

Slay with S.C.O.R.E Model! Remarkable Six Sigma in Improving Quality Education Outfit

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Abstract

Global education innovation to improve the quality of education is actively carried out in most countries worldwide. The success of Six Sigma in the profit-driven sector has sparked interest in its potential application in the education sector. However, previous studies indicate that Six Sigma is predominantly used to enhance the quality of education in various fields within higher education institutions. Even implementing Six Sigma in the context of Malaysian education is very limited and has never been studied. Therefore, the primary purpose of this concept paper is to detail strategy-based evaluation using the SCORE model to improve the quality of education using Six Sigma. The SCORE model is measured between five elements: Strength (S), Challenge (C), Option (O), Response (R), and Effectiveness (E). A comprehensive literature review was conducted by analyzing journals, conference papers, research theses, books, and websites. The main study's findings show that the SCORE model found that Six Sigma has a lot of potential and plays an important role in strengthening the quality of education. Six Sigma can be commercialized with joint collaboration with stakeholders, and implementing Six Sigma can offer opportunities that can bring significant improvement to various fields of education in Malaysia. However, the findings of this study only discuss positive actions using the SCORE model. A comprehensive description of the SCORE model cannot be explained due to constraints from a practical point of view. Nevertheless, this concept paper can be improved by using any other model to get various perspectives, such as SWOT, TOWS, NOISE, and SOAR. Implementing Six Sigma aims to broaden the existing body of knowledge in education quality assessment. One potential avenue for further research involves investigating the effects of implementing the Six Sigma DMAIC model within the Malaysian education sector. Additionally, there is an opportunity to delve into specific educational areas that may benefit from improvement, such as management, infrastructure, curriculum, and evaluation.

Keywords: SCORE Model, Six Sigma, DMAIC, Quality Education, Strategy

Introduction

Six Sigma has been effectively implemented in profit-oriented industries (Abdulla & Kavilal 2022). Originating from Motorola in the mid-1980s, Six Sigma was introduced to enhance product quality and service standards (Costa et al. 2021). As a result of Motorola's remarkable success, numerous large companies have adopted Six Sigma to boost profitability and address competitive pressures (Nuresa et al. 2022). This approach has piqued the interest of organizations across diverse sectors due to its emphasis on implementing measurement-based improvement strategies to minimize defects and variations in producing high-quality products and services (Davis & Fifolt 2018).

Six Sigma is widely used for structured improvement strategies to meet customer demands by enhancing processes using the Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) model (Elfanda 2021). The DMAIC model is a data-driven continuous improvement cycle developed to identify weaknesses and inefficiencies, especially those leading to product or service failures (Mittal et al. 2023). The Six Sigma DMAIC Model is employed to improve existing processes while maintaining established standards and seeking further enhancements. It is crucial to follow the predefined DMAIC phase cycle to ensure optimal results (Smętkowska & Mrugalska 2018).

Since 2000, Six Sigma has been applied in the education sector across various fields (Hargrove & Burge 2002). The Six Sigma approach can enhance curriculum, infrastructure, student learning performance, academic achievement, learning community, and teaching and learning in education (Sabtu & Motare 2024). Research has shown that Six Sigma is an effective strategy for improving the quality of educational institutions (Arafeh et al. 2021; Maclel-Monteon et al. 2020). Therefore, Six Sigma is seen as a systematic approach to evaluating and enhancing the quality of education with the aim of achieving perfection and ensuring customer satisfaction in educational institutions.

The study Sabtu and Motare (2024), indicates a lack of comprehensive Six Sigma studies in education, particularly at the school level. However, Higher Education Institutions (HEIs) have shown a growing interest in Six Sigma, with positive impacts on student learning, teaching, management, and academia. Alkoot (2019), demonstrates that Six Sigma has effectively enhanced students' academic performance and improved the quality of teaching and learning by lecturers (Wang 2022). Additionally, Six Sigma has contributed to the enhancement of infrastructure quality (Abdulla & Kavilal 2022), improved university operations (Biju & Nair 2017), and raised the quality of vocational fields (Sandu & Sharma 2020).

