Quality Approaches in Higher Education

Using Quality Tools to Enhance Performance
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Although there are many voices for improving quality in America’s educational system, few of these perspectives are constructed on an understanding of the meaning of quality and the body of knowledge concerning quality related to repeatable processes. 

Over the past five decades, quality practitioners have identified several fundamental principles that led to the effective redesign of the automotive, aerospace, and service industries—and that are now systematically applied to begin curtailing errors and preventing adverse events in healthcare settings.

It is time for those in the field of education—particularly those involved in preparing leaders in education systems—to come to terms with the fundamentals of quality and begin applying quality improvement methods to education. It is time for administrators in education to stop making the same mistakes that managers in industry were making before they discovered the meaning of quality.

The Big Misunderstanding

Most administrators in education and the faculty in colleges of education who teach people to become administrators are not informed about quality. Very few ever took a class that taught them about the work of Walter Shewhart, W. Edwards Deming, Joseph Juran, or other quality experts, although most are familiar with the Pareto principle that Juran invented. Most professionals in education learned about statistical methods that are focused on the statistical significance of comparisons between populations instead of understanding variation in repeatable processes, which requires the use of control charts and range charts. This lack of understanding about quality has led to programs such as “No Child Left Behind” and the current “Race To the Top” endeavor, which both miss the point when it comes to improving quality. It has led to unfortunate and counterproductive policies, such as blaming the teachers for the problems that are built into the system. It has led to some irrelevant actions, such as establishing charter schools, which have nothing to do with addressing the causes of problems with quality. It has led to an education-industrial complex that conducts national and state examinations that provide relatively useless data. It has broken the most fundamental principles of quality improvement by instilling fear in the workforce. What is missing is an understanding of quality.

What is Quality?

In repeatable processes, such as teaching students to read, write, or understand calculus, quality is all about reducing the variation in the process and moving the performance of the students to an agreed-upon level of proficiency. While it’s important to discuss proficiency, measure proficiency, hold teachers accountable for proficiency, and preach about proficiency, no one wants to wrestle with variation, which is the key to quality.

The current educational system is designed to ignore variation, and indeed to amplify the negative effects of variation, so that a significant number of students cannot possibly succeed in the system. Remember, the current system was designed to support the needs of the rapidly industrializing economy of the 1870s. The system has not changed significantly since the presidency of Grover Cleveland.

Inputs–Process–Outputs

The starting point for understanding quality in any process is to recognize the inputs-process-outputs model, shown in Figure 1. In this model, variation in the quality of the inputs creates variations and rework in the work process and results in variation of the outputs. The more variation in inputs, the more time needed in the process to address variation and the greater the potential impact on the quality of the outputs. Variation in inputs; therefore, must be appreciated in educational systems and not ignored.
Every kindergarten teacher in the country understands the issue of variation of inputs when it comes to students. Some students arrive at school already knowing the alphabet and how to write their names while others don’t even know their names. Some are able to sit and pay attention while others cannot focus their attention for more than a few moments. This is fundamental variation in the inputs into the process, but out of this, we expect teachers to produce uniform levels of proficiency. It cannot be done and the sooner we stop blaming teachers for their inability to accomplish the impossible, the sooner we can move on to dealing with the situation. This says nothing at all about the variation that occurs in the educational processes brought about by tremendous variation in access to books, computers, audio-visual aids, and support staff. To suggest that we can overcome all of this variation simply by focusing on teacher performance is the same argument that was made 30 years ago regarding the inability of American workers to produce quality products when there were flaws with materials, equipment, and processes.

**Cause and Effect**

In almost every profession except education, quality professionals use the cause-and-effect diagram, developed by Kaoru Ishikawa, to help visualize the potential sources of variation in processes. The sources of variation in an educational process are relatively complex, as illustrated by Figure 2, where variation among the students as an input to the system is only one potential source that impacts student learning outcomes. Any academic program for leaders in education that does not engage its students in Ishikawa’s methodologies is fundamentally flawed.

Given this amount of potential variation, it isn’t surprising that some students do not make it through the process. It does little good to attempt to remedy these specific sources of variation; there are far too many to feasibly address them. In fact, in some cases these sources are ingrained in the fabric of society, making them even more challenging to resolve.

There is value in reducing some of these variations, however. For instance, we can attain improvement by increasing access to books, computers, and online teaching resources; perhaps by standardizing budget requirements for each student in each state based on federal standards and the ability to withhold federal funding from states that do not adequately fund educational systems. Ask these important questions to further enhance variation reduction efforts in this situation:

- How can we design the system to minimize the impact of variation that cannot be eliminated by providing equal access to books, computer resources, and tutors?
- How can we redesign the system to avoid amplifying the negative effects of the existing variation?

It is time to stop blaming parents, students, and teachers and start understanding and changing the system.

**Education as an Industrial Batch Process**

Prior to industrialization, most schools in the United States were small one-room schools that served the predominantly rural population. Although there were levels of proficiency established, instruction was relatively individualized, with one teacher working with small groups of children of different ages throughout the day. The school year was based on agrarian needs, with students in school from about the time when harvest was completed in the fall until planting would

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Processes</th>
<th>Outputs</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>Reading skills</td>
<td>Proficiency in:</td>
</tr>
<tr>
<td>Preparation</td>
<td>Writing skills</td>
<td>• Reading</td>
</tr>
<tr>
<td>Eyesight</td>
<td>Arithmetic skills</td>
<td>• Writing</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Social interaction</td>
<td>• Arithmetic</td>
</tr>
<tr>
<td>Parental involvement</td>
<td></td>
<td>• Science</td>
</tr>
<tr>
<td>Transportation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep</td>
<td></td>
<td></td>
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<tr>
<td>Substance abuse</td>
<td></td>
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<tr>
<td>Availability of books</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of school supplies</td>
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</tbody>
</table>

**Figure 1: Variation in Students as Input**
resume in the spring. Today’s homeschooling model is a throwback to this earlier approach to individualized education with the parent functioning like the teacher in a one-room schoolhouse.

Most of today’s educational systems are based on the industrial batch process model. As numbers of students increased, it became more efficient to organize students into batches by age groups, and to educate everyone in the same batch at the same pace and with the same content and expectation for achievement. The length of time that students will remain in one batch before moving along to another batch is still based on the agrarian planting system. In most systems, students remain in their batch from early fall to late spring—just as they did 150 years ago.

During the school year, while students are in their batch, teachers will follow carefully prepared lesson plans to instruct their students. Those who arrived in their classroom without the prerequisite knowledge for the materials covered will start the year lost and will only fall further behind as the year continues. Those who arrive already understanding that year’s materials are condemned to tedious repetition of what they already know. Those in the middle will be relatively well served by the process. The current system is designed to meet the needs of the students in the middle—the 67% who comprise the one standard deviation above and below the mean. Approximately 15% of the students will not succeed and another 15% will be bored unless their school provides advanced courses. This is the reality of our classrooms, and we all know it.

One attempt to address the issue of variation within the batch process centers on reducing the batch size. It is hoped that by having fewer students in the batch, the teacher can provide more individualized attention, harkening back to the one-room schoolhouse; however, this still does not address the fact that students move from one batch to the next with greater and greater levels of variation in their preparation and abilities. It has been left up to the students to remedy this problem by dropping out of the dysfunctional system.

**Redesign the Process**

By accepting the notion that we cannot yet afford to provide individual instruction to every student although computer technology is moving toward that possibility, we are, therefore, locked
into the batch process for education. Similarly, we cannot afford to reduce the size of each batch to an individualized level of instruction due to costs. What answer is left that will address the issue of variation within batches? Change the frequency of the batch processes. The current system requires students to remain in one batch for eight to nine months, during which time they learn at the expected rate, fall further behind, or stagnate because they already know the material. The current system requires students to move through a dozen batches spread out over a dozen agricultural years.

One option for a redesigned system would require students to move through up to 24, five-month levels within a 12-year period. Students would participate in a batch process over a shorter duration with expected learning outcomes defined for that batch level. Those who meet the expected learning outcomes would move on to the next higher batch level, while those who do not would repeat that batch level with a different teacher. An entire calendar year would not go by because a student could repeat work on the batch level learning materials without waiting to start again the following fall. At the same time, students would have the opportunity to test out of a level at the beginning of each batch and move on to the next higher level in the process.

Reducing the length of time for each level will enable students to repeat material quickly that they did not master before moving on to more demanding subjects. Testing out of a level will enable advanced learners to take small jumps ahead in the process so that they do not stagnate for half a year or even an entire year. The combined effect of these changes will decrease the variation among the students engaged in any particular batch level during the process.

