Quality Management Models in Higher Education

In this report, Hanover Research addresses quality improvement models and criteria including Total Quality Management, Six Sigma, ISO 9001, the Baldrige Award criteria, and the Academic Quality Improvement Program. We detail the application of these models to a higher education framework by addressing their strengths and weaknesses and illustrating their implementation using case studies. The report provides analysis regarding the models most suited to effective implementation within higher education institutions.
Overview

Initially developed by and applied to major corporations, quality improvement models and criteria have expanded their applications, showcasing widespread utility. Applying quality improvement models to higher education is a challenging endeavor since education by nature is driven less by efficiency and the bottom-line than major corporations. Furthermore, quality improvement efforts in higher education often encounter resistance:

Some of [this resistance] is due to the influence of the traditional academic freedom that faculty members have enjoyed. Some of it is ego. And some of it is lack of understanding of how it can work…We don’t have the time and the resources to do what we really want to do to continuously improve the quality of our programs and instruction. We don’t have a culture of continuous improvement. We don’t make changes on a regular basis, because we are trapped by the catalog publishing cycle, accreditation visits, and the entrenched misunderstanding of the purposes of assessment.  

However, this does not mean that the application of quality improvement to higher education is futile. In fact, it can be extremely beneficial if administrators can overcome this institutional resistance.

All of the models and criteria in this report share a focus on measurement, customer satisfaction, and process improvement. The first two models examined in this report – Total Quality Management and Six Sigma – can be categorized as quality improvement business models. These models are focused on maximizing efficiency and customer satisfaction in individual processes. ISO 9001 and the Baldrige criteria are quality improvement frameworks, which generally require the additional implementation of a process improvement methodology. In fact, these models and criteria are never mutually exclusive, as this report will illustrate.

The final model analyzed in this report is the Academic Quality Improvement Program, which is specifically designed for higher education. It is an alternative accreditation process that categorizes an institution’s processes and applies an improvement methodology to each one. The relationship among these models and criteria is illustrated in Figure 1.

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This report does not aim to provide a comprehensive discussion of each of these models and criteria, but rather to put each in context, to provide a concise summary and methodological discussion, and then to consider the value of application to higher education quality improvement. The profiles of each of these models and criteria will outline their strengths and weaknesses and touch on case study examples. Many of the strengths and weaknesses will prove to be the same – focusing energy on quality improvement is beneficial to streamlining college processes, increasing product quality, and responding to “customers,” but it requires making a major commitment to a new philosophy and sometimes fitting higher education into confining business rhetoric.

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Total Quality Management

The Model in Context: Total Quality Management (TQM) has been in development since the 1930s, gaining ground during WWII and Japan’s economic development in the 1970s. It became more widespread through the 1980s and is considered the umbrella concept for numerous quality improvement models. TQM is based on the concepts of reducing errors during service or manufacturing processes (to 1 per 1 million units produced), streamlining supply chains, and increasing customer satisfaction. The model is about systems rather than individuals. Unlike some of the methodological approaches described in this report, TQM “is mainly a cultural initiative and a style of management toward increased quality.”

Summary: TQM involves everyone and everything in the company, hence “total” quality management. Though it involves an entire company, TQM is a management-driven philosophy that seeks to integrate all organizational functions (marketing, finance, design, engineering, and production, customer service, etc.) to focus on meeting customer needs and organizational objectives. Customer satisfaction incorporates both internal and external customers and includes both their stated and implied needs. Figure 2 illustrates the TQM model with Customer Focus at the top. The diagram illustrates how the TQM model uses Total Participation (institution-wide) and a Planning Process to implement both Process Improvement and Process Management.

Figure 2: Illustrating the TQM Model

Source: Edraw Soft

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The Methodology:
TQM is defined by five principles:

- Management commitment
- Employee empowerment
- Fact-based decision making
- Continuous improvement
- Customer focus

In order to implement TQM, institutions must accept that it is a long process. During the full implementation process, reinforcing and revising the institution’s vision is crucial. A company implementing TQM will have a steering committee comprised of top management which will create projects, form project teams, and monitor teams’ work. Below this committee, team leaders and members must be trained in process improvement. Teams can be both functional (intra-departmental) or cross-functional (inter-departmental).

The role of management in the TQM methodology is particularly important. Management must take the blame for any process improvement that goes wrong and must constantly evaluate the effectiveness and efficiency of the TQM implementation throughout the institution. Management must engage in auditing to ensure that all employees are following documented processes. Employees will follow the processes if they are trained and empowered to implement change. Fulfillment of these roles is crucial for implementing the continuous improvement core principle.

There are numerous and wide-ranging TQM tools. According to QualityAmerica, Inc., the number is close to 100. Tools include Pareto Principle charts, scatter plots, control charts, flow charts, cause and effect diagrams, plan-do-check-act lists, brainstorming, focus groups, and best practice guidelines. Analysis tools should be utilized to clearly illustrate causes and effects in any process defects. Tools can also be used to illustrate information such as assessment of customer needs, staff duties and work flow analysis, financial breakdowns, and market analysis. Figure 3 below illustrates a sample cause and effect diagram, which is a complex TQM tool.

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7 Ibid.
Strengths of Applying TQM to Higher Education:

In the early 1990s, many higher education institutions experimented with the implementation of TQM as a quality improvement approach. In fact, in 1992, nine colleges received grants of up to $3 million each to improve their teaching and research on the basis of TQM principles from the International Business Machines Corporation (IBM). There were 204 institutions which applied for the grant, and the interest in the model’s implementation in higher education increased thereafter. Recently, however, this model has fallen somewhat out of fashion in favor of derived quality improvement models like Six Sigma.

Competition for students, both traditional and non-traditional, is increasing among higher education institutions. Thus, providing a higher quality product is crucial. This is particularly true at the community college level where higher education is provided to a wide cross-section of students. In this respect, treating students as “customers” is likely to be an important step toward creating a more attractive product.

TQM is a useful model for higher education institutions because it requires participation by all members of an institution across departments, divisions, and offices. Importantly, TQM encourages cooperation among departments, an area

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where higher education institutions often falter. TQM is primarily about the concept of “total” which may be particularly beneficial for decentralized higher education institutions:

As TQM is applied to higher education, everyone from the janitor to the president is expected to play a role in making sure that the customer -- whether it’s the student, taxpayer, or prospective employer -- is satisfied. And if something goes wrong, administrators are expected to call on a team of employees, managers, and perhaps students to examine the problem and come up with solutions.\(^9\)

The TQM methodology requires staff to involve each other in the process of documenting, analyzing, and standardizing college operating procedures. It forces staff to think of each other as internal customers. By analyzing the causes rather than symptoms of process defects, TQM focuses an institution on core improvements. It makes goal-oriented staff strive towards common rather than piecemeal goals in improving college processes.\(^13\) Overall, the TQM process creates a greater awareness of the institution’s mission for all involved as well as how specific roles contribute to this mission. This is all part of creating a common language in which staff can communicate about process improvement, potentially overcoming institutional resistance.

**Weaknesses of Applying TQM to Higher Education:**
Of course there are downsides to applying any business methodology to higher education. For TQM, the primary issue may be one of time and effort. Training practitioners, widely disseminating the philosophy, collecting and analyzing data, and implementing decisions all require commitment by an often overloaded faculty. The decision-making process can be challenging because it requires consensus. Furthermore, TQM might actually discourage truly innovative thinking or strategic change because:

It employs statistical methods for the measurement of productive activity, and seeks to bring results more closely in line with expectations through the processes of benchmarking, continuous product measurement, and ongoing system adjustments…Not only can the cost of such analysis frequently outweigh any possible benefits, but it is a process which, by its very nature, frustrates the possibility of radical organizational change.\(^14\)

If institutions decide they are willing to focus on process improvement, they will have to implement cultural change because the model requires continuous improvement and total participation. This will require patience given the resistance to change and tradition often present at higher education institutions. However, as mentioned

earlier, TQM is a management-driven change. This means that top-level administrators must understand quality mechanisms and the need to develop and implement specific plans across the institution.\textsuperscript{15} This requires commitment and top-level leadership to bring together decentralized administrative and academic structures for true “total” quality management.

Since higher education is not bottom-line driven in the same way as corporations, the metrics necessary to measure results are more difficult. Without quantifying tangible results, it can be difficult to convince an institution to engage in continuous process improvement. Daniel Seymour, a TQM consultant conducted a survey of 22 institutions that pioneered TQM implementation and found that “while many of the benefits of TQM were hard to quantify, institutions often reported that employees felt better about their jobs, students were happier, and that the process had helped to break down barriers between faculty, staff, and management.”\textsuperscript{16} An institution considering TQM implementation may want to think about how it wants to see its results. In fact, many institutions have limited their usage of TQM to their business operations such as purchasing offices rather than reaching into academia.