The findings Sabtu and Motare (2024), also show that Six Sigma in education has never been studied in the context of education in Malaysia. Therefore, for analysis, the SCORE Model is used to explore the potential of Six Sigma through the Six Sigma DMAIC model in a positive way with an action-oriented approach to help plan strategically, especially in making a decision. Although there are various strategic planning tools that are always used, apart from the SCORE model, namely SWOT, TOWS, NOISE, and SOAR analysis, it was found that the SCORE model has advantages with a more positive approach (Neal 2024). The SCORE model is also an action-oriented approach compared to other analyses. Thus, this concept paper aims to describe strategy-based assessment using the SCORE model to improve the quality of education using Six Sigma.

SCORE Model

The SCORE model serves as a strategic planning tool to assist organizations in conducting assessments and developing planning strategies for implementation. It is designed to help organizations perform more detailed and structured assessments of their strategies. Unlike the widely known SWOT analysis, which focuses on strengths, weaknesses, opportunities, and threats, the SCORE model is considered a more comprehensive strategy evaluation approach. According to Neal (2023), the advantages of the SCORE model include helping organizations make informed decisions, enabling decision-makers to capitalize on strengths, and effectively identifying and addressing obstacles or challenges.

Neal (2023) introduced the SCORE model in which five key elements are identified: Strength (S), Challenge (C), Option (O), Response (R), and Effectiveness (E). This model serves as a comprehensive strategy evaluation tool, providing a more detailed analysis than the traditional SWOT framework. Furthermore, Figure 1 visually represents the components of the SCORE model, highlighting its applicability in strategic decision-making processes.

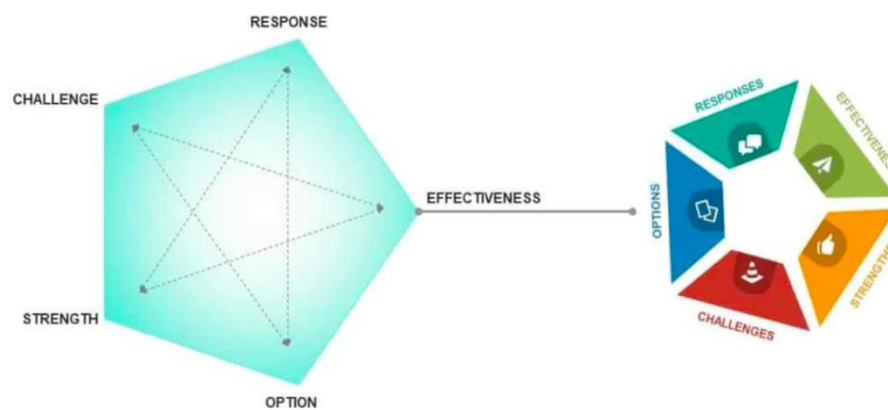


Figure 1 SCORE Model as Strategy Evaluation Beyond SWOT

Neal (2023), explains the elements of the SCORE model as follows: strengths (S) represent what you do well or have the potential to do well, challenges (C) represent areas where you need additional resources or capabilities to succeed, option (O) represents the opportunities and risks you face, response (R) represents the feedback from stakeholders and the expected return or reward, and effectiveness (E) represents how you intend to make your initiative work efficiently and reliably. Table 1 provides the definition of the analysis elements of the SCORE model, which consists of five main components: strengths, challenges, responses, options, and effectiveness.

Table 1

Definition of SCORE Model analysis elements

Elements	Definitions
Strengths	Identify the potential and main strengths of the things to be implemented that greatly benefit the stakeholders
Challenges	Detect additional resources or capabilities to deal with any challenges that will occur by equipping yourself with the necessary knowledge
Option	Detect opportunities and risks that will be passed by exploring potential options objectively, optimizing external options that are beneficial to the organization
Response	Identify feedback from stakeholders that can provide expected returns or rewards.
Effectiveness	Identify how to make the proposed initiative work efficiently and reliably

The SCORE model is extensively applied within corporate and business contexts, underscoring its pivotal role as a tool for profit-driven enterprises. By methodically and comprehensively evaluating business operations, SCORE Model analysis facilitates informed decision-making for organizational leaders. Its dual focus on internal and external elements engenders a holistic grasp of the present organizational landscape and forthcoming opportunities and challenges. Consequently, SCORE model analysis enables businesses to leverage strengths, confront challenges, capitalize on opportunities, and devise tailored strategies to accomplish the organization's objectives.

