Quality Management and Higher Education:
Big-Q, Little-q, Leadership, and Culture

Keith Luoma
Augusta University

Quality management is a philosophy that seeks to improve excellence in products, services, processes, and people. Quality management is more than a collection of tools and techniques. At its heart, it offers a different way of thinking about the organization, one that offers a unifying culture. Quality management has been successfully applied in manufacturing, service, healthcare, and a host of other fields, but applications to higher education have been comparatively limited. In this paper we distinguish between Big-Q (characterized by an overarching quality management system) and Little-q (a projects-based approach). We apply Deming's 14 points to higher education leadership and culture, and we report on a case study which illustrates these principles in action.

Keywords: quality management, Big-Q, little-q, higher education, Six Sigma, Lean, W. Edwards Deming, leadership, culture

QUALITY MANAGEMENT

Quality management is the brainchild of W. Edwards Deming, a statistician and management consultant from the United States. Deming travelled to Japan at the invitation of General Douglas McArthur to conduct a census, but the Japanese, who were facing widespread poverty in the wake of World War II, were more interested in his ideas concerning statistical quality control. Within 10 years, Japanese manufacturing had gone from producing cheap, poorly made goods to making high-quality automobiles and electronics. In the 1980s, Deming was "rediscovered "in the U.S., and he became a leader in the quality management movement (Deming & Walton, 1986).

Deming's theory, which he called the System of Profound Knowledge (SOPK), consisted of four parts (Deming, 1993). The first, systems thinking, taught that the *part* could only be understood by studying the *whole*. Looking only at the part would lead, at best, to sub optimization. The second, knowledge of variation, promoted the use of statistics to understand the variation inherent to any system. Understanding and controlling variation leads to the reduction of errors in processes and products. The third, psychology, dealt with the human aspect of systems. People are not automatons and treating them as cogs in a machine fails to utilize their creative value. The fourth, theory of learning, advocated for data-based, scientific learning. Deming is considered the father of Total Quality Management (TQM), although he never used that phrase. Deming (1986) offered 14 points for effective quality management, as well as a list of things to be avoided.

Many other individuals and organizations have contributed to quality management. Joseph M. Juran, who also worked in Japan, developed the *Juran Trilogy*, which consists of a never-ending cycle of quality

planning, quality control, and quality improvement (Gryna, Chua, & Defeo, 2007). The Motorola Corporation invented Six Sigma, which emphasized statistical techniques along with a cycle for improvement known as DMAIC, which stands for define-measure-analyze-improve-control (Goetsch & Davis, 2013). The Toyota Production System used a method known as Lean, which attempts to eliminate or reduce waste in a system (Liker & Franz, 2011). The tools used by these methods include graphs, flowcharts, check sheets, as well as elementary and advanced statistics. Teamwork is crucial, and the composition of teams should include representatives from all relevant stakeholder groups.

Regardless of the improvement cycles or tools used, quality management proceeds from the idea that it is the customer who defines quality (Gryna, Chua, & Defeo, 2007). Quality is not merely a matter of staying within formal specifications; that would make producers the judges of quality. A quality product is one that satisfies the customer.

QUALITY IN HIGHER EDUCATION: A LITERATURE REVIEW

Joseph Juran distinguished between Big-Q and Little-q (Gryna, Chua, & Defeo, 2007). Big-Q means that quality management permeates all aspects of the organization, including mission, values, and vision. TQM is an example of Big-Q. Little-q refers to the smaller-scale use of quality management to solve specific problems. Organizations that employ Little-q typically form ad hoc teams to address quality issues, and they may even have separate quality control departments. With Little-q, quality management is a tool, whereas with Big-Q, quality management is a foundation for the entire organization. The distinction between Big-Q and Little-q is maintained in the following literature reviews.

Literature on Big-Q in Higher Education

Deming believed that Big-Q could be applied to education, as is seen in the title of his second book: *The New Economics for Industry, Government, and Education* (Deming, 1993). Maguad (2011) argues that Deming's SOPK provides a focus on systems thinking that is often absent in higher education. Waldman and Schargel (2006) address the lack of systems thinking in healthcare and education. Both disciplines are biased "against risk-taking, innovation, and learning" (p. 128). To increase learning, these organizations "must celebrate our bad results, turn our mistakes into little treasures, learn from them, and then change the system so they cannot recur" (p. 128). For the systems thinker, a mistake is simply an opportunity for learning.

