

Applying Kaizen to University Teaching Through Weekly Course Evaluation

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Abstract

Purpose: Current evaluation standards in German higher education institutions (HEIs) most often do not lead to measurable quality improvement. The purpose of this paper is to critically evaluate whether Kaizen can be a useful methodology to improve the quality of teaching on course level and intensify the exchange and discussion between lecturers and learners.

Design/Methodology/Approach: The paper describes a theoretical approach of combining the continuous improvement philosophy of Kaizen with student course evaluation. Furthermore, the author uses evaluation data from two course cycles to describe results from a pilot application.

Findings: A concept is illustrated for evaluating every single course unit and continuously discussing these results together with the learners. Learners in the pilot courses accepted and welcomed the intense participation and allowed improvements mainly referring to course concept, content (and detail) selection, course material and presentation style. The participation rate declined during the term and was highly influenced by triggers like exam and grade relevance.

Research Limitations/Implications: The presented results have been collected in one single course over two years in the same institution. The next stage of research would be the application of the approach in other courses and institutions to validate results as well as to make potential adjustments to the concept.

Originality/Value: Although course evaluation has become standard in German HEIs, most institutions use it only once per term or year. This paper discusses a new approach to evaluate teaching quality on time and directly at the point of action (Gemba) to facilitate short-term reaction of the lecturers.

Keywords: Kaizen, Continuous Improvement, Higher Education Institutions, Quality Management, Evaluation

Paper Type: Research

1. Motivation and Problem Statement

The management of quality has become even more important for higher education institutions (HEI) in the past years as education rankings and accreditation standards continuously postulate appropriate procedures and standards (Dill and Soo, 2005; Bryant, 2013). For business schools, the Association to Advance Collegiate Schools of Business (AACSB) has a long tradition of defining recognized quality requirements (Miles *et al.*, 2004; Hedin *et al.*, 2005). They demand to “provide an overview of the structure of the school, its policies, and processes to ensure continuous improvement and accountability related to the school’s operations.” (AACSB International, 2013).

Quality management and process optimization methods like Six Sigma and Lean Management have initially been developed in the manufacturing industry (Womack *et al.*, 1991) but later also spread further into service and public sectors (Kollberg *et al.*, 2006; Pepper and Spedding, 2010; Sreedharan and Raju, 2016). A core element of Lean is known to be the Kaizen philosophy (Womack and Jones, 2003) which aims to continuously improve the quality of processes (Imai, 1986). The application of Kaizen in higher education (HE) teaching is only reported by few case studies in the literature (Emiliani, 2004, 2005). This article describes an approach to apply Kaizen to course level teaching in form of continuous evaluation.

At the latest since the European Bologna reform, course evaluation has been introduced to universities in Germany nationwide (Damian *et al.*, 2016). Main goals are teaching quality assurance and improvement as well as course reflection and feedback with the students. An extensive study of more than 6000 courses in 31 degree programs over a period of 13 years though exposed an equal amount of positive and negative changes in evaluation results (Marsh and Hocevar, 1991). This result was even less expected, as the lecturers have been evaluated 30 times on average. Further studies show comparable results (Kember *et al.*, 2002), amongst them also analyses in German HEIs (Lang and Kersting, 2007). One of the reasons of these findings is that lecturers do not change many aspects of their teaching, even if they generally assess teaching evaluations to be useful (Wachtel, 1998; Beran *et al.*, 2005). Not only on course level, also departments and universities face the challenge to develop measures out of student evaluations (Ballantyne *et al.*, 2000).

This article focuses in particular on the time aspect of evaluation: The circle between receiving feedback and applying changes in teaching characteristics will be rapidly accelerated by evaluating in a weekly rhythm instead of the common semester or year frequency (Peiffer *et al.*, 2015). Goal of this approach is to continuously confront lecturers and students with the course quality and to hereby implement and test smaller changes in course details in a timely and flexible way. Next to describing concept characteristics this article summarizes experiences made from a pilot study of two executions (years) in a master level course for engineering management students. Therefore, the research question of this article is: How can the Kaizen philosophy be applied to quality on course level at higher education institutions?

