



EMBRACING LEAN DESIGN: THE “MVD”

By: Jeffrey W. Ganthner, AIA

EXECUTIVE SUMMARY

Architectural and engineering design firms are notorious for embracing traditional design practices that are anything but lean. Technology has helped to accelerate the pace of change, but most still practice design methods and business practices that a generation before them first developed. Embracing lean design and business practices will give them a competitive advantage over the competition. Design firms can learn from other industries who are practicing lean methodologies such as developing minimal viable products (the MVP) to change the way they work. The time is ripe for design firms to embrace lean design by developing the minimal viable design (the MVD) and change the way they practice and conduct business.

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Embracing Lean Design, The “MVD”

In the summer of 2017, Atlantic Shores Christian School in Chesapeake, VA faced a dilemma. Their long-standing relationship with Atlantic Shores Baptist Church who housed the school was coming to an untimely end and they were in desperate need to find a new building for about 450 pre-K through 6th-grade school children. They had about a year to either lease, purchase, or build a new 50,000 square foot space. They owned land, but in their minds lacked the time to build. In June and July, it was determined that to lease or purchase a building would lead to substantially increasing tuition and result in a sharp drop in enrollment as families could no longer afford to send their children there. Dropping enrollment would financially burden even more the remaining families and result in the probable closure of the school. Something needed to be done and everyone involved was starting to either panic or look at completely unconventional solutions to solve the problem.

Burns and McDonnell, a national architecture, engineering, and construction firm, was approached at the height of the crisis to see if they had any ideas that would deliver a fully functioning school in 12 months. Typical design processes alone for schools take 12 months with another 18 to 24 months to build. At the time, Burns and McDonnell had been experimenting with rapid design processes that would take the time to design down to 120 days or 4 months for a typical project of this size. However, this would only allow about 8 months to permit and construct the building. This was not impossible, but it would require construction on an unprecedented perfect pace and scale. In construction, that rarely happens. The risk of not opening on time for a new school year was very real and would force parents to seek alternative solutions to educate their children. After all, people will flee from risk and do the safe thing especially when it comes to their children.

The time was now the end of July and the new school needed to be ready to open in 13 months or be forced to close. It was determined that construction time had to be maximized and a design process reduced from an already experimental 120 days down as much as possible. Burns & McDonnell asked for 24 hours to create a possible path for the delivery of a building within this period. During those 24 hours, the team was challenged to cut in half the time it

would take to design the building to 60 days to allow for 11 months of construction and even then, it was going to be close. Not only did the team meet this challenge, but it created a design process that would create a “Minimum Viable Design” or “MVD” that would deliver an amazing design in a defined project budget in just 4 weeks. This would allow a full 12 months to permit and construct the project. Burns and McDonnell presented the proposed design process to the school board who voted to proceed as it was their only real path forward.

Creating an MVD in just 28 days would start with a three-day rapid-paced iterative process of design/review/revise/approve for the building layouts, elevations, aesthetic approach, and primary systems. This three-day process was deemed the “design charrette” and it started on a Friday and ended on a Monday. A design charrette is an intensive design workshop where all stakeholders offer input towards a final solution. Most importantly, the design charrette does not end until resolution and agreement are achieved by all. By building early momentum with real-time client feedback through the design charrette process, a building schematic design was delivered. The project was not in the clear, but it had reached an important milestone with many of the major design decisions being locked down with 25 days remaining to deliver an MVD.

Developing a schematic design and creating pretty renderings is never the time-consuming part of a design, but it had just been reduced from a typical 3 months to 3 days! Construction documents or the documents that city plan reviewers and the builder themselves will use to approve the design and construct the building traditionally take the most time. Throwing as many people as you can at this part of the process does not help to get the time down, but rather being able to select quickly the right products and details the first time and showing only what is necessary in a set of plans and specifications matters more. To do this, every decision, especially the early ones, was immediately reviewed by an independent team for validity and correctness. Real-time pricing of material selections was made to ensure that the project stayed within budget as waiting till the end to price a completed design was too risky when considering there would be not enough time for rework. Many right decisions were made the first time, but also some poor decisions were made. When this happened because of the continual feedback, they were identified quickly, and changes could be made on the fly. A real-time building

information model (BIM) was developed and under constant review for issues as each design discipline worked at a feverish pace. Also, every other day the client reviewed progress and rendered their desires to the project team when asked. This cut lengthy independent client review time out because of this almost constant client feedback.

