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Process Improvement Consulting Teams: Creating an Undergraduate Capstone Experience

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Introduction

Traditional classroom methods have limited impact on sustainable student learning outcomes. Conversely, "real world" experiences bring classroom concepts to life for students. However, faculty need replicable experiences, concrete skills, tools and exercises to coach students and improve their marketability to employers.

Community partners are in need of data to support business and public health objectives and requirements. Specifically, mandates by the U.S. Health & Human Services Centers for Medicare and Medicaid Services (CMS) require improvement in measures, such as colorectal & cervical cancer screening, that improve population health.

Primary Health Solutions (PHS) is a Federally Qualified Health Center (FQHC) serving 5 clinic sites in Butler County, Ohio.

Further, AUPHA certification requirements include an integrative experience, such as a capstone project.

Consulting projects achieve these objectives.

Methods

From January-May 2015, 27 students were enrolled in 2 sections of Quality Management & Process Improvement, a senior level course in the undergraduate BS in Health Services Administration at Xavier University, Cincinnati, Ohio. Section 1 employed a traditional classroom lecture format used in the previous year. Section 2 combined lecture, classroom computational exercises, Design Thinking exercises at the Xavier Center for Innovation and consulting projects chosen by our community healthcare partner. Students in Section 2 were divided into teams of 4 and placed at 3 different clinic sites. Teams were assigned to collect, investigate and present baseline data for either colorectal or cervical cancer screening. At semester end, students in both sections were administered a survey to assess attitudes and knowledge of process improvement. T-tests and either chi-square or Fisher's exact tests at $p=0.05$ were used to identify variables which differ significantly between survey and course sections. Small sample size was a study limitation.



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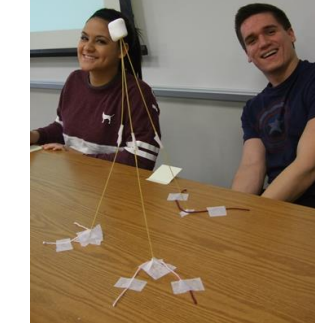
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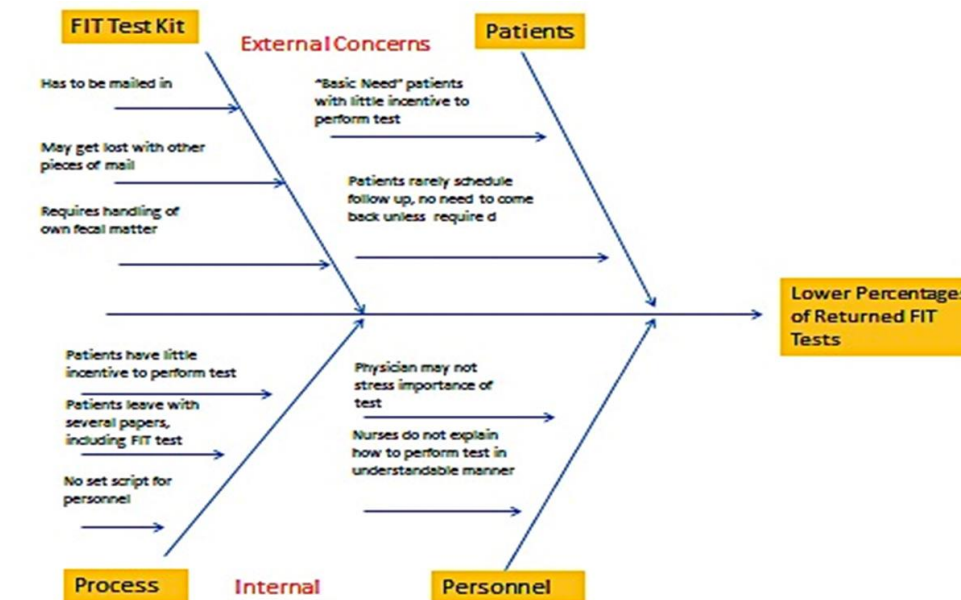
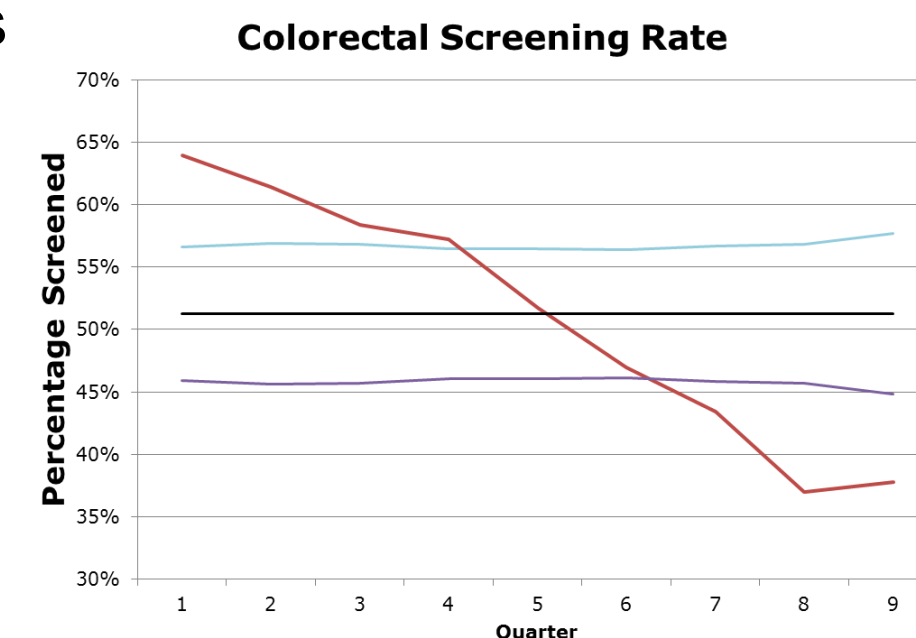
Primary Health Solutions, Butler County healthcare providers, staff & administration: M. Armentrout MD, M. Bellisario, A. Campbell MHA, A. Fugate RN, P. Greathouse RN, K. Mitchell, A.J. Ponshe MD, S. Roller CNP, D. Rose RN, H. Schuster CNP, J. Treadway CNP, M. Troche MD, T. Weinel CNP, S. Wexelblatt MD, P. Vazquez RN