The SCORE model is considered superior to other models due to its emphasis on customer importance and satisfaction. Teams utilizing the SCORE model analyze and prioritize clients, encouraging a more comprehensive assessment of institutional strengths, challenges, opportunities, partnerships, and activities. While similar to a SWOT analysis, the SCORE model also highlights the performance of co-worker and stakeholder relationships, along with employee contributions.

The implementation of the SCORE Model in the realm of education represents a significant stride towards assessing and enhancing the comprehensive educational approach. The SCORE model is widely recognized for its immense potential in evaluating the strengths, challenges, options, responses, and overall effectiveness in efforts to elevate the education sector. Its application can provide valuable insights and analysis to drive improvements and positive educational outcomes

Strength of Six Sigma

According to a literature review, Six Sigma has been identified as an effective strategy for enhancing quality in education (Sabtu & Motare 2024). The analysis also revealed that Six Sigma is widely used in the education sector across different countries (Cudney et al. 2014, 2018). Its application spans various areas such as management (Maclel-Monteon et al. 2020), teaching and learning (Wang 2022), and student achievement improvement (Abdulla & Kavilal 2022).

The primary strength of Six Sigma is its structured continuous improvement strategy, which involves improving processes using the Six Sigma DMAIC model. The Six Sigma DMAIC model is a comprehensive approach to enhancing and ensuring quality in education (Sabtu, Matore, et al. 2023). Through Six Sigma, educational institutions can conduct in-depth diagnoses of issues related to education and devise appropriate interventions to address them. Moreover, interventions based on identified root causes are more effective and yield good long-term results.

The Malaysian Ministry of Education (MOE) can facilitate the implementation of Six Sigma in the education sector by fostering partnerships with Institutions of Higher Education (HEIs). This collaboration will engage educators in the field of education and quality experts to generate ideas for enhancing the quality of education using the Six Sigma methodology. Furthermore, involving practitioners and industry experts can further expand the utilization of Six Sigma in education, adding value to existing knowledge and contributing to improving and advancing education in Malaysia.

MOE can benefit from seeking guidance from international Six Sigma experts through consultations, workshops, or conferences to gain a global perspective and strengthen the implementation of Six Sigma in education in Malaysia. Involving Six Sigma experts will help the Ministry formulate a comprehensive implementation strategy, including setting objectives, quality targets, and key performance indicators (KPIs) to be achieved. With the assistance of international Six Sigma experts, the MOE can ensure that the implementation of Six Sigma in the education system is more structured, data-based, and capable of achieving significant results.

Furthermore, the MOE could coordinate an international seminar or conference involving education experts and Six Sigma professionals from within and outside the country. The objective of this event would be to facilitate the sharing of best practices, successes, and challenges encountered by countries that have integrated Six Sigma into their education systems. This initiative will contribute to establishing an international network for exchanging ideas and fostering cooperation in quality education. Consequently, integrating Six Sigma into the education sector is advantageous for all stakeholders in ensuring Malaysia's education system attains global recognition while retaining its distinctive attributes.

Challenges of Six Sigma

Previous studies indicate that Six Sigma is more commonly used to enhance the quality of higher education institutions rather than at the school level. Notably, Six Sigma has never been applied in the field of education in Malaysia (Sabtu & Motare 2024). The primary challenge is the skepticism and resistance to change from stakeholders and implementers in educational institutions. They may perceive the Six Sigma approach as too intricate or unsuitable for the Malaysian education system and prefer to stick to familiar approaches that have been used for a long time.