On day 28, the design was completed and submitted to the city for final plan review and to the building contractor to start construction. Only the necessary plans and specifications were developed to permit and build. There simply was not enough time to do anything else. The project ultimately was constructed on time and within budget. Also, it won a prestigious statewide design award for excellence. Most importantly, the client loved the new school building. The MVD worked! The following is an analysis of why the MVD worked, the challenges and failures that had to be overcome, scaling the MVD practice-wide, and the impacts that the MVD may have on the overall architecture and engineering design industry.

WHY DID THE “MVD” WORK?

Steve Blank in his article, *Why the Lean Start-Up Changes Everything*, discusses the process of the “lean start-up” that “favors experimentation over elaborate planning, customer feedback over intuition, and iterative design over traditional big design upfront development.” From this methodology, he discusses the ideas of developing a “minimal viable product” and “pivoting”. In many ways, the design and construction of a building parallel the steps involved in starting up a business. It starts with an idea or recognized needs, develops a plan and design path to get there, and then implements or builds its design that will bring to life the idea.

Although not called at the time, Burns and McDonnell practiced many of the concepts of the “lean start-up” to develop its version of the minimal viable product, the MVD. Burns and McDonnell attacked the project with its best designers and gave them the ability to focus only on this project. Most designers are forced to daily “multi-task” a variety of commitments. By stripping them of all other responsibilities within the company and all other projects, the designers were able to develop the MVD in record time.

Edward T. Hall in his book, *The Hidden Dimension*, discusses the importance of perspective when it comes to designing spaces for people. Part of the struggle most designers face is educating clients on the design process and about the importance of early decision making. By having the client stakeholders involved in the design charrette, they felt like part of the team and were able to learn about design by simply observing the action. Design is often perceived as a linear process when it most resembles a spiral. Measuring project percent complete on a line is straight forward and on a spiral very difficult. Nailing a design concept often occurs after several failures and setbacks. The client personnel, at first, did not get this and were frustrated at the unobservable progress being made by the design team. And then, almost magically, their eyes were opened, and they observed the beautiful tapestry of a design team quickly running through iteration after iteration in a fluid if not chaotic manner. Then they began to participate and give live feedback to the designers. When this occurred, the pace of design increased and the MVD was created. Education of the design process to all of the stakeholders was critical to achieving this success. The same is true when launching a business. Does everybody understand the process? Are people bought in and committed? Do they realize how hard it is going to be? Do they understand that progress may, at first, be hard to measure? These are just some of the questions that need to be asked and answered for a team embarking on doing the impossible.

In developing the MVD, the Burns and McDonnell team practiced the lean method's three key principles as discussed by Steve Blank: they created a "framework" for their hypothesis, engaged directly with their customers to obtain feedback and to "test their hypothesis", and they practiced "agile development." The design charrette was conducted in a large conference room where client requirements, assumptions, and ideas could be mapped out on the walls for all to see and reference throughout the process. Clients were encouraged to "walk the room" and question everything and give feedback on what they observed. All of these stimuli were fed to the designers in real-time and greatly decreased the time between design iterations from days to hours to minutes in some cases.

An important ingredient was attitude by all team members. The design team members were not just amazing designers, but they were able to check their ego at the door. Everyone

was approachable and could be challenged. This created a “we are in this together” comradery that further strengthened the resolve to create a design in record time. Patrick Lencioni in his book, *The Five Dysfunctions of a Team*, discusses the importance of trust and how foundational it is for everyone on a team to have trust to be successful. The absence of trust amongst a team creates environments so toxic that failure is inevitable.

Finally, the momentum and comradery developed in the design charrette propelled the team for the next 25 days to complete the MVD. Also, early momentum is a critical and necessary component for a business launch. Speed and agility are a new firm’s advantage over traditional large businesses. Having the right-sized team to get the job done without extra “baggage” keeps a team or business traveling light and often able to sustain momentum. It is the leader’s job to keep pushing and challenging the team to keep moving even if it feels like it is losing momentum.