Students should have the option to leave school with a nationally recognized general education diploma after completing 20 levels in the overall process and should have 12 years to complete 20 levels. Colleges can set their admission standards to require completion of 22 or 24 levels, so that college-bound students have an opportunity for additional preparation for collegiate work. Gifted students could complete 24 levels in less than 12 years. Students who graduate with a 20-level diploma, who later decide to go to college, could take level 21-24 courses at community colleges as prerequisites to admission.

Address Variation in Content

Although it may not be advisable to adopt the French educational model, where every student across the country in the same grade covers the same material every day, adopting a 24-level standard for public schools would enable the federal government to establish national standards for the length of each level and the content to master in each level. The U.S. Department of Education should provide standardized online teaching and reference materials to enable school systems to reduce the costs of textbooks, lesson plan development, library resources, and online audio-visual support materials. Guidelines can be provided to reduce the variation in locally developed examinations.

Rethink What We Are Measuring and Redesign the System

The key performance metrics for a national 24-level academic standard would be the percentage of students who opt out of the system without completing the 10th, 14th, 18th, and 20th level. Systems and teachers should not be penalized when a student needs to repeat a level because this is a product of variation. The objective is to keep students in the system and continuing to make progress through each level.

It is time for leaders in the educational system and the academics who prepare them to unlearn their erroneous beliefs about quality and to learn about the control of variation as the key dimension of quality in the school setting. It is time to accept the sources of variation that are built into the system, stop blaming the workers, and change the system.

John Dew

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The development of Kaizen team leaders requires a planned approach to mastery.

Creating a Kaizen Movement During Economic Turbulence

Mychal Coleman and Erin Barwis

Abstract

In these tight economic times, continuous improvement initiatives should serve as a welcome strategy. While much of the published research on implementation focuses on failure—this case study focuses on success. From realigning administration surrounding school-wide support services to training a team of informal Kaizen team leaders, the Carlson School of Management at the University of Minnesota embedded continuous improvement into normal operations. Phase one of implementation is examined in the full text, noting the plan, structure, and support necessary for such a large cultural change within an academic institution. Along with full support from the dean, the structured, three-step Lean training of the Kaizen team leaders is the key piece to ensuring long-term learning and strategic collaboration throughout the Carlson School.

Nowhere is the need for organizational change more evident than in the university setting. Economic turbulence has left institutions with a new reality of relentless budget cutting that can lead to downsizing of key personnel and double-digit tuition hikes. Frequent changes in political ideologies have caused significant adjustments to how academic research is funded, and thus conducted. When confronted with these types of challenges, organizations typically respond with a circular wave of conservatism, curtailing any strategic initiatives for short-term cost reduction even if the same initiatives may create longer-term value. While 75% of global leaders recognize that an innovation strategy is critical to an organization’s success, fewer than half are creating a climate that fosters innovative thinking.1 Machiavelli wrote, “Strategy can be a cruel mistress, but she often favors the bold.”2 Instead of moving to eliminate
strategic capacity when faced with its new reality, the Carlson School embraced it by attempting to establish a culture of continuous improvement. Building this type of strategic capacity was an intrepid move because it looked beyond myopic short-term cost cutting to longer-term financial gains that continuous improvement culture would foster. This case study describes the Carlson School’s initial journey into continuous improvement, explaining the rationale behind it, the theories that built it, its implementation and structure, as well as lessons learned from the first few years of the initiative.

**Researching Why Programs Fail**

The Carlson School wanted a continuous improvement initiative that was both innovative and sustainable. Led by the assistant dean of administrative services and the directors of human resources, finance, and information technology services, school leaders studied the research surrounding continuous improvement, total quality management, and Kaizen movements. Most literature provided stories of continuous improvement initiatives and failure—with very little written about defined, true, sustained success. Previous research suggested that even a perfected continuous improvement system would not ensure prosperity long term.\(^3\) Programmatic failure rates were a staggering 80-90%.\(^3,4\)

It became clear there are two kinds of circumstances that lead to an initiative’s failure. The first is external factors or those occurring outside the actual implementation of a continuous improvement initiative. More specifically, an organization’s culture may simply be incompatible with the values needed to sustain continuous improvement. If the culture does not recognize the importance of cooperative work and employee empowerment, the continuous improvement program will fail.\(^3\) If top leadership fail to fully commit to implementing strong human resources practices and support systems, the continuous improvement program will fail. Internal factors, the second kind of circumstance leading to failure, are numerous and far more obvious. Poor integration of continuous improvement processes into everyday business systems, poor program execution, failure to insert internal controls, and minimal measurement systems can all lead to failure from the inside. Perhaps one of the biggest factors leading to failure, though, is selecting only upper and middle managers as continuous improvement practitioners and implementers.\(^6\)

The Carlson School avoided the failures described by previous researchers by gaining the full support and commitment of the dean and the newly appointed assistant dean of administrative services. The program was created with specific, purposeful ties to the dean’s strategic plan. Since the beginning of this dean’s tenure, the call for innovation was clear for surrounding areas of operational excellence and organizational leadership. This strategy is exemplified in such initiatives as new international experiential undergraduate programs and a new marketing approach that brands the school as one for leaders in research. The goal within administrative services was not only to support these challenging strategic initiatives, but also to improve standing processes. Carlson’s cultural journey toward cooperative values and teamwork began to take shape with the arrival of the new assistant dean of administrative services, who quickly established cooperative value mechanisms to further strategic partnerships between functional units.

**Program and Team Creation**

The journey began with the assistant dean of administrative services bringing directors from information technology, human resources, financial services, and building/facilities services together on a weekly basis. These meetings created interdepartmental collaborative initiatives. The group experienced several transformative leaps when the assistant dean encouraged each director to bring his/her direct reports to what was known as the “one down meeting.” These monthly meetings brought the next level of staffing and management to the table for collaboration and problem solving. Another transformation appeared when these meetings encouraged peers to find collaborative opportunities inside mutually-exclusive initiatives. This collaboration allowed the silos within administrative services to break down and fostered greater cooperation across disciplines. The one down meetings produced greater synergies as each functional unit began creating joint objectives to serve the same internal customers. Subsequently, the monthly one down meeting evolved to create quarterly strategic repositioning meetings, which occurred in addition to the monthly meetings. These strategic repositionings not only provided participants the opportunity to review and critique each other’s strategic objectives, but also laid the groundwork for the Kaizen movement.

Eventually the decision was made to take the Lean approach. Lean, an English phrase coined
to summarize Japanese manufacturing techniques (specifically, the Toyota Production System), is the philosophy of continually reducing waste in all areas and in all forms. Kaizen, then, encompasses the philosophy of Lean into an overall organizational shift, where continuous improvement becomes the mindset for the whole system. Adopting a Kaizen strategy required that workers and managers act in ways that both maintain and improve standards. Using the broad methodology of Lean was a key choice—Lean is less resource intensive, offers a smaller start-up cost, and is far less complex than implementing Six Sigma, which is extremely costly on the front end due to the necessary consultant time, staff training, and the ensuing multiple levels of employee downtime. Moreover, the statistical aptitude is highly complex and may be beyond some participants’ understanding.7 Lean also offers the flexibility needed in an ever-changing academic environment.

The assistant dean and the directors of human resources, information technology, and financial services selected the continuous improvement team members—those who would become the leaders and practitioners of the school. Criteria for these leaders went against the norm—no high-level managers were chosen. Instead, informal leaders with high levels of influence within their respected areas were recruited, resulting in a team composed of participants who were close to business processes around all areas of the school. As such, hourly and salaried employees, supervisors and non-supervisors, as well as academic staff and non-academic staff would all receive training together as one team.

Training the Team

The human resources department provided training and structural support to the newly selected team. Three distinct sections of training were identified—group, classroom, and hands-on skill learning.

Step one included the first two of these through a peer-driven tool known as the leadership development circle (LDC). Trainees were introduced to Lean and Kaizen through group learning surrounding The Toyota Way Fieldbook.8 This field manual is the blueprint for understanding both Lean concepts and Kaizen strategies. The LDC was designed to allow participants the opportunity to learn concepts by taking turns facilitating chapters and leading exercises from the book.

Step two took basic concepts to the next level. An outside consultant was hired to lead the top 12 trainees, now called Kaizen trainees, through an intensive two-week workshop. The trainees learned how to define Lean and Kaizen concepts and then how to use and implement them. Under the careful watch of the consultant, the trainees completed several Kaizen events during this workshop. Upon completion, trainees became Kaizen team leaders. Before the end of the second week two participants dropped out due to circumstances beyond their control, which left the Carlson School with 10 Kaizen team leaders who were eager to get out into their work spaces and begin tackling strategically-aligned projects.

Step three consisted of continuous learning after the formal sessions. Per the outside consultants, Kaizen team leaders were expected to continue to read articles, participate in Kaizen events, and practice Lean methods within their positions. This phase of training, without any formal structure, proved difficult, leading to the first round of changes to the program.

