

# Process improvement for fostering leadership at Higher Education Institutions

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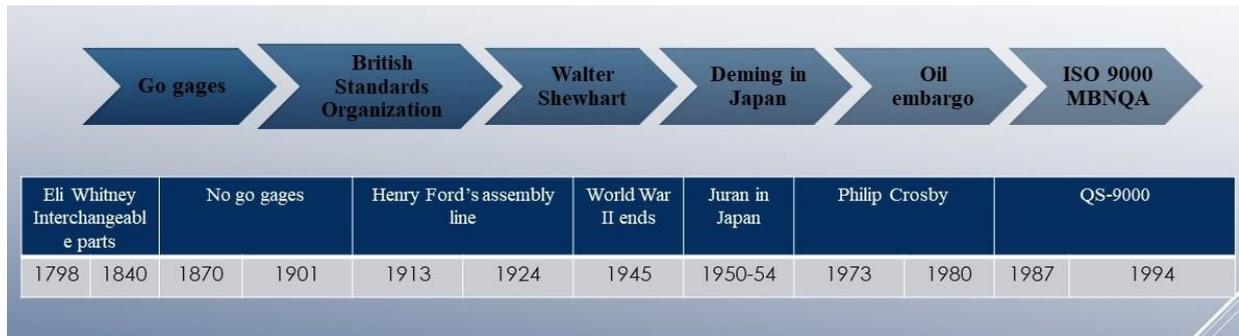
**Abstract** Process improvement methodology is often crucial for increasing leadership potential. Six Sigma is one of the leading process improvements methodologies that can be closely joined with how well an educational organization implements its strategic vision. As soon as a Higher Education Institutions (HEI) has articulated its mission statement and executed a SWOT analysis, the Six Sigma has the potential to define the areas for improvement and enhance current processes. The methodology assumes to better things within the organization that are real targets of its strategy. It is exceedingly strategy-driven approach and compels for support from the highest levels of university leadership. Besides, Six Sigma accentuates the planning process and makes possible to quantify the expected results. Each step envisaged by the methodology is essential; it is trackable, measurable and shows the impact to the process or procedure you are working on. Basically, if a HEI is willing to make changes and shift into Six Sigma approach in implementing its strategy, the whole educational institution would have to put up with the top down realization of the aims. However, to enjoy the value of the methodology use it should be adopted at all levels of the organization. The HEI should have a strong customer focus, be student-centred, and open to changes. On the other hand, the educational institutions should have robust systems, well-described procedures, and infrastructure to simplify effective collaboration. The paper derives from the analysis of an effectiveness of HEIs, the level of compliance with the results of the educational activities of the mission statement and the level of achievement of the goals and objectives of the organization. Our results and implications show some ways to apply Six Sigma tools and techniques to help Russian HEIs achieve their missions.

## 1 Introduction

The term 'quality' has been used in many different ways in educational discourse. As the term still lacks a clear definition there have been a number of deceptive policy decisions and measures, trying to assess and further improve the quality of education, which has not been previously conceptualized. Thus, what is quality of education? It can include a variety of things, for example, even biased research metrics (Strielkowski 2017). However, eventually, the quality comes down to how well a higher educational instruction is doing in meeting the requirements of its stakeholders (Figueiró and Raufflet 2015). The stakeholders, either these are students and their parents paying for educational services or ecosystems' representatives (employers), who are ultimate consumers of the graduates, are customers whose needs are to be met and satisfied (Glushak et al. 2015).

The most comprehensive and widespread paths to improve the quality in the industry are Lean and Six Sigma (Cortes et al. 2016). Sigma is both a quality leadership philosophy and a methodology that focuses on reducing discrepancies, measuring defects, and improving the quality of products, processes and services (Hahn et al. 2000). The purpose of Lean is to boost customer value while minimizing waste. Thus, Lean and Six Sigma are assumed to come together, complementing and enriching each other. Six Sigma and the philosophies related to it have existed in many forms best described in Figure 1 (Folaron 2003). Businesses were customer focused,

their decision-making process relied on data, and understanding of the business processes was primarily important to achieve success.



**Fig. 1.** Evolution of the Six Sigma  
Source: Folaron (2003)

The tools that the Six Sigma offers can grant us with unlimited opportunities to exclude high expenditures, lessen discrepancy and defects, and improve process procedures and customer experiences in business. The fundamental idea of the Six Sigma methodology is cycled around the process known as DMAIC (Sin et al. 2015). DMAIC stands for Define, Measure, Analyse, Improve and Control. For the leadership to work effectively within the Six Sigma it is crucial to start thinking in a different not familiar way. The understanding of the core principles requires changing in the way university leadership is used to tackling issues: from problem driven to customer driven approach in running business. The HEI management usually sits and waits apprehensively for what next is coming from authorities, then they react to budget cuts, lower numbers of enrolled students, and higher numbers of dissatisfied employers, worsening economy, healthcare, etc. Instead of reacting to issues and dissatisfaction, the university leadership should be searching for ways to prevent those issues of dissatisfaction (Lockheed and Hanushek 1994; Adina-Petruța and Roxana 2014). Challenges that universities have to face with should be seen as opportunities for improvement, prevention, and reduction.