A brief review of the literature reveals that some higher education institutions do employ Big-Q. Grant, Mergen, and Widrick (2004) conducted a comparative analysis of 18 international institutions that use TQM. Papanthymou and Darra (2017) found that recent interest in TQM has been strong in Arabic countries. A literature review by Manatos, Sarruco, and Rosa (2017) confirmed this, but also found a strong interest in African countries. In the U.S., the Malcom Baldrige National Quality Award program was established in 1987 by Congress (https://www.nist.gov/baldrige). Awards are granted in six categories, including education. Up to six awards can be granted in each category each year. The Baldrige program provides a quality framework for education that encompasses the entire SOPK (albeit in different form). Most winners in the education category have been from the K-12 sector; only six awards have gone to higher education institutions: University of Wisconsin-Stout in 2001, Kenneth W. Monfort College of Business in 2004, Richland College in 2005, and then after a long draught, The Alamo Colleges District in 2018, Tri County Tech in 2018, and Howard Community College in 2019.

Literature on Little-q in Higher Education

Although few higher education institutions have embraced Big-Q, many have employed Little-q by using process improvement techniques such as Lean and Six Sigma (Antony, Krishan, Cullen, and Kumar, 2012). Academic support units have often been the subject of these efforts. For example, Liberale and Kovach (2017) used Lean Six Sigma to reduce the time for institutional review boards to complete a review, resulting in a savings of over five days and a 40% reduction in the standard deviation. Doman (2011) led a team of students from a Lean seminar to improve a university's grade change process. At the start of the

project, an undergraduate grade change included 16 steps, while a graduate grade change required 43 steps. The project resulted in a 5-step process for both undergraduate and graduate level grade changes, and it was adopted by the university. This represented a significant savings in time and effort, given that the university averaged 3,000 grade changes annually. Balzer, Brodke, and Kizhakethalackal (2015) summarize several Lean projects in higher education, including one that saved a university $100,000 per year on its student billing process.

Beyond Six Sigma and Lean, other tools have been used to improve various aspects of higher education. Quality Function Deployment (QFD) has been applied to the educational process, especially in recent years. For example, Thomas, Antony, Haven-Tang, Francis, and Fisher (2017) used QFD to revise an undergraduate engineering program at a British university. QFD was used to balance the needs of a diverse group of stakeholders, consisting of faculty, students, and employers. Tetteh (2018) also used QFD to balance the interests of higher education stakeholders in the region of Accra, Ghana. A literature review by Vukadinovic, Djapan, and Macuzie (2017) summarizes several applications of Lean to the educational process, including program design and evaluation.

Accreditation bodies have recently incorporated quality improvement efforts aimed at instructional improvement. For example, the Southern Association of Colleges and Schools now requires a Quality Enhancement Program (QEP) for accreditation. A QEP must focus on "improving learning outcomes and/or student success" ("Quality enhancement plan," n.d.).

LEADERSHIP AND CULTURE: REQUIREMENTS FOR QUALITY

Although it is easy to identify quality management with its tools and techniques, Deming believed in the primacy of organizational culture, but he realized that culture was dependent on proper leadership. Deming's 14 points for quality management are quoted below.
1. Create constancy of purpose toward improvement of product and service. . .
2. Adopt the new philosophy. . . Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.
3. Cease dependence on mass inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.
4. End the practice of awarding business on the basis of price tag. . .
5. Improve constantly and forever the system of production and service. . .
6. Institute training on the job.
7. Institute leadership. The aim of supervision should be to help people . . . to do a better job.
8. Drive out fear, so that everyone may work effectively for the company.
9. Break down barriers between departments. . .
10. Eliminate slogans, exhortations, and targets for the work force. . .
11. Eliminate work standards (quotas). . .
12. Remove barriers . . . to pride of workmanship.
13. Institute a vigorous program of education and self-improvement.
14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's job. (Deming, 1986, pp. 23-24)

Each of these points is an exhortation to organizational leaders, and although originally formulated for an industrial setting, they can be applied to any field, including higher education.

Culture in higher education is not monolithic, and the type of culture at any given institution will affect its capacity for change (Kezar & Eckel, 2002). Quality management is based on teamwork, where high level leaders work to facilitate and empower their employees. This would appear to be most consistent with Berquist's collegial culture (Kezar & Eckel, 2002). Unfortunately, many higher education institutions (HEIs) are divided into cultural siloes, with mutual distrust governing relations between them. These barriers are in direct violation of Deming's point #9. In this case, leaders may need to work on the culture before quality management can begin. According to Kezar and Eckel (2002), this may be difficult since some cultures resist strong leadership. The short tenure of HEI leaders may also be problematic: According

to Duderstadt (2007), university presidents hold office on average for about five years, which he argues is too short for making significant change. This lack of continuity violates Deming's point #1. To emphasize this further, Deming (1986) named "mobility of management" (p. 98) as the greatest threat to a culture of quality. If leadership is constantly rotating, the likely result will be constantly changing goals.

When Seyfried and Pohlenz (2018) investigated quality managers in German institutions of higher education regarding their perceptions on the effectiveness of quality management, they found that without the support of top leadership, quality management was a "toothless tiger" (p. 268), with employees resenting the intrusion of TQM, and faculty seeing it as a pointless administrative exercise. This negativity on the part of key employees suggests that a lack of leadership has a "snowball" effect, leading to additional problems, such as a violation of point #14, getting everyone involved.

