owners, designers, contractors, and subcontractors must share common goals and objectives illuminating an environment of trust and commitment to the partnership" (p. 74). Overwhelming data revealed that stakeholders associated with this project overtly described this project in such a manner and felt that the CM/GC delivery model was a factor in achieving a successful outcome. When probed by the researcher for specific examples as to how CM/GC may have supported project success, stakeholders gravitated toward how the model helped them navigate decision making, especially around difficult topics, as well as its ability to support engagement and dialogue between team members. As one stakeholder noted,

> [The] CM/GC process really lends itself to supporting that mentality and that vision… [It] was far more of a team approach because you could choose to lay all the cards on the table or just have dialogue around it. There wasn't sort of a well I'm only going to show you so much because you're not really a partner.

In addition to supporting project success, fostering communication was the second sub theme that project stakeholders revealed. This finding is supported by Doloi (2013) who concluded that ensuring effective communication, among other aspects, are instrumental in order to achieve project success. Additionally, Carpenter (2014) found that, "…client satisfaction (subjective measure) may be improved by a perceived increase in cooperation and communication instilled by the collaborative properties of alternative methods," like CM/GC (p. 32). As revealed by participants in this study, healthy communication between all three categories of stakeholders were discovered. Architects and contractors felt as if the owners were more engaged and "in tune with what was

going on" and owners revealed how they appreciated that the consultants were "sitting at the table," positively interacting with them. The owner's senior project manager framed this sub theme nicely when they commented about the CM/GC they experienced on this project and others, stating, "You come together as a team and just kind of put it all out on the table and you talk through it."

Reflections

The semi-structured interview guide specifically probed participant reflections with open-ended questions about their project experience. Three sub themes were found when analyzing results, including favorability towards the model, the importance of selecting the right people, and that the model supported positive relationships.

According to McGraw Hill Construction's (2014) findings, 60% of owners that had done a CM at-Risk project reported being very satisfied with their experience. The findings on this case study support McGraw Hill Construction's data, where favorability for the model was well articulated across the stakeholder groups. All three groups, from owner, to contractor, to architect, reported that they were satisfied with the model, their experience, and would use the delivery system again. When probing deeper, some stakeholders noted that for small and straightforward projects, the model might not be necessary. In one instance a stakeholder mentioned that, "If you're just building a widget you know like a BiMart building right. You know, a fairly standardized cookie cutter design…" then CM/GC might not be as valuable. However, stakeholders reported that for complex projects, larger in scope and complexity, CM/GC is valuable. One stakeholder succinctly noted on this project, "I think it was probably almost essential."

Selecting the right people was the second sub theme identified. As Kog and Loh (2012) identify, "…the human factors, particularly the quality of the consultant and contractor, are crucial to achieving project success" (p. 527). To that end, one of the unique aspects of CM/GC, unlike its DBB counterpart, is that the process allows for the selection of the contractor based on qualifications rather than solely cost. Selection standards are identified and interviews often conducted in an effort to recognize good fits between project team members and the contractor. They typically include locally-developed criteria that best align with project team goals, relationships, and unique project conditions (Sewalk et al., 2016; Williams, 2003).

In this instant case, stakeholder interviews and documents alike supported the benefits pointed out by prior research. The ability to identify desired traits and freedom to select critical team members, whether architects, project managers, and the CM/GC contractor, were identified as extremely valuable from the owner's perspective as also discovered by Mollaoglu-Korkmaz et al. (2013). This not only fostered a healthy team atmosphere, it also ensured that the key project stakeholders maintained the right attitude towards the project. Many of those interviewed referenced the mentality difference between project members who approach a project like a traditional DBB job vs CM/GC. One architect noted of another project, "It's been the customers who treated the CM/GC like a hard bid project than a collaborative project…" that cause things to go awry.

In addition, multiple stakeholders referenced the need of specific members, especially the owner, to maintain a sophistication and understanding around expectations and the model. There are more people at the table with this model, more entities to interact. As one interview noted, "I think they (the owner) really need [to] understand

what they're getting into and understand…what CM/GC means." Additional comments were made regarding the importance of selecting a CM/GC and sub consultants based not just on price but experience and qualifications, rather than just low cost. To sum it up, as one stakeholder noted, "It's all about the people."

The last sub theme was that the CM/GC experience supported positive relationships. Identified by stakeholders as one of the primary drivers for selecting the delivery method at the onset, the trait delivered as an outcome. Maximizing stakeholder relationships serves integral if project participants wish to better their chances of project success (Anderson et al., 2004). Project participants from both the stakeholder and focus group interviews, reinforced this understanding in the details they provided surrounding their experiences. Participants sharing a common vision, team members valuing a collaborative relationship, and a team-player attitude amongst key stakeholders, interviewed subjects consistently reinforced how CM/GC, in structure and expectation, supported positive relationships. One stakeholder, in particular, elaborated on this subject, noting that CM/GC afforded the key participants a year of working together on the design prior to actual construction. This fostered positive relationships, understanding, and that the CM/GC is more invested in the owner's intentions and desires.

R2: How do stakeholders describe their actual experiences with CM/GC versus their anticipated experiences?

Stakeholders approached the CM/GC with expectations regarding what to expect from the delivery model, baring three striking sub themes. Project participants identified that they expected the model to be relationship focused, that it would provide necessary

technical support due to the district's lack of capacity, and that the model would prioritize the importance of local outreach.

Consistent with research by McGraw Hill Construction (2014), where they discovered that owners were more drawn to the delivery model because they felt improved quality would come from the collaborative model, so too did project participants in this instant case. The collaborative, relationship-driven attribute thought to be professed by the model rang true. Stakeholders anticipated that the model would bring a, "…far more relationship based [experience]," with, "…the ability to bring a partner to the table who was going to be truly a partner in the process and not just sort of a third party." The reputation the model maintained around supporting positive relationships, interactions, and experiences, were revealed across the stakeholder subject groups, both from those with and without personal CM/GC experience prior.

As identified, multiple sub themes revealed a close alignment between expectations from the delivery model and the experiences on this project. Sub theme findings such as, "supported positive relationships," "fostered communication," "team feeling," "felt listened to," and "positive outreach and engagement," all point to the fact that stakeholder experiences closely aligned to their expectations. Although there was one isolated project challenge noted under "managing risk-contingency," stakeholders from the interview and focus group reported that the relationships inherent in collaborative CM/GC model may have helped resolve the incident stemming from a problematic subcontractor.

Concluded by Frantz (2014), not only can a construction project result in the professional downfall of a superintendent, "…a construction management firm…may be

one of the main reasons a superintendent enjoys a trouble-free construction period" due in large part to an owner's lack of expertise (p. 391). Both the project owners as well as professional team members expected the CM/GC model to fulfil the owner's lack of capacity to handle, manage, and support such substantial capital programming. This finding is reinforced by the researchers when interviews revealed that most owners lacked an understanding about their roles and appropriate level of involvement in their projects (Anderson et al., 2004; Hatmoko & Khasani, 2016). As noted in Table 11, district project stakeholders, neither the superintendent, assistant superintendent, principal, or business manager, maintained any relevant school construction experience. The district intentionally called out their need to bring deep expertise to their team from both the project management and CM/GC firm as noted in multiple procurement and selection criteria. As clearly called out by the planning principal, when responding to their and the district's lack of construction know-how, they responded, "So when, you, you know when you start a new building project it was an eye opener for me right…We're like we have no idea. You tell us." Similarly, the consultants procured to support the efforts, likewise noted that the owner felt, given the complexity of the project, "…that the CM/GC would be able to better help them manage and navigate through that."

An expectation identified in the third and final sub theme related to this research question revolved around the owner's understanding that CM/GC would support improved outreach to the community as well as contractor and vendor engagement. These two assumptions stemmed both from the district's ability to elicit greater subjective,

qualifications-based criteria when selecting team members, in addition to the procurement method of subcontractors inherent with the system.

As detailed in the procurement documents of the CM/GC and project management firm, the district weighed heavily the importance of proposer understanding and activities related to supporting local involvement, outreach, and associated communication efforts. Twenty of the 100-point rating scale influenced the selection of the project management firm, and 15 of the 100 points influenced CM/GC applicants. The district leveraged the CM/GC qualifications-based selection criteria to help reinforce and support their expectation for local outreach, not simply for communication purposes, but in hopes to include as many local subcontractors as possible through targeted outreach and a more flexible subcontractor procurement process supported by CM/GC. As noted by one stakeholder, "…the district very much felt was a strong part of the community's desire was a reinvestment in local," and they crafted and selected a firm they best felt could deliver on that.

Lauded as one of the project's success experiences, "positive outreach and engagement" was identified as a primary sub theme. This data seems to fulfill the first of two expectations related to importance of local outreach. Stakeholders report fulfilling the community engagement and outreach expectations when it came to design input, communication, and coordination on behalf of the CM/GC. In addition, data revealed that the model "was critical" in order to elicit subcontractor interest. As one interview subject noted, "The CM/GC process affords us to start early with the outreach process or the solicitation process." Contractor open houses were initiated by the CM/GC to advertise and explain the project to local subcontractors, where one of the prime sub constrictors

selected ended up being a local firm who later reported, “It was a real shot in the arm for us,” landing the job. A year after the project was completed the local firm received an award for the best contractor in the region, in addition to Business of the Year. When interviewed, the business owner attributed their success to being selected and their performance and involvement on the school project.