Structuring the Kaizen Masters Program

Lean was selected because it was less complex than Six Sigma. Unlike Six Sigma, however, Lean does not have a structured process where members are trained into different skill levels (Green Belt, Black Belt, and Master Black Belt) and then moved forward to find partners and create projects. It was unclear on how participants could achieve higher levels of expertise. From the research, it was apparent that innovative continuous improvement initiatives must not be considered a collection of individuals or specific units, but rather a collective process occurring at various levels within different units of the organization.9 The challenge in creating a continuous improvement program is developing this infrastructure such that it repeatedly makes changes to organizational routines.9

Knowing this, the Kaizen Masters Program was created as a hybrid program. Similar to Kaizen, the program would link the Carlson School’s infrastructure at the organizational, process, and individual levels of the school, and like Six Sigma it would challenge individuals to advance their skill sets continuously while obtaining greater levels of proficiency. The program was also designed to provide a creative environment where members could learn and generate innovative ideas. As such, a continuous improvement (CI) committee was formed to oversee the Kaizen Masters Program. This committee was composed of members of the dean’s executive
team as well as the directors of information technology, human resources, and financial services. The committee’s charge was two-fold: first, ensure the program supported the Carlson School’s vision, and second, manage members and projects. A continuous improvement coordinator position was created to organize the Kaizen team leaders’ projects, document team leader progression, and report to the CI committee. The hierarchy is shown in Figure 1.

The Kaizen Masters Program was designed to have four levels distinguishing team leaders and providing experiential and participation criteria, as shown in Figure 2. The criteria included facilitation skills, team building, conflict resolution, strategic partnering, and conflict management, as well as the number of events completed.

Once a Kaizen team leader completed a particular level, the committee reviewed his/her projects with the internal client, and required the team leader to demonstrate his/her learning competence, with the ultimate goal of creating a team of Kaizen masters.

The Carlson School as a Learning Organization

Any change leader will tell you that building strategic capacity is difficult, but sustaining the change is even more problematic. The task takes on greater complexity when you repeatedly attempt to transform the very process you are working to stabilize. The key question surrounding continuous improvement and Kaizen initiatives is whether the university or school has the structural mechanisms in place to learn from prior failures. Learning organizations deliberately install learning exercises as they move from vision to strategy to action. The Carlson School strives to be that learning organization.

The CI committee’s goal was to ensure the Kaizen Masters Program was embedded into the fabric of the school—this was accomplished by ensuring that every functional unit’s strategic goals include continuous improvement. Once again, the dean explicitly supported this process school wide.

The continuous improvement coordinator brought strategic connections to the Kaizen team leaders and their projects by creating policies to define how projects were to be selected, scoped, and performed. Team leader meetings included an explicit platform in which the Kaizen team leaders reviewed all projects, successes, and failures in an open learning environment. This tied directly back into stage three of the team leader learning platforms, resulting in even better educated and practiced facilitators.

Transformative Moments

Since the program’s inception in late 2007, the Carlson School has slowly transformed its culture and processes. The main transformation has been gradual, as interdependency among employees has grown. Employees within administrative services partner to perform process assessments, train external customers, and support each other’s objectives. It is common to see staff from financial services working one-on-one with a supervisor from information technology to solve departmental objectives that were formerly considered mutually exclusive. The Kaizen team leaders, specifically, have formed a strong camaraderie leading to an informal “brain trust” within the Carlson School. Team leaders come together to share lessons-learned project information and internal training, as well as to partner for conference presentations.

While numerous Kaizen and Lean projects were completed, two stand out as school-wide structural transformations. The on-boarding program for new employees and the information technology (IT) service center both combined multiple departments to reduce cost, redundancy, and process gaps. The on-boarding process eliminated multiple processes and ensured that new employees received computers, keys, access cards, and a welcoming package. It also served as the springboard for creating a new employee orientation program, talent development process, and an off-boarding process. The IT service center removed computer specialists from the functional units and centralized them in a specific area.
This process allowed evenly distributed support as opposed to underutilization of staff. The service center also became the prototype for an HR service center. Staff members are now more optimally utilized and customers feel more supported. Kaizen team leaders continue to sustain both projects.

**Lessons Learned**

While the Carlson School has made major strides in creating and sustaining the Kaizen Masters Program, it isn’t perfect. The program today does not look nor function as initially planned. The Kaizen team leaders struggle with sustaining projects and feel there are gaps in their education and experience.

The first real lesson stems from the initial Kaizen team leader training. High priority was placed on education surrounding facilitation and leading a change in process for the better, and less priority on how to sustain and follow up on a project. Kaizen

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### Figure 2: The Kaizen Masters Program Criteria

<table>
<thead>
<tr>
<th>Level</th>
<th>Title</th>
<th>Prerequisites</th>
<th>Participate</th>
<th>Assist</th>
<th>Conduct</th>
<th>Read</th>
<th>Internal course</th>
<th>External course</th>
<th>Est. Completion Time**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Point event apprentice</td>
<td>Two weeks of Kaizen training</td>
<td>One full event (internal)</td>
<td></td>
<td>Three point events</td>
<td></td>
<td></td>
<td></td>
<td>4-12 months</td>
</tr>
<tr>
<td>Level 2</td>
<td>Point event team leader</td>
<td>Level 1 criteria (included here)</td>
<td>Two full events (internal)</td>
<td>Two point events (Level 1)</td>
<td>Five point events</td>
<td>One text: <em>Shigeo Shingo OR 5S for Service Organizations</em></td>
<td>One LDC: SBP 1 OR Intro to Coaching</td>
<td>OHR: Process Mapping</td>
<td>4-12 months</td>
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<tr>
<td>Level 3</td>
<td>Full event apprentice</td>
<td>Levels 1 and 2 criteria (included here)</td>
<td>Two full events (internal)</td>
<td>Two point events (Level 1), Two point events (Level 2), One full event (Level 4)</td>
<td>Eight point events</td>
<td>Two texts: <em>Shigeo Shingo AND 5S for Service Organizations</em></td>
<td>Two LDCs: SBP 1 AND Intro to Coaching</td>
<td>OHR: Process Mapping, CCE: Business Process Mgmt Cert.</td>
<td>8-18 months</td>
</tr>
<tr>
<td>Level 4</td>
<td>Full event facilitator (master)</td>
<td>Levels 1-3 criteria (included here)</td>
<td>Two full events (internal), one full event (external)</td>
<td>Two point events (Level 1), Two point events (Level 2), Two point events (Level 3), Two full events (Level 4)</td>
<td>Ten point events Three full events</td>
<td>Four texts: <em>Shigeo Shingo, 5S for Service Organizations, Managerial Breakthrough, AND Lean Lexicon</em></td>
<td>Four LDCs: SBP 1, Intro to Coaching, SBP 2, AND Self-Reflective Coaching</td>
<td>OHR: Process Mapping, CCE: Business Process Mgmt Cert., CCE: Project Mgmt Cert.</td>
<td>8-18 months</td>
</tr>
</tbody>
</table>

*For same-level experiential criteria, participants should participate first, assist second, and conduct third. For example, a Level 3 participant should have participated in two full events prior to assisting with one full event; a Level 4 participant should assist with two full events before conducting any of the three (required).

**Time to complete each level varies with participant interest and training course calendars (College of Continuing Education courses, Office of Human Resources Organizational Effectiveness trainings, etc.)
team leaders feel they are missing the knowledge on auditing and sustaining a project to effectively serve as competent change leaders. As a result, they are unable to support process owners’ commitments to sustaining a project once it’s ready for review.

Secondly, the CI committee has not consistently reviewed each project upon completion. Time constraints have not allowed such a review of projects other than the two major success stories in the onboarding program and the I.T. service center. As a result, once a process has been enhanced, there is no way of knowing whether it is sustained or improved.

Throughout the continuous improvement initiative, the Kaizen team leaders and the continuous improvement coordinator have shown a remarkable resilience in overcoming resistance and obstacles in their journey. The biggest resistance came from co-workers external to administrative services who were either reluctant to change or unfamiliar with continuous improvement. The Carlson School gives great value to the program and the staff involved.

As the Kaizen team leaders and CI committee head into the next phase of this cultural change, they must retain these lessons learned in the forefront of planning—keeping eyes on the ultimate goal of organizational effectiveness in times of economic change.

References
Science and engineering students are not the only undergraduates who benefit from research activities as this case study with liberal arts students demonstrates.