Results

- Students in Section 2 were engaged and contributed positively to the community partner's mission
- Students explored "Design Thinking" activities



- Student teams used established PI tools to improve colorectal and cervical cancer screening rates, such as control charts and Fishbone diagrams



- Importantly, student demographics and baseline GPA for Sections 1 & 2 were not significantly different from one another, allowing them to be compared
- 92% of students in the new experiential learning course preferred the new style to the old**
- Students in Consulting Teams performed 12% (mean) higher, on final survey exam, compared to traditional lecture
- Students in Consulting Teams feel well prepared to work in teams and interact with administration, providers & staff

Table 1: Student survey at course conclusion (abridged)				
Sections 1 & 2 are comparable				
Question	Desired response	Section 2 Frequency	Section 1 Frequency	p-value (two-tailed)
Female Sex	No difference	42%	80%	0.06 FE
GPA at start of course (mean ± Standard Deviation)	No difference	3.21 ± 0.36 CI ₉₅ 2.98-3.43	3.33 ± 0.39 CI ₉₅ 3.12-3.55	0.39
Completed internship	No difference	58%	87%	0.19 FE
Section 2 is engaged in meeting learning outcomes for their capstone experience				
Question	Desired response	Section 2 Frequency	Section 1 Frequency	p-value (one-tailed)
This course and assignments meet the HSA student learning objectives listed in the syllabus.	yes	92%	67%	0.14 FE
The pace of this course was...	about right	100%	47%	0.003 FE
I felt engaged in this class and curriculum more than in other classes I have taken.	agree strongly/somewhat	83%	27%	0.005 FE
Students in Section 2 feel well prepared for teamwork & presentation to healthcare executives & providers				
This class helped me to learn to work better with others in a team.	agree strongly/somewhat	92%	20%	0.0003 FE
I feel that my depth of understanding of process improvement techniques is good.	agree strongly/somewhat	100%	67%	0.03
I would have preferred to have been in the other section of this course due to the instruction style.	disagree strongly/somewhat	92%	33%	0.003 FE
If given a healthcare-related process improvement issue to solve in a healthcare organization, I feel confident that I would know how to proceed.	agree strongly/somewhat	100%	67%	0.03
I would feel comfortable working on or leading a team on a process improvement project.	agree strongly/somewhat	92%	60%	0.07 FE
I would feel comfortable presenting process improvement results and recommendations to healthcare executives and providers.	agree strongly/somewhat	100%	40%	0.001
Section 2 has a higher mean grade on 36 final survey exam questions				
Comprehensive Exam grade (mean ± Standard Deviation) percent		63 ± 22% CI ₉₅ 49-77	51 ± 22% CI ₉₅ 39-66	0.10