In addition, TQM will provide higher quality products and improved procedures, but it will not solve some of the bigger problems in higher education such as diversity in the classroom, changing student demands, and the increase in non-traditional students and educational methods.\textsuperscript{17} Others argue that TQM is fundamentally opposed to some of the philosophical objectives of higher education. Higher education institutions should not be attempting to mold themselves to the demands of “customers” (usually students) who are partially embarking on a higher education journey because they want to be given something they did not know they wanted.\textsuperscript{18}

\textbf{Case Studies:}

\textbf{Case Study #1 – Oregon State University:} Oregon State University (OSU) implemented TQM in the early 1990s. Interest in the model began when OSU investigated the length of time it took to complete simple construction projects. After several complaints, the university found that it took a staggering average of 195 days. Upon investigation, workers found that 33 glitches or extra steps contributed to delays in each project. Once these were resolved, average construction time reduced by 45 days. This case was compounded by OSU having recently suffered from a major cut in property taxes that forced major cuts in spending.\textsuperscript{19}

\textsuperscript{17} Hazzard. Op. cit.
In another example of TQM implementation, surveys of customer satisfaction found that prospective employees were irritated to reach an automated phone message. Analysis found that phone lines were usually tied up by staff members giving out routine information about job applications. Now, that routine information is printed on the application and calls are answered by staff members more than 80 percent of the time, reducing customer complaints. The use of complex flow charts to visualize processes showed that many similar non-value-added or repetitive processes were occurring across the university.20

OSU also included the academic realm in its TQM process improvement. Associate Professor of Forestry Engineering Eldon Olsen had students form a TQM team to help him improve his teaching. Through the process, “The team surveyed students’ opinions, analyzed the data, and suggested improvements.” Olsen reacted favorably to the process and results: “The TQM process helps me understand the students and what they need...And it changes the classroom from an atmosphere of confrontation to one of teamwork.”21

TQM allowed OSU to improve processes and as a result, product quality and cost savings. It did require approximately a $50,000 per year financial commitment, but the results seem to be positive: “Although university officials can’t pinpoint how much money has been saved, they say the concept has reduced paperwork, increased efficiency, and simplified procedures in the business-affairs, personnel, physical-plant, and security offices. Meanwhile, morale has surged.”22

Case Study #2 – Fox Valley Technical College: Fox Valley Technical College (FVTC) in Appleton, Wisconsin implemented TQM as early as 1986. The college initially began offering quality courses for its students in 1985 and then began implementing TQM itself using a quality-improvement council and several problem-solving teams. FVTC implemented several feedback mechanisms such as comment cards strategically located on campus picked up two or three times a week as well as focus groups to collect data on student needs and expectations. FVTC was “so committed to using measurement to achieve improvements that it offers educational guarantees to its graduates and offers retraining or refunds if these guarantees are not met.”23

One challenge for FVTC was to cut $1.2-million from the college’s $38-million operational budget for the 1992-93 academic year. Administrators said that prior to TQM, they would have discussed how many personnel would need to be cut. Using TQM, however, “the teams put together an operational plan, established budget

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requests, and then prioritized programs, facilities and equipment, and staff. The priorities identified by the teams were used to determine which areas could be cut.” Ultimately, the cross-functional teams implemented plans without any lay-offs or program cuts. Some employees even volunteered to accept shorter work weeks or to reduce the terms of their contracts.

In addition to its successful process improvements, FVTC’s success can also be measured in its Quality Institute which has worked with numerous other colleges that might want to implement TQM on their campuses.24

**Conclusion:** Some faculty and administrators may claim that TQM is purely jargon for a process they have been using internally for a long time.25 Some may claim that it unnecessarily “businessifies” higher education. If TQM advocates can overcome this skepticism, concerns still remain. The concerns about implementing TQM in a higher education framework are not much different than the concerns about implementing any quality improvement model. It requires time and commitment to assimilating a new approach and training those involved. It requires top-level administrator commitment as well as an assimilation of the philosophy by all other staff. These changes can be difficult in an academic and often decentralized environment.

Having said that, TQM has been successfully implemented at higher education institutions across the nation. TQM can work within the higher education framework if it is primarily utilized at the administrative level to improve customer satisfaction. It allows total faculty participation while remaining management-driven and can fully change the culture of an institution to one of continuous improvement and streamlined processes which can cut costs and improve morale. Overall, the success of TQM implementation in higher education may depend on the necessity of its usage at an institution (e.g. in terms of cutting costs) and the institutional resistance that exists. If students are truly seen as “customers” by an institution, TQM is more likely to work.

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25 Ibid.
Six Sigma

**The Model in Context:** Six Sigma was largely borne of Total Quality Management. Its application became widespread after Motorola developed the approach in the 1980s. It focuses on reducing defects through process improvement rather than quality control.²⁶ Though a descendant of TQM, Six Sigma is already yesterday’s business model to some – an outdated process management approach. It has seen failure at 3M, GE, and Home Depot where customer satisfaction and employee morale dropped following the model’s implementation. Still, its increasing applicability to industries and organizations outside large corporations maintains its popularity. This section will consider Six Sigma’s strengths and weaknesses as well as the application of Six Sigma to higher education.

**Summary:** Six Sigma “can be described as a set of concepts and methodologies that aim at achieving near-perfect business processes wherein the total number of defects never exceeds 3.4 per million opportunities that exist for such defects to occur.” The name “Six Sigma” or “six standards of deviation” is derived from this objective total number of defects. The focus for any organization implementing Six Sigma is to achieve extremely high levels of efficiency thus automatically reducing operating costs.²⁷ Six Sigma strengthens organizational capacity for ongoing process improvement.²⁸

**The Difference between TQM and Six Sigma:** Though Six Sigma utilizes many of the same concepts as TQM and is compatible with TQM, they are different models. TQM is focused on improving quality by conforming to internal requirements while Six Sigma is focused on improving quality by reducing defects with a fact-based and data-driven methodology. As a result, Six Sigma has the potential to deliver sharper results and to result in continuous improvement. Both models should result in higher quality products, but Six Sigma is also focused on reducing operational costs through defect reduction, cycle time reduction, and cost savings. Six Sigma also requires dedicated change-makers – trained “belts.”²⁹

A note on Lean Six Sigma: Lean Six Sigma is another methodology which is increasingly mentioned as a successful sub-model of Six Sigma. It combines the methodologies of Lean Flow (primarily used in manufacturing to reduce waste in processes) with Six Sigma. Essentially, the result “is the application of lean techniques to increase speed and reduce waste, while employing Six Sigma processes to improve quality and focus on the Voice of the Customer.”

The Methodology:
Six Sigma is a highly data-driven approach that uses many of the same tools and techniques as TQM, such as control charts, defect measurement matrices, Pareto diagrams, process mapping, root-cause analysis, statistical process control, fishbone diagrams, Ishikawa diagrams, design of experiments (DOE), failure mode and effects analysis (FMEA), process flow diagram and gage repeatability, reproducibility (R&R) studies though in a more structured and strategic manner than TQM.

In addition to these tools and techniques, Six Sigma integrates them into a broader, structured approach. Six Sigma relies on a concept referred to as DMAIC:

- **Define**: clearly identify the problem, the requirements of the project and objectives of the project
- **Measure**: to fully understand the current performance
- **Analyze**: the measurements collected to determine and validate the root cause(s)
- **Improve**: developing ideas to remove the root causes of variation and implement the solutions
- **Control**: to establish standard measures to maintain performance and to correct problems as needed

In addition, Six Sigma utilizes other methodologies such as the DMADV (Define, Measure, Analyze, Design and Verify) methodology. While DMAIC is used for making improvements in existing business processes, DMADV is used for designing completely new business processes which address specific customer needs. Importantly, the Six Sigma model has a statistical basis with a continuous focus on customer requirements. It achieves its objectives mainly through identifying the root cause(s) of problems or variations, striving for perfection with high targets, and cross-functional collaboration across an organization.

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Strengths of Applying Six Sigma to Higher Education:
There is a significant literature on the application of Six Sigma to higher education, suggesting that it can be particularly effective. One paper argues that, “Six sigma is not just right for improving the performance of university operations, from student recruitment to graduation, but also for transforming higher education itself.” In fact, the implementation of process improvement may be necessary for the survival of higher education institutions. Institutions now have to focus on “improving the levels of service they offer in every “customer-facing interaction”—which often times necessitates improving internal work processes.”

Though designed for businesses, Six Sigma can be applied effectively to higher education institutions. This is because the repetitive processes at higher education institutions lend themselves to Six Sigma analysis and implementation. For example, recruitment, admission, registration, academic advising, and graduation are all annual processes. Furthermore, numerous support services such as IT, lodging, financial aid, and catering can all be improved in efficiency and effectiveness.