R3: What aspect(s) of the CM/GC process did stakeholders find valuable to their experience?

Of the 21 sub themes revealed in this research project, data consistently pointed to positive relationships and communication as resonant patterns that transcended nearly every theme from both interview and focus group participants. This is supported by prior research, where Carpenter (2014) found high levels of satisfaction with respect to communication and cooperation. In addition, an exhaustive literature review reinforced the need for communication, among other factors, in order to support high project satisfaction and outcomes (Mollaoglu et al., 2015).

As revealed, a driving factor towards expectations and the district’s decision to proceed with CM/GC was the model’s perceived relationship-focused approach. In addition, the importance of communication and coordination was also noted. These anticipated expectations turned into realities, where multiple project successes were realized that captured these sought-for experiences. Positive outreach and engagement, feeling listened to as a client, and the team feeling established, were all fostered as a result of the relationships and communication experienced during the project.

While challenges were recognized, stakeholders reported that the relationships established through the CM/GC process, as well as open lines of communication, may

have helped minimize and mediate the matter. In addition, when asked how the CM/GC model influenced the project, stakeholders revealed that the model, as anticipated, helped foster communication to internal and external stakeholders alike. When asked to reflect back on their overall experience, project participants noted that CM/GC delivered on their understanding, fostering positive relationships as it was hypothesized to support.

R4: What aspect(s) of the CM/GC process did stakeholders find least valuable to their experience?

Despite deliberate questions contained in the interview guide, as well as intentional probing by the researcher during the interview process, limited data was uncovered related to this research question. As noted by Ryan and Bernard (2003), "…researchers have long recognized that much can be learned from qualitative data by what is not mentioned" (p. 92). However, when addressing the absence of any consistent theme across multiple data sets, researchers must be cautious and carefully scrutinize conclusions to ensure that investigators are not finding only what they are looking for (Ryan & Bernard, 2003). A careful analysis of the data provided only one sub theme that, when analysed, shed light on an experience with CM/GC that didn't fulfil expectations from select stakeholders.

As discussed by Rashvand and Majid (2014), a clear understanding from stakeholders regarding expectations must be given due attention to ensure, from owners to architects, and project managers to contractors, that project deliverables align with anticipated outcomes. A lack of clarity with respect to the CM/GC's role and expectation of involvement was brought up by multiple stakeholders in both interview and focus group settings, primarily from those representing the architectural field.

As identified by McGraw Hill Construction (2014), proponents "…argue that improved quality accrues from having contractors participate in preconstruction decisions," providing value engineering, estimating, and constructability services (p. 25). However, as identified by one architect, "…I didn't feel like they (the CM/GC firm) delivered on anything really till bid time…," when referencing pre-construction services. Another noted, "How much effort do you get from the [CM/GC] is heavily dependent on the contracting firm," going as far as describing it a "black box." On this project, all three architect stakeholders referenced a lack of CM/GC engagement in the pre-construction services based on expectations from the model. As one architect noted, "I did expect them to be more involved up front with more design decisions or to provide cost estimate or running numbers," where another noted, "I think that could have been handled better (referring to CM/GC pre construction work). So that's one of the instances that I think maybe slipped through the cracks. You know it could have gone better with a CM/GC process."

Implications

This research aimed to provide critically important information as it set out to describe and interpret the experience of an Oregon school district who had recently implemented CM/GC to deliver their capital school project. The results obtained allow future district decision makers greater insight into the CM/GC process to help them determine if the alternative delivery model is be best suited to support their district's needs.

While significant research has been performed comparing traditional quantitative measures, few studies have analyzed critical qualitative factors such as stakeholder

experiences with construction delivery models (Carpenter, 2014; Konchar, 1997; Williams, 2003). Such a vacuum in available data, there exist scarce resources upon which school district leaders can draw upon to help inform their delivery model selection (Rashvand & Majid, 2014).

Stakeholder theory has influenced organizations to broaden their measurement of success from simple economics, focusing evermore on value creation (Freeman et al., 2010). As stakeholder disappointment continues to be a root problem within construction projects, understanding how primary participants approach, are involved, interact, and make decisions during capital school campaigns will serve instrumental in ensuring value and satisfaction is supported (Eskerod, Huemann & Ringhofer, 2015).

Leveraging stakeholder theory, the CM/GC model appears well poised to support such favorable conditions due to its integrated and collaborative approach. In concept and function, the delivery mechanism, by design, appears poised to support greater collaboration, cooperation, and shared risk, appearing well structured to address many of the core tenets identified in stakeholder theory.

Findings, stemming from interviews of key project stakeholders and documents from this case study, validated by a focus group interview, provided compelling data, affirming CM/GC's ability to deliver on stakeholder theory tenets. Many salient implications and considerations were discovered that will assist future district decision makers should they be faced with a delivery model selection for their new school construction project. Following are some of the implications and considerations based on this research project:

- If a district finds itself lacking in internal capacity to support their construction campaign efforts, CM/GC appears well poised to be able to offer the opportunity to select a contractor that can bring additional expertise to the project team. Specific criteria can be identified and prioritized in order to ensure that the CM/GC and other project participants can be assembled to compliment and/or support lacking skill sets or experience from the owner's perspective.
- The model is highly relationship focused and can be greatly influenced by the proper selection of team members. Care and attention should be considered to ensure a cohesive team that understands and clarifies their roles, responsibilities, and expectations. This is critically important in the pre-construction stages to ensure that the CM/GC provides the level of services expected from the owner and other project stakeholders, especially architects.
- School district representatives, as part of the process, will be highly engaged, listened to, and involved throughout the capital planning, construction, and closeout processes. This may require a significant level of time, energy and commitment from key district stakeholders.
- Communication will be supported by the model, both to internal and external stakeholders alike. This may include substantive community outreach, including engagement with local subcontractors and suppliers. Depending on the district's desire and procurement conditions, intentional outreach to local businesses from the CM/GC may result in improved awareness and ability to involve local subcontractors.

- The CM/GC model, due to enhanced community outreach, engagement, and communication, may result in increased community pride and reverence upon project completion.
- All construction projects are likely to face challenges. Just because the CM/GC model is more collaborative, communicative, and relationship-focused, does not necessarily mean that the owner will not experience project difficulties. However, the CM/GC model may assist the parties in conflict resolution due to the collaborative relationships that have been developed.
- Inherent in the CM/GC model is that the owner shares more risk than is customary with the traditional DBB model. If project challenges arise, the owner, as part of the team, will likely be more exposed to financial implications due to the nature of the contractual arrangement with the CM/GC.
- Clarity in terms of contingency access is important to define prior to project inception. A clear understanding between all parties, ahead of project problems, is important to ensure that the CM/GC and owner understand how and when such allowances can and should be accessed.

Recommendations for Future Research

This research consisted of a bounded case study that included a school district in Oregon who recently implemented the CM/GC model to deliver their new school construction project. Only new school construction projects were considered for study, eliminating renovation, remodels, and other smaller-scale improvements. In addition, only appropriate sized projects that reflect typical Oregon new school infrastructure were

considered. These parameters delivered a suitable case study project, representative of schools by size and requisite project costs for new school construction in order to provide the greatest transferability as possible. Fifteen key project participants were involved in stakeholder and focus group interviews, in addition to collection and analysis of documents to supplement data. This section reinforces the study purpose and findings. It addresses the overall significance of the study, the subject in general, and its importance to the field.

While the interpretation of the results revealed rich data that illuminated stakeholder experiences, additional research is warranted. Although construction scopes were considered in order to ensure the case study project exemplified a "typical" new school construction project, many variables exist that could influence CM/GC stakeholder experiences. As noted by Hosseini et al. (2016), "A PDM that can lead a project to success in some aspects may lead a project to failure under different circumstances…" (p. 263). Therefore, it is suggested that additional case study research on the experiences of stakeholders among different project sites, conditions, size, community, and participant makeup be considered.

For example, as identified in this research project's own findings, project team makeup can have a significant influence on the success of a project. As identified by Krane et al. (2012), different stakeholders prioritize risks differently; while the project management team may be more interested in meeting time and budget targets, project owners may prioritize different project outcomes. This is very subjective and depends greatly on the specific team member makeup within each project. Additional research is needed to validate whether CM/GC experiences realized in this case study is also realized

when different team members, potentially with differing beliefs, personalities, and approaches, yield similar results.

On a similar subject of participant makeup, this case study revealed an inexperienced owner, but a CM/GC, architect, and project management team that generally maintained extensive experience with the model prior and overall preference towards it. However, as noted by McGraw Hill Construction (2014), different project stakeholders maintain different levels of individual deference to specific models. Had project managers, architects, and even the CM/GC not, "been fans," towards the model, as some professed, would the results have been the same? This warrants further exploration and study to determine if onset favorability for the model or familiarity from key project participants influences overall project experience and outcome from stakeholders.