Engaging Undergraduate Business Students in Quality-Related Research at a Small Liberal Arts College

James A. Griesemer

Abstract

Engaging undergraduate students in research activities is an innovative strategy for improving education in America’s colleges and universities.¹ The value of engaging students in research is reflected in the U.S. News & World Report ranking of colleges and universities where undergraduate research and opportunities for creative expression are now distinct categories. While in science and engineering programs research participation is an important step in undergraduate student development and is highly promoted by the National Science Foundation,² this is not the case for business students whose involvement in research activities have been traditionally limited to graduate studies.³

The author’s college has a long-standing tradition of engaging its undergraduate natural and social science students but not its business students in research activities. The college knows research activities sharpen students’ objectivity, enhance their ability to find and interpret relevant information, and
improve their written and oral presentation skills. Also, through research, students can be exposed to subject areas not usually covered in their academic programs. This article focuses on the author’s experiences when introducing undergraduate business students to quality-related research activities. Quality management and statistical process control are often covered only in a production systems management course for undergraduate business students at smaller liberal arts colleges.

The results exceeded the author’s expectations, and he is now planning to include research activities in his other courses.

Introduction

Introducing undergraduate research activities is an innovative strategy for improving undergraduate education in the U.S. Though large universities have engaged undergraduate business students in research activities for several years, many small liberal arts colleges have just begun offering such opportunities. This is because the institution must first address the relationship between research and the goals of a liberal arts education. Unlike larger colleges and universities, small liberal arts colleges are focused mainly on teaching, with individual faculty valued as generalists. With higher teaching loads and committee assignments, faculty at small liberal arts colleges often find it difficult to do their own research and mentor undergraduate students in research. Also, research facilities at many small liberal arts colleges may be modest at best. While balancing a scholarly agenda with heavy teaching commitments easily consumes the faculty’s available time, Elgren and Hensel state that utilizing the curriculum to better prepare undergraduates for independent research serves them well and can also prepare them to contribute to the faculty’s scholarly work. The synergy between these two activities has been referred to as an act of “enlightened self-interest.” Additionally, involvement in research projects can help a student’s résumé attract more attention from potential employers and graduate schools.

Course Approach

Involving students in research activities requires the instructor to modify his/her teaching strategy with regard to course context, which is dependent on the student’s interests; the student’s role as data gatherer, analyzer, or presenter; and the instructor’s role as educator, mentor, and facilitator. The ASHE Higher Education Report states the total experience of undergraduate research activity can be divided into three phases: beginning, middle, and end. The beginning phase involves setting the objectives and goals for participation in undergraduate research, the middle phase is the actual engagement of students in research activities, and the end phase is the presentation of findings. A more detailed approach is the pedagogical sequence for involving undergraduates in research used at the University of Dayton. It includes five key steps:

- Planning—including designing course topic research projects.
- Coaching—including supplying students with a compact manual on what constitutes good research.
- Evaluating—including the grading rubric used for the course.
- Disseminating students’ findings.
- Assessing—collecting feedback on the research experience.

Like most small liberal arts colleges, the author’s institution is working to improve the academic quality of its student body. Engaging undergraduates in research activities is seen as one way to accomplish this important goal, and doing so has been part of its curriculum for natural and social science majors for many years. There is also growing interest in introducing research activities to students in other programs such as business management. The author incorporated research activities in the Introduction to Management Science course, and these experiences were from the fall 2009 traditional semester. This course was chosen because it is a business elective usually taken by juniors and seniors, sometimes has low enrollment, and the subject matter allows the introduction of topics from any number of fields. Six students enrolled in the course.

The first challenge was obtaining the students’ buy-in on research activities. Business students are required to take only one science course with a laboratory, so many felt they were not well prepared to complete research of this type. To overcome these feelings, it was necessary to explain in detail what makes good research, especially in a business context. The students also had
concerns about working alone, so the decision was made to let them work as a team.

The second challenge was teaching the students enough about the tools of management science, such as linear, integer, and mixed integer programming, so they could participate in the research project selection.

At the same time, the author explored potential venues for presenting the students’ findings. The chairs of the divisions of natural sciences and social sciences at the college offered to let the students join their fall semester poster sessions. A second venue was participating in the student poster session at the annual meeting of the Environmental Consortium of Mid-Hudson Colleges and Universities, which was held late in the semester at a nearby college.

The students chose to focus on the student poster session at the annual meeting for several reasons. This choice established a must-have project completion date and also helped them focus on a research project with an environmental focus. The students used a basic unstructured brainstorming technique to identify possible projects. As time was short, the students decided to build on a challenging case study in their textbook based on the well known coal allocation model developed by Duke Energy. Their idea was to add an environmental constraint—meeting gaseous sulfur emissions in different air quality control zones—to the model.

The students received help in organizing the needed research activities into a project plan. Two students were assigned to solve the case study completely. The other students researched the EPA’s air quality standards, how sulfur content in coal is related to gaseous emission content, and coal usage by electric generating plants in the United States. At every class meeting students reported on their progress, including any difficulties they were experiencing. The students rapidly identified where more resources were needed to stay on the project’s critical path.

Once their research was nearly complete, the students focused on their poster and what information it should contain. They quickly found they had more background information, data, and findings than space on their poster. They were advised to have the poster serve as an overview and to write a detailed summary of their work to distribute to interested visitors. Their focus shifted to producing the poster, and they located the required paper and roll-fed plotter.

The poster and handout were completed approximately one and a half weeks before the deadline. Upon review it was discovered that the word environmental was misspelled in the title. To remedy the problem, one of the students learned how to run the plotter, since the operator was on vacation. The students then decided who would make the various presentations. This was followed by several practice presentations and question and answer sessions. The result was a very professional-looking poster, as shown in Appendix A, and a well developed complementary handout.

**Faculty Experience**

This first attempt at engaging business undergraduates in research activities changed both the instructor’s and the students’ classroom behavior. The instructor saw his role evolve from primarily a presenter of knowledge to more of a facilitator and mentor. This role change was also accompanied by changes in the pedagogy followed in the course and, most importantly, in the growth of the students from passive to active learners.

Lessons learned from this first attempt to engage undergraduate business students in research activities included the following:

- Instructors must design syllabi time and opportunities for research activities into their course. Though this may initially be seen as taking time away from important topics, these opportunities can be viewed as alternate ways to cover these topics. Also, research activities allow instructors to introduce a “hidden curriculum” covering topics not included in the standard program of study.

- Instructors can often obtain ideas by participating in local section activities of professional societies such as ASQ. This helps keep the research relevant to current issues and can serve as a venue for students to present their findings.

- Students have different academic strengths and skill sets, and working together allows students the opportunity to use them to their project’s advantage.

- Smaller sized and/or scoped research projects are better than one long project that stretches over several semesters. Students need to experience the beginning, middle, and end of the project.
• Students should work in small groups, especially if the deadline to present their findings is only two or three months.
• Class size should be limited to a reasonable number of students. If no graduate assistants are available, this experience suggests no more than 10 students in the course.
• Both the instructor and the students need to realize that their roles in the course and behavior in the classroom will change significantly. The complexity and number of student questions rose significantly, resulting in a much more dynamic learning environment.
• Instructors must be prepared to allocate more time for supporting courses with research activities to ensure satisfactory outcomes. It is important that the students’ experience is positive.

These findings support the argument that engaging undergraduate business students in research activities should only be done after individual institutions address the relationship between research and a liberal arts education.

Conclusion

The experience of adding quality-related research activities to an undergraduate business course completely changed how the course was designed and conducted. The student learning process also changed as students learned the meaning of good business research, how it is conducted, and how to present research findings at several different types of venues. The instructor learned business students appreciate an opportunity to investigate a problem for an extended time under the guidance of a faculty member. This course concluded with the students identifying projects for next year’s class.

Acknowledgements

The author acknowledges the six brave undergraduate business students who conducted the research discussed in this article. They are Frank Bates, Joe Fantozzi, Liz Karcher, Gerry Mileo, Dave Mirro, and Jim Mucci.

Editor’s Note: This article is the first in a multipart series by James Griesemer.

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James A. Griesemer

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Appendix A

USING LINEAR PROGRAMMING TO SOLVE COMPLEX ENVIRONMENTAL PROBLEMS

Student Members: Gerry Mileo, Frank Bates, Joe Fantozzi, Liz Karcher, Dave Mirro, Jim Mucci.
Faculty Adviser: Associate Professor James Griesemer, D.P.S.

Introduction

Linear programming is a problem-solving approach concerned with either maximizing or minimizing some quantity within known constraints.

The United States produces about 20%, or 1.1 billion tons per year, of the world’s coal supply. It has a 245-year supply of coal at today’s usage rates and coal deposits contain more energy than all of the world’s oil reserves. In the United States coal is burned to generate about half of the electricity used and thus generated 684,000 tons of sulfur dioxide and 131,000 tons of nitrogen oxides emissions in 2007.

Problem To Solve

A large electricity generating utility has signed three fixed-tonnage contracts and four variable-tonnage contracts and is interested in determining the lowest cost way to allocate coal purchases amongst its five plants while also not exceeding overall sulfur content specifications.

