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*While there's no substitute for real experience, I believe it helps to hear and share stories of resourcefulness in action — almost like case studies in school. With every new account, we open our mind to a new path to take and learn the tactics that others have used to overcome much larger obstacles than the ones that are currently in front of us.*

Scott Weiss in <https://techcrunch.com/2014/02/01/harvey-keitel-ceo-or-how-to-pull-off-the-impossible/>

## Designing and Developing Educational Case Studies: For Classroom or Corporate Training

*(Reading time: 8 minutes)*

Using case studies can be a very effective teaching method. A process is outlined which starts with the establishment of the educational objectives of the case study to be presented while being cognizant of the logistics around the lesson including the time available, the number of participants, and the setting. This, in turn, will guide the decision and steps involved in develop a de novo case study or supplementation of a pre-existing one.

Case studies, including all of the commercially available ones<sup>1</sup>, usually involve detailed, multi-page backgrounders culminating in complex problems or opportunities that need to be acted on. As a result, they allow individuals to learn from rich examples, i.e. inductively, that relate to real world situations.<sup>2</sup> In addition to analysis and problem-solving, case studies usually require participants to engage in decision making under ambiguous circumstances.

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<sup>1</sup> Harvard (HBP) <https://hbsp.harvard.edu/cases/>, University of Western Ontario's Ivy <https://www.iveycases.com/>, and The National Center for Case Study Teaching in Science (NCCSTS) <https://sciencecases.lib.buffalo.edu/> are a few sources.

<sup>2</sup> Using Case Studies to Teach, Boston University Center for Teaching and Learning. Retrieved from <https://www.bu.edu/ctl/teaching-resources/using-case-studies-to-teach/>



EXPLORATIONS IN EDUCATION SERIES

*'Education is not the learning of facts, but the training of the mind to think.'*

Albert Einstein (1879-1955), theoretical physicist

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Jones, D.V. (2020, April 24). Developing Case Studies [Blog post]. Retrieved from <https://duncanjones.weebly.com/8/post/2020/05/developing-case-studies.html> is licensed under [CC BY-NC 4.0](https://creativecommons.org/licenses/by-nc/4.0/).

When various approaches are discussed and debated collectively, a richer understanding of different perspectives is afforded and hence is recommended.

### **Objectives:**

The first step involves deciding on the purpose or objectives of the case study and some of the logistical criteria. Figure 1 outlines a series of questions that should be explored to establish the core requirements.

Figure 1: Objectives and logistical criteria guiding case selection, modification or development.

- Is the focus of the case study to teach subject-specific knowledge, an application of this knowledge, general concepts and skills (i.e. critical and integrated thinking) or a combination of these?
- What is the essential question (or concept) that you want to bring to the forefront? Often this involves taking a position or having the case protagonist face a major decision.
- What are the series of derivative questions that should be addressed that encompass the focus elucidated above?
- Should the case be well-structured and include detailed questions on a section by section basis to lead the reader or be less structured with just an over-riding essential question or two?
- Does a certain amount of lecture material or reading need to be covered in order to understand aspects of the case? How much and how will it be delivered?
- How much preparation do the students need to do? Reading, background research, answering questions in writing?
- How long should the case take to read and comprehend? Pre-read, in class, in exam?
- How much time is allocated to discussing or evaluating the case material? Will this be done in class, as an assignment or a combination? As a class, in groups or individually?
- In what other directions could the case discussion go? Do these directions need to be researched?
- Are there funds available to purchase a commercial case (HBP, Ivy) or copyrighted material?
- Is time available and scheduled to develop a case in-house?

### **Solution Identification:**

Now that you have established the criteria, the next step is to seek solutions. The first place to research is existing case libraries. Is there a suitable, existing case from Harvard, Ivy, NCCSTS or other sources? These cases are well developed and generally come with a teacher's guide listing core questions and answers as well as suggested follow-up topics. If you can identify a case that meets most of your criteria, you can save significant effort. If an



existing case is not perfect, can you supplement it with a bit of additional information and/or questions to meet your criteria? Finally, if nothing is suitable, likely because you have very specific criteria, then you'll need to develop a case yourself.

### Developing a Case:

Although this requires additional effort, it can be interesting and rewarding as you can customize the case and the discussion to fit your criteria. As outlined in Table 1, I have developed a number of cases in addition to using established ones. There are a number of tricks and tips that you can employ to streamline this process of a) finding the case topic, issue or story, and b) developing the case material to be distributed and discussed.

Case studies are based on real-life stories that recount interesting or unexpected problems, issues, events, discoveries or opportunities. They are rich in background information which leads to complexity and often ambiguity. As a result, cases demand careful comprehension, analysis and evaluation and can foster interesting discussion and debate. Personal experience as well as recent news stories and press releases, from the mainstream media, industry specific posts and e-zines, or financial sites, are a great inspiration for uncovering a suitable story. Major stories and events are another source which can be uncovered by searching the internet for phrases like those listed in Figure 2.

Figure 2: Potential internet search terms

- Examples of the worst ... *clinical trials, design errors, engineering failures.*
- Examples of the best run ... *projects, companies, events.*
- Future hold for ... *industrial enzymes, genetically modified crops, artificial intelligence.*
- Opportunities for ... *desalination, biodiesel, drones.*
- Challenges facing ... *aerospace industry, agriculture sector, health care.*
- List of successful ... *product launches, mergers and acquisitions, entrepreneurs.*
- List of unsuccessful ... *terrorist plots, technology, startups.*

Once you have found an interesting event or story and you need to do some basic research into it. Wikipedia is often a good source as are the references they cite. You can now determine if this story is suitable to address your essential question and the other criteria. Assuming it is, the next step is to identify a case document or write one yourself. Unless it is a short case, 1 page or less, for use in an exam, it is much easier to use something preexisting, often the press release or article you identified initially.<sup>3</sup> Figure 3 lists some

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<sup>3</sup> Beware of using copyrighted material for commercial purposes (i.e. non-educational institutions which do not fall under fair dealing guidelines) without first requesting permission from the authors. For more information on fair dealing see [https://cmec.ca/docs/copyright/CMEC\\_POSTER\\_FDG\\_EN.pdf](https://cmec.ca/docs/copyright/CMEC_POSTER_FDG_EN.pdf). Providing a link as opposed to providing the document can also suffice.