Additionally, school construction projects face a myriad of external influences such as budget, weather, site conditions, supply, subcontractor availability, and other complexities that can greatly affect project experiences. Although the case study in question faced its share of challenges when a local subcontractor went bankrupt, no other significant issues were identified by the stakeholders. Did the CM/GC model help influence the lack of challenges? Did stakeholders just fare lucky by not realizing more site, budget, or construction-related issues? If so, would their experiences be similar or different related to their feelings around CM/GC? Further research of additional sites, with varying project conditions, is necessary to ensure that the experiences realized in this instant case is indicative and predictive for others.

Finally, this case study represented a community that had not undergone a new school construction project in nearly 100 years. The excitement, anticipation, and pride in the facility was thick, from district level staff to community member. With such a lack of consistency in delivering new facilities, did this unique circumstance affect project stakeholders' experiences due to the community and district's lack of familiarity with capital improvements? It is recommended that future studies may wish to correlate consistency of new school construction with stakeholder experiences.

Conclusion

Current literature review reveals a significant lack of substantive information related to the subjective experiences of stakeholders who utilize the CM/GC delivery model to provide for school construction project(s). This research aimed to provide critically important information as it set out to describe and interpret the experience of an Oregon school district who had recently implemented CM/GC to deliver their capital school project. The results obtained provide seminal data upon which future district decision makers can weigh when considering the CM/GC process in their important delivery model selection. Often with millions of dollars at stake, the trust of their taxpayers in the balance, and the implications and consequences if school construction project outcomes are not positive, the decision over project delivery cannot be understated.

This qualitative research consisted of a bounded case study design, serving to illuminate the CM/GC model at a specific site in order to provide an in-depth understanding of stakeholder experiences when implementing the delivery system.

Considerations with regard to project scope and stakeholder selection were addressed in order to support transferability for future decision makers.

Results from this research affirm much of what limited evidence is available related to the subjective experiences of those who utilize CM/GC. Reinforced by stakeholder theory, and consistent with prior research, it is clear from the findings that the CM/GC model is collaborative, supports positive relationships, and promotes productive communication (AIA, 2011; Carpenter, 2014; Konchar & Sanvido, 1998; OSU, 2002). Project members, specifically owners, felt listened to and supported throughout the program, described themselves as part of a team, and relayed that the model supported overall project success. These findings, too, appear in line with prior research (Mollaoglu et al., 2015). Critical considerations were also identified for potential users to contemplate, which included the importance of selecting the right project team, managing risk, and establishing role and contract clarity, to support a favourable experience.

References

Alexander, D., Lewis, L. (2014). Condition of America's public school facilities: 2012-13 (NCES 2014-022). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

The American Institute of Architects. (2011). Primer on Project Delivery, 2nd ed., Washington, DC. Retrieved from: https://www.agc.org/sites/default/files/Files/Programs%20%26%20Industry%20Relations/AIA-AGC_Primer_on_Project_Delivery_2nd_Edition-FINAL.pdf

Anderson, S. D., Patil, S. S., Gibson Jr., G. E., & Sullivan, G. R. (2004). Owner-contractor work structures: process approach. *Journal of Construction Engineering and Management, 130*(5), 680-690.

Asmar, M., Hanna, A. S., & Loh, W. (2013). Quantifying performance for the integrated project delivery system as compared to established delivery systems. *Journal of Construction Engineering and Management, 139*(11), 1.

Baccarini, D. (1999). The logical framework method for defining project success. *Journal of Project Management, 30*(4), 25-32.

Bayraktar, M. E., Hastak, M., Gokhale, S., & Safi, B. (2011). Decision tool for selecting the optimal techniques for cost and schedule reduction in capital projects. *Journal of Construction Engineering and Management*, *137*(9), 645-655.

Bridoux, F., & Stoelhorst, J. W. (2016). Stakeholder relationships and social welfare: A behavioral theory of contributions to joint value creation. *The Academy of Management Review, 41*(2), 229-251.

Caillaud S., & Flick U. (2017). Focus groups in triangulation contexts. In R. Barbour, & D. Morgan (Eds.), A new era in focus group research. London: Palgrave Macmillan, 155-177.

Carpenter, N. (2014). Comparison of the design-bid-build and construction manager at risk project delivery methods utilized for the construction of public schools (Doctoral dissertation) (Order No. 3623806). Available from ProQuest Dissertations & Theses Global. (1547742374). Retrieved from: https://search.proquest.com/docview/1547742374?accountid=27800

Chan, A.P.C., Scott, D., & Chan, A.P.L. (2004). Factors affecting the success of a construction project. *Journal of Construction Engineering and Management, 130*(1), 153-155.

Construction Industry Institute (CII). (1997). *Project delivery systems: CM at risk, design-build, design-bid-build*. The University of Texas at Austin, Austin, Tex.

Construction Management Association of America (CMAA). (2012). *An owner's guide to project delivery methods*. Retrieved from: https://cmaanet.org/files/Owners%20Guide%20to%20Project%20Delivery%20Methods%20Final.pdf

Creswell, J. W. (2015). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (5th ed.). Boston, MA: Pearson.

Djojopranoto, A. W., & Benhart, B. L. (2017). Design and build: Perception of project owners and contractors on cost in Java, Indonesia. *Civil Engineering Dimension*, *19*(1), 7-13.

Doloi, H. (2013). Cost overruns and failure in project management: Understanding the roles of key stakeholders in construction projects. *Journal of Construction Engineering and Management*, *139*(3), 267-279.

Eskerod, P., Huemann, M., & Ringhofer, C. (2015). Stakeholder inclusiveness: Enriching project management with general stakeholder theory. *Project Management Journal, 46*(6), 42-53.

Eskerod, P., Huemann, M., & Savage, G. T. (2015). Project stakeholder management – Past and present. *Project Management Journal, 46*(6), 6-14.

Eskerod, P., & Vaagaasar, A. L. (2014). Stakeholder management strategies and practices during a project course. *Project Management Journal, 45*(5), 71-85.

FMI/CMAA, (2010). *11th annual survey of owners: Rising from the ashes of recent economic woes*. Retrieved from: https://cmaanet.org/files/Foundation/research/ownersurvey2k10.pdf

Frantz, J. T. (2014). The bricks and mortar superintendency: how to survive a building project. Education, 134(3), 384-394.

Franz, B. W., & Leicht, R. M. (2016). An alternative classification of project delivery methods used in the United States building construction industry. *Construction Management and Economics, 34*(3), 160-173.

Freeman, R. E. (1984). Strategic management: A stakeholder approach. Boston, MA: Pitman.

Freeman, R. E., Harrison, J. S., & Wicks, A. C. (2007). *Managing for stakeholders: Survival, reputation, and success*. New Haven, CT: Yale University Press.

Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). *Stakeholder theory: The state of the art*. Cambridge, UK: Cambridge University Press.

Freeman, R. E., Wicks, A. C., & Parmar, B. (2004). Stakeholder theory and "the corporate objective revisited." *Organization Science, 15*(3), 364-369.

Hale, D. R., Shrestha, P. P., Gibson Jr., G. E., & Migliaccio, G. C. (2009). Empirical comparison of design/build and design/bid/build project delivery methods. *Journal of Construction Engineering & Management, 135*(7), 579-587.

Haponava, T., & Al-Jibouri, S. (2012). Proposed system for measuring project performance using process-based key performance indicators. *Journal of Management in Engineering, 28*(2), 140-149.

Hatmoko, J. D., & Khasani, R. R. (2016). Comparing performance of government and private clients in construction projects: Contractors' perspective. *Civil Engineering Dimension, 18*(2), 85-92.

Hennink, M. M. (2014). *Focus group discussions.* New York, NY: Oxford University Press.

Hosseini, A., Laedre, O., Andersen, B., Torp, O., Olsson, N., & Lohne, J. (2016, July). Selection criteria for delivery methods for infrastructure projects. *Procedia – Social and Behavioral Sciences, 226*, 260-268/

Khosravi, S., & Afshari, H. (2011). A success measurement model for construction projects. International Conference on Financial Management and Economics IPEDR, 11. Singapore: IACSIT Press.

Kog, Y. C., & Loh, P. K. (2012). Critical success factors for different components of construction projects. *Journal of Construction Engineering and Management, 138*(4), 520-528.

Konchar, M. (1997). *A comparison of United States project delivery systems.* (Doctoral dissertation). State College, University Park, PA.

Konchar, M., & Sanvido, V. (1998). Comparison of U.S. project delivery systems. *Journal of Construction Engineering and Management, 124*(6), 435-444.

Krane, H. P., Olsson, N. E., & Rolstadås, A. (2012). How project manager-project owner interaction can work within and influence project risk management. *Project Management Journal, 43*(2), 54-67.

Krefting, L. (1991). Rigor in qualitative research: The assessment of trustworthiness. *American Journal of Occupational Therapy, 45*, 214-222.

Krippendorff, K. H. (2013). *Content analysis: An introduction to its methodology.* Thousand Oaks, CA: Sage.