2. Research Background

ISO 9000 defines quality as the “degree to which a set of inherent characteristics fulfils requirements” (International Standards Office, 2015). Education quality cannot be measured easily by a single indicator but instead is a multi-dimensional concept (Cheng and Ming Tam, 1997). Indicators for education performance from an economic viewpoint and regarding to many rankings often focus more on research than on teaching (Ramsden, 1991). When focusing on teaching, the voice of customer (VOC) can be utilized to find the right measures for quality

(Hwang and Teo, 2001). One of the main obstacles for this tool's application are the identification of the process "customers" and their concrete requirements (Andreassen, 1994; Owlia and Aspinwall, 1997). For the analysis of the customer's voice, internal and external process stakeholders have to be considered (Elias, 2016). For HEIs, state or country education regulations, funding authorities and international or professional accreditations and ranking associations form examples for external stakeholders (Patil and Codner, 2007; Nickel, 2008; Paor, 2016). For teaching, the internal stakeholders prevail with the students as primary "customers". The teaching quality model of Rindermann (2009) organizes factors into three groups which affect the learning outcome: Lecturer, student and the course environment.

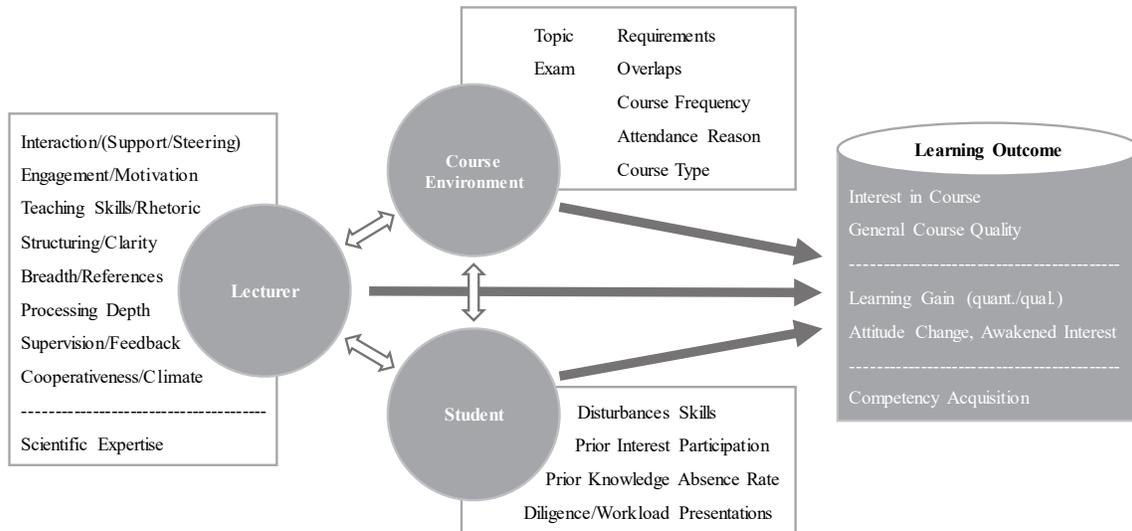


Figure 1. Multi factor model of teaching quality, translated from Rindermann (2009)

As approach to measure and change many of these indicators, the Kaizen philosophy is applied. To find a good scientific definition for Kaizen has been provenly difficult as it can be translated as a change to being good or better (Brunet and New, 2003). The Japanese Imai (1986) coined the term as an overarching philosophy for continuous, incremental improvement of all aspects of an organization (Doolen *et al.*, 2008). In the production industry, this philosophy stands for the goal to create a common awareness of all employees to continuously reflect the own activities and processes as well as the overall context to find ways for improvement, independently from hierarchical boundaries and creation of improvement projects (Imai, 1986). This policy of small steps on the operational level can also be applied to university teaching as presented in the following.