Linear Programming Model

Determine how much coal to buy from each supplier and where to ship it while not exceeding sulfur content limits.

Let: \( x_{ij} \) = tons of coal purchased from supplier \( i \) and shipped to plant \( j \).

The objective function coefficients, \( C_{ij} \), are the cost to buy coal from supplier \( i \) and ship it to plant \( j \). In computing the total cost, the transportation cost can be added to the cost of the coal, the transportation cost, and deposit cost coming at the plant.

There are three types of constraints: supply constraints, demand constraints, and sulfur emission constraints.

For the fixed-tonnage contracts, the constraints are equalities. For the variable-tonnage contracts, any amount of coal up to a specific maximum may be purchased. For the sulfur emissions limits, the constraints are less than inequalities.

Supplies and Demands must first be expressed in the same units, BTUs, and identity numbers assigned to the suppliers and plants follows:

<table>
<thead>
<tr>
<th>ID</th>
<th>#</th>
<th>Supplier</th>
<th>Tons (x10^6)</th>
<th>Heat Rate (BTUs/lb)(x10^4)</th>
<th>Total Heat Rate (BTUs) (x10^6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Supplier A</td>
<td>3.50</td>
<td>1.30</td>
<td>26,000</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>Supplier B</td>
<td>3.00</td>
<td>1.30</td>
<td>26,000</td>
</tr>
<tr>
<td>3</td>
<td>C</td>
<td>Supplier C</td>
<td>2.75</td>
<td>1.20</td>
<td>25,200</td>
</tr>
<tr>
<td>4</td>
<td>D</td>
<td>Supplier D</td>
<td>2.00</td>
<td>1.20</td>
<td>24,000</td>
</tr>
<tr>
<td>5</td>
<td>E</td>
<td>Supplier E</td>
<td>1.75</td>
<td>1.20</td>
<td>21,000</td>
</tr>
</tbody>
</table>

ID # Plant # Electricity Produced (kWh) Heat Rate (BTUs/kW) Total BTUs Demand (BTUs)

<table>
<thead>
<tr>
<th>#</th>
<th>Plant #</th>
<th>Electricity Produced (kWh)</th>
<th>Heat Rate (BTUs/kW)</th>
<th>Total BTUs Demand (BTUs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Plant #1</td>
<td>26,000,000</td>
<td>26,000</td>
<td>69,000,000</td>
</tr>
<tr>
<td>2</td>
<td>Plant #2</td>
<td>26,000,000</td>
<td>26,000</td>
<td>69,000,000</td>
</tr>
<tr>
<td>3</td>
<td>Plant #3</td>
<td>26,000,000</td>
<td>26,000</td>
<td>69,000,000</td>
</tr>
<tr>
<td>4</td>
<td>Plant #4</td>
<td>26,000,000</td>
<td>26,000</td>
<td>69,000,000</td>
</tr>
<tr>
<td>5</td>
<td>Plant #5</td>
<td>26,000,000</td>
<td>26,000</td>
<td>69,000,000</td>
</tr>
</tbody>
</table>

Subject to:

Supply constraints:

- \( x_{18} + x_{19} + x_{110} + x_{111} + x_{112} = 350,000 \)
- \( x_{28} + x_{29} + x_{210} + x_{211} + x_{212} = 300,000 \)
- \( x_{38} + x_{39} + x_{310} + x_{311} + x_{312} = 275,000 \)

Demand constraints:

- \( x_{48} + x_{49} + x_{410} + x_{411} + x_{412} < 200,000 \)
- \( x_{58} + x_{59} + x_{510} + x_{511} + x_{512} < 200,000 \)
- \( x_{68} + x_{69} + x_{610} + x_{611} + x_{612} < 200,000 \)
- \( x_{78} + x_{79} + x_{710} + x_{711} + x_{712} < 200,000 \)

Sulfur Emissions Constraints

<table>
<thead>
<tr>
<th>Plant #</th>
<th>Plant #</th>
<th>Plant #</th>
<th>Plant #</th>
<th>Plant #</th>
<th>Plant #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Solution

Suppliers and plants follow:

- Supplier A ships 211,795.3 tons to plant #1.
- Supplier A ships 138,423.1 tons to plant #3.
- Supplier B ships 57,794.01 tons to plant #4.
- Supplier B ships 57,794.01 tons to plant #4.
- Supplier C ships 10,873.05 tons to plant #1.
- Supplier C ships 12,609.01 tons to plant #1.
- Supplier C ships 60,794.01 tons to plant #5.
- Supplier D ships 60,794.01 tons to plant #5.
- Supplier E ships 60,794.01 tons to plant #5.
- Supplier F ships 60,794.01 tons to plant #5.
- Supplier G ships 60,794.01 tons to plant #5.
- Supplier H ships 60,794.01 tons to plant #5.
- Total (minimized) cost of coal is $95,339,440.00

Reference

Chenicheri Sid Nair and Lorraine Bennett

Abstract

This article advocates the value of the student voice as a catalyst for initial conversations and discussions about designing and implementing continuous quality improvement action plans in higher education. In the case study, student satisfaction data and feedback collected through unit (subject) evaluations at a large, research-intensive university in Australia were drawn upon to inform a targeted intervention strategy that addressed pedagogical and curriculum design concerns. Working from the student data, staff teams identified and prioritized areas for improvement and focused on making changes that had high impact on student learning. While this systematic quality improvement initiative was developed in response to student feedback in one university, the contention is that this approach has relevance and application to universities around the world that are focusing on improving the quality of student learning and the student experience.

Introduction

Over the last decade, greater interest in the quality of education programs has become firmly embedded across the international higher education sector. Universities often embark on this “accountability journey” by reviewing their pedagogy and curriculum and, in particular, by giving greater consideration to feedback from students. Bennett and Nair identified numerous ways...
universities are utilizing information from students’ evaluations. Some of these purposes include:

- Diagnostic feedback to faculties about their teaching that can aid in the development and improvement of teaching.
- Useful research data to underpin further design and improvements to units, courses, curriculum, and teaching.
- A measure of teaching effectiveness for use in administrative decision making, e.g., performance management and development appraisal.
- Initial information for current and potential students in selecting units and courses.
- A measure for judging quality of units and courses increasingly becoming tied to funding.

For many universities the importance of measures related to the quality of the units, courses, programs, and student experience are reflected in the values, aspirations, strategic documents, and the nature of the organization. While there is growing awareness across universities of the purposes of evaluations, it is only recently that universities have started to focus on the need to act on the data collected in a systematic and strategic manner. The integration of student feedback into the quality assurance process is currently common to most institutions worldwide. Student feedback can be used not only to assess the current quality of courses, but also to guide the improvement, for example, in classroom and laboratory practices as well as the overall quality of the education environment.

This article discusses a case study on how working with student data and developing a systematic improvement strategy is worth pursuing, as the results to date are encouraging for improvements in unit pedagogy and curriculum design. Further, the results suggest a targeted intervention approach developed strategically and molded to the internal context of the units has the advantage of addressing issues that are easily correctable. Post-intervention comments from staff and students also suggest greater understanding of learning and teaching concepts and opening up new and previously inaccessible ways of thinking about learning, teaching, and assessment.

The study is from one of the Group of Eight (Go8) leading Australian universities. It is a large, research-intensive and highly internationalised institution that is home to more than 56,000 students from over 130 countries. It is a diverse institution, operating across six Australian and two overseas campuses. It also offers a number of courses through partnerships in other countries, such as Singapore, Hong Kong, and Indonesia.

The Approach

Data Collection

In 2002, the university’s policy on evaluating units was amended so that each unit is evaluated at least once every year it is offered, instead of the previous three- to five-year cycle. The term “unit” refers to the subject that is taught; and, in the context of the higher education institution described in this case study, refers to a single “subject” that students take. Units or subjects are used interchangeably and are components of a course, sometimes referred to as a program or curriculum, which might lead to a degree or certificate.

Evaluation is completed through a survey, which at the time of this study, contained eight standard university questions common to all faculties with the option to include up to 10 additional questions of their choosing common to all units within a single faculty. Table 1 reports the eight standard university questions with the associated response scales.

In addition, students had the opportunity to provide written comments to two open-ended questions. One asked for feedback on the best aspects of the unit and another about what could be improved.

To facilitate the administration of the survey to all units on all campuses, the Centre for Higher Education Quality (CHEQ) introduced a new survey management system with the ability to have both paper and Web-based versions. At the time of this study, about 7,000 units were evaluated using paper-based or online methods. Though there was opportunity for using paper or online methods of collection, the units reported in this article were collected by paper-based administration only. The faculty administered all surveys this way to ensure consistency of data that was collected. This study only looks at the eight standard university questions with the associated response scales.

