

# Lean Learning

University's challenges lead to **\$27.2 million** in cost improvements

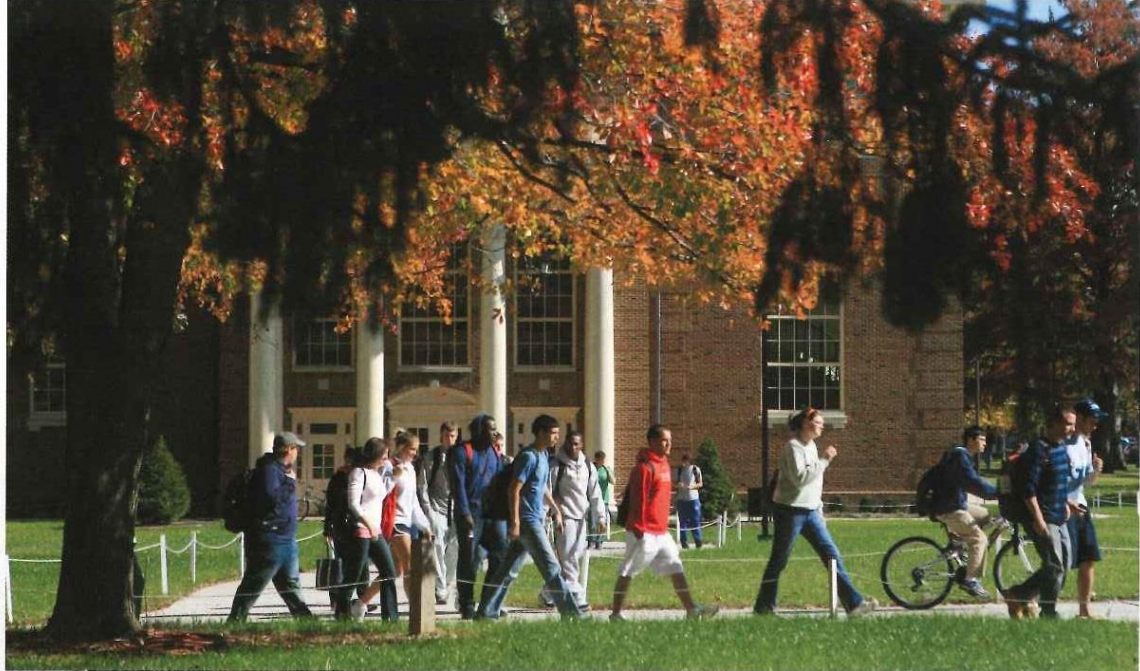
## In 50 Words Or Less

- Miami University in Ohio needed to reduce expenses without adversely affecting academic outcomes and the student experience.
- A lean initiative was used to improve quality, responsiveness and productivity, and to reduce costs.
- Projects have already resulted in \$27.2 million in financial improvements.

by Timothy C. Krehbiel,  
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**THE ECONOMIC DOWNTURN** of 2008 placed many public universities in a financially unsustainable position. Tightening of state funds, decreased return on endowments and growing resistance to increased tuition created an environment requiring dramatic changes to maintain quality and perhaps even to survive.

THE TRI DELT Sundial is located across the lawn of central quad from MacCracken Hall on Miami University's campus in Oxford, OH. The sundial was a gift to the university from the Delta Delta Delta sorority (photos courtesy of Miami University).



STUDENTS WALK on the campus of Miami University.

Despite its long history and strong reputation, this fiscal climate forced Miami University in Oxford, OH, to eliminate \$30 million from its budget in 2009. Founded in 1809, Miami University is the 10th oldest public university in the United States and is known for its commitment to classroom teaching and its picturesque 2,000-acre campus.<sup>1</sup> Approximately 15,500 undergraduates and 2,200 graduate students are enrolled at the main campus in Oxford. An additional 5,500 undergraduates attend two nearby branch campuses. Miami employs more than 4,100 faculty members and staff, and 4,500 part-time student workers.

Although the deep cuts and associated layoffs in 2009 addressed the current financial challenge, David K. Creamer, vice president for the finance and business services divi-

sion (FBS), said he knew additional changes were needed.

"For Miami University to preserve its competitive advantage in a resource-constrained and rapidly-changing higher education marketplace, we needed strategies that would enable the university to restore service levels at the reduced staffing level, continuously improve service, and generate new ideas for resource creation and improvement into the future," Creamer said. "I believed lean strategies and tools could help us to build a culture that didn't just focus on these outcomes in a crisis, but every day."<sup>2</sup>

Creamer's assessment provided the catalyst to start the Miami University lean initiative (MU-Lean). The lean journey has resulted in training for more than 1,400 employees and completing 369 projects that have resulted in more than \$27.2 million in financial improvements. In addition, more than 35% of the projects have directly supported the university's green initiative.

