DEMONSTRATING PROGRAM RIGOR: BLOOM BLOSSOMS!

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Abstract

This paper demonstrates how Bloom's revised action verb categorization and taxonomy can provide the necessary foundation from which a proxy for quantification of an academic program's rigor can be demonstrated. Course Student Learning Outcomes (SLO's) are utilized to categorize each outcome into one of the six categories of Bloom's taxonomy of cognitive skills. A summary of the entire graduate business program's course offerings provides one mechanism an educational institution can utilize to approximate the rigor being applied to the program. "Rigor" is a subjective term with no definitive quantification, but with the use of Blooms hierarchical ranking of action verbs for the three domains: the cognitive, psychomotor and the affective, there is a structure upon which rigor can be evaluated. The levels at the top of the taxonomy are considered the most rigorous because they require order thinking skills [1]. The overall intent of the restructured taxonomy remains the same: categorize student learning outcomes according to their level of difficulty [2].

Introduction

Accreditation agencies demand "rigor" in graduate academic programs, yet they seldom define it and rarely provide guidance as to how to quantify it to demonstrate compliance. Of the four major graduate business accreditation agencies, these are the requirements that specify "rigor":

The Western Association of Schools and Colleges (WASC) is a regional accreditation agency:

WASC

(3 Core Commitments, 4 Standards, 39 CFRs)

- **CFR 2.1**
  The institution's educational programs are appropriate in content, standards of performance, rigor, and nomenclature for the degree level awarded, regardless of mode of delivery. They are staffed by sufficient numbers of faculty qualified for the type and level of curriculum offered.

  Guideline:
  The content, length, and standards of the institution's academic programs conform to recognized disciplinary or professional standards and are subject to peer review.

- Related documents:
  Substantive Change Manual
  Substantive Change Policy
- See also: CFR: 3.1

- **CFR 4.4**
  The institution, with significant faculty involvement, engages in ongoing inquiry into the processes of teaching and learning, and the conditions and practices that ensure that the standards of performance established by the institution are being achieved. The faculty and other educators take responsibility for evaluating the effectiveness of teaching and learning processes and uses the results for improvement of student learning and success. The findings from such inquiries are applied to the design and improvement of curricula, pedagogy, and assessment methodology.

  Guideline:
  Periodic analysis of grades and evaluation procedures are conducted to assess the ==rigor== and effectiveness of grading policies and practices.

    - See also: CFR: 2.2; CFR: 2.3; CFR: 2.4; CFR: 2.5; CFR: 2.6

- In addition, there are 9 components of the Intuitional Report: Component# 3 Degree Programs: Meaning, Quality, and Integrity of Degrees

  What are the processes used at the institution to ensure the quality and ==rigor== of the degrees offered? How are these degrees evaluated to assure that the degrees awarded meet institutional standards of quality and consistency? (CFRs 2.6, 2.7, 4.1, 4.3, 4.4, 4.6)

Distance Education Accreditation Commission (DEAC) is a national accreditation agency:

DEAC

 (12 Accreditation Standards)

- Introduction to Standard III:

  III. PROGRAM OUTCOMES, CURRICULA, AND MATERIALS INTRODUCTION

  "Program outcomes reflect academic competencies at an appropriate level and ==rigor==. They communicate the knowledge and skills students will acquire upon successful completion of the program. The effective design of program outcomes, curricula, and supplemental materials results in cohesive educational offerings and evaluation methods of student learning that are clearly connected to the stated outcomes. The institution delivers clear, up-to-date, and well-organized curricula and instructional materials and provides access to appropriate learning resources. Institutions present evidence that all educational offerings conform to commonly accepted education practices."

      The core components of Standard 3:
      - Description of program outcomes

- Appropriate program outcomes
- Curricula delivery
- Comprehensive curricula and instructional materials
- Curricula development
- Academic units of measurement
- Educational media and learning resources
- Examinations and other assessments
- Student integrity and academic honesty

- Introduction to Standard V:
  "The institution implements a comprehensive assessment program to monitor student satisfaction and achievement of learning outcomes. The institution's outcomes assessment plan documents, monitors, and analyzes data collected to improve learning outcomes and to inform institutional effectiveness activities."
  - *One of the 3 Core components for this standard:*

