Capstone Lessons to Prepare Students for the Changing World of Corporate Innovation

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Abstract

For engineering undergraduates, the capstone course is the final exercise prior to a corporate engineering career. The author suggests that the capstone course can be the platform to prepare students for two harsh realities of the rapidly changing corporate world. First, corporations recognize the need for innovations, but the established products and processes create roadblocks to innovative thinking. Contemporary literature on innovation refers to this phenomenon as the innovator’s dilemma. Second, companies have established cultures which often fail to take advantage of disruptive technologies. Contemporary literature on innovation refers to this underlying culture as the sequence. Students that learn these principles in the capstone course will be saved the pain of learning by trial and error. They will have a competitive advantage in the corporate world.

Certainly, no established company purposely ignores creativity, but businesses must focus on producing existing products to keep cash flowing. Well managed businesses know how to produce consistent products, minimize risk, and avoid distractions. By the very nature of innovation, new ideas introduce conflicts and changes which involve risk and distraction from the established business. These traits can kill innovation, albeit unintentionally.

Capstone instructors have the unique opportunity to explain the principles of the changing technical world, just before the student enters the corporate world. This article proposes lessons, exercises and assessments to teach the challenges of corporate innovation to undergraduate seniors. The article includes suggested strategies that the entry-level engineer might employ in anticipation of these challenges. The desired outcome is to preserve the innovative spirit of the young engineering graduates as they face the realities of the rapidly changing corporate world.

Introduction

Young engineers need to be prepared to face the realities of the rapidly changing corporate world. The changes are being driven by politics, financial markets, international events, natural disasters, fierce competition and advanced technologies. The young graduate is not likely to have much experience in any of these arenas. A student’s life is filled with course work, job hunting and personal relationships. The pending transition from student to corporate engineer is another burden. There is little time left for the student / engineer to ponder the impact of global issues, nor would it be reasonable to expect such a young person to be skilled in such matters. Yet, as the young engineer starts a new career, they may quickly become aware of breakthrough technologies and will be eager to help their employer. If these students are made aware of the
potential pitfalls of the changing corporate world, they will be in a much stronger position to present potential breakthrough technologies to their employers. They will also understand what motivates their employer and why new ideas might get negative reactions. This article addresses issues pertaining to the rapidly changing world of corporate innovation.

New engineers may be eager to bring their fresh views to the established corporate world. But soon they learn that simply having a good idea is not enough. They may even become discouraged if their ideas are not immediately embraced. In some cases, new ideas may even get the new engineer into trouble. It would well serve the engineer to understand why this occurs and how they might prepare themselves to run a corporate gauntlet which is likely to include many critics and detractors.

Two fundamental principles of corporate culture will be considered in this article. Principle 1) corporate managers understand that the company needs innovations to survive in the long run, but the corporate operations that support the established product line will resist the disruptions caused by new innovations. This principle will be referred to as the innovator’s dilemma. Principle 2) the fundamental mindset and collective conscience of an organization drives behaviors and attitudes toward innovative ideas. This will be referred to as the DNA of innovation. The student that understands these principles will be better prepared to properly introduce new ideas and innovations to their company.

The following sections explain the principles in detail and suggest methods to teach these principles to engineering undergraduate students.

**Principle 1: The Innovator’s Dilemma**

No one is surprised when a poorly operated company fails, but when a long established company fails, there is cause for concern. Unfortunately, the literature describes many horror stories of established companies that were overtaken by upstart challengers. How could this happen? Why didn’t these companies recognize the competitive threat? Why didn’t they act sooner, and of most interest to educators, why didn’t they solicit ideas from their newly-hired engineers? Clayton Christensen studied this phenomenon and coined the phrase “the innovator’s dilemma.”