3. Systematic Integration of Continuous Feedback in HE Courses

3.1 Structure and Content of Continuous Evaluation

Basing on the Kaizen philosophy, the presented approach uses evaluation feedback on an operative level and in short-term frequency. The students are encouraged to reflect each course unit and give feedback to the lecturer. This weekly evaluation can clarify difficulties in lecturer's comprehension and customize parts of the course content to the actual participants. The students assess the respective unit web-based in the first days afterwards. This way of feedback generation enables the students to give their input even on the way home with their mobiles and its anonymity encourages a larger number of text comments (Spooren *et al.*, 2013). At the

beginning of the following unit, a short reflection statement is given by the lecturer to summarize the quantitative evaluation results and text annotations. Important for the lecturer at that point is the demonstration of effectiveness of the evaluation participation. They could disagree with some statements and should use the opportunity to explain their own point of view. Other input can be presented to influence the current course unit or the following weeks. In addition to this core element of continuous evaluation, some points during the term bring the opportunity for special evaluation types which can be found in the following figure.

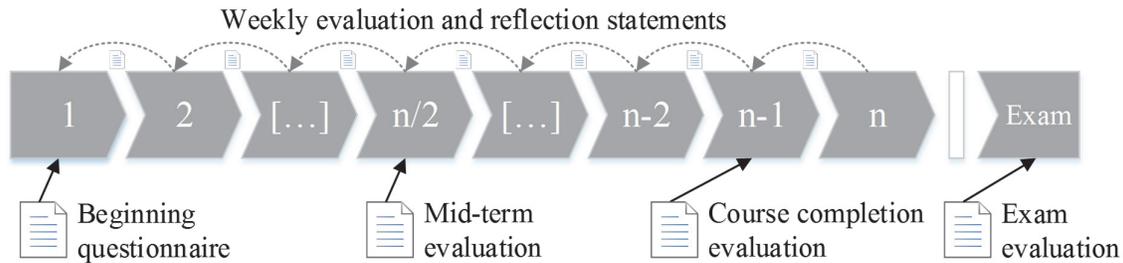


Figure 2. Evaluation points and types during the term

At the beginning of the term, a specific questionnaire can gather participant's characteristics like field of study, professional background but most importantly prior knowledge and skills related to the course's topic. This starting information gives the opportunity to adjust details of the planned course in advance even before taking the weekly evaluations into account. The course completion evaluation equals the regularly used method in German universities. In addition, the mid-term evaluation enables the lecturer to ask about the course in general while still being able to change aspects during the second half of the course. Both of this larger evaluation questionnaires should be reflected in front of the students shortly after the point of evaluation. Finally, also the exams are being evaluated, which is very new to German HEIs (Peiffer *et al.*, 2015). As the exam is also an element of the overall course, it should not be left out of the evaluation structure.

4. Results

The concept of continuous evaluation has been applied to a master degree course for engineering management students about Lean Management and Six Sigma in two consecutive years. The bachelor level background comprised different HEIs and slightly different courses as well so that the prior knowledge and skill sets differed significantly. Another reason for the need of continuous feedback was the diversity of applied forms of teaching. The term consisted of lectures, group exercises, statistical software tutorials, seminar papers and their presentations, further short presentations, process simulation, guest lectures and excursions to local companies.

One of the biggest challenges was the uphold of a high participation rate despite of the high questionnaire frequency. For the generalizability of evaluation results, approximately 15 filled out questionnaires are needed (Rindermann and Schofield, 2001; Rantanen, 2013). As the courses only had up to 40 students, the number of questions was minimized to lower the required completion time and focus on the most important aspects. Therefore, the weekly evaluation was inspired by the one-minute questionnaires of Hounsell (2003). Main question topics have been lecturer's speed, content comprehensibility, proportion of new knowledge as well as satisfaction with form and type of presentation.

The results from text comments are summarized in table 1. The participants to comments ratio was very high in the first year of the course (5) and decreased significantly to less than two in the second year. In both years, most of the comments aimed at content of the course unit and the form of teaching. Thematic overlaps with other courses, its aspiration level and examination details have been mentioned frequently. Another focus laid on the behavior of the lecturers like structuring the unit's content, rhetoric, interaction with the students and supervision.