Besides that, the successful implementation of Six Sigma typically relies on consistent and ongoing data collection. This is crucial for accurate analysis to ensure that the intervention plan can be executed in an organized manner (Bumjaid & Malik 2019). However, this circumstance may present difficulties for educational institutions with restricted

technological resources or inadequate infrastructure for data gathering and analysis. MOE implementers may face challenges due to unfamiliarity with the Six Sigma concept and methodology. This may be particularly difficult because Six Sigma is primarily used in profit-oriented fields (Smętkowska & Mrugalska 2018)

As a result of the identified challenges, collaborative efforts among educators and all stakeholders need to be mobilized to ensure the implementation of Six Sigma can be realized in the education system in Malaysia, especially at the school level. MOE should conduct a specialized training program for stakeholders and education implementers, focusing on the principles of Six Sigma and its application in education. Collaboration using the Quadruple Helix Model involving the government, HEIs, industry, and the community will aid in developing, creating, and commercializing Six Sigma in education (Sabtu, Mohd Matore, et al. 2023). Moreover, it is essential to emphasize monitoring, evaluation, and continuous improvement in the planning cycle to ensure educational excellence through Six Sigma

Options of Six Sigma

The options are focused on opportunities and options. Implementing the Six Sigma approach in the Malaysian education system presents numerous opportunities for substantial improvements across various aspects of education. The Six Sigma framework offers a fresh alternative for educational institutions to elevate the quality of education in Malaysia. Through systematic data collection and analysis, Six Sigma provides the Ministry of Education and Culture with an opportunity to make evidence-based decisions that are more accurate, transparent, and tailored to the needs of teachers and students. Furthermore, introducing Six Sigma fosters a culture of ongoing evaluation and improvement, ensuring that all changes or enhancements are evaluated for effectiveness and adjusted to meet current needs.

Furthermore, implementing Six Sigma can foster opportunities for enhanced collaboration with industries utilizing Six Sigma methodologies. A memorandum of understanding (MoU) or a cooperation agreement can be established between an educational institution and a profit-based company to formalize this collaboration. This partnership may encompass the provision of training programs, experiential learning opportunities, and joint participation in specific projects. For instance, a mentorship program could be instituted to pair educators in the field of education with seasoned industry professionals proficient in Six Sigma. These mentors would offer guidance on the practical implementation of Six Sigma and provide recommendations to ensure that the quality of education aligns with the standards stipulated by educational policymakers.

Implementing Six Sigma presents an opportunity to enhance the efficiency of the education sector and drive cost reductions. In addition to elevating quality, Six Sigma has the potential to generate cost savings by minimizing waste and optimizing resource utilization. Education often contends with diverse challenges that demand immediate attention and resolution (Dian et al. 2022). It's important to recognize that ensuring quality in education goes beyond policy development; it demands a dedication to excellence from all stakeholders, particularly teachers. Thus, integrating the Six Sigma approach can address this by incorporating continuous monitoring, evaluation, and improvement into the planning cycle to elevate the quality of education, particularly in teaching and learning.

Responses of Six Sigma

MOE plays a crucial role in successfully implementing Six Sigma in the education sector. It is important to obtain feedback from the MOE to assess the effectiveness of the Six Sigma approach and to pinpoint areas for improvement in education. This involves utilizing school achievement reports and data provided by the MOE to gauge educational outcomes before and after implementing Six Sigma. The report focuses on enhancing teaching quality, improving student academic achievement, and optimizing school operations. Feedback from the MOE is essential for identifying challenges, evaluating the impact of the Six Sigma approach, and determining the necessary improvements for educational institutions.

Teachers play a crucial role in successfully implementing Six Sigma in education. It is essential to gather feedback from teachers to understand their experiences with using Six Sigma in the context of education in Malaysia. This feedback can be obtained through group discussions or individual interviews. Understanding how Six Sigma has influenced teaching techniques and assessment methods is crucial for improving the quality of education and developing successful human capital.

In educational institutions, students play a crucial role in the implementation of Six Sigma. Similar to customers in the industry, students are regarded as customers in educational settings. The main objective of incorporating Six Sigma in education is to prioritize student needs and satisfaction. Therefore, employing the Six Sigma approach can enhance the quality of teaching and educational management, ultimately leading to improved student academic achievement. It's important to gather feedback from students to gauge their experience and satisfaction with teaching and learning in the classroom.

Effectiveness of Six Sigma

Implementing the Six Sigma approach in education has great potential to maximize the use of resources and minimize waste. Six Sigma is a methodology that focuses on improving efficiency and reducing variation in the process, which can lead to more effective use of resources (Jayamohan & Bhasi, 2021). In fact, the Six Sigma approach is popular for structured improvement strategies to meet customer demands. Therefore, it cannot be denied that Six Sigma in education can improve the quality of education while meeting customer demand through increased efficiency, improving management processes, and raising the standard of educational institutions in Malaysia.