Table 1: Case examples and their inspiration<sup>4</sup>

Course/Subject	Case type	Application	Inspiration
BTC1820H Agricultural biotechnology	<ul style="list-style-type: none"> <li>- Monsanto HBP case</li> <li>- RNAi/agrobacterium NCCSTS case</li> <li>- Food Evolution (2017) movie critique</li> <li>- Verbio biodiesel field trip</li> </ul> <p>Prepared cases from scientific papers and patents for:</p> <ul style="list-style-type: none"> <li>- Genetically modified trait</li> <li>- Enzymatic process for bioethanol production.</li> <li>- Pregabalin drug synthesis</li> </ul>	<p>Class discussion Homework and class discussion Homework and class discussion Class discussion</p> <p>Exam Exam Exam</p>	<p>Availability Availability and quality</p> <p>Arranged</p> <p>Arranged</p> <p>Coursework Coursework Coursework</p>
BTC1860H Biologics in therapy	<p>Scientific papers and press releases for:</p> <ul style="list-style-type: none"> <li>- TGN1412</li> <li>- Siliq</li> <li>- CAR-T therapy</li> <li>- Enbrel (also patents)</li> </ul>	<p>Class discussion Class discussion Class discussion Class discussion</p>	<p>Clinical trial mishap Clinical trial mishap Clinical trial mishap Patent issue</p>
IMI3001H Biocommercialization	<ul style="list-style-type: none"> <li>- Ivy case on Vivosonic supplemented with the patent and term sheet (internal document)</li> <li>- Z-Tech IPO prospectus</li> <li>- Molecular Templates investment memo (internal document)</li> <li>- Scientific paper on COVID-19.</li> </ul>	<p>Class discussion</p> <p>Class discussion Class discussion</p> <p>Online exam</p>	<p>Written about my personal experience</p> <p>Personal experience Personal experience</p> <p>Current events</p>
IMI302H Business plans & project management	<p>10' Aeroflux investment pitch video plus supporting slides. Patent analysis</p>	<p>Online exam</p> <p>Class discussion</p>	<p>Attended the actual Hatchery pitch Consulting project</p>
HMB301H Biotechnology	<p>Researched information on Alnylam (website, stock information, press, patents).</p>	<p>Ongoing class exemplar</p>	<p>Interesting stock/company</p>
BTC1710 Biomaterials and protein chemistry	<p>Two detailed NCCSTS cases on diabetes.</p>	<p>Class discussion</p>	<p>Availability and quality</p>

<sup>4</sup> All 6 courses were taught by the author between 2017-2020 at the University of Toronto, between two and four times each.



alternate sources from which case documents can be assembled.

Figure 3: Alternate sources for case documents, beyond news articles and press releases (and my experience)

- The Prospectus, the Quarterly or the Annual Financial Report of a publicly traded company (Z-tech breast cancer imaging prospectus).
- Key pages from the website of a company, association, charity or other informational site (startup Molecular Templates cancer therapy candidate).
- Reports and papers from industry like consulting companies
- Patent document (Savron soil remediation).
- Government sites like Statistics Canada, grants and awards, regulations.
- Scientific paper (Review of potential COVID-19 therapies<sup>5</sup>).
- Movie (GM crop debate following the movie Food Evolution)
- Video (Aeroflux startup pitch at UofT's Entrepreneurship Hatchery).
- Internal document (Outdated Vivosonic audiology Venture Capital investment review).
- Internal document (Outdated Nimble wheelchair business plan).

To maximize the value of a case study, the case should be present both a breadth of information and significant detail. This often requires that the case document be supplemented with background information, or a need to write your own case around the core event. Again, developing a list of issues, questions and omitted information prior to conducting the research helps focus your efforts. News and press releases often lack the desired depth of information. In some cases, these reports are based on longer releases, reports or papers that can be found elsewhere including company or industry association websites. Specific details about products are revealed in scientific research papers as well as in the associated patent literature (which requires full disclosure to be valid). This a very iterative process as every answer and piece of data can generate more questions.<sup>6</sup>

Finally, a list of case discussion topics, should be prepared and formed into challenging, open ended questions (and optionally distributed with the case). These topics leverage the questions and answers developed in the objective setting stage as well as the case supplementation stage and all of the associated research. During the case discussion, these questions can be presented in a Socratic questioning style.<sup>7</sup>

<sup>5</sup> Liu, C., Zhou, Q., Li, Y., Garner, L. V., Watkins, S. P., Carter, L. J., ... Albaiu, D. (2020). Research and Development on Therapeutic Agents and Vaccines for COVID-19 and Related Human Coronavirus Diseases. *ACS Central Science*, 6(3), 315–331. doi: 10.1021/acscentsci.0c00272

<sup>6</sup> For BTC1820, which is a graduate course focusing on a series of in-depth 2+ hour Socratic-style case discussions, I have read between 50 and 150 scientific papers on each topic.

<sup>7</sup> More on Socratic questioning can be found at [https://en.wikipedia.org/wiki/Socratic\\_questioning](https://en.wikipedia.org/wiki/Socratic_questioning)

