Flossing your teeth and adopting a puppy: In-class exercises for developing critical thinking in a digital age

Abstract

How can we best develop students' critical thinking capabilities within a context of uncertainty and information overload? This session engages participants to explore this question, while offering two in-class exercises we have used in undergraduate Management courses to target specific aspects of students' critical thinking skill sets: "Flossing your Teeth" and "Adopting a Puppy". We will share teaching materials and guide participants through each exercise, then facilitate idea generation and sharing on how these exercises may be adapted and applied to a range of Management learning contexts.

Key words: critical thinking, decision-making, information literacy

Introduction

Critical thinking has been identified by business educators and employers alike as an essential competency for our students and graduates (e.g., Lovelace, Eggers, & Dyck, 2016). While definitions vary, we follow many in considering critical thinking as the underlying competency needed for problem solving and decision-making (e.g., Whitten & Brahmasrene, 2011). As a higher-order cognitive skill set (e.g., Abrami et al., 2015), critical thinking allows students to apply the content from management and organizational behavior courses (and beyond) to complex business problems. Thus, it is critical (pun intended) that Management educators incorporate critical thinking development in our courses.

This proposed session focuses on two in-class exercises designed to target specific aspects of critical thinking: 1) "Flossing your Teeth" targets the development of information literacy skills (needed to gather evidence/ research as part of critical thinking), and 2) "Adopting a Puppy" targets the development of analytical skills (needed to apply the evidence/research gathered toward generating potential solutions to a problem). We have used these exercises in upper-level undergraduate Organizational Behavior courses, in both face-to-face and online formats. Given that the exercises have no ties to discipline-specific content, they could easily be used in a range of Management courses (regardless of topic).

Theoretical Foundation and Contributions

The development of critical thinking skills has long been a focus in Management education (e.g., Athanassiou, McNett, & Harvey, 2003; Burke & Rau, 2010), fueled by calls from employers (e.g., National Association of Colleges and Employers, 2020), priorities of business school accreditation bodies (e.g., AACSB, 2020), and undeniable evidence of the links between critical thinking and performance within the business environment (e.g., Hilton, 2008).

Yet, valuing students' development of critical thinking is far simpler than engaging in the process. Prior research in Management teaching and learning suggests that not enough is being done to actively develop core competencies like critical thinking in the classroom, and also that we as educators often lack clear tools and guidance needed to make progress in this area (e.g., Lovelace et al., 2016).

In addressing *how* students learn critical thinking skills, research suggests that student-centered experiential learning is often most effective (e.g., Kolb & Kolb, 2005; Lovelace et al., 2016). However, examples of such strategies are often time- and resource-intensive (e.g., a multi-week client project or online simulation). This session will build on the available research on critical thinking development, while also considering the very real constraints of higher education today. We aim to support Management educators in implementing a range of teaching and learning strategies within the classroom to develop students' critical thinking skills. The two in-class exercises we will share are designed to support active engagement from students, to be relevant to a diverse student body, useful in a variety of course formats (including face-to-face or online), and feasible for a 1-hour time block.

Learning Objectives

For the purposes of these exercises, and the courses/programs in which we have used them, we define the broad learning outcome for decision-making and critical thinking as follows. Students should be able to:

- evaluate alternatives and understand the ramifications of those alternatives within a given business context.
- apply a structured approach (problem identification, research, analysis of alternatives and providing supported recommendations) to solving business problems.