Weaknesses of Applying Six Sigma to Higher Education:
As noted above, Six Sigma relies on data collection in order to implement process improvement. There are two challenges in this respect – the accuracy of data and the difficulty of collecting data. It is crucial that data is accurate because Six Sigma data analysis is meant to find the root causes of defects in processes, not merely symptoms. Implementing data collection at a higher education institution may be an extra burden for staff. Furthermore, “It turns out that the greatest challenge in the Six Sigma methodology is selecting and prioritizing the right projects.” Higher education institutions must consider how to focus their resources for the most effective process improvements.

Another major challenge is investing the human capital necessary to successfully implement Six Sigma institution-wide. At the leadership level, Six Sigma requires Champions (Initiative, Deployment, and Project), Master Black Belts, Black Belts, and Green Belts who all have distinct responsibilities in driving Six Sigma from choosing projects to driving analysis. If these leaders are chosen effectively, they will still require support and ideas from across an institution. As such, process improvement language, toolsets and common roadmaps must tie an institution together as they implement Six Sigma.

39 Ibid., 12.
The necessity of evaluating results highlights another issue for implementation in the higher education framework. At corporations, the value of Six Sigma implementation is generally measured in pretax income per annum.\textsuperscript{40} For corporations the ROI is expected to be 30x to 100x over a two-year period. Ultimately, success can be converted to earnings per share. For higher education, the metrics are likely to be different and less quantifiable. They may be measured in cost-savings, but also student achievement or satisfaction. Still, developing effective metrics is crucial for Six Sigma success.

\textbf{Case Studies:}

\textbf{Case Study #1 – Illinois Central College:} Illinois Central College (ICC) adopted the Six Sigma methodology in 2003 as a way to increase inter-departmental cooperation. After two years of success, the college decided to more heavily implement Six Sigma to improve processes across the college such as student services and administration. In addition, ICC offered Yellow Belt and Green Belt training to employees across the college.

On the Six Sigma portion of its website, ICC lists its processes currently undergoing Six Sigma, as shown in Figure 4. The website provides a detailed description of each process, including the involved supervisors, team members and sponsors as well as details of the projects’ statuses within the DMAIC methodology. ICC even invites further Six Sigma proposals from anyone in the college community. The website provides a Six Sigma Charter worksheet and details as to submitting a Six Sigma Charter and how it will be evaluated. It even provides an interactive Project Readiness Checklist for users to evaluate their proposals prior to submission. ICC is a prime example of a higher education institution embracing Six Sigma as its improvement model.

Figure 4: Six Sigma Projects at Illinois Central College

<table>
<thead>
<tr>
<th>Project</th>
<th>Progress/Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation and Improvement of Corporate and Community Education</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Enterprise Work Systems</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Interpreter Preparation Program Admissions</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Admission</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Advising Development Students</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Advisement</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Computer Lab Classrooms</td>
<td>Define Measure</td>
</tr>
<tr>
<td></td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Bookstore Charges</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Bookstore Charge Process</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Constructing the Class Schedule</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Process used to develop the Class Schedule</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Developing &amp; Improving Business Relationships</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Market Responsiveness: Strategic Outreach</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Course Delivery and Offerings</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Project address changes to course offering to better meet student</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>preferences</td>
<td></td>
</tr>
<tr>
<td>Identifying &amp; Responding to Emerging Market Needs</td>
<td>Define Measure</td>
</tr>
<tr>
<td></td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Athletic/Academic Tuition Waiver Processing</td>
<td>Define Measure</td>
</tr>
<tr>
<td></td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Test Proctoring</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Process whereby faculty requests or student needs are</td>
<td>Analyze Improve Control</td>
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<tr>
<td>accommodated for testing outside of a regularly scheduled class</td>
<td></td>
</tr>
<tr>
<td>session</td>
<td></td>
</tr>
<tr>
<td>Vehicle Request</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Process whereby employees request a college vehicle and its use is</td>
<td>Analyze Improve Control</td>
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<tr>
<td>changed back to the department</td>
<td></td>
</tr>
<tr>
<td>Petition to Graduate</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Process whereby students file an application for graduation and</td>
<td>Analyze Improve Control</td>
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<tr>
<td>receive notice of their status</td>
<td></td>
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<tr>
<td>Transcript Evaluation</td>
<td>Define Measure</td>
</tr>
<tr>
<td>Transcript Evaluation</td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Credit Card Compliance/Processing/Reconciliation</td>
<td>Define Measure</td>
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<tr>
<td></td>
<td>Analyze Improve Control</td>
</tr>
<tr>
<td>Course Quality Approval Process</td>
<td>Define Measure</td>
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<tr>
<td></td>
<td>Analyze Improve Control</td>
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</tbody>
</table>

Source: Illinois Central College.41

The following two case studies illustrate the application of the Six Sigma model. The first one illustrates the concept of the “acceptable level of imperfection.” The second one illustrates the application of the DMAIC methodology.

Case Study #2 – Applying Six Sigma: For some colleges, there are three outcome measures for the processes contributing to graduation performance: fraction of incoming students who graduate, graduation time in years, and the cost of obtaining a baccalaureate degree. An institution may want to reduce its average six-year graduation rate and the standard deviation of this average. To do this, it is first

necessary to distinguish between causes that are uncontrollable within the scope of the Six Sigma project and those which can be improved.

Given that certain factors affecting graduation (e.g. family situations) are uncontrollable, then a 100 percent graduation rate on average is not possible, but if the institution found that it could achieve an 80 percent graduation rate on average by eliminating or improving the factors that are controllable, it can have a major impact. These factors might include class availability, class scheduling, and student advising. If this level of analysis were applied to all the repetitive college processes from recruitment through graduation, then the college could be said to be operating in the best possible manner. Figure 5 illustrates this concept of an “acceptable level of imperfection” where “any quality improvement made beyond that point is more expensive than the expected cost savings of fixing the imperfection.”

**Figure 5: Finding the Acceptable Level of Imperfection**

![Diagram showing the impact of quality level on cost, with an optimum point where the cost is minimized.](source: Xerox)

**Case Study #3 – Xerox Global Services:** Xerox Global Services (Xerox’s consulting arm) consulted for a higher education institution looking to improve how information flowed in, through, and out of the institution. Using the DMAIC Lean Six Sigma methodology, the consultants were able to make recommendations to the institution about centralizing and digitizing information storage methods. This case study specifically illustrates the application of the DMAIC methodology.

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1. **Define:** At many institutions, student documents are stored only in hard copy and not collectively. This slows down numerous processes such as accessing information for stakeholders. Documents have to be scanned or faxed and storage is expensive, wasting both time and finances.

2. **Measure:** Xerox calculated numerous variables such as amount of storage available and being used, number of information requests, length of time to fulfill those requests, number of times requests had to be redone, and level of user satisfaction.

3. **Analyze:** Xerox analyzed the aspects of processes which had no-value-added. It took both hard costs and intangible benefits (e.g. user satisfaction) into account. As a result of this analysis, Xerox considered various solutions such as storing information online to reduce storage costs, data transfer costs (e.g. mailing), and implementing a single point of access for all student information.

4. **Improve:** During this part of its Lean Six Sigma implementation, Xerox utilized a pilot program before full-scale roll-out of the new processes. Full implementation resulted in reduced costs, increased staff productivity, and the increased ability to collaborate about the digitized information among departments.

5. **Control:** The final step was to put controls in place ensuring for maintaining the improvements long-term. Controls included putting metrics into place to measure productivity and feedback.\(^4^4\)

**Conclusion:** Significant literature exists on the applications of Six Sigma and Lean Six Sigma to higher education, suggesting that it is a viable option for a quality improvement model. Six Sigma is beneficial because it allows administrators to zero in on specific processes within the institution that require process improvement. Since higher education institutions consist of numerous repetitive processes involving “customers,” they are primed for implementing the Six Sigma methodologies. As the three case studies illustrated, higher education processes that can utilize Six Sigma range from graduation rates to digitizing student records (notice that these processes are primarily administrative). However, it is worth noting that to successfully implement Six Sigma and to “control” its positive results, an institution must implement effective metrics. In addition, the human capital resources necessary to train leaders and to define and prioritize projects is immense.

ISO 9001

The Model in Context: Though the United States dominated global manufacturing in the 1950s and 1960s, the rise of global trade in the 1980s led to the necessity for international standards. In 1987, the International Organization for Standardization (ISO) adopted the ISO 9000 series of standards with members from 91 nations. Today, ISO 9001 (the document containing the requirements) is a world-recognized standard and many companies look to obtain the certification. Importantly, “The ISO 9000 standards are based on the idea that a well designed quality assurance program provides confidence in the organization’s products and the management team.”

Summary: ISO 9001 is a Quality Management System Standard – “a system of clearly defined organizational structures, processes, responsibilities and resources used to assure and build on minimum standards of quality.” For a company’s customers, commercial or otherwise, the standard ensures them that “minimum acceptable systems, processes and procedures are in place to ensure product and service quality can be met.”