    STUDENT ACHIEVEMENT

    The institution evaluates student achievement using indicators it determines are appropriate relative to its mission and educational offerings. The institution evaluates student achievement by collecting data from outcomes assessment activities using direct and indirect measures. The institution maintains systematic and ongoing processes for assessing student learning and achievement, analyzes data, and documents that the results meet both internal and external benchmarks, including those comparable to courses or programs offered at peer DEAC-accredited institutions. The institution demonstrates and documents how the evaluation of student achievement drives quality improvement of educational offerings and support services.
- Standard XI:
  XI. STUDENT ACHIEVEMENT AND SATISFACTION
  ACHIEVEMENT OF STUDENT LEARNING OUTCOMES

  "….The institution must demonstrate and document in its Self-Evaluation Report through results of learning outcomes assessments that student achieve learning outcomes that are appropriate to its mission and to the rigor and depth of the degrees or certificates offered. The institution must also describe how its Outcomes Assessment Plan has contributed to the improvement of the institution over time and explain how the plan demonstrates that the institution is fulfilling its stated mission. The institution must demonstrate that it uses evidence of student learning to gauge the effectiveness of the educational practices and methodologies through its institutional effectiveness planning efforts. This data should also be used to identify and implement strategies for improving student learning. It is not enough for an institution to simply collect data. The institution must demonstrate that the evidence is analyzed and drives curricular and institutional improvements."

- Their definition of "Objectives": "„inputs that describe what the institution teaches students as a result of the curriculum offered. They describe the intended results of instruction planned by the institution. Data collected as a result of objectives communicates to all stakeholders the level of curriculum <mark>rigor</mark> being taught and assessed."

Accrediting Council for Independent Colleges and Schools (ACICS International) is also a national accreditation agency:

ACICS

According to their Accreditation Criteria, this is their definition of Academic Quality:

"ACICS defines academic quality as the overall performance of the institution in the context of its mission and as measured by the extent to which the institution achieves its intended student learning and student success outcomes.

Student learning outcomes involve assessment of skill and competency attainment. Student success outcomes include student retention or persistence; employment or placement; and student, graduate and employer satisfaction.

The effectiveness of the institution is demonstrated by its compliance with accreditation standards as well as its continuous striving for enhancement of quality. ACICS assesses academic quality in the following areas: mission and objectives; campus effectiveness planning; student outcomes; financial stability; recruitment and admission practices; organizational structure and administration; student services; academic program and curriculum; quality of faculty and instruction; physical facilities; library and learning resources; and publication and disclosure of student achievement."

- 3-7-300 − ORGANIZATION AND ADMINISTRATION
  3-7-303. Program Advisory Committee. A program advisory committee, comprised of individuals from similar accredited doctoral programs and representatives of the employers that would be hiring graduates, shall meet at least annually with program administrators and faculty. The committee shall provide advice and guidance about the program, the currency and content of its curriculum, admissions criteria, and externship opportunities. Members of this committee may also provide information regarding the validity and <mark>rigor</mark> of the program and the quality of the graduates.

- Definition of an Upper-Division Course: "Generally, a course that presents more specialized course content, is more <mark>rigorous</mark> than a lower-division course, and often includes at least one prerequisite. Upper-division courses usually carry course numbers in the 300-499 or 3000-4999 range."

- For competency-based programs:
  "In considering the application, the Council will determine if the institution has demonstrated that it has used a <mark>rigorous</mark> process to identify what the student or graduate must know and be able to do to be considered "competent" by employers and experts in the field or discipline. In addition, the institution has demonstrated that it has developed robust direct assessment

techniques and has explicitly described how it determines the equivalent number of credit or clock hours for the program."

- For an international partnership agreement, they require that "Institutions shall ensure the quality and <mark>rigor</mark> of the courses/program offered through the international partnership agreement."

The Association to Advance Collegiate Schools of Business (AACSB International) is an international business accreditation agency.

AACSB

Standard 11: Degree program structure and design, including the normal time-to-degree, are appropriate to the level of the degree program and ensure achievement of high-quality learning outcomes. Programs resulting in the same degree credential are structured and designed to ensure equivalence. [DEGREE PROGRAM EDUCATIONAL LEVEL, STRUCTURE, AND EQUIVALENCE]

Definitions

- Normal time-to-degree reflects the period of time (years, terms, etc.) that is customary to complete a full-time degree program. Local, provincial, or national norms, as well as the practice of other AACSB-accredited institutions, provide guidance to establish what constitutes normal time-to-degree.
- Teaching/learning models include traditional face-to-face classroom models, distance (online) models, blended models that employ face-to-face and distance (online) components, other forms of technologically enhanced instruction, or any other form of instructional methodology.