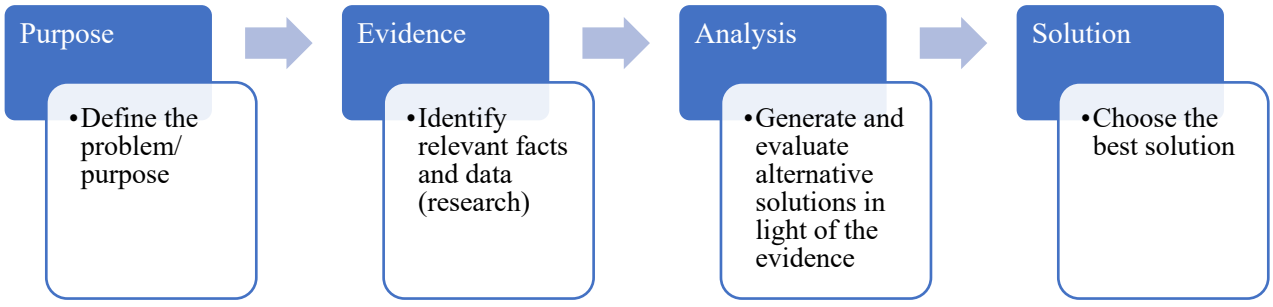
The "Flossing your Teeth" exercise particularly emphasizes the problem identification and research portions of 'apply a structured approach to solving business problems'. The "Adopting a Puppy" exercise targets competencies for 'evaluation' and 'analysis of alternatives' within these broader critical thinking learning outcomes.

Exercise Overview

Because we tend to approach critical thinking as the 'skill set needed to apply everything else you learn', we introduce the critical thinking and decision-making learning outcomes, supportive course content (reading and lecture material) and these two in-class exercises early on in the course (typically week 1 or week 2 of the semester). We typically spend the equivalent of one 60-minute class on the parallel topics of critical thinking and evidence-based management, (which we conceptualize as the application of critical thinking to management contexts; e.g., Barends, Rousseau, & Briner, 2015).

We introduce the class session with a brief lecture, recapping the critical thinking learning outcomes for our course/program and outlining a process model for critical thinking (see Figure 1).

Figure 1. *Framework for critical thinking process*



After describing and discussing the first half of the critical thinking process, we engage students in the "Flossing your Teeth" exercise. After debriefing from that exercise, we explain the second half of the critical thinking process and engage students in the "Adopting a Puppy" exercise. We

close the class session with a broader debrief of both exercises, the critical thinking process, and common barriers to effectively engaging in critical thinking.

Exercise 1: Flossing your Teeth

The "Flossing your Teeth" exercise was developed to help students practice problem identification and research, and to build information literacy within a digital environment. With unlimited access to information online, we have found that many students face challenges determining quality, utility, and level of objectiveness of various sources. Further, biases such as confirmation bias can easily be magnified via open online search platforms (e.g., Google).

To begin the exercise, we divide the class in half, and then break each half into small groups of 3-4 students (in face-to-face classes, typically one half of the classroom would be labeled 'A' and the other half labeled 'B', then we would sub-divide each half of class accordingly; in online classes, students would be divided into specific small breakout groups according to 'A' or 'B' designation). To introduce the exercise, we inform students that we are asking them to conduct some quick research in order to better understand the impact of flossing your teeth. Then, speaking to the 'A' groups directly (or via written instructions to the 'A' groups only), we would ask them to use research and answer the question: "Is flossing good for you?" Speaking to the 'B' groups directly (or via written instructions to the 'B' groups only), we would ask them to use research and answer the question: "Is flossing bad for you?" Students are encouraged to use whatever resources they have immediately available (e.g., their own experiences, each other, smart phones, and laptops) to research their assigned questions and come up with an answer in the next 10 minutes.

After 10 minutes, we bring all groups back together and ask them to share what they have learned about flossing. Inevitably, the vast majority of the 'A' groups have concluded that

flossing is indeed good for you, while the vast majority of the 'B' groups have concluded that flossing is actually not as good for you as most think and in fact can do some harm. We then guide the class in a debriefing discussion (see Appendix A) to explore how the definition of the 'problem' (framing of the question) altered the research findings, and how students determined which sources provided 'valid or useful' information in their research process. This discussion feeds into a brief presentation of information literacy strategies such as lateral reading, as well as strategies for evaluating bias in the research process and specific sources.