<i>Category</i>	<i>Year 1</i>	<i>Year 2</i>
Content of the Current Course ("What")	29%	29%
Lecturers / Forms of Teaching ("How")	55%	41%
Course Series' Concept and Structure	15%	17%
Environmental Conditions / Material	0%	8%
Continuous Evaluation Approach	2%	6%

Table 1. Categorization of text comments from pilot application

The overall quantitative evaluation on a scale from -3 (very unsatisfied) to +3 (very satisfied) resulted in weekly values between +1,71 and +2,47 with the exception of a statistical software exam which significantly reduced the average value in both years to +0,5 and +1,0. Grading and examinations seem to be highly sensible topics to students resulting in a higher evaluation participation rate in general as well as highly more textual comments.

5. Conclusion, Limitations, and Outlook

The student feedback about continuous evaluation has been mostly positive. As popular aspect, influencing parts of course's content and style has been highlighted. After a very high activity in the first year, less students participated in the weekly evaluation in the second round. One of the reasons could be the larger amount of course participants (40 instead of 22) and less direct contact between lecturers and students. Another possibility would be a best fit of this approach to newly designed courses or changes in faculty's course responsibilities. After the first rounds, proven and reliable courses could result in less evaluation participation and comments. To prove these assumptions, further research will have to apply the concept to courses of different size, student maturity and scientific fields.

Viewing the concept from the institutional aspect, its success and application is highly dependent on the involvement and view of the lecturers. They have to be flexible to continuous changes in their routine, open to replying to evaluation grades and comments every week and still encourage the student to participate in the feedback circle. Important for evaluating the feedback results on HEI management level are intra-institutional comparisons and target values (Abrami, 2001; Kulik, 2001; Smith, 2008). For a successful long-term implementation, the handling of evaluation results should be centrally supported. Counseling and didactical support in combination to student evaluation proved to be significantly more successful (Cohen, 1980; Dresel and Rindermann, 2011; Penny and Coe, 2004).

An institution-wide implementation of continuous evaluation could result in higher teaching quality in wide breadth. But it could also lead to acceptance problems of lecturers as it intervenes in their academic freedom (Emery *et al.*, 2003; Wilkesmann, 2012). Existing quality management systems would be able to use operational teaching measures instead of long-term data. After all, the choice of methods and tools for quality management in higher education institutions has to meet the individual stakeholder's requirements and organizational culture.

References

- AACSB International (2013), *Eligibility Procedures and Accreditation Standards for Business Accreditation*, Tampa, FL.
- Abrami, P.C. (2001), “Improving Judgments About Teaching Effectiveness Using Teacher Rating Forms”, *New Directions for Institutional Research*, Vol. 2001 No. 109, pp. 59–87.
- Andreassen, T.W. (1994), “Satisfaction, Loyalty and Reputation as Indicators of Customer Orientation in the Public Sector”, *International Journal of Public Sector Management*, Vol. 7 No. 2, pp. 16–34.
- Ballantyne, R., Borthwick, J. and Packer, J. (2000), “Beyond Student Evaluation of Teaching. Identifying and addressing academic staff development needs”, *Assessment & Evaluation in Higher Education*, Vol. 25 No. 3, pp. 221–236.
- Beran, T., Violato, C., Kline, D. and Frideres, J. (2005), “The Utility of Student Ratings of Instruction for Students, Faculty, and Administrators. A 'Consequential Validity' Study”, *Canadian Journal of Higher Education*, Vol. 35 No. 2, pp. 49–70.
- Brunet, A.P. and New, S. (2003), “Kaizen in Japan. An empirical study”, *International Journal of Operations & Production Management*, Vol. 23 No. 12, pp. 1426–1446.
- Bryant, M. (2013), “International Accreditations as Drivers of Business School Quality Improvement”, *Journal of Teaching in International Business*, Vol. 24 No. 3-4, pp. 155–167.
- Cheng, Y.C. and Ming Tam, W. (1997), “Multi-models of quality in education”, *Quality Assurance in Education*, Vol. 5 No. 1, pp. 22–31.
- Cohen, P.A. (1980), “Effectiveness of student-rating feedback for improving college instruction. A meta-analysis of findings”, *Research in Higher Education*, Vol. 13 No. 4, pp. 321–341.
- Damian, R., Grifoll, J. and Rigbers, A. (2016), “On the role of impact evaluation of quality assurance from the strategic perspective of quality assurance agencies in the European higher education area”, *Quality in Higher Education*, Vol. 21 No. 3, pp. 251–269.
- Dill, D.D. and Soo, M. (2005), “Academic quality, league tables, and public policy. A cross-national analysis of university ranking systems”, *Higher Education*, Vol. 49 No. 4, pp. 495–533.
- Doolen, T.L., van Aken, E.M., Farris, J.A., Worley, J.M. and Huwe, J. (2008), “Kaizen events and organizational performance. A field study”, *International Journal of Productivity and Performance Management*, Vol. 57 No. 8, pp. 637–658.
- Dresel, M. and Rindermann, H. (2011), “Counseling University Instructors Based on Student Evaluations of Their Teaching Effectiveness. A Multilevel Test of its Effectiveness Under Consideration of Bias and Unfairness Variables”, *Research in Higher Education*, Vol. 52 No. 7, pp. 717–737.
- Elias, A.A. (2016), “Stakeholder analysis for Lean Six Sigma project management”, *International Journal of Lean Six Sigma*, Vol. 7 No. 4, pp. 394–405.
- Emery, C.R., Kramer, T.R. and Tian, R.G. (2003), “Return to academic standards. A critique of student evaluations of teaching effectiveness”, *Quality Assurance in Education*, Vol. 11 No. 1, pp. 37–46.
- Emiliani, M.L. (2004), “Improving business school courses by applying lean principles and practices”, *Quality Assurance in Education*, Vol. 12 No. 4, pp. 175–187.
- Emiliani, M.L. (2005), “Using kaizen to improve graduate business school degree programs”, *Quality Assurance in Education*, Vol. 13 No. 1, pp. 37–52.
- Hedin, S.R., Barnes, C.H. and Chen, J.C. (2005), “AACSB 2003 accreditation standards. Impact on continuous quality improvement”, *International Journal of Services and Standards*, Vol. 1 No. 3, p. 358.

