Teaching Students to Evaluate - Improving Critical Thinking

Satish Nargundkar

Managerial Sciences Department
J. Mack Robinson College of Business

Instructional Innovation Grant Proposal for Summer 2014.

I have reviewed the proposal, and I support the request for a course release for the project.

(Signed page has been submitted as hard copy)

_________________________               _______________
Pam Barr                           Date
Interim Chair, Department of Managerial Sciences
Teaching Students to Evaluate - Improving Critical Thinking

Problem Statement
Evaluation is the highest form of critical thinking (CT) in Bloom’s (1956) taxonomy, and the next to highest in the revised taxonomy, with creation as the highest. The literature in CT is mixed on how it should be taught. Broadly speaking, there are three schools of thought. The first assumes that CT stands alone and should be taught that way, separate from any other discipline. This is labeled as the *direct* method in the discussion here. The second approach assumes the reverse – that CT should only be taught through deep immersion in a particular subject, but never directly. This is the *indirect* method. A third approach simply combines the two, and can be viewed as the *mixed* method. Table 1 summarizes the approaches found in the literature.

<table>
<thead>
<tr>
<th>Table 1: Broad classification of pedagogical approaches to CT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>Direct</td>
</tr>
<tr>
<td>Indirect</td>
</tr>
<tr>
<td>Mixed</td>
</tr>
</tbody>
</table>

Given that improving students’ CT ability is an important objective, this study proposes using the mixed approach to teach students. In other words, besides providing students with CT tasks relevant to the subject matter being taught, they will be explicitly taught what CT means, and how to evaluate something in general. They will essentially be asked to play the role of the instructor, and create rubrics for evaluation of their peers’ work, perform the evaluations, and then discuss the process.

In addition to the goal of improving CT skills, one key element of teaching effectiveness is student perceptions of the instructor’s fairness in grading/evaluation. Teaching students about evaluation methods explicitly should help students better understand how instructors think when evaluating student work.
Proposal Objectives
The following are the objectives of this study:
1. To test whether the mixed approach to teaching CT does in fact improve CT skills among students.
2. To gauge the impact of this approach on student perception of the fairness of the evaluation process used by the instructor.

Methodology
The mixed approach to teaching CT will include the following steps:
1. Students work on an assignment relevant to the subject matter in the course, and are evaluated by the instructor based on some rubric developed by the instructor, as is normally done.

   The intervention (Explicit CT instruction in class)
   2. Students are given an exercise in class to evaluate the work of some fictional students, with no specific guidance on how to evaluate (See Appendix A). There will typically be very little consistency in evaluation across students in the classroom, even though the problem is relatively straightforward, simply because each student doing the evaluating will have different unspoken criteria for evaluation. I have already tried this in class and found this to be true. The differences in grades given by the students to the same fictional response can be quite dramatic.
   3. The students discuss why their ratings were so different from each other. They will now be asked to form small groups to discuss and come up with rubrics to evaluate the work of the fictional students. The instructor may guide them as needed in figuring out how to create meaningful rubrics. They will then be presented with additional fictional student work to evaluate. The results of this round of evaluations should be much more consistent across the different evaluators.
   4. Student performance on the next assignment related to the subject matter will be assessed by the instructor. If the in-class exercise in evaluation works as expected, students should be better able to think critically about how they approach their own assignments, and do a better job in demonstrating CT ability.

Evaluation
The scores on assignments before and after the intervention will be compared in courses taught during summer and fall. Both assignments will have some CT component to them. Students should show significant improvement in CT skills after the intervention. Further, student evaluations of instruction should show satisfaction with the fairness of grading component.

Generalizability of the Innovation
This innovation is easy to implement in any course without any need for special technology or extensive preparation.

Funding/Equipment
No special equipment is needed for this study. The only requirement is time, so a summer course release to work on the study is requested.
References


APPENDIX A

Grading Exercise

Problem:

The fixed costs for a proposed project add up to $10,000 and the variable cost is $25 per unit. If selling price is $75 per unit, what is the breakeven point?

Solution:

Let \( X = \text{Number of Units Sold} \)

\[
\begin{align*}
\text{Revenue} & = 75X \\
\text{Fixed Cost} & = 10,000 \\
\text{Variable Cost} & = 25X \\
\text{Total Cost} & = 25X + 10,000
\end{align*}
\]

\[\text{Profit} = \text{Revenue} - \text{Total Cost} = 75X - (25X + 1000) = 50X - 1000\]

At Breakeven, Profit = 0

Hence, \( 50X - 1000 = 0 \),

Or, \( X = 10000/50 = 200 \) units

The breakeven point is thus **200 units**.

Grade the answers of the following 4 students on a scale of 0 to 10, 10 being perfect.

<table>
<thead>
<tr>
<th>Student 1</th>
<th>Student 2</th>
<th>Student 3</th>
<th>Student 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rev = 75X</td>
<td>Let X = # Units</td>
<td>Breakeven point is 200 units because profit margin is $50 per unit, and selling 200 units will recover then $10000 fixed cost.</td>
<td>Breakeven is 200 units.</td>
</tr>
<tr>
<td>Cost = 25X + 10,000</td>
<td>Profit = 75X - 25 - 10000 = 75X - 10025</td>
<td>X = 10025/75 = 133.6</td>
<td></td>
</tr>
<tr>
<td>Profit = 50X - 10,000</td>
<td>Breakeven = 2000</td>
<td>Dear Instructor, I really enjoyed your class. Hope you have a wonderful holiday!</td>
<td></td>
</tr>
<tr>
<td>Breakeven = 2000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dear Instructor,

I really enjoyed your class. Hope you have a wonderful holiday!

Breakeven is 200 units.