Krueger, R. A. (2002). *Designing and conducting focus group interviews.* Retrieved from https://www.eiu.edu/ihec/Krueger-FocusGroupInterviews.pdf

Kulkarni, A., Rybkowski, Z., & Smith, J. (2012, July 17-22). Cost comparisons of collaborative and IPD-like project delivery methods versus competitive non-collaborative project delivery methods. *Proceedings of the 20th Conference of the International Group for Lean Construction.* San Diego, CA.

Liu, L. (2004). *A cost-benefit assessment of the CM/GC delivery system based on post project evaluations and Oregon public project data*. Master's thesis, Oregon State University, Corvallis, OR.

Lundin, R. A., & Söderholm, A. (1995). A theory of the temporary organization. *Scandinavian Journal of Management, 11*(4), 437-455.

McGraw Hill Construction. (2014). *Project delivery systems: How they impact efficiency and profitability in the building sector*. Retrieved from file:///C:/Users/wsmith/Downloads/McGraw%20Hill%20project%20delivery%20systems%20smartreport%202014-08-06.pdf

Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: Jossey-Bass.

Mertens, D. M. (2010). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative and mixed methods* (3rd ed.). Thousand Oaks, CA: Sage.

Miller, J. B., Garvin, M. J., & Mahoney, S. B. (2000). Toward a new paradigm: simultaneous use of multiple project delivery methods. *Journal of Management in Engineering, 16*(3), 58.

Minchin, R. E., Li, X., Issa, R. R., & Vargas, G. G. (2013). Comparison of cost and time performance of design-build and design-bid-build delivery systems in Florida. *Journal of Construction Engineering and Management, 139*(10), 1-5.

Mollaoglu, S., Sparkling, A., & Thomas, S. (2015). An inquiry to move an underutilized best practice forward: Barriers to partnering in the architecture, engineering, and construction industry. *Project Management Journal*, *46*(1), 69-83.

Mollaoglu-Korkmaz, S., Swarup, L., & Riley, D. (2013). Delivering sustainable, high-performance buildings: Influence of project delivery methods on integration and project outcomes. *Journal of Management in Engineering, 29*(1), 71-78.

Nguyen, N. H., Skitmore, M., & Wong, J. K. W. (2009). Stakeholder impact analysis of infrastructure project management in developing countries: A study of perception of project managers in state owned engineering firms in Vietnam. *Construction Management and Economics, 27*(11), 1129-1140.

Office of Superintendent of Public Instruction (OSPI). (2011). *School facilities manual: School construction assistance program.* Retrieved from http://www.k12.wa.us/SchFacilities/pubdocs/SchoolFacilitiesManual2011.pdf

Office of Superintendent of Public Instruction (OSPI). (2017). *K-12 capital facilities cost study.* Retrieved from http://www.k12.wa.us/SchFacilities/pubdocs/OSPI-ESD112K-3CostStudy.pdf

Office of Superintendent of Public Instruction (OSPI). (2018). *Statewide average square foot cost for construction at time of bid.* Retrieved from http://www.k12.wa.us/ SchFacilities/Programs/pubdocs/AverageSquareFootCosts.pdf

Oregon Department of Education. (2017) *2015-16 Fall membership report.* Retrieved from https://www.oregon.gov/ode/reports-and-data/students/Documents/ fallmembershipreport_20152016.xlsx

Oregon School Boards Association (OSBA). (2018). *Bond and local option election data.* Retrieved from http://www.osba.org/Resources/Article/Bonds/Election-Recent_Bond- Local_Option_Election_Results.aspx

Oregon School Capital Improvement Planning Task Force and Portland State University. Hatfield School of Government. Center for Public Service, "the schools our students deserve: A statewide school facilities program for Oregon" (2014). *Center for Public Service Publications and Reports.* Paper 5. Retrieved from http://pdxscholar.library.pdx.edu/publicservice_pub/5

Oregon State University, Construction Engineering Management Program. (2002). *Oregon public contracting coalition guide to CM/GC contracting*. Retrieved from https://www.agc-oregon.org/wp-content/uploads/2011/10/CM_GC_Guide_05.pdf

Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). Thousand Oaks, CA: Sage.

Project Management Institute (PMI). (2008). *A guide to the project management body of knowledge* (PMBOK® guide) – Third edition, Newtown Square, PA: Author.

Rashvand, P., & Majid, M. (2014). Critical criteria on client and customer satisfaction for the issue of performance measurement. *Journal of Management in Engineering, 30*(1), 10-18.

Rojas, E. M., & Kell, I. (2008). Comparative analysis of project delivery systems cost performance in Pacific Northwest public schools. *Journal of Construction Engineering and Management, 134*(6), 387-397.

Ryan, G. W., & Bernard, H. R. (2003). Techniques to identify themes. *Field Methods, 15*(1), 85-109. https://doi.org/10.1177/1525822X02239569

Savage, G. T., Bunn, M. D., Gray, B., Xiao, Q., Wang, S., Wilson, E. J., & Willas, E. S. (2010). Stakeholder collaboration: Implications for stakeholder theory and practice. *Journal of Business Ethics, 96*(S1), 21-26.

Sewalk, S., Mohr, D., Fitzgerald, P., & Taylor, J. M. (2016). Corrected copy: Integrated project delivery. *Journal of International Diversity*, *2016*(1), 10-24.

Stake, R. E. (1995). *The art of case study research.* Thousand Oaks, CA: Sage.

State of Washington Joint Legislative Audit and Review Committee (JLARC). (2005). An assessment of general contractor/construction manager contracting procedures. *Rep. No. 05-9*, Olympia, WA.

Team [Def. 1]. (n.d). In *Merriam Webster Online*, Retrieved March 15, 2018, from https://www.merriam-webster.com/dictionary/team

Turkulainen, V., Aaltonen, K., & Lohikoski, P. (2015). Managing project stakeholder communication: The Qstock Festival Case. *Project Management Journal, 46*(6), 74-91.

Turner, J. R., & Mueller, R. (2004). Communication and co-operation on projects between the project owner as principal and the project manager as agent. *European Management Journal, 22*(3), 327-336.

Williams, G. (2003). *An evaluation of public construction contracting methods for the public building sector in Oregon using data envelopment analysis*. Ph.D. dissertation, Portland State University, Portland, OR.

Williams, T. (2016). Identifying success factors in construction projects: A case study. *Project Management Journal, 47*(1), 97-112.

Yang, R. J., Wang, Y., & Jin, X-H. (2014). Stakeholders' attributes, behaviors, and decision-making strategies in construction projects: Importance and correlations in practice. *Project Management Journal, 45*(3), 74-90.

Yin, R. K. (2014). *Case study research: Design and methods* (5th ed.). Thousand Oaks, CA: Sage.

Appendix A: Oregon Department of Education Grant Database

Oregon Department of Education
Office of School Finance
2015-17 Facility Grants

Facility Grant Amount available:	**$12,500,000**
2016-17 Total Application $ Allowed:	**$402,326,092**
Rate of reimbursement:	**3.1069402%**