The Institutional Strategy

The university’s strategic approach to working with data to affect improvement involved two centralized units working together. The Centre for the Advancement of Learning and Teaching (CALT) was
the academic development unit working alongside the university’s CHEQ. CALT and CHEQ would work collaboratively with faculties, drawing on student evaluation data and other performance measures, to establish goals and priorities to improve the quality of learning and teaching and consequently student performance and satisfaction levels. The challenge, however, was to develop a methodology to form the basis of a systematic improvement strategy in response to unit evaluation data. The guiding principles used to underpin the initial strategy included:

- Working from data sources (evidence-based).
- Targeting poorly performing units as a priority.
- Establishing response teams consisting of CHEQ, CALT, and faculty staff.
- Linking staff and student development support.
- Focusing initially on aspects that presented minimum obstacles to change.
- Providing concentrated support over a short term to achieve high impact.
- Drawing on models of good practice (high performing units) as exemplars.
- Documenting and demonstrating improvement as a consequence of the actions taken.

The four phases of the university’s quality cycle—plan, act, evaluate (monitor and review), and improve—were used as the framework for the methodology. Appropriate tasks, responsibilities, timelines, and measures were identified for each of these phases. The entire process was designed to take place over a six to eight week period to enable the improvements to be made, where possible, in time for the next teaching cycle.

**The Application of the Strategy**

The university reported in this article has ten faculties. The strategy was piloted in one of the smaller faculties, which teaches professional courses within the pharmaceutical discipline. An important cornerstone of this strategy was to target poorly performing units as a priority. Poorly performing units are defined by the university as having a mean rating of 3.0 or less on a 5-point Likert scale for the overall satisfaction item in the questionnaire. This item, “Overall I was satisfied with the quality of this unit,” has a high correlation with the other seven core items in the questionnaire.

This did not mean that the CALT/CHEQ team did not value or acknowledge highly performing units; in fact they were often referred to as exemplars of “good practice.” As the resources available were limited, a decision was made early in the planning to focus on the units most in need of help, in other words, to address the “hot spots.” Final selection of the targeted units involved a fairly detailed process. Initially the bottom 25% of performing units for the faculty, based on the “satisfaction item” from the second semester, were identified and other units where items were rated 10% below the faculty average for that item were added to the list.
Other factors taken into account included the class size, response rate, and for units taught on more than one campus, any campus-specific trends. It was also helpful to identify sequential units and units that were in the same year level or course. During the prioritizing process, discussions were held with faculty staff, including the associate dean teaching as well as relevant program, course, and unit leaders. These discussions were essential, as they often brought out contextual information, which was not evident from the data sets. Although the “satisfaction item” was used initially to select the units in the spotlight, further analysis was carried out on each of these units to see if other items in the survey scored below the mean. The responses to the open-ended questions for these units (the qualitative data) were also reviewed for further clues as to possible areas for improvement. In essence, the student data was the starting point for the conversations within the faculty regarding unit improvement.

A total of 20 units were in the bottom 25% evaluated in this faculty. Eight units in the bottom 25% were initially selected for the first implementation of the focused improvement strategy and staff from five of these units agreed to participate in the program. The response team worked intensively with these faculty staff on the areas that were identified as needing improvement. The CALT staff provided the following types of activities:

- Reviewing and reshaping unit objectives.
- Aligning assessment tasks to objectives.
- Providing advice and ideas on innovative assessment tasks.
- Reviewing learning materials.
- Providing unit guide and learning material templates.
- Conducting workshops on giving effective student feedback.
- Highlighting the role of learning objectives in curriculum development.

In addition, the response team also met with staff and students involved in the units to test other ideas and to identify additional areas for improvement. The areas of teaching and learning selected for intensive improvement varied within each unit. They emerged from in-depth conversations with staff and students and further data analysis, especially of the open-ended responses.

### Findings From the Case Study

The data in Table 2 indicate that when the units were evaluated again in the second semester of the following year and after the intervention program, the mean for the satisfaction item in four of the units improved, and the fifth unit reported a marginally insignificant lower satisfaction at 3.2 (3.23 versus 3.20). Table 2 illustrates the evaluation data two years after the intervention program where the mean satisfaction was consistently maintained well above the intervention year (with the exception of unit 4).

In addition to the improvements in student satisfaction noted in the post-intervention unit surveys, comments and observations from both staff and students since the intervention reflect a shift in thinking about learning and teaching practices across the faculty. Most importantly, the faculty leadership has taken steps to align and coordinate internal faculty systems and resources to support the learning and teaching mission of the university.

Staff within the faculty, but not directly involved with the improvement strategy, reported a “mushroom” effect as a result of the intervention development activities. There are several examples that serve as evidence of the staff’s willingness to

### Table 2: Mean Comparisons of the Satisfaction Item for the Five Units Involved in the Trial

<table>
<thead>
<tr>
<th>Units</th>
<th>Year 1*</th>
<th>Year 2*</th>
<th>Year 3*</th>
<th>Mean change (Year 2–Year 1)</th>
<th>% Change of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>3.68</td>
<td>3.85</td>
<td>3.95</td>
<td>0.17</td>
<td>4.6 ▲</td>
</tr>
<tr>
<td>Unit 2</td>
<td>3.28</td>
<td>4.00</td>
<td>3.77</td>
<td>0.72</td>
<td>22.0 ▲</td>
</tr>
<tr>
<td>Unit 3</td>
<td>3.00</td>
<td>3.50</td>
<td>3.93</td>
<td>0.50</td>
<td>16.7 ▲</td>
</tr>
<tr>
<td>Unit 4</td>
<td>3.23</td>
<td>3.20</td>
<td>3.10</td>
<td>-0.03</td>
<td>0.93 ▼</td>
</tr>
<tr>
<td>Unit 5</td>
<td>3.07</td>
<td>3.29</td>
<td>3.70</td>
<td>0.22</td>
<td>7.2 ▲</td>
</tr>
</tbody>
</table>

* Mean on satisfaction item
explore new ways of engaging with students. Interest in exploring how to cater to a range of learning styles was demonstrated, for example, in the faculty’s adoption of electronic audience response systems in large lectures. This new initiative encouraged students to provide feedback on their level of understanding throughout the lecture and provided students with instant feedback on their level of understanding and learning. This initiative also enabled lecturers to assess the effectiveness of their teaching against the learning objectives for the session and to elaborate on difficult or not-fully-grasped concepts on the spot.

Some faculty staff also expressed a general interest in learning more about and trying a variety of student-centered and interactive pedagogies in their teaching. These discussions have led to greater consideration of the different learning styles of the diverse student population. Further, teaching staff were encouraged to limit didactic and one-way transmission teaching approaches, which often create barriers to learning for many students.

Learning materials are now prepared to support multiple learning styles recognizing non-verbal, visual, and global learners, as well as more traditional learners. Online and multi-media support strategies have been introduced to allow students to go back over notes online and to improve timely feedback.

Assessment tasks have also been reviewed and weightings adjusted to better reflect the learning priorities of the unit. In some cases, more continuous and staggered submission schedules are now used and clear criteria provided so that students are not confused or unsure about what is required in the assessment. This has also enabled students to receive progressive, formative feedback on their work, giving them time to reflect on feedback and their learning between each task.

All these initiatives, gradually introduced across the faculty, are designed to improve the learning experience and outcomes for students. Feedback from both staff and students suggests that these innovations are an improvement and are helping more students to break through learning thresholds.

The following student comments are evidence of the value they placed on the improvements to the units and how learning was enhanced:

- “…the continued references to practical applications helped me maintain a sense of purpose and focus.”
- “It is really handy for us to have some idea of what type of questions are going to be asked, as often in the past with subjects like this we don’t (sic) get any feedback until the exam and that is often too late!”
- “…just want to tell you the self-assessments were really good. If you could put up another lot it’d be great way for us to study. Thanks.”
- “I really liked the online module, as it gave instantaneous feedback and it forced me to think about my own answer first.”
- ‘It was good because it…provided a different point of view to consider the question.”

Concluding Remarks

The premise of this article was to confirm the value of “listening to and drawing on the student voice” to drive quality improvement. The case study, which illustrates the implementation of a systematic improvement strategy in a faculty with poorly performing units (subjects), supports the value of such an approach. The overall conclusion is that the strategy is worth pursuing, as the outcomes are encouraging for sustained improvements in the overall student satisfaction levels when looked at over time.

The results suggest a targeted intervention approach, developed strategically and molded to the internal context of the faculty, has the advantage of addressing issues that impact substantially on the student experience. Moreover, the study illustrated that student concerns are often easily correctable. The results also suggest that even though the targeted improvement strategy was implemented in a concentrated time frame (eight weeks), the outcome of better satisfaction was maintained in most areas. This trend suggests that a strategic approach starts to build a quality culture. The “mushroom” effect, observed in staff not directly involved with the improvement strategy, was a sign that the quality agenda was starting to impact learning and teaching practices across the faculty.