The question is can we use the Six Sigma to guarantee stakeholders flawless and vigorous quality of education? What new the Six Sigma can bring into governing the educational process, and how this powerful tool with all rigorous elements can lead the university management to a more disciplined, better organized, and data supported business success?

## 2 Premises of the Six Sigma for University leadership

The most common process methodology for the Six Sigma is DMAIC, which means that defining, measuring, analysing, improving, and controlling are key elements leading to success is used in the right place and time. Primarily the methodology has been used in manufacturing, though we assume it cannot be limited by industry use only and can be applied to educational processes as well. Each phase requires certain steps be followed (Zu et al. 2008). Furthermore, each step is accomplished with a sequence of common effective tools.

So, at the define phase the university leadership (UL) should clearly determine the problem they are to tackle, set goals and see how those are aligned with the mission of the educational institution. The baseline and localization of the problems UL are dealing with will be signified at the measure phase. The results of that phase will give a better idea of what root causes were and provide us with possible hypotheses. With collecting data, those theories will be either confirmed or rejected. Now that the UL have found the roots of the problems, they are able to come up with develop, implement and further evaluate solutions aimed at established causes (Chakravorty 2009; Mehrabi 2012). The objective of forthcoming actions will be to reveal positive changes as compared to the current state of the process through adaptation. Any proposed changes are piloted to see how whether the improvement phase works or not. Long-term effects on a large scale could be traced within some period, and this will prove if the institution's mechanisms are in place. We should also understand that there should be some open space for future adjustments and improvements, but the best practices would be spread out within all organization's structural units.

The effectiveness of the university can be expressed by the level of compliance with the results of the educational activities of the mission statement and the level of achievement of the goals and objectives of the organization. Educational organizations should have an internal quality assurance policy reflecting the development strategy of the educational organization and logically connected with the strategic management of the university. All stakeholders should be involved in the development and implementation of the quality assurance policy: students, scientific and pedagogical workers, administration, employers, employers' associations. Policies and procedures are the basis of a coherent and consistent system of quality assurance of the university. The system

should be cyclic procedure of continuous improvement and contribute to the accountability of the university. It has the potential to ensure the development of a culture of quality where interested parties take responsibility for the quality of their activities at all levels of functioning of the university (Martins et al. 2019). The quality assurance policy will be effective if it reflects and takes into account the relationship between all the factors that determine the context in which educational programs are implemented: intra-university, national, and pan-European. Therefore, the implementation of the quality assurance policy should consider compliance with the following criteria:

1. Availability and accessibility of clearly formulated, documented, approved and published objectives of the HEIs;
2. Compliance of the educational organization's mission with goals and objectives of the innovation ecosystem of the territory;
3. Availability and effectiveness of the mechanism (processes) of the development and approval of the objectives of the educational organization, taking into account the stakeholders' opinion (administration, teachers, students, employers);
4. Taking into account the requirements of professional practice (professional standards, recommendations of employers, the results of the analysis of the professional field) in the mission of the educational organization;
5. Availability and effectiveness of methods to achieve and adjust the goals of the educational program, taking into account the development of science and industry;
6. Consistency of the expected learning outcomes with the requirements of professional standards (if any are available);
7. Conformity of the expected learning outcomes to the descriptors of the National Qualifications Framework at the bachelor/ master/specialist level;
8. Presence in the competence model of graduates of professional competencies developed on the basis of the professional standard (if available and where appropriate) and/or other qualification requirements.

By assigning a compliance ratio of 1 to 4 to each of the eight criteria, the educational organization is given the opportunity to evaluate the quality of the proposed programs from the point of view of the implementation of its mission. Moreover, the description of the implementation of the mission can be reflected graphically. Below is an example of the implementation of the mission, goals and objectives of the educational organization N with a compliance rate according to criteria rated as significant (3) and full (4) compliance.

To assess the linkage between the quality of education and the innovation economy, refer to the table describing the relationship of the university with stakeholders on each of the life cycles of the educational program.