The problem follows a recurring pattern. Ironically, the problem begins with the success of a corporation. Initially, the company enjoys a receptive marketplace and establishes a broad base of loyal, happy customers. The company builds on its success and customers return to buy more products. The repeat business provides a healthy supply of cash flow to keep the company operating. Success breeds growth. As the company grows, the product is refined, features are added and manufacturing capacity increases. These are certainly positive developments, but they all require increased cash flow to sustain operations. The bigger the company gets, the more it depends on revenue streams from its established products. The new engineer will be well advised to understand this principle. The established product line and its sustaining revenue stream will be highly guarded. This is not the arena for poorly thought out suggestions or high risk actions. New ideas and proposals that involve the main revenue stream will be intently scrutinized.
Good corporate managers learn to avoid risks to the cash flow revenue stream. This leads to the paradox, the innovator’s dilemma. Corporate managers understand that innovation is key to the long-term survival of the company, but unlike the well-established products, new innovations are risky propositions. New innovations demand resources at the expense of the established revenue stream. New innovations typically start out in niche markets that are too small to generate substantial revenue growth. Even more perplexing, the new market is poorly defined and difficult to anticipate. The innovation investment is a gamble and good managers know they shouldn’t gamble!

Innovations are sometimes thought of as being disruptive, causing changes to the established operations. It is this disruptive characteristic that makes innovation unattractive to a management team that is intent on protecting the revenue stream. A new innovation may well be a source of new revenue, but it is very difficult to predict the value and it is a risky investment. In fact, it is most likely that the disruptive innovation will appear weak in the established customer base. If it is going to generate revenue, it will have to come from some new untested market. For example, prior to the development of the Sony Walkman tape player, there was a well established market for tape recorders. The Walkman design was radical in that it eliminated the “record” feature. The fact that it was a device with no recording capability meant that it would have no appeal in the well established tape recorder market. But by eliminating the most expensive feature, Sony made an inexpensive and lightweight tape player that was swept up by an all new market segment. In hindsight, the Walkman was an obvious winner, but during its development, good corporate managers had to wonder about the sanity of a launching a tape recorder that can’t record!

The Sony Walkman scenario follows a common pattern which Christensen identified. Figure 1 (page 4) illustrates Christensen’s model. It shows the time progression of an established product line compared to a similar, but disruptive new technology. Over time, the established product line becomes more sophisticated, increasing in refinement and feature content. These developments increase cash flow and keep the company ahead of competitors. But eventually, the established product reaches a saturation level, beyond which customers are unwilling to pay for more features or additional refinements. At that point in time, the market is ripe for a new disruptive innovation. Rather than attempting to compete on price or additional features, an upstart company will launch a disruptive technology that strips away excesses and concentrates on a specific market segment or a unique aspect of the product. The disruptive technology is typically simpler, cheaper and more reliable than the established products. Although it may not be competitive in the established market, it may offer one unique feature that attracts a totally different market segment. For example, in the early days of cellular telephones, the land-line phones were superior in every way except one, portability. Today, the land-line telephone is nearing extinction as the market is flooded with cellular phones.
Established companies are reluctant to adopt the disruptive technology approach because of the associated risk to the revenue stream. To sustain and grow a new technology, a nimble organization would be required to respond as the market dictates, but the established organization will have not-so-nimble infrastructure set up to support the established product. Improvements, new features and upgrades will need to be tended to as the market finds new uses for the disruptive technology. Customers will find new uses and new requirements for the innovative product. Upstart competitors, not burdened by existing infrastructure, will respond quickly to take advantage of the new market opportunity. All of these are distractions to the established company, with its established payroll, capital investments, extensive distribution system, etc. Although established companies may claim to welcome out-of-the-box thinking, they will not likely be prepared to draw new organization lines to accommodate a disruptive innovation that does not fit in the existing hierarchy.