## Organizational structure / FIGURE 1



### Implementation

As it does in many large organizations, waste exists in universities, specifically in admissions, curriculum, financial services, housing, dining and physical facilities.<sup>3</sup> Applications of lean to higher education are uncommon, but early adopters are reporting positive outcomes.<sup>4</sup> A moment of crisis, such as that experienced by Miami in 2008, is a common driver for implementing lean in higher education.<sup>5</sup>

In 2009, consultants were brought to campus to assess the situation and chart a course forward. The lead consultant and a co-author of this article, Alfred Ryan, has more than 30 years of industry experience in lean and productivity improvement. He suggested

## Roles and responsibilities / TABLE 1

Executive steering team:	Lean champion:	Steering teams:	Process improvement teams (PIT):	Resource support team members:
Vice president of finance and business services, lean champion, department/division administrators	Devoted full time to the Miami University lean initiative (MU-Lean); member of executive steering team	Department lean leaders, senior lean leaders, department and division administrators	Cross functional, multilayered	Process owner, key customer, important stakeholder, subject matter expert; assigned to PIT
<ul style="list-style-type: none"> <li>Provides overall direction</li> <li>Identifies target areas for improvement</li> <li>Selects which projects to undertake and when</li> <li>Approves team goals and metrics</li> <li>Assures sustained results</li> <li>Evaluates and approves lean suggestions</li> </ul>	<ul style="list-style-type: none"> <li>Reviews all MU-Lean initiatives</li> <li>Maintains program metrics</li> <li>Serves as resident expert, trainer, facilitator and coach</li> <li>Oversees training and certification program</li> <li>Ensures quality</li> </ul>	<ul style="list-style-type: none"> <li>Coordinate and support lean projects in their areas</li> <li>Ensure dedicated space for team meetings</li> <li>Ensure that time is available for training and team meetings</li> <li>At least one steering team member is assigned to each process improvement team (PIT)</li> </ul>	<ul style="list-style-type: none"> <li>Walk process and collect real-time data</li> <li>Redesign processes</li> <li>Develop action plans</li> <li>Create standard work</li> <li>Develop metrics</li> <li>Implement process changes</li> </ul>	<ul style="list-style-type: none"> <li>Provide direction, resources, and expertise to PIT as needed</li> <li>Attend PIT meetings if necessary</li> <li>Approve process redesigns</li> <li>Support implementation of new process</li> </ul>

a systematic approach to cost reduction and continual improvement within a lean service framework.

Ryan and Creamer formed an executive steering team and began work on implementation plans. Ryan was appointed director of MU-Lean and university-wide lean champion.

The implementation process had eight phases:

1. Create a mission and define breakthrough objectives.
2. Build an organizational structure.
3. Develop training and certification.
4. Build momentum in finance and business services.
5. Position early adopters in projects with impactful results.
6. Expand to other areas of the university and reach out to all employees.
7. Expand internal training and certification.
8. Create a sustainable culture of continuous improvement.

Phases one to five were completed from 2009 to 2012, and progress is ongoing in phases six to eight.

### Mission and breakthrough objectives

The executive steering team decided the mission of MU-Lean would be to support Miami University's mission statement.<sup>6</sup> The initiative therefore had to reduce expenses without having any adverse effect on academic outcomes and the student experience. A set of five breakthrough objectives was developed: increase revenue, improve productivity, reduce costs, increase cost

avoidance and support the green initiative.

Because lean service is unknown to many in higher education, the executive steering team needed to define lean in terms the university community would understand, beginning with the following definitions:

- What is lean? Lean is a set of principles, concepts and techniques designed for a relentless pursuit of continuous improvement and the elimination of waste.
- What is lean to Miami? Lean is a process that Miami uses to improve quality, responsiveness and productivity, and to reduce costs by analyzing work and finding ways to improve it.

To be successful, MU-Lean would require support from the top. Creamer convinced the Miami University Board of Trustees that MU-Lean could help ensure long-term financial stability. His passion for lean spread to other members of the executive cabinet, including David Hodge, university president.