Much like the TQM and Six Sigma models already discussed in this report, ISO 9001 focuses on documenting an institution’s processes and implementing continuous improvements. Documentation of revisions and procedures can act as a training mechanism. However, unlike Six Sigma, ISO 9001 provides a template to evaluate quality management more so than a methodology for improving business performance. ISO 9001 does not have guidelines for how to achieve continuous improvement, though that is part of its doctrine. As a result, quality improvement models are often utilized to supplement quality management systems. Thus ISO 9001 can be the foundation of an institution’s quality management, which the institution can supplement with quality improvement models such as TQM and Six Sigma.

The Methodology:
The ISO 9001 requirements contain twenty elements of quality standards as listed in Table 1 (please see Appendix A for a descriptive list of these elements). The successful implementation of quality standards within all these elements can lead to ISO 9001 certification.

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47 Ibid., 2.
48 Ibid., 3.
49 Ibid., 5.
Table 1: The 20 Elements of ISO 9001 Standards

<table>
<thead>
<tr>
<th>Management Responsibility</th>
<th>Quality System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Review</td>
<td>Design Control</td>
</tr>
<tr>
<td>Document Control</td>
<td>Purchasing</td>
</tr>
<tr>
<td>Handling of Purchaser Supplied Product</td>
<td>Product Identification and Traceability</td>
</tr>
<tr>
<td>Process Control</td>
<td>Inspection and Testing</td>
</tr>
<tr>
<td>Inspection, Measuring and Test Equipment</td>
<td>Inspection and Test Status</td>
</tr>
<tr>
<td>Control of Nonconforming Product</td>
<td>Corrective Action</td>
</tr>
<tr>
<td>Handling, Storage, Packaging and Delivery</td>
<td>Quality Records</td>
</tr>
<tr>
<td>Internal Quality Audits</td>
<td>Training</td>
</tr>
<tr>
<td>Servicing</td>
<td>Statistical Techniques</td>
</tr>
</tbody>
</table>

Source: Applied Quality Strategies

Since the ISO 9001 standards were written by engineers and quality professionals from large manufacturing industries, the primary methodological challenge is to interpret the standards for higher education application. If a higher education institution chooses to implement ISO 9001, a major decision will be which interpretation of the standards to use. Some authors only attempt to re-interpret some of the twenty elements in relation to education while others have re-interpreted all of the elements. Some elements, such as Document Control, Management Responsibility, and Corrective Action, are easily re-interpreted in a higher education framework, while others such as Product Identification and Traceability, and Handling of Purchaser Supplied Product are more challenging.

As an example, Karapetrovic et al. utilize a system which re-interprets all twenty elements, though their analysis is primarily based on engineering departments. To apply the standards to higher education, each institution must be said to create three main products: student knowledge, abilities and competencies; courses and programs; and research (new knowledge). Translating the ISO 9001 standards for higher education usage requires redefining the manufacturing terms within the context of these three “products” as shown in Figure 6.

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Though full details of Karapetrovic et al.’s interpretation of the standards cannot be provided in this report, it is worth highlighting an example of how they re-interpret the standards for higher education. Contract review is one of the twenty ISO 9001 elements designed “to provide the faculty (department) with a clear understanding of customers’ needs and specifications, to evaluate if these needs can be achieved, and to provide the customers with a clear understanding of the manner in which the faculty (department) shall meet them.” To implement this element, various processes can be undertaken such as:

- Defining and documenting the industry and society requirements with respect to undergraduate and graduate programs offered, by means of alumni and employers surveys, questionnaires, interviews, as well as the analysis of available legislation, governmental guidelines and standards.

Source: Karapetrovic et al.53

54 Ibid., 108.
Review of students’ understanding of the admission requirements, program content and context, graduation requirements, and their responsibilities and authorities, through interviews and surveys.\footnote{55 Karapetrovic. Op. cit., 108.}

The objective of successful contract review is similar to the data collection and measurement conducted in both TQM and Six Sigma by providing an overview of existing processes and expectations. This opens the door to other types of verification and validation such as design of tests, exams, and project requirements (ISO 9001 element: control of inspection, measuring, and testing equipment) or professional development (ISO 9001 element: training). Within each of these elements, quality improvement processes can be utilized. For example, analyzing the design of tests, exams, and project requirements might demonstrate quality inconsistency across or even within departments which could lead to re-design so that graduating students have consistent qualifications.

**Strengths of Applying ISO 9001 to Higher Education:**

In addition to ISO’s advocacy of the application of ISO 9001 to higher education, a wide body of literature promotes the application. The primary argument for application is that in an increasingly globalized education sector, ISO 9001 certification provides globally-recognized quality assurance in the same way for educational institutions as it does for corporations. Even in a domestic or regional market, the credibility, accountability, and dedication to quality promote a committed image of a higher education institution.\footnote{57 Van der Bergh, Wouter. “Application of ISO 9000 Standards to Education and Training.” European Centre for the Development of Vocational Training, p. 45. October 1997. http://www.ilo.org/public/english/region/ampro/cinterfor/temas/calidad/doc/iso.pdf} This may be especially true in a technical college largely devoted to vocational training where consistency and quality of student qualifications is crucial. The implementation of ISO 9001 standards has additional benefits:

- Provides a visible, understandable and verifiable focus for the internal quality improvement efforts of an organization
- ISO 9000 obliges the organization to formalize its quality level, and develop procedures to avoid deterioration in the future
- The perspective of a certificate and formal recognition of the efforts undertaken is important for the motivation of staff
Unlike traditional quality approaches in education and training, ISO 9000 standards consider education or training objectives not as isolated processes, but in the context of the organization’s quality objectives.

The compulsory requirements avoid the use of ‘TQM a la carte’ with no clear milestones.

Documenting and operating a quality system is seen as an excellent means for maintaining quality levels in organizations with a high turnover of staff (e.g., some higher education institutes) or who use external teachers and trainers.

Weaknesses of Applying ISO 9001 to Higher Education:
Given all the elements of ISO 9001 and the re-interpretation of the standards in a higher education framework, it is a major investment: “The establishment of an ISO 9001 quality system in a university environment certainly requires a considerable amount of human, financial and information resources.” However, Karapetrovic et al. assert that “this does not imply that universities or departments that are considering implementation have to start from scratch and spend hundreds of thousands of dollars in the endeavor.” Much of the documentation required for accreditation means that most higher education institutions already have a good start on ISO 9001 quality standards.

That being said, interpreting the ISO 9001 standards to fit a higher education framework requires some work. Even among experts, there is significant disagreement as to how to interpret the standards for higher education. Interpretation problems include terminology, order of the elements, methods and extent of quality assurances, and product definitions. These interpretation problems, in turn, bring up the issue of relevance: The ISO 9000 standards were designed for medium to large corporations in the manufacturing sector. Requirements such as document control and quality records may formalize quality at a higher education institution, but may not add value in the way that they would for a manufacturing firm. In addition, ISO 9001 has no minimum standards since an institution sets its own. ISO 9001 simply provides a way to structure these standards. Some higher education institutions have found that the ISO 9001 standards are best implemented only in certain departments or offices rather than institution-wide.

Furthermore, obtaining a globally recognized certification of quality standards management may be less relevant for institutions that are not particularly interested in reaching a global audience. Implementing ISO 9001 may be of internal benefit, but unlikely to hold the importance it does for major international corporations or

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60 Ibid.
62 Ibid., 51-52.
institutions engaged in global trade. The audit process required for certification can also be costly.

**Case Studies:**
ISO 9001 implementation in higher education has occurred primarily outside the U.S. The main case studies are of institutions in Asia, Germany, Australia, and the UK. However, numerous American higher education institutions offer courses on ISO 9000 standards. For example, Ivy Tech Community College in Indiana offers a 16-hour clause-by-clause training course to help organizations achieve ISO 9001 certification.63 This indicates that this quality management model is still viewed primarily as a business certification among American higher education institutions.

**Case Study #1 – Lansing Community College:** Lansing Community College’s (LCC) Financial Services Division became ISO 9001 certified in 2005. LCC’s website states that:

> We pursued this certification in a quest to develop and implement a quality management system (QMS) to better satisfy the needs of our customers, to ensure employee satisfaction and empowerment, and to facilitate the continuous improvement of our processes and services.64

LCC’s Financial Services division implemented the standards in an effort to provide quality and friendly service, as well as “products and services that meet or exceed the requirements and expectations of our customers.”65 To achieve this objective, the division utilizes customer feedback and focuses on continuous improvement in its processes. As required by ISO 9001 standards, the division maintains a Quality Policy and annual documentation to ensure accuracy and stability in their procedures and quality management. The certification gives credibility and accountability to LCC’s Financial Services division.

In addition, LCC’s Business & Community Institute, Business, Media, and Information Technology Division, Administrative Services Division, and Student & Academic Support Division achieved ISO 9001:2000 certification. LCC states that “Lansing Community College is the first community college in the country whose business functions achieved ISO registration.”66 LCC utilizes tools including monthly management reviews, semi-annual internal audits, and annual third party audits.