Of course, disruptive technologies do not guarantee success. Upstart companies are risky ventures which may dissolve as quickly as they are established. Established companies are run by corporate officers that must act as good stewards for their investors. Wasting money on high risk upstart products will not be tolerated by investors. Although it appears totally reasonable to be completely risk-adverse, history has shown that established companies that disregard disruptive innovation will eventually be challenged by an upstart competitor. Perhaps the most legendary case is corporate giant IBM’s disregard for the disruptive technology of the personal computer. Once the upstart has gained a foothold, it is too late for the established company to respond. Maier and Rechtin describe the failings of ten corporate giants in the space satellite industry.
This is the principle of the innovator’s dilemma. Understanding the dilemma will help the new engineer form a strategy to have their new ideas heard and taken seriously by their employers, without looking foolish.

Teaching the lesson of the innovator’s dilemma

Prior to a lecture on the innovator’s dilemma, the students could be asked to write a brief plan to launch a new product. This will give some assessment of their preconceived notions. They should be asked to explain how a company might introduce a new product and how the company can gauge customer reaction. After the students turn in this pre-work, the following lecture and in-class exercise will introduce the innovator’s dilemma.

Typically, one lecture session is sufficient to introduce the basics of the innovator’s dilemma by highlighting the principles described above. The lecture could be supplemented by an optional reading assignment. Christensen’s book, The Innovator’s Dilemma is referenced by many contemporary publications on innovation and could be considered a must-read for any student dreaming of a career as an inventor, entrepreneur or innovator. The book is a relatively inexpensive paperback and is readily available through most booksellers and libraries.

Following the lecture, an in-class object lesson will help reinforce the points. The exercise involves a technique called brainwriting. In this exercise, groups of 4 or 5 students are challenged to come up with disruptive technologies. In the following example, the established technology was the power wheelchair. The instructor explained that power wheelchairs have reached the saturation point such that additional features and refinements will not sell more chairs. The situation is ripe for a new, disruptive product. The students are challenged to come up with a simple, reliable new product. Brain-writing helps the students envision a new product. It begins with each student sketching some random object they encountered that day. The students then pass their sketches to the person on their left. Following the exchange, the students must sketch a new idea for a wheelchair, using some feature of the random object that was just passed to them. After 5 minutes, the students again exchange sketches and the next student must add an additional modification to the sketch. The process continues until each student has added something to each sketch. Finally the team is challenged to compare their ideas to the current product’s market and select the idea with the most potential for success. Figure 2 illustrates one such sketch that started with a toaster and led to a new idea for a manually energized power-assisted chair.

A homework assignment can further reinforce the concepts. With their new product design on paper, the team can be challenged to develop some ideas for how they might present their new idea. They must face the innovator’s dilemma and propose how they could convince an established company to consider developing their radical idea, while still supporting the existing product. If the students have co-op work experience, they could consider the dilemmas their co-op employers might face if they were to take on the challenge of developing a new, disruptive technology.

In addition, or as an alternative to the brain-writing exercise, another potential assignment is to have the students conduct research looking for the next disruptive technology to hit the market.
They must make a speculative prediction of where a technology will be in the next 5 years and what technology it will replace. The instructor might use the Nintendo Wii gaming system as an example that students can relate to. While other gaming competitors were working on ever more sophisticated graphics and expensive graphics emulators, Nintendo employed very simple graphics and existing technologies to launch a revolution in video gaming. This assignment will help the students understand that innovation does not require miraculous breakthrough technology. The students discover that disruptive technology is typically simpler, cheaper and more reliable than the established products. Some examples that students have cited include: Netflix, cloud computing, electrical recharging by induction and LED lights.

Figure 2: Illustration of a brain-writing sketch sheet

The following sections consider how to assess the learning outcomes.