In his 2011 annual address, Hodge remarked, "We must view our university through the lens of entrepreneurial thinking. The implementation of lean methodologies begins to open doors to this type of thinking."<sup>7</sup>

President Hodge completed the two-day lean leader training, providing valuable feedback on the direction of the initiative and related training. With the backing of the president, his executive cabinet and trustees, MU-Lean has been able to navigate the political hurdles that can cripple continuous improvement programs in large organizations.

## Communication

The executive steering team knew ineffective or insufficient communication is one of the most common handicaps to the success of lean initiatives.<sup>8</sup> To counter this, MU-Lean began the following communication activities: monthly newsletters; a website containing past newsletters and details on training workshops and certification requirements; information-sharing sites on the university's course management system; and a quarterly report to the president and trustees.

In 2013, the university approved an ambitious seven-year strategic plan known as the Miami University 2020 Plan, with the overriding goal to achieve Miami's vision.<sup>9</sup> MU-Lean committed its support to the 2020 Plan and further aligned its continuous improvement objectives and metrics with Miami's goals and vision.

## Building the organizational structure

Lean projects are completed by cross-functional process improvement teams (PIT). To build a self-sustaining culture, a strong infrastructure was designed to support MU-Lean and develop future leaders (see Figure 1, p. 40).

At the top of the organizational structure is the executive steering team, which provides overall direction, maintains program metrics, oversees training and certification, selects projects to pursue and meets with PITs as time allows (see Table 1, p. 41).

Because the organization is too large for the executive steering team to provide direct support to all PITs,

steering teams within targeted areas of the university are added as more individuals are trained in lean methods.

In addition to coordinating lean efforts within their areas, the steering teams ensure individuals have time allotted for their training and projects, plus dedicated space for meetings. At least one steering support team member is added to each PIT to provide assistance and resources as needed, and most importantly, serve as a direct link to an area's leadership to overcome obstacles.

Resource team members are added to provide expertise in specific areas, such as HR or IT, if needed.

## Developing training and certification

The main objectives in developing training and certification were to develop future leaders and recognize individuals' efforts to improve Miami. Initially, outside consultants and the lean champion did most of the training. As expertise grows, however, more training is delivered internally.

MU-Lean encourages individuals to seek outside knowledge in all areas of continuous improvement (for example, Agile, ITIL, Six Sigma and W. Edwards Deming's system of profound knowledge) and bring it back to campus to help create a vibrant learning culture of process improvement.

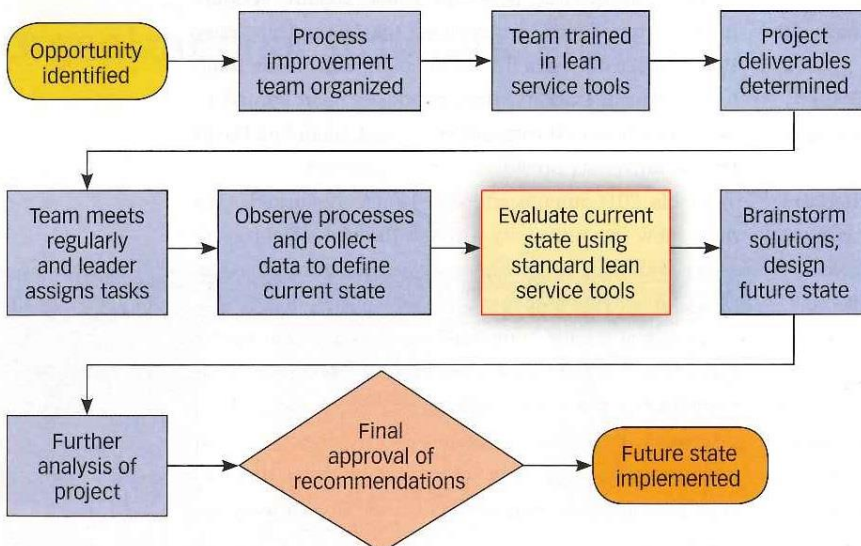
The first step in certification is a two-day team-leader workshop. Topics include Jeffrey Liker's 14 management principles,<sup>10</sup> types of waste, lean tools and MU-Lean's standard project cycle, which stresses the evaluation of

the current state to search for root causes rather than symptoms (see Figure 2). More than 400 employees have received this level of training.

Part of the team-leader workshop is devoted to developing a project proposal. If the project is approved and the individual agrees to lead a PIT, lean leader status is obtained. Lean leaders form the foundation for the certification pyramid designed to build future leaders (see Figure 3).

After serving as a lean leader, individuals can apply for the senior lean leader certification program. The 24 to 30-month program consists of participating in five projects, leading three projects, receiving additional internal and external training, completing written evaluations of all outside courses, and presenting a completed

## Standard project cycle / FIGURE 2



project to the certification board. To date, 29 individuals have received senior lean leader certification.