- Hounsell, D. (2003), “The evaluation of teaching”, in Fry, H., Ketteridge, S. and Marshall, S. (Eds.), *A handbook for teaching & learning in higher education*, 2nd ed., Kogan Page, London, Sterling, VA, pp. 200–212.
- Hwang, H.B. and Teo, C. (2001), “Translating customers’ voices into operations requirements. A QFD application in higher education”, *International Journal of Quality & Reliability Management*, Vol. 18 No. 2, pp. 195–226.
- Imai, M. (1986), *Kaizen, the key to Japan's competitive success*, Random House Business Division, New York.
- International Standards Office (2015), *Quality management systems -- Fundamentals and vocabulary* No. 9000:2015.
- Kember, D., Leung, D.Y.P. and Kwan, K.P. (2002), “Does the Use of Student Feedback Questionnaires Improve the Overall Quality of Teaching?”, *Assessment & Evaluation in Higher Education*, Vol. 27 No. 5, pp. 411–425.
- Kollberg, B., Dahlgaard, J.J. and Brehmer, P. (2006), “Measuring lean initiatives in health care services. Issues and findings”, *International Journal of Productivity and Performance Management*, Vol. 56 No. 1, pp. 7–24.
- Kulik, J.A. (2001), “Student Ratings. Validity, Utility, and Controversy”, *New Directions for Institutional Research*, Vol. 2001 No. 109, pp. 9–25.
- Lang, J.W.B. and Kersting, M. (2007), “Regular Feedback from Student Ratings of Instruction. Do College Teachers Improve their Ratings in the Long Run?”, *Instructional Science*, Vol. 35 No. 3, pp. 187–205.
- Marsh, H.W. and Hocevar, D. (1991), “Students' evaluations of teaching effectiveness. The stability of mean ratings of the same teachers over a 13-year period”, *Teaching and Teacher Education*, Vol. 7 No. 4, pp. 303–314.
- Miles, M.P., Hazeldine, M.F. and Munilla, L.S. (2004), “The 2003 AACSB Accreditation Standards and Implications for Business Faculty. A Short Note”, *Journal of Education for Business*, Vol. 80 No. 1, pp. 29–34.
- Nickel, S. (2008), “Qualitätsmanagementsysteme an Universitäten und Fachhochschulen. Ein kritischer Überblick”, *Beiträge zur Hochschulforschung*, Vol. 30 No. 1, pp. 16–39.
- Owlia, M.S. and Aspinwall, E.M. (1997), “TQM in higher education - a review”, *International Journal of Quality & Reliability Management*, Vol. 14 No. 5, pp. 527–543.
- Paor, C. de (2016), “The contribution of professional accreditation to quality assurance in higher education”, *Quality in Higher Education*, Vol. 22 No. 3, pp. 228–241.
- Patil, A. and Codner, G. (2007), “Accreditation of engineering education. Review, observations and proposal for global accreditation”, *European Journal of Engineering Education*, Vol. 32 No. 6, pp. 639–651.
- Peiffer, H., Rach, H., Rosanowitsch, S., Wörl, J. and Schneider, M. (2015), “Lehrevaluation”, in Schneider, M. and Mustafic, M. (Eds.), *Gute Hochschullehre: Eine evidenzbasierte Orientierungshilfe*, Springer, Berlin, pp. 153–184.
- Penny, A.R. and Coe, R. (2004), “Effectiveness of Consultation on Student Ratings Feedback. A Meta-Analysis”, *Review of Educational Research*, Vol. 74 No. 2, pp. 215–253.
- Pepper, M. and Spedding, T.A. (2010), “The evolution of lean Six Sigma”, *International Journal of Quality & Reliability Management*, Vol. 27 No. 2, pp. 138–155.
- Ramsden, P. (1991), “A performance indicator of teaching quality in higher education. The Course Experience Questionnaire”, *Studies in Higher Education*, Vol. 16 No. 2, pp. 129–150.