Basis for Judgment

- Degree programs are structured and designed to support the content coverage, <mark>rigor</mark>, interactions, and engagement that are normally expected at this level of study. Expectations may vary dependent on the educational practices and structures in different world regions and cultures.
- Expectations for student effort for the same degree credentials are equivalent in terms of depth and <mark>rigor</mark>, regardless of delivery mode or location. The school is responsible for establishing, supporting, and maintaining the quality of learning that students must demonstrate to satisfy degree requirements, regardless of delivery mode or location.
- Normally, the majority of learning in traditional business subjects counted toward degree fulfillment (as determined by credits, contact hours, or other metrics) is earned through the institution awarding the degree.
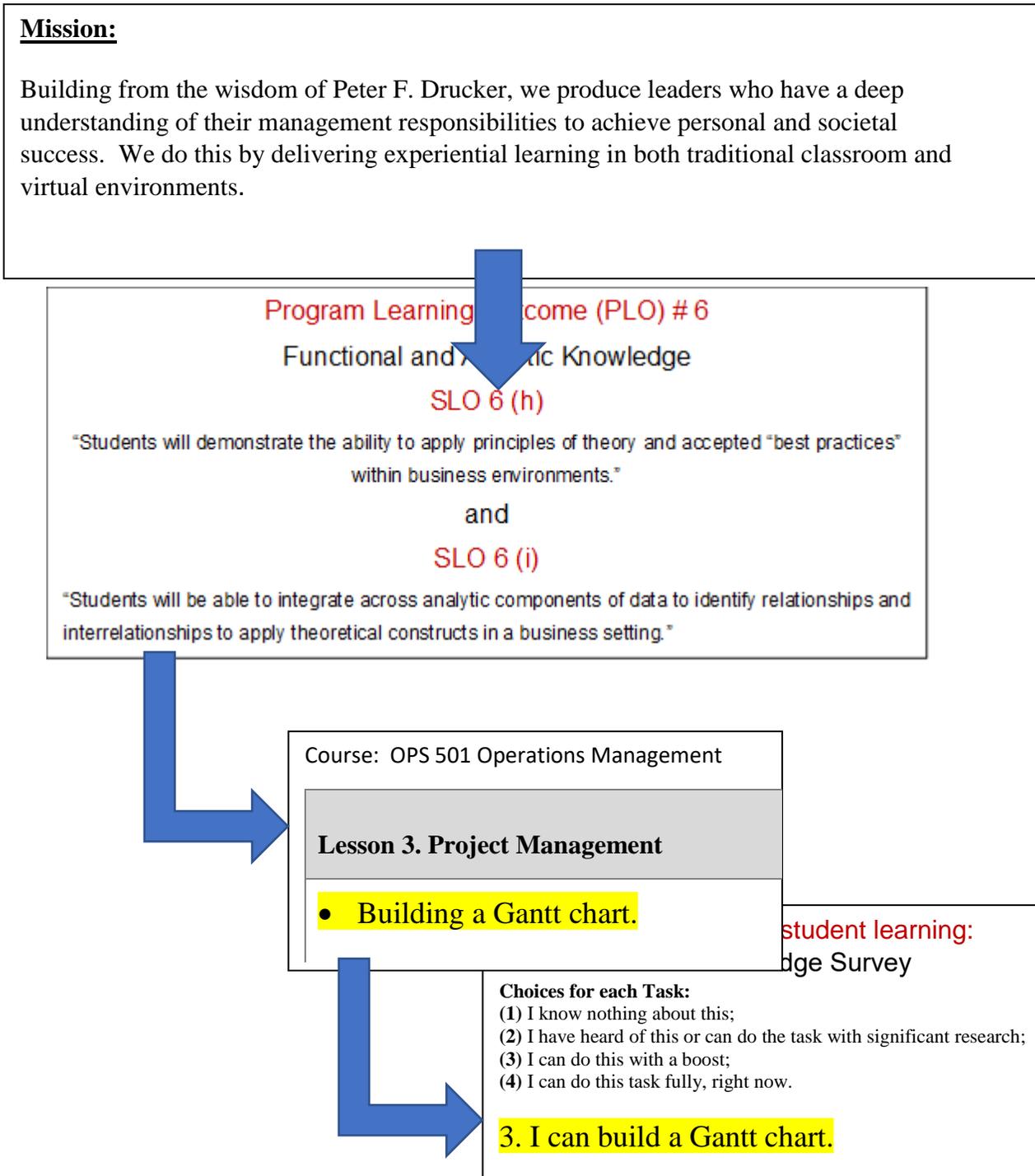
Each of the regional, national and international accrediting agencies require rigor yet there is no specific guidelines as to how to measure rigor, how to quantify it or how to assess it.