Department lean leaders are selected from the senior lean leaders. They help manage and coordinate lean events, serve as mentors and assist in training. Currently nine individuals have achieved this certification, which carries a \$3,000 yearly salary stipend.

A fourth level of certification will soon be available. Divisional lean leaders will mentor, take an active role in training and coordinate activities across entire divisions.

The lean champion is recognized as the university-wide lean expert and is the only individual whose full-time responsibility is MU-Lean.

### HR aspects of MU-Lean

MU-Lean stresses the human side of lean. Accordingly, certification typically requires about 40% of the training in topics referred to as acceptance tools and about 60% in technical tools. Acceptance-tool training includes the Myers-Briggs type indicator assessment, learning about communication's role in management, managing conflict, building a reputation of integrity, being aware of micro-inequities, building and maintaining your team, and managing change.

Technical-tool training includes value stream mapping, the plan-do-check-act cycle (PDCA), swim-lane charts, six Ss (five Ss plus safety), metrics development, standardized work, *kaizen* blitzes and principles of agile software.

Reporting tools were customized to promote standardization and ease of implementation. A workbook was developed to guide teams through all necessary steps in a project cycle and track all required information. In addition, a Visio template for building current and future states was developed, which links to an Excel template to ensure consistency and validity of metrics calculations.

### Building momentum

FBS and academic affairs are the largest two of the nine divisions at Miami. MU-Lean strategy was to build depth in FBS and grow vertically to the other divisions. Thoughtful implementation positioned the early adopters in projects with impactful results.

The housing, dining, recreation and business services department is one of the largest in FBS and directly touches customers daily. Reducing costs without adversely affecting the university's vision of providing the best student experience presented an enormous challenge.

## Certificate pyramid / FIGURE 3



Prior to MU-Lean, an outside consulting group had reviewed custodial services and identified more than \$2 million in potential savings, but those recommendations had never been implemented.

A PIT was formed to review and implement the recommendations. The team members applied their newly acquired knowledge in lean to collect data (square footage, method of cleaning and types of floors, for example) and determined the current state of custodial services.

Next, the team designed the future state and developed standard work procedures. Implementation began in 2011 and resulted in more than \$3 million in savings within two years. Reductions in labor and management costs came through increasing efficiency through standard work practices, attrition and reassignments.

The project resulted in a 20% reduction in the amount of chemicals used, thus significantly supporting Miami's green initiative. Importantly, quality metrics developed by the team indicated no adverse affect on the quality of the work performed.

The custodial project proved the effectiveness of the MU-Lean method and generated interest across many departments in FBS, perhaps most notably the police department and physical facilities. Since 2009, FBS has completed 265 projects.

### Reaching out

MU-Lean has not been a program enforced from the president down. FBS has been a proof-of-concept test area, and others have been free to use the methods developed. Organic growth has come from nurturing select big-win projects with strategic importance outside FBS, reaching out to individuals with existing expertise in lean and related methods, and implementing a formalized suggestion program.

A PIT developed a suggestion-box approach to soliciting project ideas from across the university. The goal was

to develop a bottom-up approach in which everyone can be an agent of change. The team knew the process must be user-friendly, measurable, automated and sustainable.

After the "I Have a Lean Idea" initiative was piloted in 2013 in FBS, 150 suggestions were received and 45% became projects. "I Have a Lean Idea" was implemented campuswide in January 2014. More than 300 ideas were submitted during its first five months, and almost 40% have become projects.

Although only five of the 369 completed projects are from outside FBS, 20% of all active projects involve other divisions, including academic affairs, IT, university advancement, enrollment management and intercollegiate athletics.

Significantly, many of the completed projects originating in FBS involved members from multiple divisions, and many of the active and future projects are interdivisional.

There are areas outside of FBS where individuals have experience in quality and productivity improvement methods, including ISO 9000 and the Shingo model of implementation, in addition to those already mentioned.

Additionally, some faculty members have research interests and expertise in these areas, which has helped to bridge the divide between academics and operations. Often, these other skill areas develop their own silos of thought, and the challenge is incorporating the knowledge and skills into the lean effort and realizing the different schools of thought that have the same intent: to make the workplace better by improving service or product.

### Current status and the journey ahead

As of July 2014, 1,405 employees had received 18,702 hours of lean training, and 85 had completed or were pursuing certification (see Table 2). Projects have addressed

a wide range of topics, including reducing energy costs, recovering helium gas in chemistry labs, improving parking ticket processes and increasing fresh herb production.