Total amount of grant funding per ORS 327.008
March 1, 2017

		Dist_ID	Dist_Nm	Inst_ID	School_Nm	Pending	Approved	Total $ submitted	Total $ allowed	Type of Structure	Total Sq. Ft.	Cost/Sq.Ft.	Preliminary $ Paid (Yr. 1)	Allowed $ Paid (Yr. 2)	Initial % Paid	Combined Payment	% Paid (Yr. 1)
2015-16	1	2100	Greater Albany Public SD	637	North Albany Elementary School			$294,702	$294,702	New building on an existing can	2,550	$116	$10,315	-$1,158	3.5000%	$9,157	3.11%
	2	2100	Greater Albany Public SD	633	Clover Ridge Elementary School			$298,573	$298,573	New building on an existing can	2,550	$117	$10,450	-$1,174	3.5000%	$9,276	3.11%
	3	2050	Culver SD 4	425	Culver Elementary School			$4,233,820	$4,233,820	Addition to existing building	17,425	$243	$148,184	-$16,641	3.5000%	$131,543	3.11%
	4	2187	David Douglas SD 40	972	Cherry Park Elementary School			$2,151,988	$2,151,988	Addition to existing building	7,336	$293	$75,320	-$8,459	3.5000%	$66,861	3.11%
	5	1970	Crook County SD	265	Barnes Butte Elementary			$17,821,642	$17,821,642	New school building	73,000	$244	$623,757	-$70,050	3.5000%	$553,707	3.11%
	6	2083	Springfield SD 19	554	Mt. Vernon Elementary School			$866,658	$866,658	Addition to existing building	2,728	$318	$30,333	-$3,406	3.5000%	$26,927	3.11%
	7	2083	Springfield SD 19	1352	Riverbend Elementary School			$876,603	$876,603	Addition to existing building	2,728	$321	$30,681	-$3,446	3.5000%	$27,235	3.11%
	8	2083	Springfield SD 19	559	Yolanda Elementary School			$1,560,166	$1,560,166	Addition to existing building	3,970	$393	$54,606	-$6,132	3.5000%	$48,474	3.11%
	9	2083	Springfield SD 19	553	Ridgeview Elementary School			$917,414	$917,414	Addition to existing building	2,060	$445	$32,109	-$3,606	3.5000%	$28,503	3.11%
	10	2057	Klamath County SD	473	Henley Elementary School			$20,595,144	$20,595,144	New school building	62,966	$327	$720,830	-$80,951	3.5000%	$639,879	3.11%
	11	2180	Portland SD 1J	914	Lincoln High School			$359,290	$359,290	Addition to existing building	1,500	$240	$12,575	-$1,412	3.5000%	$11,163	3.11%
	12	2207	Pendleton SD 16	5287	Pendleton Early Learning Center			$10,891,308	$10,891,308	Remodeled or converted structu	50,523	$216	$381,196	-$42,809	3.5000%	$338,387	3.11%
	13	2255	Willamina SD 30J	1224	5th/6th grade 5-Plex			$461,557	$461,557	New building on an existing can	5,376	$86	$16,154	-$1,814	3.5000%	$14,340	3.11%
	14	1894	Baker SD 5J	2	Brooklyn Elementary School			$145,043	$145,043	Pre-manufactured structure	1,800	$81	$5,077	-$570	3.5000%	$4,507	3.11%
	15	1894	Baker SD 5J	4	Haines Elementary School			$133,910	$133,910	Pre-manufactured structure	1,800	$74	$4,687	-$526	3.5000%	$4,161	3.11%
	16	2197	Tillamook SD 9	1013	Liberty Elementary School			$692,192	$692,192	New building on an existing can	3,840	$180	$24,227	-$2,721	3.5000%	$21,506	3.11%
	17	2137	Gervais SD 1	786	Gervais Middle School			$766,537	$766,537	New school building	14,400	$53	$26,829	-$3,013	3.5000%	$23,816	3.11%
	18	2092	Lowell SD 71	5252	Mountain View Academy			$119,801	$119,801	Pre-manufactured structure	1,792	$67	$4,193	-$471	3.5000%	$3,722	3.11%
	19	2054	Grants Pass SD 7	435	Allen Dale Elementary			$769,857	$769,857	Addition to existing building	3,844	$200	$26,945	-$3,026	3.5000%	$23,919	3.11%
	20	2054	Grants Pass SD 7	436	Highland Elementary			$799,961	$799,961	Addition to existing building	3,367	$238	$27,999	-$3,144	3.5000%	$24,855	3.11%
	21	2054	Grants Pass SD 7	437	Lincoln Elementary			$684,986	$684,986	Addition to existing building	2,575	$266	$23,975	-$2,692	3.5000%	$21,283	3.11%
	22	2054	Grants Pass SD 7	1351	Parkside Elementary			$847,988	$847,988	Addition to existing building	3,589	$236	$29,680	-$3,333	3.5000%	$26,347	3.11%
	23	2054	Grants Pass SD 7	439	Redwood Elementary			$657,375	$657,375	Addition to existing building	2,574	$255	$23,008	-$2,584	3.5000%	$20,424	3.11%
	24	2054	Grants Pass SD 7	435	Allen Dale Elementary			$769,857	$769,857	Addition to existing building	3,844	$200	$26,945	-$3,026	3.5000%	$23,919	3.11%
	25	2212	La Grande SD 1	1068	Greenwood Elementary School			$1,227,464	$1,227,464	Addition to existing building	2,720	$451	$42,961	-$4,825	3.5000%	$38,136	3.11%
	26	2088	Bethel SD 52	584	Fairfield Elementary			$11,233,533	$11,233,533	New school building	55,762	$201	$393,174	-$44,155	3.5000%	$349,019	3.11%
	27	2088	Bethel SD 52	586	Malabon Elementary			$12,125,197	$12,125,197	New school building	55,301	$219	$424,382	-$47,659	3.5000%	$376,723	3.11%
	28	2088	Bethel SD 52	588	Willamette High School			$10,974,449	$10,974,449	New school building	35,266	$311	$384,106	-$43,136	3.5000%	$340,970	3.11%
	29	2243	Beaverton SD 48J	1172	Raleigh Hills			$554,916	$554,916	Addition to existing building	2,465	$225	$19,422	-$2,181	3.5000%	$17,241	3.11%
	30	2219	Joseph SD 6	1087	Jospeh Charter School			$916,907	$916,907	New building on an existing can	7,435	$123	$32,092	-$3,604	3.5000%	$28,488	3.11%
	31	2142	Salem-Keizer SD 24J	751	Mary Eyre			$564,519	$564,519	Pre-manufactured structure	3,584	$158	$19,758	-$2,219	3.5000%	$17,539	3.11%
	32	2142	Salem-Keizer SD 24J	741	Scott Elementary			$326,569	$326,569	Pre-manufactured structure	1,792	$182	$11,430	-$1,284	3.5000%	$10,146	3.11%
	33	2142	Salem-Keizer SD 24J	746	Kennedy Elementary			$261,936	$261,936	Pre-manufactured structure	1,792	$146	$9,168	-$1,030	3.5000%	$8,138	3.11%
	34	2142	Salem-Keizer SD 24J	762	Swegle Elementary			$305,459	$305,459	Pre-manufactured structure	1,792	$170	$10,691	-$1,201	3.5000%	$9,490	3.11%
	35	2142	Salem-Keizer SD 24J	5282	CTE Center			$271,390	$271,390	Remodeled or converted structu	35,900	$8	$9,499	-$1,067	3.5000%	$8,432	3.11%
	36	1976	Bend-LaPine Administrativ	5293	Silver Rail Elementary			$19,933,663	$19,933,663	New school building	72,378	$275	$697,678	-$78,351	3.5000%	$619,327	3.11%
	37	1976	Bend-LaPine Administrativ	5292	Pacific Crest Middle School			$34,625,701	$34,625,701	New school building	121,456	$285	$1,211,900	-$136,100	3.5000%	$1,075,800	3.11%
	38	1976	Bend-LaPine Administrativ	251	Bend High School			$3,489,109	$3,489,109	Addition to existing building	7,004	$498	$122,119	-$13,714	3.5000%	$108,405	3.11%
	39	2145	Mt Angel SD 91	794	John F. Kennedy High School			$2,742,120	$2,742,120	Remodeled or converted structu	5,009	$547	$95,974	-$10,778	3.5000%	$85,196	3.11%
	40	2084	Fern Ridge SD 28J	566	Veneta Elementary School			$2,183,690	$2,183,690	Addition to existing building	7,500	$291	$76,429	-$8,583	3.5000%	$67,846	3.11%
	41	2084	Fern Ridge SD 28J	564	Fern Ridge Middle School			$606,792	$606,792	Addition to existing building	3,144	$193	$21,238	-$2,385	3.5000%	$18,853	3.11%
								$170,069,784	**$170,069,784**		**688,437**	**$232**	**$5,952,092**	**-$668,436**		**$5,283,656**	

		Dist_ID	Dist_Nm	Inst_ID	School_Nm	Pending	Approved	Total $ submitted	Total $ allowed	Type of Structure	Total Sq. Ft.	Cost/Sq.Ft.	Preliminary $ Paid (Y	Allowed $ Paid (Yr.	Initial % Paid	Combined Payment	% Paid (Yr
2016-17	1	2206	Hermiston SD 8	3426	Desert View Elementary		*	$231,963	$231,963	Pre-manufactured structure	1,674	$139	$0	$7,207	0.00%	$7,207	3.11%