This first attempt at a comprehensive approach to implementing targeted, systematic improvement in response to student unit evaluations shows not only a great deal of promise but also demonstrates to students that their feedback is the backbone of change. Further, the ability for faculties to also use the data to improve teaching and learning has resulted in students gaining confidence in the new unit evaluation process and is consistent with research findings. This shift in trust is demonstrated with the increase in overall response rates since the implementation
of the new system for the unit evaluations. Response rates during this period have increased from just over 32% to nearly 41%. This translates to actual responses increasing from 39,041 to 55,334.

Clearly, the effectiveness of the university’s evaluation system is fundamental to the success and impact of the quality agenda. In this case, the university adopted a system that enabled it to respond more swiftly and strategically to student feedback, thus closing the loop on the quality cycle. The marriage of evaluation and quality is here to stay across the higher education sector, and the approach implemented in this study demonstrates that there is a symbiotic union between collecting student-generated data and evidence-based planning and decision making to effect change. It is best summarized in a paper presented by the Graduate Careers Council of Australia (GCCA) as follows: “It is a myth that all you have to do is to send back the result of a survey to those concerned and action, improvement, and innovation will automatically occur. Such an assumption ignores all the research on motivation and change management in universities.”  

References

Chenicheri Sid Nair

Sid Nair is professor of higher education development at the Centre for the Advancement of Teaching and Learning (CATL), University of Western Australia, Perth. His research work lies in the areas of quality in the Australian higher education system, classroom, and school environments, and the implementation of improvement based on stakeholder feedback. Recent book publications include Leadership and Management of Quality in Higher Education and Student Feedback: The Cornerstone to an Effective Quality Assurance System in Higher Education. He has extensive lecturing experience in the applied sciences in Canada, Singapore, and Australia and is an international consultant in quality and evaluations in higher education. He may be contacted at sid.nair@uwa.edu.au.

Lorraine Bennett

Associate professor Lorraine Bennett has a position in the new Centre for Learning Innovation and Professional Practice (CLIPP) at the University of Ballarat in Victoria, Australia. She has received two Australian Learning and Teaching Council (ALTC) grants; regularly consults, presents, and publishes on issues in learning and teaching; and is active at state, national, and international levels in academic development and quality arenas. Contact her at lorraine.bennett@ballarat.edu.au.
Call for Articles

Quality Approaches in Higher Education

The American Society for Quality’s Education Division has launched a new bi-annual, online, peer-reviewed journal called Quality Approaches in Higher Education. The editorial review team actively encourages authors to submit papers for upcoming issues.

The purpose of this publication is to engage the higher education community and the ASQ Education Division membership in a discussion on topics related to improving quality in higher education and identifying best practices in higher education and to expand the literature specific to quality in higher education topics. Quality Approaches in Higher Education welcomes faculty from two- and four-year institutions, including engineering colleges, business schools, and schools of education, to consider submitting articles for review.

The following types of articles fit the purview of Quality Approaches in Higher Education:

• Case studies on how to improve quality in a college or university.
• Conceptual articles discussing theories, models, and/or best practices related to quality in colleges and universities.
• Research articles reporting on survey findings such as a national survey on students’ attitudes toward confidence, success in college, social networking, student engagement, access and affordability, etc.
• Case studies or conceptual articles providing institutional perspective on process development and maintenance methodology at colleges or universities.
• Case studies or conceptual articles addressing issues such as the role of faculty and administrators in quality systems.
• Case studies, research studies, or conceptual articles focusing on accreditation issues.
• Case studies demonstrating best practices using the Baldrige Education Criteria for Performance Excellence, including experience and recommendations for successful implementation.
• Case studies, research studies, or conceptual articles on scholarship of teaching, enhancing student learning, learning outcomes assessment, student retention, best practices for using technology in the college classroom, etc.

In particular, we are looking for articles on the following topics: using assessments for continuous improvement and accreditation, showing how use of the Baldrige framework can increase student success, increasing engagement and quality of learning through lecture capture and other technologies, dealing with rising costs without jeopardizing learning, sponsoring programs for helping graduates gain employment, and merging research with practice (action inquiry).

Articles generally should contain between 2,500 and 3,000 words and can include up to four charts, tables, diagrams, illustrations, or photos of high resolution. For details, please check the “Author Guidelines” at http://www.asq.org/edu/2009/09/best-practices/author-guidelines.pdf.

Please send your submissions to Deborah Hopen, the editor, at debhopen@nventure.com.
Author Guidelines

Quality Approaches in Higher Education

Quality Approaches in Higher Education is peer reviewed and published online by the Education Division of the American Society for Quality (ASQ). The purpose of this publication is to engage the higher education community and the ASQ Education Division membership in a discussion of topics related to improving quality and identifying best practices in higher education and to expand the literature specific to quality in higher education topics. We will consider articles that have not been published previously and currently are not under consideration for publication elsewhere.

General Information

Articles in Quality Approaches in Higher Education generally should contain between 2,500 and 3,000 words and can include up to four charts, tables, diagrams, or other illustrations. Photos also are welcome, but they must be high resolution and in the format described later in the “Submission Format” section.

The following types of articles fit the purview of Quality Approaches in Higher Education:

• Case studies on how to improve quality in a college or university.
• Conceptual articles discussing theories, models, and/or best practices related to quality in colleges and universities.
• Research articles reporting on survey findings such as a national survey on students’ attitudes toward confidence, success in college, social networking, student engagement, access and affordability, etc.
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Manuscript Review Process

We log all article submissions into a database and delete all references to you. These “blinded” versions then go to the editorial review team for comments and recommendations. The review process takes approximately two months during which time the reviewers advise the editor regarding the manuscript’s
Author Guidelines: *Quality Approaches in Higher Education*

suitability for the audience and/or make suggestions for improving the manuscript. Reviewers consider the following attributes:

1. *Contribution to knowledge*: Does the article present innovative or original ideas, concepts, or results that make a significant contribution to knowledge in the field of quality in higher education?

2. *Significance to practitioners*: Do the reported results have practical significance? Are they presented clearly in a fashion that will be understood and meaningful to the readers?

3. *Conceptual rigor*: Is the conceptual basis of the article (literature review, logical reasoning, hypothesis development, etc.) adequate?

4. *Methodological rigor*: Is the research methodology (research design, analytical or statistical methods, survey methodology, etc.) appropriate and applied correctly?

5. *Conclusions and recommendations*: Are the conclusions and recommendations for further research insightful, logical, and consistent with the research results?

6. *Readability and clarity*: Is the article well organized and presented in a clear and readable fashion?

7. *Figures and tables*: Are the figures and/or tables used appropriately to enhance the ability of the article to summarize information and to communicate methods, results, and conclusions?

8. *Organization and style*: Is the content of the article logically organized? Are technical materials (survey scales, extensive calculations, etc.) placed appropriately? Is the title representative of the article’s content?

9. *Attributions*: Are the sources cited properly? Are attributions indicated properly in the reference list?

You should use these attributes as a checklist when reviewing your manuscript prior to submission; this will improve its likelihood of acceptance.

There are three possible outcomes of the review process:

- **Accept with standard editorial revisions.** In this case, the content of the article is accepted without requiring any changes by you. As always, however, we reserve the right to edit the article for style.

- **Accept with author revisions.** An article in this category is suitable for publication but first requires changes by you, such as editing it to fit our length requirements. We provide specific feedback from our reviewers to guide the revision process. We also assign a tentative publication date, assuming you will submit the revised article by the deadline.

- **Decline to publish.** Occasionally articles are submitted that do not fit our editorial scope. In these situations, we may provide you with suggestions for modifying the article to make it more appropriate to our publication, but we do not assign a tentative publication date.

Please note that after articles are edited for publication, we return them to you to approve the technical content. A response may be required within 48 hours or the article may be held over for a subsequent issue.

Articles that appear to be advertising or don’t fit the general topics addressed by *Quality Approaches in Higher Education* will be rejected without receiving peer reviews.

**Helpful Hints**

1. Articles should emphasize application and implications.
   - Use the early paragraphs to summarize the significance of the research.
   - Make the opening interesting; use the opening and/or background to answer the “so what?” question.
   - Spell out the practical implications for those involved in higher education.
2. Detailed technical description of the research methods is important, but not necessarily of interest to everyone.

3. Throughout the article, keep sentence structure and word choice clear and direct. For example, references should not distract from readability. As much as possible, limit references to one or two per key idea, using only the most recent or most widely accepted reference.