Legend: Table 1: Section 2 is the new experiential learning capstone course section. Section 2: n = 12; Section 1: n = 15. Both Sections had 100% survey participation. Frequency p-values analyzed by Pearson Chi-square, or Fisher's Exact (FE) for cells <5. One-tailed p-values are reported for the desired response based on Section 2. **Figure 1:** GPA at start of course, by section. **Figure 2:** Final survey exam (percent); n = 36 questions.

Figure 1: GPA by section

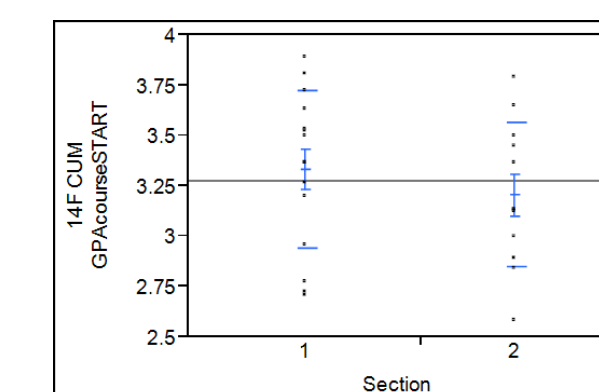
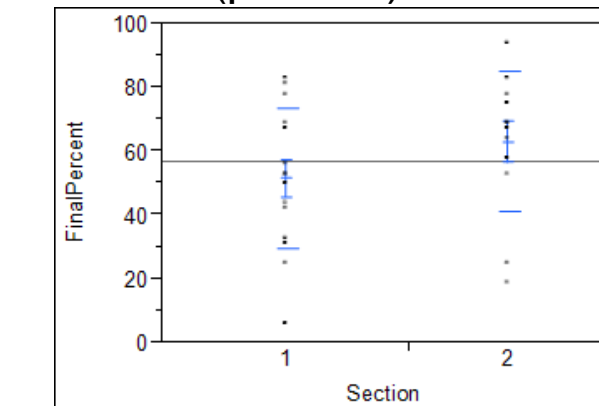


Figure 2: Final survey exam (percent)



Conclusions & Next Steps

A capstone consulting project was successfully applied to undergraduate education. Students utilized standard quality management tools and strategies to collect, analyze and present baseline quantitative and qualitative data to healthcare providers and executives.

PHS, our community healthcare partner, is poised to meet requirements for CMS and FQHC qualification and improve outcomes for their clients. Students in the next semester will continue PDSA cycles for each project.

Students preferred the new experiential learning capstone course to a lecture-based format and preformed better on a comprehensive exam.



Significance

Students learn better and value experiential learning. Students want to work and contribute to their community. Consulting teams support the work of PHS to provide increased value to their underserved and underinsured FQHC community, consistent with Xavier University's mission.

Resources

Guo L. (unpublished) Quality Improvement Handbook. Langley, G. J., Moen, R., Nolan, K. M., Nolan, T. W., Norman, C. L., & Provost, L. P. (2009). *The improvement guide: a practical approach to enhancing organizational performance*. John Wiley & Sons. Scholtes, P. R., Joiner, B. L., & Streibel, B. J. (1996). *The team handbook*. Oriel. Alexander E.S. (unpublished) Quantitative Outcomes Exercises for Public-Private-University Partnerships. (PPUPs) alexandere2@xavier.edu

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