Assessing Outcomes of the Innovator’s Dilemma Lesson

To assess outcomes, the student’s perception of the changing corporate world should be measured. Several survey questions can be used to measure their understanding. Sample questions may be similar to the following:

- Agree or disagree: New ideas will always be welcomed by my employer. Explain your rationale.
- Agree or disagree: Companies must be innovative to survive. Explain.
- Fill in the blank: My employer will expect me to come up with ___ new ideas every year. Explain the reason for your answer.
A recent capstone class included the lessons and exercises on the innovator’s dilemma. Following the lessons, the students were given the survey as described above. The survey data and the author’s interpretation follow:

Question 1: New ideas will always be welcomed by my employer.
   The desired response is “disagree”, which was recorded by 70% of the students. 30% of the student respondents still believe that new ideas will always be welcomed. Their rationale is that if an idea is a good one, it has to be accepted. This response may indicate the naiveté of some students, or perhaps it is an indication of an optimistic perspective on life.

Question 2: Companies must be innovative to survive.
   The desired response is “agree”, which was recorded by 90% of the students. The 10% of the students that disagreed with this statement pointed out that a company may decide to be non-innovative and focus only on the manufacture of the existing product line until the product has run its course. This response is a very pragmatic view of business and not necessarily wrong.

Question 3: My employer will expect me to come up with ___ new ideas every year.
   This fill-in-the-blank question allowed students to speculate about their future. Responses ranged from 0 to 100+. Those that responded 0 made the claim that as new employees, they will be on a steep learning curve and not expected to deliver innovations right away. Those that responded 100+ claim that they will be expected to bring a new, fresh, out-of-the-box view to their new employer. Any response is legitimate. This question is intended cause the students to pause and reflect on their future.

Question 4: New products should be more sophisticated then the old products.
   The desired response is “disagree”, which was recorded by 100% of the students! This is the key lesson. The students now recognize that they their ideas don’t have to be technically sophisticated to be innovative. Some of the student comments indicated that they also understand the difference between disruptive technology and new features in existing products.

Following the work on the innovator’s dilemma, the students should refer back to the pre-work and reevaluate their plan to show that they understand that the product should be relatively simple and it should be designed to evolve quickly as the market may use the new product in unexpected ways. Their new plan should show that they can’t be certain of the market and include thoughts that account for the market response.

Student strategies to address the innovator’s dilemma

Students can begin to develop their own personal strategies and tactics to deal with the innovator’s dilemma. Instructors can offer some tips as follows:
• Think about what kind of customer might be interested in your invention and be prepared to explain this to your supervisor.
• If your idea will have appeal to current customers, it is likely that it is a new feature rather than a disruptive technology. But if your idea is unlikely to excite the established customers, it may truly be a disruptive technology. Be sure to know the difference.
• Plan to fail inexpensively, assure your supervisor that the cost to develop your idea will not bankrupt the company and not disturb the revenue stream!
• Be aware that the company’s existing processes and procedures were not designed with your new idea in mind. In fact, the existing organization may even be adversarial toward your ideas. Be prepared with suggestions for addressing the organizational issues, such as proposing a small dedicated team to develop the new idea.

Principle 2: The Sequence

Innovation can be either fostered or stifled by corporate culture. As companies strive to keep pace with changes in the market place, the predominant culture will greatly influence how new ideas are created, processed and incorporated into the established operations. Corporate culture involves behaviors, processes and value systems. Certainly, no established company sets out to purposely stifle innovation, but the company’s highest priority will be to deliver the established products and sustain the business with healthy cash flow, even if that comes at the expense of innovation. Innovation represents a level of risk and distraction that may not be welcomed by the main-stream organization. The company’s risk tolerance and aggressiveness is dictated by the corporate culture.

In a recent publication, Michael Metzger defines a series of events which he labeled the Sequence. Metzger’s claim is that innovation follows a pattern of four stages that is so rigorous, identifiable and predictable that the pattern may be considered as fundamental to a corporation as DNA is to humanity. If the new engineer understands the sequence, they will be more effective at shaping, presenting and implementing their ideas. Metzger’s claim is that corporations that focus on managing the sequence are more innovative and subsequently more successful.