Furthermore, Six Sigma places a strong emphasis on meticulous data collection and analysis. The decisions and actions taken at each stage of the Six Sigma process are based on precise data, enhancing the approach's reliability. By utilizing the DMAIC approach, Six Sigma ensures that processes are continuously monitored, allowing for the identification of trends or patterns within the data that can be leveraged to make more accurate predictions about process outcomes. The research findings indicate that Six Sigma is an effective process improvement tool for educational institutions, enabling them to delve deeper into the root causes of educational process issues to enhance and uphold quality standards (Taraza et al. 2023; Tissir et al. 2022).

Six Sigma is often viewed as an elegant methodology for several reasons. One of its strengths is its clarity, particularly in the structured approach of the DMAIC phase. Each phase is clearly

defined, with specific goals, quality tools, and steps for those involved. In terms of simplicity, Six Sigma prioritizes problem-solving without unnecessary theoretical or procedural burdens, focusing on the most efficient approaches to achieve desired results. Additionally, Six Sigma underscores the importance of established procedures and consistently applying quality tools to ensure accurate, precise, and reliable results.

Six Sigma is highly suitable for supporting and maximizing business objectives, making it widely accepted in various industries. One of the fundamental principles of Six Sigma is the focus on customer needs. By understanding and meeting customer needs, Six Sigma helps businesses achieve greater customer satisfaction, a critical goal in many businesses. Additionally, Six Sigma aims to reduce variation and defects in processes, which, in turn, reduces operational costs. Businesses can maximize profits by reducing waste and increasing efficiency, aligning with the organization's financial goals.

Six Sigma is a highly integrated methodology suitable for quality improvement in educational institutions. It focuses on improving individual processes and how each process contributes to the organization's strategic goals. By aligning Six Sigma projects with strategic objectives, organizations can ensure that each improvement effort contributes to overall synergy, increasing efficiency and performance throughout the system. In addition, Six Sigma involves all levels of the organization, from front-line employees to upper management, in continuous improvement and quality improvement efforts. As a result, Six Sigma is seen to help increase efficiency, reduce waste, and maximize the overall performance of an organization.

The SCORE Six Sigma Framework Model, illustrated in Figure 2, offers a comprehensive view of the strengths and weaknesses of the Six Sigma approach and suggests integrated actions to enhance its implementation. This model is a valuable tool for monitoring the ongoing progress of Six Sigma, particularly in education.



Figure 2: SCORE Framework Model on Six Sigma

Summary

This study has found that, in general, the analysis of strategy-based assessment findings using the SCORE model indicates that Six Sigma holds great potential and plays a significant role in enhancing the quality of education and developing quality human capital. The result of this study supports the idea that the commercialization of Six Sigma can be achieved by involving stakeholders through the Quadruple Helix model, which includes the government, HEIs, industry, and the community to facilitate the implementation of Six Sigma in Malaysia's education system. In general, it seems that implementing Six Sigma in Malaysia's education system offers significant opportunities for improvement in various areas. These results indicate that receiving feedback from stakeholders is essential for researchers to identify issues, conduct evaluations, and implement necessary improvements within educational institutions. An implication is that Six Sigma could potentially establish the Malaysian education system as a globally recognized standard with unique features, providing value-driven education. However, the findings are restricted to positive actions using the SCORE model. A comprehensive explanation of the SCORE model could be more practical due to constraints. Just a reminder to consider enhancing the concept paper by using alternative models to gain different perspectives. Some of the models to consider are SWOT (Strengths, Weaknesses, Opportunities, Threats), TOWS (Threats, Opportunities, Weaknesses, Strengths), NOISE (Needs, Opportunities, Improvements, Strengths, Enhancements), and SOAR (Strengths, Opportunities, Aspirations, Results). The relevance of this idea, using Six Sigma, aims to expand the body of knowledge for quality assessment in education, which has traditionally relied on the same methods. It would be interesting to assess the impact of the Six Sigma DMAIC model in the Malaysian education sector. The study can be broadened to encompass various fields of education, including management, infrastructure, curriculum, and assessment.

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