Oregon Department of Education
Office of School Finance
2015-17 Facility Grants

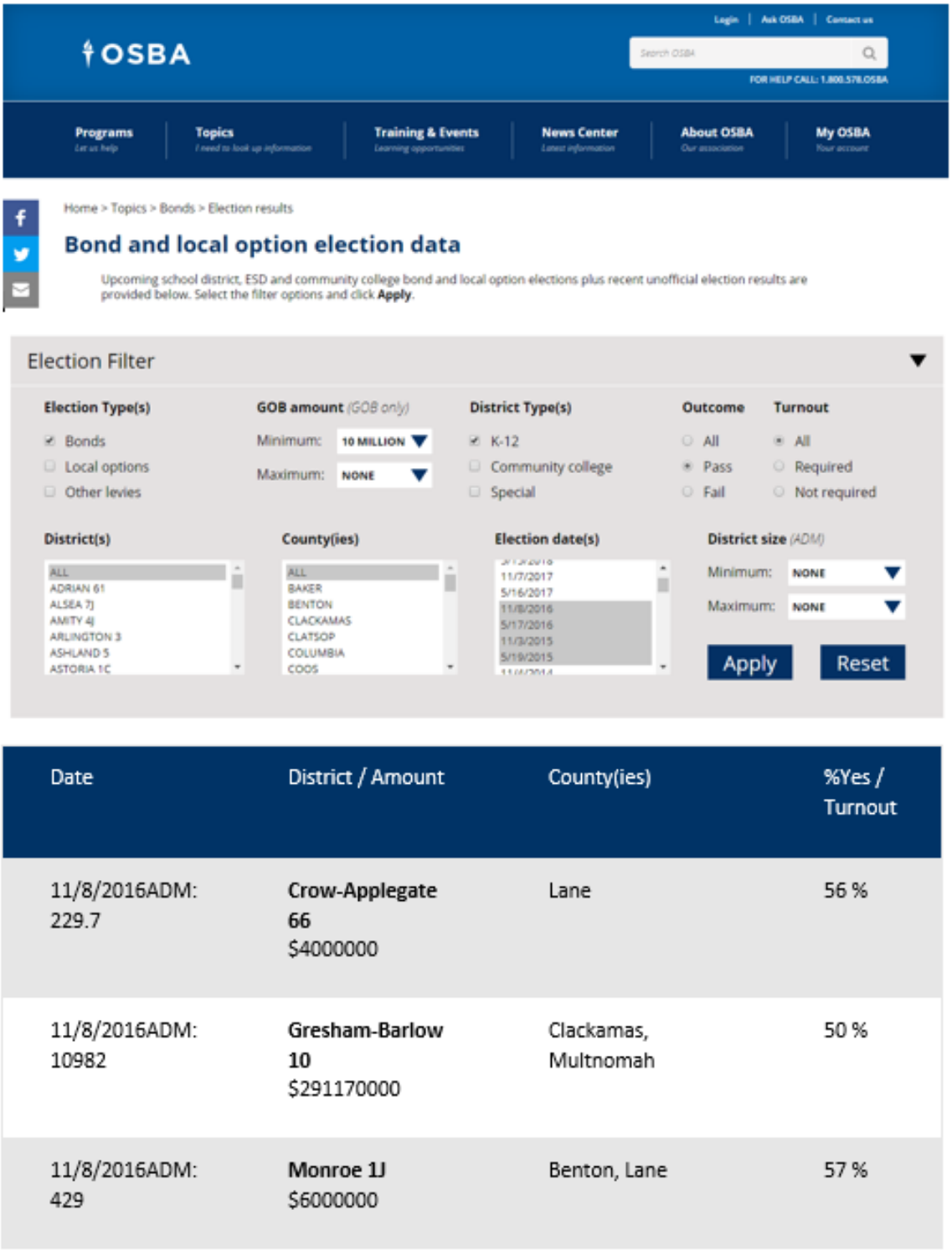
Facility Grant Amount available:	$12,600,000
2016-17 Total Application $ Allowed:	$402,326,082
Rate of reimbursement:	3.1088402%

Total amount of grant funding per ORS 327.008

March 1, 2017

	Dist_ID	Dist_Nm	Inst_ID	School_Nm	Pending	Approved	Total $ submitted	Total $ allowed	Type of Structure	Total Sq. Ft.	Cost/Sq.Ft.	Preliminary $ Paid (Yr. 1)	Allowed $ Paid (Yr. 2)	Initial % Paid	Combined Payment	% Paid (Yr. 1)
2	2055	Three Rivers/Josephine C	445	Fruitdale Elementary		*	$118,180	$118,180	Pre-manufactured structure	1,792	$66	$0	$3,672	0.00%	$3,672	3.11%
3	1970	Crook County SD	265	Crooked River Elementary (Cecil Sly Elem.)		*	$174,336	$174,336	remodeled or converted structur	3,270	$53	$0	$5,417	0.00%	$5,417	3.11%
4	2255	Willamina SD 30J	2255	CTE Agriculture / wood shop		*	$1,041,500	$1,041,500	New building on an existing can	11,984	$87	$0	$32,359	0.00%	$32,359	3.11%
5	1991	Douglas County SD 4	269	Eastwood Elementary		*	$128,860	$128,860	Pre-manufactured structure	1,792	$72	$0	$4,004	0.00%	$4,004	3.11%
6	2083	Springfield SD 19	550	Maple Elementary		*	$1,770,744	$1,770,744	Addition to existing building	6,573	$269	$0	$55,016	0.00%	$55,016	3.11%
7	1947	Vernonia SD 47J	1781	Wood Shop		*	$179,554	$179,554	New building on an existing can	2,584	$69	$0	$5,579	0.00%	$5,579	3.11%
8	1947	Vernonia SD 47J	1782	Green house		*	$60,809	$60,809	New building on an existing can	1,440	$42	$0	$1,889	0.00%	$1,889	3.11%
9	1976	Bend-LaPine Administrativ	3218	High Lakes Elementary		*	$136,048	$136,048	Pre-manufactured structure	1,792	$76	$0	$4,227	0.00%	$4,227	3.11%
10	1976	Bend-LaPine Administrativ	1317	lava ridge elementary		*	$133,124	$133,124	Pre-manufactured structure	1,792	$74	$0	$4,136	0.00%	$4,136	3.11%
11	1976	Bend-LaPine Administrativ	1324	Amity Creek Elementary		*	$129,331	$129,331	Remodeled or converted structu	839	$154	$0	$4,018	0.00%	$4,018	3.11%
12	2207	Pendleton SD 16	1049	Washington Elementary		*	$15,181,493	$15,181,493	New school building	64,037	$237	$0	$471,680	0.00%	$471,680	3.11%
13	2207	Pendleton SD 16	1048	Sherwood Heights Elementary		*	$15,056,902	$15,056,902	New school building	64,037	$235	$0	$467,809	0.00%	$467,809	3.11%
14	2050	Culver SD 4	710	Culver high School		*	$1,120,668	$1,120,668	Addition to existing building	2,584	$434	$0	$34,818	0.00%	$34,818	3.11%
15	2100	Greater Albany Public SD	636	Periwinkle Elementary		*	$1,030,597	$1,030,597	Pre-manufactured structure	4,707	$219	$0	$32,020	0.00%	$32,020	3.11%
16	2100	Greater Albany Public SD	650	South Albany High		*	$15,067,274	$15,067,274	New school building	36,800	$409	$0	$468,131	0.00%	$468,131	3.11%
17	2081	Pleasant Hill SD 1	500	Pleasant Hill Elementary		*	$1,978,267	$1,978,267	Addition to existing building	7,000	$283	$0	$61,464	0.00%	$61,464	3.11%
18	2081	Pleasant Hill SD 1	502	Pleasant Hill High		*	$3,419,241	$3,419,241	New building on an existing can	15,060	$227	$0	$106,234	0.00%	$106,234	3.11%
19	2082	Eugene SD 4J	526	Roosevelt Middle School		*	$36,280,000	$36,280,000	New school building	97,000	$374	$0	$1,127,198	0.00%	$1,127,198	3.11%
20	2082	Eugene SD 4J	515	Howard Elementary		*	$27,206,000	$27,206,000	New school building	87,500	$311	$0	$845,274	0.00%	$845,274	3.11%
21	2142	Salem-Keizer SD 24J	728	Auburn Elementary		*	$247,679	$247,679	Pre-manufactured structure	1,792	$138	$0	$7,695	0.00%	$7,695	3.11%
22	2142	Salem-Keizer SD 24J	2142	Riverfront learning center		*	$4,864,448	$4,864,448	Remodeled or converted structu	21,246	$229	$0	$151,135	0.00%	$151,135	3.11%
23	2092	Lowell SD 71	5252	Mountain View		*	$65,530	$65,530	Pre-manufactured structure	1,792	$37	$0	$2,036	0.00%	$2,036	3.11%
24	2092	Lowell SD 71	5349	bridge Charter Academy		*	$120,652	$120,652	Pre-manufactured structure	4,820	$25	$0	$3,749	0.00%	$3,749	3.11%
25	2180	Portland SD 1J	918	Roosevelt High School		*	$45,003,158	$45,003,158	Addition to existing building	129,090	$349	$0	$1,398,221	0.00%	$1,398,221	3.11%
26	2096	Siuslaw SD 97J	609	Siuslaw Kindergarten		*	$557,991	$557,991	Pre-manufactured structure	5,525	$101	$0	$17,336	0.00%	$17,336	3.11%
27	2243	Beaverton SD 48J	0	Timberland Middle School		*	$60,181,631	$60,181,631	New school building	165,500	$364	$0	$1,869,807	0.00%	$1,869,807	3.11%
28	2142	Salem-Keizer SD 24J	5282	CTEC		*	$779,328	$779,328	Remodeled or converted structu	35,900	$22	$0	$24,213	0.00%	$24,213	3.11%
							$232,286,308	**$232,286,308**		**779,922**	**$230**	**$0**	**$7,218,344**		**$7,218,344**	

Appendix B: OSBA Bond Election Database



Date	District / Amount	County(ies)	%Yes / Turnout
11/8/2016ADM: 229.7	**Crow-Applegate 66** $4000000	Lane	56 %
11/8/2016ADM: 10982	**Gresham-Barlow 10** $291170000	Clackamas, Multnomah	50 %
11/8/2016ADM: 429	**Monroe 1J** $6000000	Benton, Lane	57 %

Date	District / Amount	County(ies)	%Yes / Turnout
11/8/2016ADM: 15911.4	**North Clackamas 12** $433000000	Clackamas	62 %
11/8/2016ADM: 1556.4	**Seaside 10** $99700000	Clatsop	65 %
11/8/2016ADM: 5129.1	**Sherwood 88J** $247500000	Clackamas, Washington, Yamhill	54 %
11/8/2016ADM: 2757.2	**St Helens 502** $49635000	Columbia	56 %
11/8/2016ADM: 12569.3	**Tigard-Tualatin 23J** $291315000	Clackamas, Multnomah, Washington	60 %
11/8/2016ADM: 1339	**Umatilla 6** $10500000	Umatilla	56 %
11/8/2016ADM: 912.3	**Vale 84** $8000000	Malheur	63 %
5/17/2016ADM: 304.2	**Adrian 61** $945000	Malheur	64 %
5/17/2016ADM: 573	**Athena-Weston 29J** $4000000	Umatilla	78 %