4. Avoid acronyms and jargon that are industry- or organization-specific. Try not to use variable names and other abbreviations that are specific to the research. Restrict the use of acronyms to those that most readers recognize. When acronyms are used, spell them out the first time they are used and indicate the acronym in parentheses.

5. Our reviewers and readers usually view articles that include reference to your proprietary products or methods as advertising. Although we encourage you to share personally developed theories and application approaches, we ask that you refrain from using our publication as a marketing tool. Please take great care when including information of this nature in your article.

6. If the article cites cost savings, cost avoidance, or cost-benefit ratios, or provides the results of statistical evaluations, include an explanation of the method of calculation, along with any underlying assumptions and/or analysis considerations.

7. When submitting an article that includes survey data, include the complete survey instrument. We may make the entire survey available online.

8. Our staff does not have the means to compile references or verify usage permissions; therefore, it is important for you to provide all that information with your article, including written letters of authorization when appropriate. Plagiarism is a rapidly growing crime—particularly due to the use of information from the Internet. Please help yourself, and us, to maintain professional integrity by investing the time necessary to verify your sources and to obtain and document all necessary permissions. Information on our requirements for documenting references, along with specific examples, is included at the end of these guidelines.

**Submission Format**

1. We accept only electronic submissions in Microsoft® Word® format. Send electronic copies of articles to debhopen@nvventure.com. Also please include an abstract of 150 words or less for each article. Include all of your contact information in a cover letter or your e-mail message.

2. Tables should be included at the end of the article and must be in Microsoft Word. Each table must be referenced in the article and labeled, such as “Table 1: Graduation Rate by Major.” Do not embed .jpg, .tif, .gif, or tables in other similar formats in your article.

3. Drawings and other illustrations should be sent in separate Microsoft® PowerPoint® or Microsoft Word files; each item should be included in a separate file. All drawings and other illustrations must be referenced in the article, and must be labeled, such as “Figure 1: Pareto Analysis of Student Participation in Department Activities.” Please do not use other software to generate your drawings or illustrations. Also, please do not embed .jpg, .tif, .gif, or drawings or illustrations in other similar formats in your article.

4. We can use photos if they enhance the article’s content. If you choose to submit a photo with your article, it must be a high-resolution .jpg or .tif (at least 300 dpi and at least 4" by 6" in size).
cannot enlarge photos and maintain the required resolution. Photos should be sent in separate files and referenced in the article. Photos should be accompanied by a complete caption, including a left-to-right listing of people appearing in the photo, when applicable. Do not include any text with the photo file.

5. Also submit a separate high-resolution electronic photo (at least 300 dpi) for each author. Author photos should be at least 1" by 2". Author photos should have a plain background, and the author should be facing toward the camera.

6. Please include a 75- to 100-word biography for each author, mentioning the place of employment, as well as including a telephone number, Web site, and/or e-mail address. If you have published books within the past five years, we encourage you to include the names of one or two books. We do not have space to mention articles, speech titles, etc.

Copyright Transfer

Prior to publication, you must sign a form affirming your work is original and is not an infringement of an existing copyright. Additionally, we ask you to transfer copyright to ASQ. The copyright transfer allows you to reproduce your article in specific ways, provided you request permission from ASQ and credit the copyright to ASQ. The transfer also allows ASQ to reproduce the work in other publications, on its Web site, etc.

If you use materials from other works in your articles (other than standard references), you must obtain written permission from the copyright owner (usually the publisher) to reprint each item of borrowed material. This includes any illustrations, tables, or substantial extracts (direct quotations) outside the realm of fair use. Submit these permission letters with the article. Articles cannot be published until copies of all permission letters are received.

For example, an article includes a PDSA illustration from a book. The permission statement would include: Figure 1 is from Nancy R. Tague's *The Quality Toolbox, 2nd ed.*, ASQ Quality Press, 2005, page 391. This permission statement would appear in the caption just below the PDSA figure.

References

One of the most common errors we've observed with submitted articles is improper referencing. Two problems occur most frequently: information included without proper attribution in the references and formatting that does not meet our style requirements. The information in this section is intended to ensure your references adhere to our standards.

*Quality Approaches in Higher Education* uses its own reference style. All references should be consecutively numbered in the body of the text, using superscripts, and a matching number, also using superscripts, should appear in the references section at the end of the article. Do not include periods with the numbers or spaces preceding or following the numbers. If multiple references are associated with a particular citation, list each separately (do not show a range). For example, “The engineering department modified its program and created an integrated freshman curriculum2,3 to promote a comprehensive learning environment that includes significant attention to student communication skills.” Use a comma to separate the numbers, but do not include a space after the comma. Please do not use Microsoft Word endnotes or footnotes; also, please do not include citations in the body of the text, such as is used for APA style.
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Examples

TYPE: Book, one author:

TYPE: Book, two authors:

TYPE: Magazine/journal article, one author:

TYPE: Magazine/journal article, two authors:

TYPE: Magazine/journal article, no month or year given, only volume and number:

TYPE: Web site articles:

TYPE: Conference proceedings:

Tips
• We use commas to separate segments of the reference information, not periods.
• Authors’ names always appear with the first name followed by the last name.
• The names of books, magazines, newsletters, and journals are italicized.
Author Guidelines: Quality Approaches in Higher Education

- Double quotation marks are used around the names of magazine, newsletter, and journal articles and conference proceedings’ titles. Punctuation marks fall inside the quotation marks in almost every case.
- It’s not necessary to include the city with the publisher’s name.
- When inserting the reference numbers in the body of the text, use the “superscript” function in Microsoft Word. Do not include a period behind the reference number or a space before or after the reference number, as shown below:
  
  Correct: Text in body of the article¹
  Incorrect: Text in body of the article¹.
  Incorrect: Text in body of the article ¹

- When inserting the reference number in front of the reference information in the list at the end of the article, use the standard font size and format. Do include a period behind the reference number and a space after the period, as shown below:
  
  Correct: 1. Reference information
  Incorrect: ¹Reference information
  Incorrect: ¹Reference information
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Summary

Thank you for considering having your article published in Quality Approaches in Higher Education. We look forward to reviewing your manuscript. Please feel free to contact our editor, Deborah Hopen, at debhopen@nventure.com if you have any additional questions.
Call for Reviewers

Quality Approaches in Higher Education

Can you think critically about what you read?

Are you able to express yourself clearly and concisely.

Do you have expertise in quality approaches for higher education?

Are you willing to volunteer your time to help improve your profession?

If you can answer “Yes” to each of these questions, then Quality Approaches in Higher Education invites you to become a member of its Review Board. As a reviewer, you will be expected to maintain a standard of high quality for articles published in this journal and help build its reputation for excellence.

To become a reviewer, please complete the application on the next page and send it with a copy of your curriculum vitae to Deborah Hopen at debhopen@nventure.com. Your application will then be reviewed by the editorial team and you will be notified in approximately 60 days if you have been accepted as a reviewer. Following acceptance to the Review Board, you will become part of the pool of reviewers available to evaluate articles submitted for publication. The frequency of your review assignments will depend on the number of articles submitted and the number of reviewers with the expertise needed to critically evaluate each article.

Once assigned to review an article, you will be e-mailed that article, which will have been “blinded” to remove information about the author(s) to assure your impartiality. Along with the article you will be sent detailed review instructions and the review form, itself. As you critically read the assigned article, your primary focus will be on the article’s content, not its style-related issues such as grammar, punctuation, and formatting. The editorial team is charged with assuring that all style-related issues are resolved in accordance with ASQ’s modified-AP style guide prior to publication. Your task is to provide ratings and detailed comments in nine content-related categories, plus an overall rating which reflects your recommendation for article disposition. You will be given approximately three weeks to return your completed review form for each article.

Article disposition will be determined by the editorial team based on input from the reviewers. In cases where a revision is recommended, detailed instructions will be provided to the author(s) using reviewer comments. Revised articles will be evaluated by the editorial team for compliance to the improvement recommendations, and one or more of the original reviewers may be asked for input as part of this process.

We look forward to receiving your application to become a reviewer.

The Editorial Team

Quality Approaches in Education
Deborah Hopen, Editor
Call for Reviewers: *Quality Approaches in Higher Education*

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  - Enhancing Student Learning
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- [ ] Research Methodology
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  - Organizational Research

- [ ] Other (please specify)

- [ ] Quality Assurance in Higher Education
  - Baldrige Education Criteria for Performance Excellence
  - Quality Improvement
  - Quality Systems and Processes
  - Theories, Models, and Best Quality Practices
  - Measurement Systems
    - Measuring/Assessing Learning and/or Learner Outcomes
    - Measuring/Assessing Teaching
    - Measuring Improvement
    - Measuring/Assessing Institutional Performance

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Applicant’s Curriculum Vitae must be included with this application.
Email to Deborah Hopen at debhopen@nventure.com.