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LCC’s ISO audits ensure compliance with its standards in the following six areas: objectives for quality, continual improvement, balance between documentation, skills, and training, design control, monitoring and measuring, and customer satisfaction.67

Case Study #2 – University of Surrey, UK: The University of Surrey is one of the many international universities implementing ISO 9001. In 2004, the university’s Polymer Research Centre in the School of Biomedical and Molecular Sciences achieved ISO 9001 certification. The university’s website states that: “The certification gives customers an assurance of quality control, and the knowledge that enquiries [sic] to the Centre and projects undertaken by them will be dealt with professionally, promptly and efficiently.” The university took two years to obtain the ISO certification, working with an ISO consulting company which had primarily undertaken manufacturing certification previously.68

Achieving ISO 9001 certification was important to the Polymer Research Centre’s work. The majority of the Centre’s industry-funded work was driven by customer requirements. Responding to customer needs required a quality management system so as to ensure consistency in the Centre’s products. Administrators were particularly concerned with maintaining the rigor and reputation of the school’s research and believed that ISO 9001 certification would contribute directly to that objective. The University described the effects of their implementation (emphases added):

The systems which are now in place, include a central logging process for all projects, documentation, standard experimental procedures and a comprehensive quality assurance manual, all electronically available to Research Centre staff. This means that colleagues can pick up on inquiries in the absence of the project supervisor and during periods of leave or sickness, work is not delayed or postponed. Every project has a unique project number and control form and since all equipment needs to be calibrated periodically, the electronic schedule picks up when calibration is due and notifies the technician. The quality management system includes a facility for customer feedback, so comments from the customer satisfaction survey can be taken into account as the Centre constantly seeks to improve its efficiency.69

Conclusion: ISO 9001 standards provide a way for higher education institutions to categorize and understand quality management: “If an education or training organization is looking for a comprehensive quality assurance approach, then the principles and requirements of ISO 9001 or 9002 are to be considered seriously.”70

Many efforts have been made to re-interpret the traditionally manufacturing-oriented

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67 “Lansing Community College…” Op cit.
elements to higher education. The main advantages are the comprehensive nature of the quality management, which provides a globally recognized certification if fully implemented.

However, the continuous process improvement which is part of ISO 9001 does not have a framework, meaning that institutions are likely to supplement implementation with a quality improvement model such as TQM or Six Sigma. Since higher education institutions will be primarily interested in quality improvement, standardizing their quality management may be of less importance. In addition to requiring supplemental quality improvement frameworks, ISO 9001 standards require heavy resource investment in a system not principally designed for education. The creativity needed to fit ISO 9001 standards to a higher education framework make it less amenable than other quality improvement models.
Baldrige Award Criteria

The Award in Context: Unlike the other models described in this report, the Baldrige Awards are criteria utilized annually to evaluate institutions’ applications of quality improvement measures. These quality improvement measures might be implemented using one of the models already described in this report.

The Malcolm Baldrige National Quality Award was named for the U.S. Secretary of Commerce from 1981 to 1987. Baldrige was remembered for his contribution to long-term improvements in the effectiveness and efficiency of government. The Award was created by Public Law 100-107 in 1987 and is principally supported by the Foundation for the Malcolm Baldrige National Quality Award, established in 1988.71

Summary: Given the drop in U.S. dominance in top manufacturing quality, the Award aims to create a public-private partnership whereby national awards are given to institutions that best implement quality improvement programs according to the criteria. Organizations in six categories may apply: manufacturing, service, small business, nonprofit, education, and healthcare. Applicants must undergo evaluations by panel and site visits in order to win the award.72 Public Law 100-107 states that:

A national quality award program of this kind in the United States would help improve quality and productivity by:

- Helping to stimulate American companies to improve quality and productivity for the pride of recognition while obtaining a competitive edge through increased profits;
- Recognizing the achievements of those companies that improve the quality of their goods and services and providing an example to others;
- Establishing guidelines and criteria that can be used by business, industrial, governmental, and other organizations in evaluating their own quality improvement efforts; and
- Providing specific guidance for other American organizations that wish to learn how to manage for high quality by making available detailed information on how winning organizations were able to change their cultures and achieve eminence.73

The Methodology:
Continuous improvement is the basic tenet of the Baldrige Award criteria. For each of the criteria, companies and institutions are asked how they plan to improve in that area. Both process and results oriented, the award criteria are intended to address many company operations, processes, strategies, and requirements.74 The Baldrige

criteria are composed of seven, weighted criteria consistent across all types of applicant organizations. The Education Criteria for Performance Excellence provides specific sub-criteria to fit within an education framework with a potential total of 1,000 points.

Table 2: Baldrige Education Criteria for Performance Excellence

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-Criteria</th>
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<tbody>
<tr>
<td>Leadership</td>
<td>Senior Leadership, Governance and Societal Responsibilities</td>
</tr>
<tr>
<td>Strategic Planning</td>
<td>Strategy Development, Strategy Deployment</td>
</tr>
<tr>
<td>Customer and Market Focus</td>
<td>Customer Engagement, Voice of the Customer</td>
</tr>
<tr>
<td>Measurement, Analysis, and Knowledge Management</td>
<td>Measurement, Analysis, and Improvement of Organizational Performance, Management of Information, Knowledge, and Information Technology</td>
</tr>
<tr>
<td>Workforce Focus</td>
<td>Workforce Engagement, Workforce Environment</td>
</tr>
</tbody>
</table>

Source: Baldrige National Quality Program

Utilizing the Baldrige criteria as a quality improvement methodology usually requires some supplemental process improvement strategy, however, the criteria do provide a comprehensive means to assess, report and improve on processes. The Baldrige criteria first requires institutions to describe themselves in terms of areas such as structure, governance, culture, core competencies, workforce profile, competitive environment, and stakeholder support. This assessment forces organizations to take stock of their quality.

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76 Ibid.
In the rest of their applications, institutions must detail where they currently stand on each of the criteria as well as their objectives and how they plan to achieve them. For example, organizations must detail their current strategic planning process and how it addresses key factors. Institutions must then explain their strategic objectives, the timetable for achieving them and how they address areas such as innovation and stakeholder requirements.\footnote{“Education Criteria...” Op cit.}

Importantly, the criteria focus on many of the same areas of quality as both TQM and Six Sigma. Applicants are asked how their programs, offerings, and services meet or exceed the requirements of their “customers.” Institutions must demonstrate that they are engaging both these external customers as well as internal customers (the workforce) in every process. In addition, data collection and measurement is a crucial aspect of the Baldrige criteria. Institutions must detail how they collect and analyze data on customer satisfaction in terms of both requirements and changing expectations as well as data in areas such as enrollment, purchasing, and personnel decisions. Institutions must also put this information in the context of their competitive environments and institute metrics for performance analysis.\footnote{Ibid.}

In terms of process improvement, the Baldrige criteria do not include an established framework, but they do require institutions to work towards “mature processes.” As Figure 7 illustrates, the criteria encourage institutions to move from fire-fighting type reactions to problems to establishing effective strategic and operational goals which are integrated among units, thus encouraging progress, innovation and collaboration.
Strengths of Applying Baldrige to Higher Education:
The education criteria for the Baldrige Award were established in 1999. Since then, an increase in the number of educational institutions receiving the Baldrige Award indicates that the criteria are becoming a widely-used framework for quality evaluation and improvement.

Two models already discussed in this report – TQM and Six Sigma (as well as their derivatives) – are business methodologies which have been adapted to fit within a higher education framework. For many educators, adapting business management philosophies and quality improvement methodologies to higher education is inappropriate, even if they do want to engage in continuous improvement. In this regard, the Baldrige criteria are now specifically designed for application by educational institutions but allow quality improvement methods to vary “depending on the mission and culture of each institution.”

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Additionally, methodologies like TQM and Six Sigma often require complex data collection and statistical analysis which may not be appropriate for higher education. As one administrator at a Baldrige state-level award-winning college noted, “There is no more deadly approach to a quality initiative than beginning with massive efforts to train staff in statistical process tools.”81 In fact, the whole Malcolm Baldrige process is less disruptive to an institution:

There are no tools, no teams, no processes, no prerequisites to getting started in Malcolm Baldrige. It is not necessary to re-engineer, get total leadership buy-in, or disrupt the organization in any way to be “in.” With the MB Criteria, you simply write about what (how) you are doing regarding each of the categories.82

For many organizations, the Baldrige assessments and feedback are much more rigorous than the various accreditation processes higher education institutions undergo. These accreditations generally require adherence to minimal standards rather than quality improvements. As the University of Wisconsin, Stout (2001 Baldrige National Award winner) Chancellor Charles Sorenson explained, “We liked the paradigm of the Baldrige. It was tight, it was focused and it didn’t necessarily tell you what you had to do within those seven categories. It allows you to really address those things in your mission and how you function.”83

The Baldrige criteria incorporate continuous improvement in the same way as other models in this report. Sorensen stated that, “We think differently at this campus now…We think with more vision than we ever did before, always looking ahead five years at what we want to become and how we’re going to get there.” Since winning the award, UW-Stout has had numerous requests from international and domestic schools and private sector organizations requesting presentations and consultations, illustrating the widespread respect for the Baldrige Award and criteria as another of its strengths.84

**Weaknesses of Applying Baldrige to Higher Education:**

Having noted the strengths of the Baldrige criteria over business models like TQM and Six Sigma in the application to higher education, it must be noted that these two business models provide a structure to quality improvement which the Baldrige criteria do not. As noted, the criteria do not have specific process improvement guidelines, though they encourage institutions to improve in a certain way. This missing component can allow more flexibility, but without being particularly prescriptive, the criteria may be less attractive to institutions requiring structural guidelines for process improvement.

