

Using Critical Thinking to Improve Engineering Student Retention

Cindy P. Veenstra, Ph.D.



Presented at the Third Annual Research and Scholarship in Engineering Education Poster Session. 10/14/08.

Abstract

Improving the graduation rate of engineering students at any engineering college is a challenge. A new critical thinking tool that is gaining wide-spread use in lean manufacturing may be used by engineering colleges to guide their efforts in improving the graduation rate of their engineering students. This tool is known as the strategic X-matrix. An example using the strategic Xmatrix will be presented.

Research Question

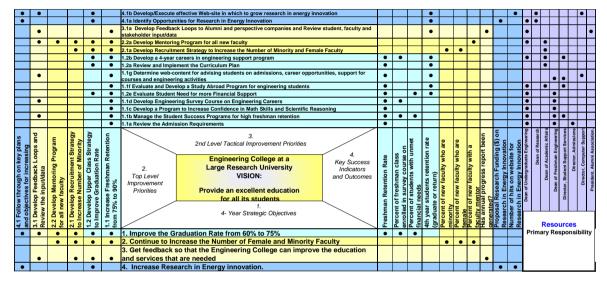
Using critical thinking, how does an engineering college improve its student retention?

Methodology

The ideas of lean six sigma were used to enhance critical thinking for the objective of improving engineering student retention. Using six sigma DMAIC, first the overall objectives must be defined and the success indicators must be proposed and measured. The Strategic X-Matrix enhances critical thinking for this definition. Analyze-Improve- Control can then be used to Improve student retention. The X-Matrix enables an improved thought process for developing the improvement priorities and success indicators for higher graduation rates.



An Example of a Strategic X-Matrix



Example

An hypothetical example for an engineering college is proposed using the X-matrix. Read it by starting at the bottom and reading clock-wise.

My recent PhD research at U-M showed that

Freshman retention was influenced by:

- High School Preparation
- Concern about Financial Needs
- Confidence in Math ability
- Interest in Study Abroad Program

Enrollment in a Survey Course on Engineering Careers Improving these characteristics were included as Tactical Improvement Priorities

Four Strategic Objectives were Considered:

- * Improve the Graduation Rate
- Increase the Minority and Female Faculty
- Obtain Feedback from all stakeholders for education of engineering students
- Increase Research in Energy Innovation

References

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Acknowledgements

The template for the X-Matrix was developed by the ASQ Quality Management Division.

About the Author

Dr. Veenstra recently graduated from the University of Michigan in IOE. Her Ph.D. research was on "Modeling Freshman Engineering Success". She has started a consulting company, Veenstra and Associates (www.veenstraconsulting.com), that guides colleges in their continuous improvement strategy for raising their student graduation rates. She may be reached at cpveenst@umich.edu.