Date	District / Amount	County(ies)	%Yes / Turnout
5/17/2016ADM: 293.4	**Echo 5** $4000000	Umatilla	77 %
5/17/2016ADM: 555.2	**Gaston 511J** $12000000	Washington/Yamhill	56 %
5/17/2016ADM: 4030.1	**Hood River County** $57175000	Hood River	71 %
5/17/2016ADM: 1663.8	**Junction City 69** $14635000	Lane	55 %
5/17/2016ADM: 142.3	**Mapleton 32** $4000000	Lane	63 %
5/17/2016ADM: 6718.6	**McMinnville 40** $89400000	Yamhill	62 %
5/17/2016ADM: 1720.7	**Milton-Freewater 7** $12500000	Umatilla	79 %
5/17/2016ADM: 1183.5	**Nyssa 26** $7500000	Malheur	52 %
5/17/2016ADM: 1036.4	**Sisters 6** $10700000	Deschutes/Jefferson	52 %
5/17/2016ADM: 2570.5	**South Lane 45J** $35950000	Douglas/Lane	57 %

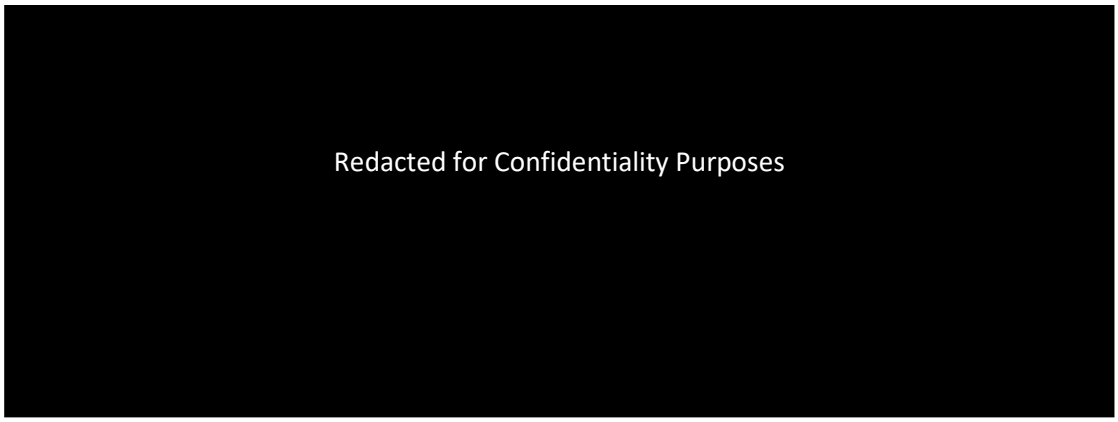
Date	District / Amount	County(ies)	%Yes / Turnout
5/17/2016ADM: 1027	**Yamhill-Carlton 1** $14200000	Yamhill	61 %
5/19/2015ADM: 284.6	**Marcola 79J** $7820000	Lane	55 %
5/19/2015ADM: 10163.2	**Reynolds 7** $125000000	Multnomah	52 %
5/19/2015ADM: 218.6	**St Paul 45** $5270000	Marion	64 %
5/19/2015ADM: 5428.5	**Woodburn 103** $65000000	Marion	55 %

Appendix C: Interview Guide

Research Questions	Interview Guide Questions
Demographics/ Background:	1. What is your current role? (Background) 2. What was your role on or with the project team? (Background) 3. What prior experience, if any, did you have with school construction before this project? (Background) 4. What experience, if any, did you have with the CM/GC process prior? (Background)
What are the experiences of a school district who implemented the construction manager/general contractor delivery model for their new school construction project in Oregon?	5. What was your involvement and/or understanding as to why the CM/GC method was selected? (Background & Opinion) 6. What was your involvement and experience in the selection of the general contractor, architect, and consultants? (Background & Observation) 7. Describe what a successful school construction project means to you? (Opinion) 8. Describe your actual experience with this project. (Observations) Probe follow up questions (if necessary): a. What were the projects successes? (Opinion) b. Did the project face any challenges (e.g. financial, programming, scheduling, phasing, subcontractor)? (Observation & Opinion) 9. How did CM/GC model impact/affect any successes/challenges, if at all? (Opinion)
How do stakeholders describe their actual experiences with CM/GC versus their anticipated experiences?	10. What did you expect/understand CM/GC to be able to offer? (Opinion) 11. How did your actual experience with CM/GC align with your anticipated experience? (Opinion)
What aspect(s) of the CM/GC process did stakeholders find valuable/least valuable to their experience?	12. What aspect(s) of the CM/GC process did you find most valuable to your experience? Least valuable? (Opinion) 13. What are your feelings around utilizing the CM/GC process again based on your recent experiences (Opinion) 14. Would you recommend the model to others? Explain? (Opinion) 15. What lessons learned do you have to share? (Observation & Opinion)

Denotes focus group question as well.

Appendix D: School District Approval Letter



December 5, 2018

Wade Smith, Superintendent
Walla Walla Public Schools
364 Park Street
Walla Walla, WA 99362

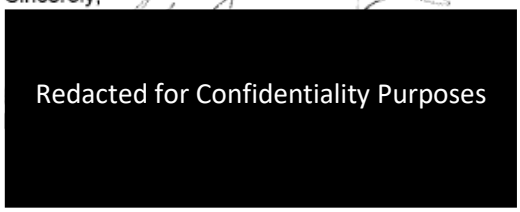
Dear Mr. Smith,

Your request to initiate research on the topic of stakeholder experiences who have implemented CM/GC to deliver new school construction projects in Oregon is approved.
This letter does not:

- Create any obligation for district personnel or stakeholders to participate. All participation must be completely voluntary and the confidentiality of the sources and district must be carefully maintained; nor,
- Create any obligation on the part of staff to engage in research interviews that occur during instructional or work time.

At the conclusion of your study or within a year of the date of this letter, whichever comes first, please send an executive summary of our findings and copies of any reports to our attention.

Sincerely,



Appendix E: Statement of Informed Consent

Dear _____,

Introduction:

I am requesting your participation in a research study for the fulfillment of a doctoral dissertation. The purpose of the study is to explore stakeholder experiences having implemented CM/GC to deliver new school construction projects in Oregon, which your district has recently accomplished. The data collection gathered in the study will be used only for the fulfillment of the requirement for the Doctorate of Education program at Concordia University – Chicago. Your involvement may include either a one-on-one interview or small group interview.

Consent:
I understand that my participation is strictly voluntary and I may refuse to participate if I so desire. If I agree to participate I understand that I may withdraw from the study at any time. I also understand that my responses will be anonymous and kept confidential. Research records, audio recordings, and interview transcripts will be stored securely and only the researcher will have access to this information, but no names or identifiable attributes will be attached to any of the responses.

I understand that there are no foreseeable risks or benefits to my participation.
I can contact the researcher: Wade Smith, Phone: (541) 256-0260. Email: crf_smithwa@cuchicago.edu or the researcher's dissertation chair: Dr. Paul Sims, Phone: (773) 552-2591, Email: paul.sims@cuchicago.edu with any questions about this study.
I understand that my participation will consist of one, 45-minute interview with the researcher.

The Institutional Review Board –Human Subjects in Research, Concordia University – Chicago, has reviewed this research study. For research-related problems, questions or concerns regarding subjects' rights, I can contact the Institutional Review Board through Dr. Amanda Mulcahy, Director of Research Compliance, Office of the Vice President for Research at (708) 209-3159 (crf_amandamulcahy@cuchicago.edu).

I have read the above information and by signing this document I consent to participate in this study.