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82 Ibid., 7.
83 Green, Robert. “2001 Baldrige Award Winner Profile: University of Wisconsin-Stout.” *Quality Digest Magazine.* http://www.qualitydigest.com/sept02/articles/05_article.shtml
84 Ibid.
Another weakness of the Baldrige criteria is that they do not particularly address institutions’ maturity or capability levels or institutions’ positions within their competitive environments. Due to the individualistic and flexible nature of the criteria, each institution chooses to apply the criteria as befits them. This means that even as higher education institutions across the nation win the awards, their practices might not be particularly comparable. In addition, the actual organization of the award bears some questions. Many of the evaluators are “volunteers” and eighty percent of the organizations which apply for the award do not receive site visits, placing a heavy emphasis on the application without seeing institutions’ processes in action.  

Case Studies:  
Case Study #1 – Richland College: Richland College won a Baldrige Award in 2005, the first community college to receive the award. Richland is a community college in the Dallas County Community College District. Richland’s award-winning profile highlighted its numerous quality improvement efforts. It established four strategic planning priorities:

- Identify and meet community educational needs
- Enable all students to succeed
- Enable all employees to succeed
- Ensure institutional effectiveness

For each of these strategic priorities, Richland provided associated measures for success called Key Performance Indicators. To evaluate and ensure progress, Richland’s “ThunderTeam” meets once a month to review the Key Performance Indicators and looks for root causes and actions to improve in those areas where it is not achieving progress. In addition, “With input from a broad range of stakeholders, including students, faculty, staff, and community members, RLC’s ThunderTeam, comprised of senior leaders, sets and deploys RLC’s vision and values, directions, and performance expectations.” Richland also helped found and participates in the League for Innovation in the Community College and the Continuous Quality Improvement Network.

As mentioned, defining metrics for quality improvement can be challenging at higher education institutions. Richland’s success in implementing quality improvement was measured in various ways:

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87 Ibid.
88 Ibid.
v The number of students who complete the core curriculum in preparation for transfer to four-year institutions has grown from 500 students in 2002 to 1,660 in 2005.

v From 2000 to 2005, RLC’s enrollment for credit students has increased from about 12,500 to about 14,500, exceeding local competitors.

v Four satisfaction measures students rate as most important, including classes scheduled, class time convenience, variety of courses, and intellectual growth, have surpassed the Noel Levitz Student Satisfaction national norm over the past four years.

v RLC has a well-deserved reputation as a “leadership training ground;” 22 of its former employees have been named as presidents of other colleges.89

Case Study #2 – San Juan College: This community college in Farmington, New Mexico was awarded state-level Baldrige awards in 1995 (RoadRunner), 1998 (RoadRunner), and 2000 (Zia). Dr. Nelle Moore, Director of Institutional Research and Planning, recounted the experience of using the Baldrige criteria for higher education quality improvement. She was particularly impressed by how quickly the process took hold after applying for an award. Explaining that filling out the application made it obvious where there were holes in the institution’s quality management, winning the RoadRunner award was still an important step for the college:

In one move, the College became enmeshed in the quality process. The MB Criteria provided a framework and a language to guide the College. Several issues that had been ignored for years, such as professional development for faculty and staff, came to the forefront as critical issues. The new 5-Year Plan was designed around the seven MB Criteria…90

Most importantly, “The Malcolm Baldrige Criteria have provided a conceptual framework and a set of core values that have unified and focused the action planning process of the College.” The College had been considering implementing TQM, but found the Baldrige criteria an easier way to enter the quality improvement world.91 This case illustrates that simply addressing the criteria can be a catalyst to quality improvement without implementing a business model that requires significant investment and cultural change within an institution. Though they do not provide a framework for process improvement, the criteria do provide a framework for assessment.

89 “Richland College, 2005 Award Winner.” Op cit.
91 Ibid., 7.
Case Study #3 – University of Wisconsin, Stout: The University of Wisconsin, Stout (UWS) won a National Baldrige Award in 2001. UWS demonstrated numerous ways in which it was addressing quality improvement on its campus, which is part of the much wider University of Wisconsin system.

Feedback mechanisms were particularly strong. The Chancellor’s Advisory Council is a “cross-functional mechanism for organizational planning.” The Council has nineteen members “consisting of senior leaders and faculty, staff, and student representatives, aims to foster a unified view of the UW-Stout mission and its top priorities: student learning and development.”92 In addition, the Council is charged with developing the university’s strategic plan, budget, and priorities for improvement with help from cross-organizational committees and teams. UWS places great emphasis on open communication, also utilizing surveys, website postings, and open forums to encourage feedback. Moreover, UWS focuses on “customer satisfaction” by listening to its students using numerous individualized, state, and national survey data to obtain segmented satisfaction data by ethnicity, gender etc.93

UWS also places significant emphasis on stakeholder satisfaction. For example, maintaining close ties with local businesses provides opportunities for student internships. The university also maintains close agreements with local two-year colleges to ensure effective transitions for students looking to obtain four-year degrees at UWS. Employers of UWS graduates are consistently surveyed to determine satisfaction with its degree programs in terms of workforce preparedness. In fact, UWS’s distinguishing feature is its career-driven curriculum. Benchmarking itself against similar universities, UWS constantly revises its degree programs: “Between 1995 and 2001, UW-Stout revised requirements for 26 degree programs and added seven new ones.” Using industry input, educational reviews, and systematically gathered data UWS is able to constantly undergo these quality improvements to ensure its students are well-prepared.94 Like Richland College, UWS has established various metrics on which to judge its progress:

- Ninety-nine percent of employers surveyed rate UW-Stout graduates as well-prepared.
- Since 1996, the job placement rate for graduates has been at or above 98 percent.
- UW-Stout’s “Mission Driven-Market Smart” focus is characterized by an array of programs leading to professional careers primarily in industry and education.
- About 90 percent of alumni say they would attend UW-Stout again.95

94 Ibid.
95 Ibid.
**Conclusion:** The interest in the Baldrige Award across higher education institutions indicates a continuing trend toward implementing quality improvement programs. The Baldrige criteria provide a comprehensive framework for institutions already implementing or planning to implement quality management and improvement systems. The criteria mirror many of the same quality improvement areas as TQM and Six Sigma. An organization’s ability to fulfill a complete application itself indicates a commitment to their current and future quality objectives. Importantly, this may not require the same level of investment or disruption as other models discussed in this report.

On the other hand, the Baldrige criteria do not have a prescriptive framework for quality process improvement. This could be perceived as a negative because institutions may be looking for a distinct framework for their quality improvement measures. If institutions desire this, they may look to supplementing Baldrige with business models such as TQM or Six Sigma.
Academic Quality Improvement Program

**The Model in Context:** Unlike other models in this report, the Academic Quality Improvement Program (AQIP) is uniquely designed for higher education. The Higher Learning Commission, a commission of the North Central Association of Colleges and Schools launched AQIP in July 1999. Institutions already accredited by the Commission can undergo AQIP’s alternative evaluation process based on quality improvement processes. The number of participating institutions grew from fourteen in 2000-01 to over 180 in 2007. The program “infuses the principles and benefits of continuous improvement into the culture of colleges and universities by providing an alternative process through which an already-accredited institution can maintain its accreditation.”

**A Note on SACS Quality Enhancement Program:** It is worth noting that XYZ is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (SACS), which has its own quality enhancement criteria. Since 2001, SACS has published “The Principles of Accreditation: Foundations for Quality Enhancement.” A revised edition has been released in 2010.

SACS requires each institution applying for accreditation “to document the quality and effectiveness of all its programs and services.” In fact, under Core Requirement 2.12 of SACS accreditation, each institution must “develop an acceptable Quality Enhancement Plan (QEP). Engaging the wider academic community, the QEP is based upon a comprehensive and thorough analysis of the effectiveness of the learning environment for supporting student learning and accomplishing the mission of the institution.” Though an institution’s QEP must include implementation plans, goals, and assessment methods, it is not a comprehensive quality improvement program in the same way as AQIP. It does not include a process improvement methodology or categorizations of quality improvement areas.