Adopting a Puppy

The "Adopting a Puppy" exercise was developed to help students develop analytical skills within the critical thinking competency. We have found that a fundamental barrier for students in attempting to analyze alternatives is a strong tendency to describe rather than analyze or evaluate. For example, students may research two competing companies in an attempt to discern which company is more likely to be financially successful in 5 years. A common practice has been for students to gather plenty of information on each company, describe all that they have learned about each company, and then present a decision on which company is likely to be 'better' – without ever articulating any decision criteria, or analysis process on which their final decision is based. Therefore, we created this quick in-class exercise to help students understand the difference between description and analysis, to apply a clear process of analysis when making a decision, and to articulate that process (including decision criteria) to relevant stakeholders.

We introduce the exercise to students by showing a screen with pictures of three different dogs[1], varying on characteristics such as size, breed, and age. We inform students that for the

[1] While we have always used dogs because we have them as pets ourselves, this exercise could easily be adapted to any kind of animal or other similar decision that seems relevant to your students.

sake of the exercise, they should imagine that they are going to adopt a dog and must make a decision as to which dog they will adopt among those available. We next guide students (working in small groups of 3-5) through the following tasks, asking that they discuss and then write down key points on each:

1. Describe the dogs (e.g., "Pet A has orange fur.")
2. In choosing a dog to adopt, what are the criteria that are most important to you? (E.g., Would you want to adopt a big dog or little dog? High energy or low energy?)
3. Now rate each dog according to your key criteria (from step 2). (*Option here to introduce and have students use a decision matrix.)
4. Based on the results of step 3, which of the 3 available dogs would you like to adopt and why? (You can think of this as your optimal puppy alternative!)

After the groups have completed these 4 steps, we bring the class together for a debrief discussion (see Appendix B). We have the groups explain to the rest of the class which dog they would adopt and why. We then ask students to explain (in their own words) how description was different from analysis. We then reflect and build on the students' contributions to reiterate the role of analysis in the critical thinking process, and provide an example of description vs. analysis more relevant to the Management context (e.g., how a manager would describe job candidates vs. how a manager would analyze or evaluate job candidates).

Session Description

This proposed session will facilitate knowledge and idea sharing among participants and between participants and facilitators, centered on how we as Management educators can best support students' critical thinking development. We will share research findings and resources we have found helpful in informing our own teaching in this area, as well as the two specific in-

class exercises outlined above. Participants will experience these in-class exercises as 'students' and then have opportunities to discuss with one another and with facilitators how they might apply and/or adapt these exercises in their own courses. In order to fight against the 'zoom fatigue' that can occur in a virtual environment, we will actively engage participants in all aspects of the session – utilizing polls, breakout groups, and hands-on activities throughout.

This session would work well within either a 60-minute or 90-minute time block; thus, we provide a timeline for the session in both formats.

Activity	**Time (60-minute session)**	**Time (90-minute session)**
Introductions and overview of session	5 minutes	5 minutes
Brief overview of research and resources we have found helpful related to developing students' critical thinking	5 minutes	5 minutes
Sharing of resources, questions and challenges/barriers experienced by participants related to developing students' critical thinking	5 minutes (large group only)	10 minutes (in breakouts)
Demonstration of exercise 1: "Flossing your Teeth"	15 minutes	20 minutes
Discussion, Q&A related to exercise 1	5 minutes	5 minutes
Demonstration of exercise 2: "Adopting a Puppy"	10 minutes	15 minutes
Discussion, Q&A related to exercise 2	5 minutes	10 minutes (in breakouts)
Idea generation and sharing related to participant applications of these exercises or others for developing critical thinking	10 minutes (large group only)	20 minutes (with breakouts)

References

Abrami, P. C., Bernard, R. M., Borokhovski, E., Waddington, D. I., Wade, C. A., & Persson, T. (2015). Strategies for teaching students to think critically: A meta-analysis. *Review of Educational Research*, *85*(2):275-314.

