Applying Lean Six Sigma to Postsecondary Continuing Education
By John Wilkerson

Clayton State University is a four-year state institution in Georgia's university system, with an enrollment exceeding 5,700. The university is accredited by the Commission of Southern Accreditation of Colleges and Schools to award associate, bachelor's and master's degrees. Clayton State students represent every region of the United States and some 25 foreign countries.

Clayton State's Continuing Education (CE) Department has offered an array of lean Six Sigma training programs to the business community since the program was established in January 2005. Training curriculum included Six Sigma executive development courses, lean Six Sigma champion, lean Six Sigma Black Belt, lean Six Sigma Green Belt, lean Six Sigma Yellow Belt, lean administration and lean principles. Students from corporate customers such as Ford Motor, Bank of America, Delta Airlines, DHL, AT&T, Fresh Express, Blue Cross & Blue Shield and numerous State of Georgia agencies rated these CE program courses nearly flawless.

During the last few years, national employment trends have remained fairly stable, yet business leaders have been under consistent pressure to reduce costs and improve productivity. Additionally, adult education enrollment increased by 40% from 1995 to 2001, and then began to decline by 44% in 2005, according the National Center for Education Statistics.[1] This net 4% decrease has forced administrators, educators, trainers and curriculum designers to innovate and create new ways to increase enrollment and student satisfaction.

During this time, I unmasked several challenges to conquer to implement lean Six Sigma thinking into a CE curriculum and to increase student satisfaction. Regardless of the challenges, our industry's objectives are to improve training effectiveness, provide a high ROI for local businesses and increase student satisfaction.

Solutions

There are three steps to get to the solution. The first step is project selection. The keys to our initial success was linking *kaizen* events to the university strategic plan, selecting the right group of students and the course that could produce excitement in the local business committee. The CE center director and lean Six Sigma program director selected the Lean Six Sigma Green Belt course for a continuous process improvement (CPI) pilot.

In the past, most Green Belt students were motivated and wanted to apply their skills to their work environments as soon as possible. The course was affordable and usually produced a positive return on investment for employers. Armed with motivated students, the potential for excitement in the business committee and a link to the university's quality instruction effort and academic expansion strategic plan themes was a recipe for a successful pilot.

The second step is method selection. After much research, we considered numerous methods, including lean, Six Sigma and plan-do-study-act (PDSA) cycle. The pilot team could not select one proven approach that would work in this situation. We decided to take an integrated approach, and we used the various components of both lean and Six Sigma methods.

The third step is deployment through define, measure, analyze, improve and control (DMAIC). DMAIC is broken down here:

- **Define:** Our approach began with forming a problem statement, project scope, baseline test score data, end-of-course surveys or voice of customer (VOC) and value stream analysis (VSA), all which eventually formed our project charter.
- **Measure:** The tools used during the measure phase were basic statistics. We measured minimum, maximum, median, mode and standard deviations. We reviewed other measurement system analysis (MSA) techniques and found that there was not enough significant data to measure.
- **Analyze:** During the analyze phase, we mapped the process, as well as developed a fishbone and several other graphic techniques. Failure mode effects analysis (FMEA) was an additional analysis tool considered, but it was ruled out because of the potential for being too subjective.
- **Improve (pilot):** The results from the VSA in the define phase were used during the initial pilot. Two glaring nonvalue-added segments of training material appeared to not connect with the students. The curriculum developer reworked the training materials prior to the pilot course.
- **Improve (deployment):** The next training course was conducted in the same manner, except for corrections noted during the VSA. End-of-course surveys and test scores showed improvement.
- **Control:** Currently, the control phase is ongoing. We continue to measure VOC and test scores for this program. The lessons learned from the CPI project will evidently be applied throughout the program.

Business results

Our results were outstanding. We are proud of three measurable accomplishments: improved test scores, end-of-course surveys and cycle time of lean Six Sigma Green Belt projects.

- **Test scores:** Our Lean Six Sigma approach has been credited with improving test scores and reducing variation among test populations. Test scores increased by a modest 2%. The variation of the test scores was much more impressive at nearly four units of measurement. We see the reduced variation as an excellent benchmark for increased consistency in instruction delivery and course content.
- **Surveys:** Survey results were very promising. Two important evaluation factors, course content and course relevancy, were rated the highest among all criteria. Based on the student referrals, the lean Six Sigma program enrollment increased by more than 28% during the fiscal year.
- **Project cycle time:** A separate requirement for completing the CSU Lean Six Sigma Green Belt program includes completing a service, safety or cost-savings project. There was no direct correlation between student test scores and project completion, but project cycle time was reduced by 31% during the deployment phase.

Lessons learned

As in most lean Six Sigma deployments, there are peaks and valleys. We had the luxury of having a lot of control during the pilot and deployment phases. Most students were familiar with each other, which supported open communication during and after the class. The faculty was also consistent, which helped reduce delivery instruction variance. Another benefit is that students had a desire to learn and grow. Each student was self-motivated to attend the course, and collectively, they grow by learning which tools to use during each DMAIC phase.

Many statistical techniques turned out to be overkill when applying MSA. Another lesson learned is to include listening to all types of VOC elements. End-of-course surveys, body language, verbal and nonverbal communication and the type of questions asked provide important clues about customer satisfaction. We could have used the PDSA model throughout the process but didn’t because of the need to streamline execution. PDSA clearly could have been integrated. Finally, the program enjoyed

repetitive business because we reacted quickly to the students' needs. We learned that we must act quickly and take meaningful action steps. Students are always watching.

Business results

In keeping with the state of Georgia's Customer Service Initiative, as well as University System of Georgia and the University Strategic Plan, we sought measurable business results for our customers, Georgia employers and employees. Our stated CE challenges, training effectiveness, high return on training investment and improved student satisfaction are industrywide as well as local opportunities. We took an innovative and nontraditional approach to these common problems. Although our 2% improvement in test score results as moderate, we are hopeful our 28% Green Belt course student referral rate will continue. As many educators have cited in the past: "Take one step forward and no steps backward." We are encouraged that others will build on our work.

Reference

1. U.S. Department of Education, National Center for Education Statistics, Adult Education Survey of the 1995, 1999 and 2005 National Household Education Surveys Program (NHES) and Adult Education and Lifelong Learning Survey of the 2001 NHES.

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