**Summary:** AQIP draws from models such as TQM, Continuous Improvement, Six Sigma, ISO 9000 standards, state and national quality awards, and especially the Baldrige criteria. By incorporating these concepts into a model specifically designed for higher education, AQIP is a significant step in higher education quality improvement. Like other models, AQIP is about “focusing on key processes, basing
decisions on data, decentralizing control, empowering faculty and staff to make the decisions that directly affect their work,” systems thinking, and stakeholder focus.\textsuperscript{103} In order to achieve what AQIP calls “reaffirmation” - the reaccreditation process utilizing AQIP standards – institutions must complete several steps:

- Identify and take action on their most crucial issues (Action Projects)
- Use peer review and feedback (Strategy Forums)
- Use AQIP to be held accountable for progress (Annual Update Reviews)
- Analyze themselves (following an outline of key processes)
- Prepare a comprehensive written description (continuously revised) of current practices and current levels of performance (Systems Portfolio)\textsuperscript{104}

Following this entire process, each institution is assigned a peer review team every four years to perform a Systems Appraisal – a review of the institution’s adherence to its Annual Update Reviews, analysis, and Systems Portfolio in achieving progress on its Action Projects. The peer reviewer team will also provide “actionable feedback” regarding the institution’s future quality improvement priorities. In addition, institutions undergo a Quality Checkup visit.\textsuperscript{105}

**The Methodology:**
The AQIP methodology is founded on its “Principles of High Performing Organizations,” which underlie its evaluation process and the values accredited institutions should seek to embody. These principles, as shown in Table 3, create a different perception of AQIP compared to other models outlined in this report. A value-based quality improvement model may be more in line with higher education objectives than the bottom-line driven business models such as TQM and Six Sigma. On the other hand, AQIP incorporates many of the same quality improvement principles.

**Table 3: AQIP’s Principles of High Performing Organizations**

| **A mission** and vision that focus on serving students’ and other stakeholders’ needs | Broad-based faculty, staff, and administrative involvement |
| Leaders and **leadership** systems that support a quality culture | A **learning**-centered environment |
| **Respect for people** and willingness to invest in them | **Collaboration** and a shared institutional focus |
| **Agility**, flexibility, and responsiveness to changing needs and conditions | **Planning** for innovation and improvement |
| Fact-based **information**-gathering and thinking to support analysis and decision making | **Integrity** and responsible institutional citizenship |

Source: The Higher Learning Commission\textsuperscript{106}

\textsuperscript{105} Ibid.
Given a required adherence to these values, AQIP has nine categories in which institutions can place a group of related processes: Helping Students Learn, Accomplishing Other Distinctive Objectives, Understanding Students’ and Other Stakeholders’ Needs, Valuing People, Leading and Communicating, Supporting Institutional Operations, Measuring Effectiveness, Planning Continuous Improvement, and Building Collaborative Relationships. The interrelationship among these nine categories is illustrated in Figure 8, with understanding “customer needs” as the primary category.

**Figure 8: The Interrelationship of the Nine AQIP Categories**

![Diagram showing the interrelationship of the nine AQIP categories](source: AQIP Accreditation Handbook)

For the processes in each category, institutions must provide analysis. AQIP provides a four-step model which is similar in many ways to Six Sigma’s DMAIC (and related) process improvement methodology. Each process is put through this four-step analysis, which is founded on similar principles of data measurement, analysis, and improvement. However, this four-step methodology requires institutions to put their processes in the context of their own institutional objectives and identity. This allows for the fact that higher education institutions are different and that pure efficiency or profit increases may not be the most productive outcome for certain processes.

- **Context**: Questions that explain how a particular system is realized in a given college or university
- **Processes**: Questions that ask how the institution has designed and deployed processes that help it achieve its overall goals
- **Results**: Questions that ask about the performance of institutional processes, whether performance results meet stakeholder requirements
- **Improvement**: Questions that ask how the institution promotes systematic improvement of its processes and performance in each category

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107 “Maintaining Accredited Status through the Academic Quality Improvement Program (AQIP).” The Higher Learning Commission, p. 7.  
http://www.wctc.edu/general_info/accreditation_quality_improvement/acc_handbook.pdf

For example, AQIP’s final category, Building Collaborative Relationships, “analyzes how [an] institution’s current and potential relationships contribute to accomplishing [its] mission.”109 Thus, relationships for any AQIP-aspiring institution should be mission-driven. This is a slightly different vision than Six Sigma, for example, where relationships are more often measured by how they directly benefit the institution in some efficiency or profit-driven manner. Using the four-step methodology, institutions can contextualize their internal and external relationships, how they maintain these relationships, how these relationships affect the institution, and how the institution might improve the processes related to maintaining these relationships.

AQIP’s goal is to create a comprehensive quality improvement process: “The AQIP Categories’ comprehensive nature and specific questions about processes, results, and improvement allow each organization to fully describe its activities and accomplishments while analyzing itself in a way that promotes critical and productive thinking about improvement.”110

**Strengths:** AQIP’s primary strength as compared to the other models discussed in this report is that it is designed for higher education. Thus, AQIP does not require adaptation, re-interpretation or translation to work within a higher education framework. This makes it easier to implement immediately. Also, AQIP encourages participating institutions to focus on three or four Action Projects each year: “AQIP does not expect a college or university to address everything simultaneously.”111 This makes AQIP implementation slightly more manageable for institutions than the all-encompassing cross-functional quality improvement processes of TQM, for example. Furthermore, AQIP allows all processes to be considered within the context of an institution’s objectives, mission, and situation. Since higher education institutions have such different objectives, this is particularly important.

Institutions implementing business quality improvement models, such as those described in this report, will likely differ immensely in their implementation experiences because of their interpretations of the models. Institutions implementing AQIP will likely have more similar experiences. In this regard, the oversight process is a particular strength of AQIP. Like ISO 9001 and the Baldrige criteria, an overseeing body is able to evaluate and provide valuable feedback for participating institutions. Using Peer Reviewers and Strategy Forums, AQIP encourages networking in its review processes. As the accreditation handbook states, “The Strategy Forum is a supportive, facilitated peer review process to help an organization select, critically examine, and commit to a set of Action Projects that will drive quality

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109 Ibid., 4.
110 Ibid., 5.
111 “Maintaining Accredited Status through the Academic Quality Improvement Program (AQIP).” The Higher Learning Commission, p. 11.
http://www.wctc.edu/general_info/accreditation_quality_improvement/acc_handbook.pdf
improvement.” Moreover, AQIP encourages networking among the implementing institutions. For example, AQIP maintains “FrontPage,” a collaborative online forum for administrators at institutions utilizing AQIP.

**Weaknesses:** Since AQIP is designed to be an alternative accreditation process for higher education institutions accredited through the Higher Learning Commission, it may not be of specific interest to schools not in the North Central region. However, AQIP allows for “Associate” relationships with institutions interested in applying AQIP at their institution without the possibility for accreditation. AQIP notes:

> This level of participation is appropriate for organizations not located in the North Central Association region and therefore not eligible for Higher Learning Commission accreditation. It is also appropriate for divisions of a large organization (such as the School of Education, the College of Engineering, or the Student Affairs Division) if the entire institution is not yet ready or willing to base accreditation on an organization-wide quality initiative.

Like any of the models discussed in this report, AQIP requires time and resource investment. Each institution must weigh the costs, potential benefits and fit of the AQIP model. Other critics cite the fact that since the concept of “quality” can be defined by each individual institution, improvements might not be significant. For example, one critic stated that “quality” can mean something as mundane as increasing the percentage of local adults who take at least one community-college course per year. Nothing there will bother colleges that want to keep enrollment high by passing as many students as possible through courses of scant intellectual merit.” Critics maintain that student achievement needs to remain the cornerstone of achievement and accreditation rather than subjective conceptions of quality.