Association to Advance Collegiate Schools of Business (AACSB). (2020). 2020 Guiding Principles and Standards for Business Accreditation. Retrieved on February 11, 2021 from http://www.aacsb.edu/

Athanassiou, N., McNett, J., & Harvey, C. (2003). Critical thinking in the management classroom: Bloom's taxonomy as a learning tool. *Journal of Management Education, 27*(5), 533-555.

Barends, E., Rousseau, D. M., & Briner, R. B. (2015) Evidence-based management: The basic principles. *Center for Evidence-Based Management.* Retrieved from https://www.cebma.org/wp-content/uploads/Evidence-Based-Practice-The-Basic-Principles.pdf

Burke, L., & Rau, B. 2010. The research–teaching gap in management. *Academy of Management Learning & Education, 9*(1): 132–143.

Hilton, M. (2008). Skills for work in the 21st century: What does the research tell us? *The Academy of Management Perspectives, 22*(4), 63-78.

Kolb, A., & Kolb, D. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education, 4*(2), 193-212.

Lovelace, K. J., Eggers, F., & Dyck, L. R. (2016). I do and I understand: Assessing the utility of web-based management simulations to develop critical thinking skills. *Academy of Management Learning & Education, 15*(1), 100-121.

National Association of Colleges and Employers, (2020). *2020 annual report of the Job Outlook.* Retrieved from https://www.stjohns.edu/sites/default/files/2020-05/nace_job_outlook_0.pdf

Whitten, D., & Brahmasrene, T. 2011. Predictors of critical thinking skills of incoming business students. *Academy of Educational Leadership Journal, 15*(1): 1–13.

Appendix A: Guide to Debriefing Discussion for "Flossing your Teeth" Exercise

The following questions can be used to guide students in discussion following this exercise.

- What did you conclude about flossing your teeth? Is it good for you? Bad for you?
- Why did different groups come to different conclusions?
- How did you go about researching this 'problem/question'?
    - Where did you look? (e.g., Google?)
    - What did you type in search boxes?
    - How did you navigate the infinite results?
- What are some sample sources you found?
    - How do you know if they are 'trustworthy' or 'valid'?
    - What would be signals of an 'bad source'? (e.g., less valid, untrustworthy, biased in some way?)
- What are some takeaways regarding the first two steps in our critical thinking process?
    - Regarding step 1: 'defining the problem or question'?
    - Regarding step 2: 'gathering evidence and research that provides relevant facts/data'?

We then build on what students generate here to suggest some specific strategies for conducting web-based research[2].

- Read laterally – open multiple sources at a time and skim across sources rather than reading each in full, one at a time
- Go upstream – look to what information/sources the article cites and find those sources to better understand the basis of the arguments presented
- Go beyond first results – search engines (academic and otherwise) don't necessarily provide the 'best' sources at the top of the list, so never assume this is the case
- Spot sponsored content – look for logos and other disclosure statements to identify the money behind the research and conclusions so that you can better understand any 'hidden motives' or bias behind the results

[2] The resources available through the Civics Online Reasoning curriculum from Stanford have proven quite helpful here. See: https://cor.stanford.edu/

Appendix B: Guide to Debriefing Discussion for "Adopting a Puppy" Exercise

The following questions can be used to guide students in discussion following this exercise.

- So… which puppy are you adopting, and why? (*Encouraging students to recognize and articulate their decision criteria through this discussion.)*
- How did your discussion of 'describing the puppies' differ from your discussion of 'evaluating/analyzing the puppies'?
- When is 'description' more appropriate, and when is 'analysis/evaluation' more appropriate?
- What are some key takeaways from this exercise related to the final two steps of our critical thinking process?
    - Related to step 3: 'analysis' (generate/evaluate alternatives in light of the research evidence)?
    - Related to step 4: 'solution' (determine the best or optimal decision)?

We then provide students with a more discipline-specific example of description vs. analysis, such as a manager needing to make a hiring decision (how would a manager describing the candidates differ from the manager analyzing or evaluating the candidates?)

Through this example, we also introduce or illustrate how tools like a decision matrix or algorithm can be used in decision-making.