- Rantanen, P. (2013), “The number of feedbacks needed for reliable evaluation. A multilevel analysis of the reliability, stability and generalisability of students’ evaluation of teaching”, *Assessment & Evaluation in Higher Education*, Vol. 38 No. 2, pp. 224–239.
- Rindermann, H. (2009), *Lehrevaluation: Einführung und Überblick zu Forschung und Praxis der Lehrveranstaltungsevaluation an Hochschulen mit einem Beitrag zur Evaluation computerbasierter Unterrichts, Psychologie*, Vol. 42, 2nd ed., Empirische Pädagogik, Landau.
- Rindermann, H. and Schofield, N. (2001), “Generalizability of Multidimensional Student Ratings of University Instruction Across Courses and Teachers”, *Research in Higher Education*, Vol. 42 No. 4, pp. 377–399.
- Smith, C. (2008), “Building effectiveness in teaching through targeted evaluation and response. Connecting evaluation to teaching improvement in higher education”, *Assessment & Evaluation in Higher Education*, Vol. 33 No. 5, pp. 517–533.
- Spooren, P., Brockx, B. and Mortelmans, D. (2013), “On the Validity of Student Evaluation of Teaching. The State of the Art”, *Review of Educational Research*, Vol. 83 No. 4, pp. 598–642.
- Sreedharan, V.R. and Raju, R. (2016), “A systematic literature review of Lean Six Sigma in different industries”, *International Journal of Lean Six Sigma*, Vol. 7 No. 4, pp. 430–466.
- Wachtel, H.K. (1998), “Student Evaluation of College Teaching Effectiveness. A brief review”, *Assessment & Evaluation in Higher Education*, Vol. 23 No. 2, pp. 191–212.
- Wilkesmann, U. (2012), “Hat die Governance der Hochschule Einfluss auf den Teaching Approach von Professor/innen? Ergebnisse zweier deutschlandweiter Befragungen von Professor/innen”, in BMBF (Ed.), *Bildungsforschung 2020 - Herausforderungen und Perspektiven: Dokumentation der Tagung des Bundesministeriums für Bildung und Forschung vom 29.-30. März 2012, 29.03.2012*, BMBF, pp. 179–190.
- Womack, J.P. and Jones, D.T. (2003), *Lean thinking: Banish waste and create wealth in your corporation*, Free Press, New York.
- Womack, J.P., Jones, D.T. and Roos, D. (1991), *The machine that changed the world: How Japan's secret weapon in the global auto wars will revolutionize western industry*, Harper Perennial, New York.