In fact, like any of the models or standards described in this report, AQIP is not particularly prescriptive. It is focused on results – the results obtained by each institution’s compliance with AQIP’s broad mandates and decided by each institution. As a change from an accreditation process which sets minimum standards, AQIP might seem refreshing, but its ability to substantively improve an institution is largely based on effective self-reflection and improvement. AQIP maintains that certain colleges will not be cut out for the process. Steven D. Crow, the executive director of the North Central Association’s commission on higher education stated that AQIP is only open to institutions already achieving basic standards and those without financial or governance problems. He explained that

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North Central retains the right to push an institution back to using the old accreditation-review process if it does not show sufficient commitment to quality improvement under AQIP.116

**Case Studies:**

**Case Study #1 – College of Lake County:** The College of Lake County (CLC) is a community college in Grayslake, Illinois. CLC is accredited by the Higher Learning Commission and began participation in AQIP in 2002. In 2006-07 CLC implemented its Action Projects through a Governance Analysis Team, Facilities Assessment Team, and Student Advising Team. The Facilities Assessment Team pursued the AQIP methodology to “Conduct a comprehensive facilities assessment of all college buildings to improve the maintenance and replacement of major systems and facilities.” Its goals included the following:

- Work with a contractor to conduct a comprehensive facilities assessment of all the college buildings at the Grayslake and Lakeshore campuses and Southlake Educational Center.
- Assess the physical conditions, needs, scope of rehabilitative work, schedule and cost estimates for building and major equipment.
- Develop systematic preventative maintenance and replacement schedules and provide a tool for developing short- and long-term budget projections for maintenance and replacement of major systems and facilities.117

On its website, CLC publishes its past Action Projects, Systems Portfolios, and summaries of Quality Check-Up visits. A Quality Highlight Document illustrates how CLC implemented the process through its Student Advising Team: “The problems with the current system were evident through low advising ratings on student surveys, concerns reflected on faculty and staff surveys, and feedback in the AQIP systems appraisal report.” The Student Advising Team made recommendations in terms of action plans, time lines, resource needs, new policies, and programs. CLC hired a Director of Advising and created a new advising center and is working towards mandatory advising for all new students.118 CLC’s current Action Projects address Strategic Planning, College Readiness, and Sustainability.119

**Case Study #2: North Hennepin Community College:** North Hennepin Community College (NHCC) began implementing AQIP in 2006. On its website, NHCC provides an FAQ list addressing some of the concerns, particularly for

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faculty, of implementing AQIP. For example, faculty not previously involved in the accreditation process might ask how AQIP will affect them. NHCC answers that “With AQIP, the accreditation process strives to become more transparent. You will likely have a better understanding of how your every-day efforts contribute to the accreditation process on an ongoing basis and you will see how what you do impacts NHCC’s accreditation status with the HLC.” In addition, faculty might be concerned that they would have additional work as a result of AQIP. NHCC counters that “…You will likely be asked to give input on decisions that involve you or impact your area in some way. You will have an opportunity to work on action projects that are important to you, and your contributions will be recognized and valued…”

NHCC outlines a comprehensive AQIP Activity Chronology on its website, from its implementation in 2006 all the way through 2021. The implementation of AQIP began with a Vital Focus process to determine if AQIP fitted NHCC’s needs through a survey and conversation day. Since then, AQIP has completed various Action Projects. The ongoing Course Prerequisites Action Project “is meant to design and implement a system to enforce course prerequisites and placement levels and expand the current Placement for Success process. The goal will be that it results in more students who start college-level courses with the skills they need to be successful. This project will expand in a prioritized fashion as new course prerequisites and placement levels are brought forward.”

The Trust and Respect Action Project at NHCC focused on concerns about values on campus. The project was focused on the use of non-violent communication, using a methodology developed by Marshall Rosenberg. As a result of utilizing this type of communication, the committee “developed guidelines and strategies which promote and enhance communication as well as efficiency and productivity.”

The academic, value-based, and service-based variety of NHCC’s action projects illustrates the diversity of processes on which AQIP’s quality improvement methodology can be implemented.

**Conclusion:** The primary weaknesses in the AQIP model are not much different from other models and criteria described in this report in terms of time and resource investment. The primary controversy over AQIP is its use as an accreditation method, as accreditation requires adherence to certain regulatory standards. On the other hand, quality improvement models are based on an institution’s self-evaluation of areas where it needs to improve. To some critics, using self-evaluations as an accreditation method will not ensure that institutions maintain certain standards, thus...

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weakening the value of the accreditation. However, if an institution is looking to apply AQIP without undergoing accreditation, AQIP’s methodology and criteria may be an effective framework for quality improvement which will not encounter the same criticism.

In fact, this is one of AQIP’s main strengths – it is specifically designed for higher education. As such, it is concerned with individual institutional goals and how different processes fit into the context of each institution. It also provides a methodology for evaluating and improving processes within each criterion. Though it is still data-driven to some extent, the heavy statistical tool usage of some of the business models does not exist within AQIP. Furthermore, the peer review aspect of AQIP may be especially welcome for educators feeling isolated by quality improvement implementation.
Conclusion

Given this analysis, three conclusions are clear. Firstly, the implementation of any of these models or criteria at a higher education institution requires investment of time and resources and usually an institution-wide commitment to quality improvement. Secondly, certain models and criteria contain elements which are better suited for application to higher education frameworks than others. Thirdly, higher education institutions should not feel limited to implementing a single business improvement model. These models and criteria are not mutually exclusive, and may be more effective if combined.

This report aimed to provide an analysis of the strengths and weaknesses of each model in relation to higher education but does not aim to conclusively recommend one model as the best. As this report illustrated, the concepts of data-driven measurement, customer satisfaction, process analysis, process improvement, and metrics exist among all the quality improvement models and criteria, though they may use different terminologies or methodologies.

The report outlined two primary business models – TQM and Six Sigma. Both models have been successful implemented within higher education frameworks as the case studies illustrate. However, applying business methodologies to higher education requires some adaptations. Both models are heavily data-driven, though Six Sigma provided a more solid methodology for process improvement. For institutions looking primarily for ways to cut costs, improve efficiency and incorporate discreet data analysis and metrics into their quality improvements, these models are the most attractive.

ISO 9001 is also primarily a business model. The ISO 9000 standards are a globally-recognized certification obtained by many businesses and international higher education institutions. Of all the models, ISO 9001 requires the most re-interpretation to work within the higher education framework because it is primarily designed for manufacturing companies.

The two models specifically designed for education were discussed last. Like ISO 9001, the Baldrige Award provides criteria for analysis rather than a methodology. It is a nationally-recognized award scheme which has been the catalyst for quality improvement at many higher education institutions. However, without an attached methodology, it generally requires the supplement of some other quality improvement model.

Lastly, AQIP might be considered “the best of all possible worlds.” It is designed specifically for higher education institutions and allows institutions to put their quality improvement objectives within the context of their own institutional missions. It provides both process categorizations and a process improvement methodology.
However, AQIP does suffer criticism as an accreditation process and does not offer the same cost-cutting or efficiency focus as the business models described.

Ultimately, the vision of all quality improvement models incorporates increased efficiency, customer satisfaction, mission adherence, cost savings, and continuous improvement processes, as well as the following self-sustaining quality improvement objectives. Achieving these objectives ensures that quality improvement is implemented across an institution long-term, encompassing all its processes and people:

- Every employee understands the company’s business, goals, and vision.
- Every employee knows how he or she contributes to the company.
- Every employee knows how to improve their processes.
- Every employee knows how to solve problems.
- Every function works together seamlessly.123

Obtaining all of these objectives is no easy task, especially because it requires an institution-wide cultural change. The overall objective of a higher education institution focused on quality improvement should be not only to implement successful change, but to make this change self-sustaining as the institution moves forward.

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123 “Six Sigma – The Initiative, the Deployment, the Technology,” p. 5.
Appendix

20 Elements of ISO 9001

1. Management Responsibility. Management sets the company quality policy and implements it by providing resources, personnel and training.


3. Contract Review. Contracts reflect the customers’ needs and expectations. Products and services provided must comply with those requirements.

4. Design Control. Engineering drawings and design changes are carefully documented to ensure that changes have been fully coordinated and approved internally, and when appropriate, by the customer.

5. Document Control. The creation and modification of documents supporting the Quality System is strictly controlled by ISO 9001 procedures.

6. Purchasing. Purchasing procedures describe supplier requirements and the system for ensuring compliance to these standards.


8. Product Identification and Traceability. Methods of tracking date and lot codes of product and raw materials from start to finish guarantee traceability.

9. Process Control. Work instructions, quality plans and workmanship standards verify that each job is being done correctly.

10. Inspection and Testing. Inspection and testing at receiving, in-process and final inspection areas ensures quality. Test and inspection records are preserved as part of the quality system.

11. Inspection, Measuring and Test Equipment. Instruments and measuring tools are calibrated regularly and records maintained.

12. Inspection and Test Status. Only inspected materials may be used or processed further. Inspected product is always identified.

13. Control of Nonconforming Product. Materials or products that fail to meet specifications are rejected and separated from normal production. Only the proper authorities may decide if rejected material will be used as is, reworked or returned to the supplier.

14. Corrective Action. The corrective action system focuses on identifying the root cause of quality concerns and any corrective action required.

15. Handling, Storage, Packaging and Delivery. Procedures outline practices that protect products from damage during manufacturing and shipping.

16. Quality Records. Quality records provide an audit trail for internal and external auditors.

17. **Internal Quality Audits.** Specially trained teams verify that the Quality System is working by evaluating the same 20 elements required by the external auditors, on an on-going basis.

18. **Training.** Training records are maintained for every employee showing their levels of expertise.

19. **Servicing.** Where servicing is specified in the contract, procedures are established to verify that servicing meets the indicated requirements.

20. **Statistical Techniques.** Control charts, graphs and other methods of analysis determine how well a process is working and facilitate continuous improvement.
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