In general, leadership and culture will strongly determine whether a HEI will be limited to Little-q or can progress to Big-Q. If a silo culture exists, systems thinking is impossible, and the institution can employ Little-q at best. HEIs with a collegial culture and supportive leadership are in a much better position to embrace systems thinking and reach the heights of Big-Q.

LEADERSHIP AND CULTURE: A CASE STUDY

Several years ago, the author participated in a quality improvement project at a state college in the southeastern United States. The background to the problem is as follows: Each year about half of all incoming freshman placed into at least one Learning Support (LS) class, meaning that they required some combination of remedial English, math, or reading. This created an extremely high workload for the 12 LS faculty members who were responsible for advising and registering 700 students per semester. In addition, the department faced several cultural barriers. The faculty at-large believed that regularly admitted students should have priority in registering; thus, the LS students had to wait until the last day of registration. Furthermore, the computer registration system was designed to prevent students with registration "holds" from registering via the online student registration system. Since LS requirements were recorded as a registration hold, LS faculty had to register students "by hand." As a result, each semester, on the day before classes would begin, 700 LS students would converge on the LS office to be advised and registered. Faculty would work a 12-hour day, with minimal breaks, and students would wait for hours to see an advisor. Despite the department's pleas for help, this scenario continued for 15 years.

Eventually, a large group of students registered a complaint with the President. At his request, a cross-disciplinary team was charged with improving the process. After flowcharting the entire process, the team identified several opportunities for improvement. A computer programmer offered to revise the registration program so that it would temporarily remove the LS registration holds, which would then be replaced at the end of the day. This meant that LS students could now register for classes on their own, meaning that advisors would now have time to advise, rather than focus on the laborious task of registering students. Other improvements were made, including a set of color-coded advising sheets, one for each combination of LS requirements. The design used a quality technique known as error-proofing, which virtually eliminated the possibility of an advising error. One final improvement was made—with Presidential approval, LS advising was spread out over three days. These changes resulted in happier faculty and students, better advising, and fewer advising errors. It also granted more autonomy to the students, who were free to create their own course schedules. In subsequent semesters, constant improvements, including refinements to the advising sheets, became the new norm.

This case study illustrates several of Deming's (1986) points. Under the old advising and registration process numerous registration errors were made, resulting in a lengthy registration audit conducted when registration was completed, violating point #3, "cease dependence on mass inspection" (p. 23). The process remained stagnant for 15 years, violating point #5, "improve constantly and forever the system of production and service" (p. 23). The Learning Support department was chastised over the years regarding the advising situation, violating point #8, "drive out fear" (p. 23). Although the LS department sought assistance, other units felt that the problem was not theirs to solve, violating point #9, "break down barriers between departments" (p. 23). The problem was finally solved when point #7, "institute leadership" (p.

23) and point #9 were initiated, which resulted in the other points (#3, #5, and #8) being adopted as well. The solution also led to improved faculty morale, suggesting point #12, "pride of workmanship" (p. 24). The new philosophy (point #2) also led to continual improvements (point #5).

In the above example, it is difficult to see how anyone other than a senior leader could have successfully championed the project, thereby leading to a culture change. The project not only required cooperation between distinct units (point #9), but furthermore, one was an academic unit (Learning Support), while the other was an academic support unit (computer services). Second, it underscores the value of the team approach; faculty, staff, and student input were used to solve the problem, to the benefit of all three. Third, it shows the power of culture, but unfortunately in a negative way. Higher education is, at least in terms of operations, highly conservative, and it has resisted the practice of customer service (Mark, 2013). That an inefficient advising and registration model could linger for 15 years attests to this, and it is instructive to note that it took a minor crisis to induce change.

CONCLUSION

Quality management has been successfully applied in higher education, and this is true in its Biq-Q and Little-q forms, and in academic support areas as well as instructional areas. If the lack of Baldrige award winners in higher education is any indication, Big-Q is not widely practiced in the U.S., and the evidence shows limited application in other countries. Little-q is more widely practiced and may, at least in theory, be a steppingstone to Big-q.

Because of the culture of higher education, change must be championed by strong leaders, and the breadth and depth of the change will depend on the nature of this leadership. Any leader, even a department chair, can champion Little-q, although the effectiveness will vary depending on the level of support needed outside of the department. A Dean may be in a much better position to support such efforts, but it is hard to see how anyone lower than a Provost or President could champion Big-Q. In the United States, the Chancellor of the University System of Georgia championed the Service Excellence program, so the program, at least in theory, had a high potential for success. However, chancellors change, and the program floundered with a new leader, illustrating Deming's (1986) frustration with "mobility of management" (p. 98).