Signature of Participant:_____ Date:_____

Signature of Researcher:_____ Date:_____

Appendix F: Theme and Sub Team Coding Sample

Themes	Transcript	Sub-Themes			
2. Project Successes	**Interview 1** [00:05:45]It'll be this May, will be three years since the district passed its bond and you know when you can still get everyone together in a room and everybody's on speaking terms with one another I view that as a success [00:06:10]Overwhelmingly I would say this project has been very successful. **Interview 1** [00:10:18]We hosted several rounds of public outreach to either local suppliers you know, be it local auto parts or even heavy equipment suppliers, anything of that nature, to painting to the sub shop. **Interview 1** [00:10:30]We had a lot of outreach specific with them again with our CM/GC at the table as a partner. **Interview 1** [00:11:22]But again back to the subjective piece that just really from a community perspective it was very successful community wide. **Interview 1** [00:11:34]I would say quite honestly for, the for both of the groundbreaking and the ribbon cutting you know the kind of the bookends there were probably I would say three to four hundred people at a groundbreaking ceremony. I can't remember the last time any program I went to where you had the community turn out. I mean literally had people in tears saying that I never thought I would see that [00:12:01]Just kind of blows you away it's something that you, you know we take for granted [00:12:07]You have longtime community members literally in tears at how excited they are. **Interview 2** [00:04:17]I mean everything you know came out. I mean it to, to a large degree, was surreal. **Interview 2** [00:06:02] Just to see the building and how it is, that, you know, shining castle compared to the rest of the community. I mean you look at that, the nicest building. [00:06:52] Passers through told me that they looked over and saw the school and went, oh my God. And they pull off the road to gaze at what a beautiful building. **Interview 2** [00:13:35]So it was it was good for our board. And it was, you know, you could ask you know questions and whatever and like I said	3.1.1 Positive Outreach and Engagement	3.1.2 Pride of Project	3.1.3 Felt Listened To	3.1.4 Team Feeling

	they ran them(owner's rep) you know there was a more of a presentation to the board and engagement and board with it. **Interview 2** [00:14:51]I think the board really liked the way we did that second meeting because they got to ask questions and it was always good. **Interview 2** [00:16:21]When we had to, we had groundbreaking there was probably I would actually go so far to say there might have been 200-250 people here. And then when we when we christened it, it was probably three or four hundred people [00:17:21]And I'm not exaggerating when I say I've had well into 75 to 100 people come up to me at one time or another thank me and say I never thought I would see that. [00:18:44]He said you know I grew up in this community. I never thought I would see what what you've done. And, and, and you know I mean granted it's a 30 40 dollar item I mean it's not that big a deal. But I was just I was awestruck. But he put it in the back of my pickup and said thanks. [00:19:05]I think you know our experience with that situation and the way people have looked at this school and the way I was treated I have to believe is unique. [00:19:40]I don't know that if you were to interview a 100 or 200 superintendents who have gone through what we've gone through that they would ever have had the same experience that we had. **Interview 3** [00:03:16]But as far as me bringing up concerns to the contractor they addressed those immediately or explained their why for why it needed to be a certain way. **Interview 3**] [00:06:50]They listened to me. I said you cannot put grates in drainage areas where my kids can stick their hands in there because my kids are going to stick their hands in there. They're kids. **Interview 3** [00:07:18]Success. I would say that we achieved it. Ninety seven percent. **Interview 3** [00:07:47]They would build little models for us of what it was going to look like, what it was going to see, what we were going to what we could expect. I mean that's from the bricks. I mean they put	

	bricks, the CMU's together. They sprayed water on them for us so we could actually see when you put the sealant on there. **Interview 3** [00:08:34]I think what I'm most proud of is how proud this community is of this building. [00:08:58]I mean I feel like we got enough feedback from the community and really tried to listen to them equally as the contractor listened to us and the pride the community has in it. **Interview 3** [00:13:07]But we were very intentional as a team to go through and make the decision and when I say the team it was XXXX(owner's rep), myself the contractors the architects. **Interview 3** [00:14:12]I personally felt like it helped just because I knew that XXXX(owner's rep name) and XXXX(other owner's rep name) and those guys were in on my side and so I was able, to be able to have side conversations with them and you know tell them really specifically here's, here's my concern. And then they represented us. So I, I personally didn't have to have the heated discussions, wasn't a part of any of those. [00:14:42]From a principal's perspective that was really nice to have that owner representation **Interview 4** [00:08:47]I am more than happy with the architect and the design how they listen to us what we wanted. I felt like we had a really good back and forth. If I didn't like something they said you know I'd at least give them the opportunity to make it right. **Interview 5** [00:06:45]In XXXX(the town) we hosted open houses to engage with the community or local subs and suppliers. It affords you an opportunity to market the project I guess to a degree that you wouldn't otherwise have in the hard bid world [00:07:14]A lot of new subs that we hadn't worked with before and formed some good relationships and worked well with. **Interview 5** [00:08:43]Successful. The answer is yes. **Interview 6** [00:05:58]I think XXXX(the project) was successful because for one I think we, we ended up as a team delivered probably more project and what was originally planned. **Interview 6** [00:08:01]So it's like a momentum. Some good momentum there for them(the district). It's pretty cool.	

	Interview 6 [00:10:32]I think that the contracting company did a fairly decent job on the estimating early on and in just collaborating. I think the relationship and collaborating with XXXX(the architects) and the rest of the team and the owner I think that was fairly successful. **Interview 6** [00:15:36]I would describe XXXX(the project) as a success. **Interview 7** [00:01:28]I've never seen anything more impressive I don't think my life. It was so comprehensive and extensive and it just blew my mind. [00:02:35]I just remember seeing this school going up and thinking how I never thought construction looked beautiful before [00:02:47]And I just remember thinking how beautiful the construction was on the school. [00:03:07]I just remember thinking like this is going to be so beautiful and this is this is exactly what we need. [00:04:57]And it smelled so good, it was shiny and beautiful with everything was just state of the art. [00:05:07]And it was really what this community needed. **Interview 7** [00:11:27]I know that the building at this school has really opened up our community to inviting more families to move in. [15.0s] [00:12:10]I know that we've had some new families move here specifically because of the school. [4.5s] [00:12:19]In a long term the school will contribute to the growth of our community and the stimulation of the economy. **Interview 7** [00:14:07]I felt like that was a huge success. It had a ripple effect and when huge wonderful projects like happened that's what you hope for. **Interview 8** [00:08:07]I mean the communication piece went really well. One of the strengths was that I mean you know XXXX(business manager) was the lead from the district and, and then so there was basically had kind of like three leads. [00:08:26]Between all three of us constantly working together a lot of stuff was that could have caused a lot of headaches was addressed early on, three sets of eyes looking [11.4s] [00:08:57]So I think that that was a real benefit of that model is you had three people with a very similar vested interest in the success of the project.	

	Interview 9 [00:08:23]Again the owner was satisfied with, with the way we completed the design and construction there. [00:08:38]At the end of the day they were very pleased with the way the exterior building lighting turned out [00:09:09]They were satisfied with the camera and access control systems. [00:09:23]To us that was some of the satisfaction is seeing the owner come back to us and say wow, this is really neat. [00:09:36]The architect probably gets far more accoldades for the building that they design and rightfully so. [00:09:48]We felt like that that owner actually got more bang for their buck than I've seen in a long time **Interview 10** [00:08:42]School projects have tons of pressures and of course ultimately most of them revolve around cost [00:09:21]I think we brought a lot in terms of overall organization. **Interview 10** [00:10:19]And we basically put our foot down and said you do not want to do this. [00:12:33]Those were things that I think worked really well in in the end. **Interview 10** [00:13:29]That project when really pretty darn smoothly. **Interview 11** [00:06:04]so far he said it's working and they're happy [00:04:14]I really appreciate the client wanting to have fun [00:04:25]They were willing to add more back. **Interview 11** [00:06:18]That's the best part of that project was just the relationships. Everybody was very open and excited about the project. **Interview 11** [00:06:38]It's the whole team. [00:06:50]Everything went very smoothly and everybody is on good terms. **Interview 11** [00:07:13]The contractor on site foreman was very responsive **Interview 11** [00:15:29]It was a great project and it went really well. Hopefully the strong relationship we have with them continues. **Interview 11** [00:05:44]I know that they're happy. [00:06:04]so far he said it's working and they're happy. **Interview 12** [00:02:18]Yeah it was a good job for us. **Interview 12** [00:04:21]You know honestly I, I really liked it. [00:04:43]I thought XXXX(the project) just went really slick. Yeah there were changes, there were things we had to work through. You know to me it	

	felt like the changes flowed a lot easier and I thought it made for everybody being a lot happier campers at the end of the day. Not just XXXX(superintendent) and XXXX(Bus Man) but XXXX(CM/GC) and all the subcontractors **Interview 12** [00:06:23]It went really well I thought. You know the owners and the owner rep were very, very involved, which was helpful. They knew exactly what was going on out there all the time. [00:06:41]They were all very involved and they made it nice. It made things happen faster. **Interview 12** [00:07:28]It was humbling. So for us just getting our name on the project was, was a success for us being involved with it. **Interview 12** [00:07:54]I gotta tell you it even surprised me how good it went. [00:08:12]It was a real shot in the arm for us **Interview 12** [00:11:08]When you stand back and look at everything that went in that thing and just 16 months I mean the coordination is, as long as I've been been doing it, it still amazes me how it all comes together. **Document 4 Board Update** The Design team is nearing the end of Schematic Design, and working with the District's Core Team to finalize some of the design details (i.e. Parent Drop Off, Collaboration Spaces)...Focus Group Workshops: the next round of Focus Group Workshops is scheduled for 10/27,and should allow the Design Team to review the current Design and various options through the Focus Groups for input and discussion. **Document 5 Board Update** After several rounds of Focus Group workshops, ongoing discussion with the Core Team, and much hard work, the Design Team is anticipating completion of the Schematic Design (SD) phase the end of this week; this will essentially craft the total square footage and design elements of the building, and allow the Design Team to now move into Design Development (DD) and start quantifying types of materials, specifics to mechanical and electrical systems, etc.	