Finn states, "Since its publication, more than 5,000 authors have found Bloom's taxonomy valuable in the classification of student learning outcomes [3]. The literature provides hints as to how Bloom's taxonomy is used in areas of technology [4] [5] [6] [7] and course-specific uses of Bloom are utilized in business courses [8] [9] [10] [11] [12]. The evolution of online instruction has provided similar uses of Bloom's taxonomy to develop student learning outcomes [13] [14]. Bloom's taxonomy of the cognitive domain of learning is exemplified in articles associated with experiential learning [15] [16].

This paper directly applies Bloom's taxonomy of action verbs to the student learning outcomes of each graduate course in an effort to quantify the accreditation requirement of "rigor".

Application of Bloom's Taxonomy to quantify "rigor"

Each course in our MBA program contains a minimum of ten Student Learning Outcomes (SLO's) which were originally produced from the step-down process of "Mission Statement" to "Program Learning Objectives (PLO's)" to course "Student Learning Outcomes (SLO's). An example below illustrates this transition from an institution's macro level to a course's micro level:

Mission:

Building from the wisdom of Peter F. Drucker, we produce leaders who have a deep understanding of their management responsibilities to achieve personal and societal success. We do this by delivering experiential learning in both traditional classroom and virtual environments.

Program Learning [...] come (PLO) # 6

Functional and [...] ic Knowledge

SLO 6 (h)

"Students will demonstrate the ability to apply principles of theory and accepted "best practices" within business environments."

and

SLO 6 (i)

"Students will be able to integrate across analytic components of data to identify relationships and interrelationships to apply theoretical constructs in a business setting."

Course: OPS 501 Operations Management

Lesson 3. Project Management

- Building a Gantt chart.

[...] student learning:
[...] dge Survey

Choices for each Task:
(1) I know nothing about this;
(2) I have heard of this or can do the task with significant research;
(3) I can do this with a boost;
(4) I can do this task fully, right now.

3. I can build a Gantt chart.

Each of the twelve courses in the MBA program has defined and standardized course student learning objectives (SLO's).   For example, the OPS 501 Operations Management course has these ten outcomes:

1. I can explain the overall goals of operations management.
2. I can elaborate on how to use factor rating for decision-making.
3. I can build a Gantt chart.
4. I can explain the lean operations approach to the production of a good or service.
5. I can predict future outcomes using the moving average technique.
6. I can determine quality for a particular good or service.
7. I can construct statistical sampling models to determine production characteristics.
8. I can develop an activity using a process flow chart.
9. I can build an ABC inventory analysis to optimize operations.
10. I can discuss the latest applications of technology to operations management.

Bloom's taxonomy of action verbs was revised in 2001 [2] to produce six columns of verbs that increase in sophistication, level of difficulty, and rigor: 1. Remembering; 2. Understanding; 3. Applying; 4. Analyzing; 5. Evaluating; and 6. Creating. This ordering of cognitive skills is the benchmark for rigor in any program.

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

Assessing each of the action verbs for each course in a graduate business program yields a categorization of the level of the course in terms of the level of difficulty and could be used as a proxy for measuring rigor.

OPS 501 "Operations Management"

1. I can explain the overall goals of operations management.
2. I can elaborate on how to use factor rating for decision-making.
3. I can build a Gantt chart.
4. I can explain the lean operations approach to the production of a good or service.
5. I can predict future outcomes using the moving average technique.
6. I can determine quality for a particular good or service.
7. I can construct statistical sampling models to determine production characteristics.
8. I can develop an activity using a process flow chart.
9. I can build an ABC inventory analysis to optimize operations.
10. I can discuss the latest applications of technology to operations management.

Bloom's Taxonomy	
Definitions and Levels	Knowledge Survey categorization of Bloom's action verbs
I. Remembering	0
II. Understanding	0
III. Applying	0
IV. Analyzing	0
V. Evaluating	3
VI. Creating	7
Total number of SLO's for this course.	10

Taking each course's assessment and combining them into one table produces a visual representation of the entire MBA program's rigor.