Higher education faces many challenges, including rising tuition, declining state support, and competition from for-profit schools. None of these is likely to have a simple solution, but it is unlikely that "doing the same thing we've always done" will solve anything. Leaders who wish to lead change would do well to consider Deming's 14 points which, when used in conjunction with a wide variety of quality tools, have a proven track record as change agents. A quote attributed to Deming, perhaps apocryphally (Graban, 2013), is still instructive: "It is not necessary to change. Survival is not mandatory." For higher education to survive, it will need to change, and quality management will likely play an important role.

REFERENCES

Antony, J., Krishan, N., Cullen, D., & Kumar, M. (2012). Lean Six Sigma for higher education institutions (HEIs): Challenges, barriers, success factors, tools/techniques. *International Journal of Productivity and Performance Management*, *61*(8), 940–948.

Balzer, W.K., Brodke, M.H., & Thomas Kizhakethalackal, E. (2015). Lean higher education: successes, challenges, and realizing potential. *International Journal of Quality & Reliability Management*, *32*(9), 924–933.

Deming, W.E. (1986). *Out of the crisis.* Cambridge, MA: Massachusetts Institute of Technology, Center for Advanced Engineering Study.

Deming, W.E. (1993). *The new economics for industry, government, and education.* Cambridge, MA: Massachusetts Institute of Technology for Advance Engineering Study.

Deming, W.E., & Walton, M. (1986). *The Deming management method*. New York, NY: Dodd, Mead and Company.

Doman, M.S. (2011). A new lean paradigm in higher education: A case study. *Quality Assurance in Education*, *19*(3), 248–262.

Duderstadt, J.J. (2007). *The view from the helm: Leading the American university during an era of change.* Ann Arbor: University of Michigan Press.

Goetsch, D.L., & Davis, S. (2013) *Quality management for organizational excellence*. Boston, MA: Pearson.

Graban, M. (2013). Don't threaten people with this famous Dr. Deming quote. [Blog post]. Retrieved from https://www.leanblog.org/2013/02/dont-threaten-people-with-this-deming-quote/

Grant, D., Mergen, E., & Widrick, S. (2004). A comparative analysis of quality management in US and international universities. *Total Quality Management & Business Excellence*, *15*(4), 423–438.

Gryna, F.M., Chua, R.C.H., & Defeo, J.A. (2007) Juran's *quality planning & analysis for enterprise quality.* Boston, MA: McGraw Hill.

Kezar, A., & Eckel, P.D. (2002). The effect of institutional culture on change strategies in higher education: Universal principles or culturally responsive concepts? *The Journal of Higher Education*, *73*(4), 435–460.

Liberale, A.P., & Kovach, J.V. (2017). Reducing the time for IRB Reviews: A case study. *Journal of Research Administration*, *48*(2), 37–50.

Liker, J.K., & Franz, J.K. (2011). *The Toyota way to continuous improvement: Linking strategy and operational excellence to achieve superior performance*. New York: McGraw-Hill.

Maguad, B.A. (2011). Deming's "profound knowledge": Implications for higher education. *Education*, *131*(4), 768–774.

Manatos, M.J., Sarrico, C.S., & Rosa (2017). The integration of quality management in higher education institutions: A systematic literature review. *Total Quality Management*, *28*(2), 159–175.

Mark, E. (2013). Student satisfaction and the customer focus in higher education. *Journal of Higher Education Policy and Management*, *35*(1), 2–10.

Papanthymou, A., & Darra, M. (2017). Quality management in higher education: Review and perspectives. *Higher Education Studies*, *7*(3), 132–147.

SACSOC. (n.d). *Quality enhancement plan*. Southern Association of Colleges and Schools. Retrieved from http://www.sacscoc.org/pdf/081705/Quality%20Enhancement%20Plan.pdf

Seyfried, M., & Pohlenz, P. (2018). Assessing quality assurance in higher education: Quality managers' perceptions of effectiveness. *European Journal of Higher Education*, *8*(3), 258–271.

Tettah, G.A. (2018). Quality in the higher education system: Use of the quality function deployment tool. *Quality Approaches in Education*, *9*(1), 17–36.

Thomas, A., Antony, J., Haven-Tang, C., Francis, M., & Fisher, R. (2017). Implementing Lean Six Sigma into curriculum design and delivery–a case study in higher education. *International Journal of Productivity and Performance Management*, *66*(5), 577–597.

Vukadinovic, S., Djapan, M., & Macuzic, I. (2017). Education for lean & lean for education: A literature review. *International Journal for Quality Research*, *11*(1), 35–50.

Waldman, J.D., & Schargel, F.P. (2006). Twins in trouble (II): Systems thinking in healthcare and education. *Total Quality Management & Business Excellence*, *17*(1), 117–130.