OVERCOMING CHALLENGES

Lean teams and lean businesses will face many challenges as they try to create the uncreated. However, there are some excellent lean practices that, if followed, will greatly increase an aspiring team to reach success. One of the most effective tools to employ as discussed by Steve Blank is the “business model canvass.” It is a visual display of the “building blocks” needed to create a lean design or business. It enables a team to attack in parallel different “components” that will need to be addressed to reach success. Working in parallel will allow a team to skip or park challenges that are not ready to be resolved and still make progress in other areas. One of the challenges with the Atlantic Shores project was site drainage. It would require extensive review and analysis to ascertain exactly where on the site the building should be placed. Rather than freezing and resolving before moving on, the design team, in working towards the MVD, simply skipped this issue and focused on the inner workings of the building itself until more information could be gathered to resolve the site. Similarly, business plans often lack a clear understanding of all the cost structures early on. Instead of stopping to resolve, it may be better to put in a few placeholders that are deemed reasonable and move on until this issue can be attacked and resolved.

EARLY FAILURE IS GOOD

In practice, obtaining the actionable design solution (MVD) does not happen on the first iteration. If it happens on the second or twentieth is often determined on how fast and willing a team can change course. In his book, *The Lean Startup*, Eric Ries discusses the importance of having the courage to “pivot” and having enough “runway” to do it. Pivoting often requires abandoning good solutions for better ones. And this can be hard especially if certain team members have a lot invested in them. Teams and businesses should learn to propose an idea and then seek to divorce their personal “ownership” of that idea to the group. Once an idea is incorporated it is no longer owned by an individual. A team that can pivot away from an idea quickly and without personal attachment is a team filled with mature professionals. In college, I had an architectural professor that loved my model for a design that I had created. He offered to buy my model for ten dollars. As a poor college student, I quickly agreed to the deal. After all, I was going to get a good grade and I was thrilled that my professor wanted to buy my model. As soon as the transaction was complete, he gathered the entire class together and walked us out into the courtyard. He then placed my model on the ground and lit it on fire. Then he taught us an important lesson which was to never become too attached to our work. This gave each of us the freedom to separate ourselves from our work, pivot to ideas faster, and not fear early failure. With early failure, lessons are learned and there is still time to develop the MVD. By sticking to sub-par ideas too long, we run the risk of failing late in the game and not having enough “runway” to recover. The same is true for business. Failing early and not being emotionally attached to a failed idea will allow a business to apply what they learn quickly into another idea before their “runway” runs out.

SCALING THE “MVD” PRACTICE WIDE

In the architecture and engineering design business, scale means efficiency and specialization. If a successful design process can be replicated, then a possible competitive advantage is gleaned over another firm. However, not all clients are the same and being able to solicit near or real-time feedback is not always able to be achieved. Also, many design firms do not have the luxury of practicing and designing for only one project type such as schools. This creates a

uniqueness to every project. However, the design charrette can be replicated to a point on every project. If a client cannot be present, it is not as effective, but still can achieve early momentum for a design team. This is when experience and lessons learned from the past come into play to develop an MVD as quickly as possible. The design charrette can be taught with enough flexibility for a design team to learn to take full advantage of experience, skill, and talent to maximize client feedback no matter how little it may be. Being lean means maximizing each available resource with no fluff present to drag a practice down. Start-up businesses do not need to run to the local office supply store to purchase the new pen, printer, and desk accessories that will only serve to clutter and burden a new business. They just need to get started with what they have and then to seek only what they need. In this way, lean practices can be scaled practice-wide.

IMPACT OF THE “MVD” ON THE A/E DESIGN INDUSTRY

The architecture and engineering industry is notoriously slow to change and even worse at trying new methodologies related to the design process. Existing firms that learn to pivot quickly and implement the philosophy behind developing an MVD will gain a tremendous competitive time advantage over their competition. Time is how the architecture and engineering industry prices most projects and opportunities. How much billable time a project takes multiplied by a billing rate determines the fee for a project. This is widely accepted by the marketplace. However, when firms can still price traditionally and convert their fees to a fixed amount, then they gain a tremendous income advantage when they can deliver an MVD in less time. This extra income can then be used to reward employees, shareholders, or reinvested into improving the process even further. Competing against this delivery model with traditional processes will put tremendous pressure on those firms unable or unwilling to change. Eventually, the whole industry will embrace lean methods such as the MVD for both design and business practices.

CONCLUSION

The architecture and engineering industry is a traditionally heavy design process-driven business. Lean business methods applied to the design process to develop minimal viable designs (MVDs) will serve both clients and firms alike. Taking out the waste in a design firm's process will also impact how it performs in business overall. The time is ripe for architects and engineers to free itself of the baggage of traditional design methods and business practices and embrace lean practices.

FOR MORE INFORMATION

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