TEACHING PROCESS IMPROVEMENT BY DOING PROCESS IMPROVEMENT

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Why teach process improvement by doing process improvement?

1. Efficiency
2. Effectiveness
3. Credibility
4. Empowerment
Process Improvement Exercise

1. Brainstorming
2. Prioritization
3. Analysis
4. Improvement

Adaptation of Kathy Baugher’s LEARN concept
BRAINSTORMING

Working in groups of 3-4, students list:

• Five things that enhance their learning, and

• Five things impede their learning in the class.
Not within scope of exercise:

- Topics covered in course
- Personal issues
- Gripes

How can you tell a gripe from a legitimate problem?

A gripe is something that one student or a very small group of students wants to complain about but not do anything about.
## Worksheet- Enhance learning

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 organized lectures</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2 forecasting project</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3 professor approachable</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4 bonus for attending APICS and ASQC</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5 no review sheets for tests</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
# Worksheet- Impede learning

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 too many notes</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>2 integer programming separated from graphical method</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>3 tests covered too much material</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>4 homework assignments too long</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>5 no review sheets for tests</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
**Worksheet- Enhance learning (ASQC)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 practical applications</td>
<td>1 2 3</td>
</tr>
<tr>
<td>2 class discussions</td>
<td>1 2 3</td>
</tr>
<tr>
<td>3 sit in front of class</td>
<td>1 2 3</td>
</tr>
<tr>
<td>4 frequent short tests</td>
<td>1 2 3</td>
</tr>
<tr>
<td>5 activities/demonstrations</td>
<td>1 2 3</td>
</tr>
<tr>
<td>Item</td>
<td>Score</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>forced to take class, did not want to take class</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>communication problems with professor</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>grades do not reflect abilities or understanding of material</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>political atmosphere</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>not enough time to study (nontraditional students)</td>
<td>1 2 3 4 5</td>
</tr>
</tbody>
</table>
PRIORITIZATION

• In-class survey
• Pareto chart
# Worksheet- Enhance learning

<table>
<thead>
<tr>
<th>Item</th>
<th>Item 1</th>
<th>Item 2</th>
<th>Item 3</th>
<th>Item 4</th>
<th>Item 5</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>organized lectures</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>forecasting project</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>32</td>
</tr>
<tr>
<td>professor approachable</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>bonus for attending APICS and ASQC</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>homework and tests similar</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>18</td>
</tr>
</tbody>
</table>
## Worksheet- Impede learning

<table>
<thead>
<tr>
<th>Item</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. too much note taking - can’t concentrate on lecture</td>
<td>53</td>
</tr>
<tr>
<td>2. integer programming separated from graphical method</td>
<td>48</td>
</tr>
<tr>
<td>3. tests covered too much material</td>
<td>36</td>
</tr>
<tr>
<td>4. homework assignments too long</td>
<td>53</td>
</tr>
<tr>
<td>5. no review sheets for tests</td>
<td>48</td>
</tr>
</tbody>
</table>
**Pareto chart** - histogram of survey data designed to focus improvement efforts on most important problems
ANALYSIS

• Ishikawa diagram -- all causes

• Identify most likely causes
### Ishikawa Diagram

**Student perceptions are unrealistic**
- Underestimate needs of industry
- Underestimate their own capabilities
- Too much material or too little credit
- Uneven workload
- Irrelevant material

**Student preparation is inadequate**
- Mathematics
  - Statistics
  - Algebra
  - Arithmetic
- Reading comprehension and retention
- Organize thoughts
- Unclear explanations of course material
- Inadequate instructions for assignments
- Disorganized lectures
- Course presentation not conducive to learning

**Course organization or coverage is unreasonable**
- Too much material or too little credit
- Uneven workload
- Irrelevant material

**Prerequisites**
- Study skills
- Time budgeting
- Procrastination

**Students avoid course because they perceive it is too hard**
- Underestimate needs of industry
- Underestimate their own capabilities
- Too much material or too little credit
- Uneven workload
- Irrelevant material
- Course organization or coverage is unreasonable
- Text not readable
Ishikawa Diagram

- Unwilling to communicate
  - time constraints
  - afraid to admit does not know answer

- Teaches above class level
  - bad mood
  - teaches as taught
  - just got doctorate
  - does not understand class needs

- just got doctorate
- does not understand class needs

- no experience

- preoccupied
  - tired

- math anxiety

- poor self-image

- Students do not listen

- Intimidates students

- Speaks English poorly

- Communication with professor

Tired

Tired

Math anxiety

Math anxiety

Preoccupied

Preoccupied

Poor self-image

Poor self-image

Intimidates students

Intimidates students

Speaks English poorly

Speaks English poorly

Students do not listen

Students do not listen

Teaches above class level

Teaches above class level

Communication with professor

Communication with professor

University of Indianapolis
IMPROVEMENT DEVELOPMENT

• Well-documented

• Minimal administration involvement
## Improvements

<table>
<thead>
<tr>
<th>Situation</th>
<th>Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integer programming separated from graphical method</td>
<td>Students revise lecture schedule</td>
</tr>
<tr>
<td>Homework assignments too long</td>
<td>Students revise homework schedule</td>
</tr>
<tr>
<td>Too much note taking - can’t concentrate on lecture</td>
<td>Students make handouts of lecture notes</td>
</tr>
</tbody>
</table>
Continuous Improvement

ACT
build on improvements in successive years

PLAN
do the process improvement exercise

STUDY
let the students evaluate the results

DO implement the improvements developed by students
How can I tell things are improving?

• The items listed that need improvement change. (No one has said the class is not interesting for a 2-3 semesters)

• Student evaluations
Important Attitudes

• Every student’s opinion valued.
• Every student makes a difference.
• The teacher must not think his or her teaching is perfect.
• The course is worth improving.
• Improvements will be implemented.
Important Attitudes

• Accept what cannot be changed.
• Administration must focus on improvement -- not cause
• The teacher must not fear losing control of the class.

Deming’s 8th point - Drive out fear.