**Table 1.** Applying Six Sigma tools and techniques to help a HEI achieve its mission

Six Sigma Phase	Characteristics of the phase at the HEI level	Description
Define	Program choice and description.	Determining the desired level of qualification; legal field. Defining entry requirements; expected learning outcomes at the program or module levels. Defining forms / types of assessment of learning outcomes at the program and module levels. Describing available teaching and learning resources of the educational program.
Measure	Writing up the self-evaluation report.	Analysis and assessment of the compliance of the program with previously approved standards and criteria. A working group approved by the university carries out the analysis. Analysis involves the collection and discussion of data. Adjusting and amending the program based on the results of the analysis. Writing up the self-evaluation report, including all supporting documents for the internal review/audit.
Analyse	External review of the quality of the education program.	Selecting and approving the external expert panel (ERP) which includes experts who are not affiliated with the program/university. Members of the ERP study self-evaluation report and make preliminary conclusions. Meetings with the leadership of the university, teachers, etc. External evaluation by members of the ERP of the documents submitted and the results of meetings for compliance with previously established standards and criteria.

Improve	Drafting the report on the results of the external review procedure. Feedback of the HEI to the report of the ERP.	The ERP drafts a report, which reflects all the information on the results of the external evaluation, recommendations, conclusions. Based on the report, an official letter of recommendation is prepared in the name of the relevant decision-making body. The university prepares a formal response to the suggestions and recommendations described in the external report. University introduces changes to the program, according to the proposed recommendations of the ERP. The official response of the university and changes in the program are sent to the body that makes the final decision.
Control	Formal decision making . Publication of the results. Follow up procedures.	The body making the final decision examines the documents sent by the university. All participants in the evaluation procedure (university/ quality assurance agencies) publish their reports.

Source: own results

Based on the analysis of the self-examination report, submitted documents and information, as well as interviews with representatives of professional communities, graduates, students, graduates, doctoral students, staff, and the leadership of an educational organization, an ERP prepares an external review report based on an agreed decision.

The report reflects a comprehensive evaluation of the educational program with relevant recommendations. Evaluation of the educational program is given strictly on the basis of its compliance with the standards and accreditation criteria. If the members of the external review panel come to the conclusion that the educational program does not meet the standards, they substantiate in detail the positions of non-compliance with the standards, and also articulate the measures necessary to improve the quality of the educational program.

### 3 Structural partnership

The procedure for the development and approval of educational programs is much broader and includes not only a check for compliance with established standards. An educational program will be successful if it has sustainable partnerships with external stakeholders, thereby influencing the formation of an innovation ecosystem. We understand municipalities, other educational organizations, regional authorities, commercial and non-commercial enterprises, etc. as external stakeholders.

Undoubtedly, there is a big difference in the organizational structures, culture, goals and behaviour patterns in the market between educational organizations and stakeholders. Moreover, if organizations exist for quite a long time on the market for goods and services, the process of convergence will be extremely painful: the culture of each of the organizations is formed and serves to meet decisive goals within strategic objectives (Bikse et al. 2014). Taking into account the differences in structures, several structural patterns of partnership are possible:

1. Interface-level dialogue, which means the least amount of changes in the structure and culture of interacting organizations but involves a series of actions to achieve a better understanding and effectiveness. This form may include mutual representation in the governing bodies (board of directors and committee of the educational organization), intensive and extensive work on the implementation of joint projects, participation in the design of regional development programs, etc.
2. Dialogue within the framework of newly created organizations from representatives of interacting organizations. An example of this kind of organization is enough: a small innovative enterprise, a joint venture, or a technology park.

In the education system, effective communications may mean that all stakeholders have actively participated in each of the life cycles of the educational program. For such a link to be sustainable, it should be based on clear and understandable goals, which are a systematic part of the development of partner policies. In addition, representatives of the academic community, students, social partners and employers should be included in the groups that ultimately determine the alumni competency map.

Thus, it becomes obvious that the development and maintenance of a culture of quality in an educational organization is a complex and multifaceted process. Imposing a model from outside does not always produce the desired results. There are many reasons for this: differences in national systems, management styles, the economy of the region and country. The conditions in which universities exist can both serve as a stimulus and impede the development of a new culture.

## 4 Conclusions

Overall, it would seem that government structures, cutting back on education expenses, should force universities to work in a new way. However, it is crucially important to maintain a balance between the financial side of the transformation and preserving the quality of educational services.

Along with the developed 'third' mission, the university and its staff should not forget about the reputation; in the race for the first places in the world rankings, one should not forget about raising the level of educational programs. One of the ways to encourage the development of culture can be the support and recognition by the state of the diversity of missions in Russian HEIs. The funds in this case will be different - investments may be, for example, in the development of IT to support virtual educational environments, incentive funds for university staff or to develop sustainable partnerships with external stakeholders.

Our results demonstrate that the universities should remain autonomous as well as should have the right to choose the path of development and its role in shaping the economy of the region.

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