CIAM's Level of Delivery of Student Learning Outcomes (SLO's)						
Course	Bloom's Taxonomy of Action Verbs					
	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
DRU 502 Innovation	0	0	0	1	5	4
ETH 501 Ethics	0	0	0	4	4	2
ACC 501 Accounting	0	0	0	4	5	2
DRU 501 Leadership	0	0	1	1	2	6
BUS 501 Quant. Analysis	0	0	0	0	4	7
MGT 501 Org. Behavior	0	0	0	2	5	3
FIN 501 Finance	0	0	0	1	9	1
MKT 501 Marketing	0	0	0	2	4	4
IS 501 Infor. Systems	0	0	0	0	6	4
IB 501 Internat. Business	0	0	0	1	8	1
OPS 501 Operations Mgt.	0	0	0	0	3	7
MGT 511 Strategic Mgt.	0	0	0	2	2	6
Totals	**0**	**0**	**1**	**18**	**57**	**47**
June 2018						

The percentage totals for each column are 0%; 0%, 1%, 15%; 46%, and 38% respectively. Columns five and six together represent 84% of the delivery of the degree program for a graduate MBA degree at the two highest levels of Bloom's action word taxonomy.

The definition of rigor, according to Merriam-Webster is best applied to the business accreditation setting with the synonym discussion below.

Synonym Discussion of rigorous by Merriam-Webster's dictionary:

"Rigid, rigorous, strict, stringent mean extremely severe or stern. rigid implies uncompromising inflexibility. ⟨rigid rules of conduct⟩ rigorous implies the imposition of hardship and difficulty. ⟨the rigorous training of recruits⟩ strict emphasizes undeviating conformity to rules, standards, or requirements. ⟨strict enforcement of the law⟩ stringent suggests severe, tight restriction or limitation. ⟨stringent standards of admission⟩".

Applying the first three definitions above, a graduate program that delivers 84% of it's student learning outcomes in the two most challenging levels of understanding is one method of demonstrating rigor in an MBA program.

Assessment

Each of the student learning outcomes in our graduate business program is assessed with a pre and post knowledge survey where by the students in each course are provided the course learning outcomes with a Likert scale questionnaire ranging from "I know nothing about this", I have heard of this or can do the task with significant research", "I can do this with a boost", and finally "I can do this task fully, right now". The benchmark is to achieve a score of at least one point greater in the post knowledge survey from the pre knowledge survey. This is one mechanism of student learning assessment: the perception of learning as determined by the students. In addition, faculty provide at least one quantitative assignment that is graded for performance from one of the ten course student learning outcomes. This provides a two-dimensional comparison of learning in each of the twelve courses of the MBA program.

Below is a tabulation of the past assessment analysis of all of the twelve courses from two recent graduating cohorts. As can be viewed, the student perception of learning achieved the benchmark goal of at least one point increase between the post and the pre score in 23 of 24 courses offered.

Pre/Post Knowledge Survey Comparative Analysis Summary

Course	Cohort 5	Achieve Goal? (Yes/No)	Cohort 6	Achieve Goal? (Yes/No)
MGT 501 Management & Org. Behavior	1.6	Yes	1.51	Yes
IB 501 International Bus. Concepts	1.4	Yes	2.13	Yes
ETH 501 Bus. Ethics	1.4	Yes	1.56	Yes
DRU 502 Innovation & Entrepreneurship	1.8	Yes	1.22	Yes
FIN 501 Corporate Finance	0.6	No*	1.20	Yes
MGT 511 Strategic Management	1.6	Yes	1.04	Yes
DRU 501 Leadership	1.3	Yes	1.43	Yes
IS 501 Management of Info. Systems	1.5	Yes	1.79	Yes
ACC 501 Accounting	1.1	Yes	1.19	Yes
BUS 501 Quantitative Analysis	1.2	Yes	1.71	Yes
MKT 501 Marketing Management	1.3	Yes	1.30	Yes
OPS 501** Operations Management	1.4	Yes	1.68	Yes
The Pre/Post Knowledge weighted average difference has a goal of > 1.0				
*The Finance course had only three students and one was skilled in the finance topic which skewed the results dramatically. The identical survey was analyzed with the removal of the one "knowledgeable" student and the weighted average difference was 1.09 versus 0.6.				

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