As Table 2 shows, the 369 completed projects have accumulated \$27.2 million in financial improvements, more than 75% of these projects show productivity improvement, and more than 35% contribute to Miami's green initiative.

MU-Lean outcomes have succeeded without detrimental affects on the academic mission and have increased the university's financial efficiency. In 2014, *U.S. News & World Report* ranked Miami University as the most efficient university in the nation. Rankings are based on schools' ability to efficiently spend their limited resources to produce the highest possible educational quality.<sup>11</sup>

To reach its ultimate goal of creating a sustainable culture of continuous improvement, MU-Lean must expand training and certification, and to aggressively pursue expansion to all areas of the university. It will be critical that senior leadership understands the mission and breakthrough objectives of MU-Lean.

### Lessons learned

The central financial area is a natural place to start a lean initiative for a higher education institution. Expansion into other divisions can be frustrating and slow due to federated organizational challenges inherent in the university setting.

Adoption of lean outside the central financial area requires divisional leadership support and the initiative of individuals who can lead lean teams to improve areas that are strategically important to the division and the university.

Many teams will be tempted to quickly conclude what the future state process should look like before completing all steps of the project cycle. Team members may decide to forego walking the process (going to the *gemba*) and justify the shortcut with their perceived familiarity and knowledge of other offices across campus.

Leaders must stress that there are really three states of any process: what we think the current state is, what the current state really is, and what the future state should embody. Until the current state is fully understood, root causes may remain elusive and indistinct from the symptoms.

## Lean journey's results / TABLE 2

Training:	Certification:	Project outcomes:
<ul style="list-style-type: none"> <li>• 1,405 employees trained</li> <li>• 18,702 hours of training</li> <li>• 2020 goal is lean introduction to 100% of Miami University employees</li> </ul>	<ul style="list-style-type: none"> <li>• 400-plus lean leaders</li> <li>• 29 certified senior lean leaders (56 are currently in the certification program)</li> <li>• Nine certified department lean leaders</li> <li>• No certified divisional lean leaders to date</li> <li>• 1 lean champion</li> </ul>	<ul style="list-style-type: none"> <li>• 369 projects completed, 154 projects active, 39 future projects identified</li> <li>• Total financial improvements: \$27,229,953, including \$15,089,016 in cost avoidance, \$6,598,398 in cost reduction and \$5,542,539 in revenue generated</li> <li>• 75% resulted in productivity improvement</li> <li>• 35% supported the green initiative</li> </ul>

It is essential to first design an improved process and automate it, if appropriate. Teams may wish to rush to automation as the answer and, consequently, build a future state that automates a bad process. Without a thorough understanding of the current state and future-state customer requirements, organizations risk implementing a technical solution that falls far short of expectations.

Second, it is too easy to assume software solutions can and will be delivered as promised. Adoption of software requires due diligence, and implementing bad software solutions is an organizational disaster to be avoided.

Many individuals resist documenting standardized work. Some fear their superiors will use the documentation to increase their workloads or to eliminate their positions altogether.

Everyone, however, must recognize that L.E.A.N. does not stand for "less employees are needed." Documenting the process measures and evaluates the process, not the person. Ultimately, the individual's work should become less stressful and more impactful on the organization.

Others believe their work is highly creative and impossible to document in a standardized-work form. It is important to stress that creativity is found through iteratively applying the PDCA cycle in an effort to improve a standard work process.

It is essential to embrace change and definitively bury the "this-is-the-way-we-have-always-done-it mentality." Change also must occur to the initiative. Learning will allow improvements to the structure, implementation, certification needs and tools required to complete lean events.

The challenge is to not become viewed as lean disciples or evangelists, but rather to be seen as catalysts for change who reach out to partner with individuals with expertise, interest and motivation in all types of continuous improvement methods.

Leaders must emphasize that the goal is to support the mission of the organization rather than the lean journey itself. The lean journey is a marathon and not a sprint.

Training takes time. Implementing new processes takes time. Changing organizational culture takes even more time. Research shows changing the way work is organized has a more profound and lasting impact on organizational culture than does training employees in problem-solving methods.<sup>12</sup>

Do not expect a big culture shift until individuals in the organization have experienced for themselves a

better and more effective work experience achieved through the lean effort.

Most importantly, to produce exceptional results, one must have continuous support from the top of the organization. There are too many hurdles and setbacks to navigate without the backing of your organization's leaders. **QP**

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