The following four stages are defined by Metzger. It is suggested that one full lecture be devoted to explaining the sequence:

Stage 1: Corporate conscience leads to conclusions about how the world OUGHT to be. This drives business decisions about what the company stands for, what types of products it will produce and what level of service it will provide.

Stage 2: The perception of reality IS a major factor in the decisions made by corporate directors. If reality is studied with an objective eye, the corporate leaders will have an accurate view of the world. But if reality is viewed through a lens clouded by corporate bias, the judgment of the corporate leaders will also be clouded. The key is make unbiased studies of customer needs and wants. Care should be taken to remain objective, despite preconceived opinions, personal motivations, corporate history and political agendas.
Stage 3: Pragmatic experience helps the corporation determine what CAN be done to reshape the world. Innovation opportunities become apparent in those situations where the company finds that what OUGHT to be differs from what IS in fact reality. The company then decides options CAN remedy the discrepancies.

Stage 4: A vision for the future reflects the collective WILL of the corporate leaders. The choice of the available actions identified in Stage 3 will be a clear indication of the corporate vision. This may be a short term vision, such as taking an immediate profit or it may be a long term vision such as establishing a jobs-for-life company.

The sequence can be remembered by the four key words OUGHT-IS-CAN-WILL. An example might help students understand and remember the stages of the sequence. The following scenario can be discussed with the students.

Imagine the events that might occur in the normal daily life of a student as they head to classes and express the events in terms of the four stages of the sequence:

* Stage one (what ought to be); the students have certain expectations about what OUGHT to be, whether they are conscious of their expectations or not. For example, they expect classrooms ought to be secure, warm and well lit. The instructor ought to be on-time, prepared and knowledgeable about the subject matter.

* Stage two (what really is the case); the students routinely encounter the reality of what IS happening on any given day. For example; they may find reality matches their expectations of what ought to be; the building is indeed secure and the instructor is acceptable. Or, they may find that reality does not match expectations. For example, they may find the building is not functional. It is dark due to a power failure.

* Stage three (what can be done); depends on the agreement between expectation and reality. For example, if the reality of the situation aligns with the student’s expectation then there is nothing exceptional to do, and the student goes about their business. But, if the reality does not meet expectations, then the student will begin to consider what can be done.

* Stage four (what we hope will be); the action taken by the student is an indication of their vision of the future. In the scenario of the power outage, their vision may be focused on short term, immediate remediation. They may simply find a temporary light source. But if their vision is for a long term solution, the student may decide to file a complaint with the building administrator.

By relating the sequence to a common day in student line, the students more readily grasp the steps in the sequence. They become cognizant of the sequence and begin watching for signs of the sequence in other daily events.

In terms of innovation, students can begin to look for applications of the sequence and its influence on innovation. New innovations represent someone’s conscience decision about the way things ought to be. The innovation addresses an apparent reality. Students may begin to
challenge whether an innovation was developed based on assumptions and speculation, or was an in-depth market study executed? Students may consider alternative solutions. Is the new innovation the best solution? Is it the only solution? Finally, they can consider how the innovation represents a vision for the future.

**The personas of the sequence**

Metzger also identifies four personas that are pervasive in the sequence. The company’s culture is influenced by the behaviors they represent. Three of the personas represent negative behaviors and one represents the desired behavior. The personas are:

Negative Personas:
- Inward-looking person - This person does not look beyond their own experiences.
- Outward-looking person - This person takes no personal responsibility.
- Hopeless person - To this person, nothing matters other than power and control.

Desired Persona:
- Clear-eyed person - This is the desired persona, reasonable and even-tempered.

Although the innovator strives to be clear-eyed, it is inevitable that they will exhibit negative characteristics from time to time. The young innovator will benefit from recognizing these behaviors in themselves and others.

**Teaching the lesson of the sequence**

One method to teach the sequence is to do an in-class exercise. Table 1 (page 11) is an example of a table developed in class. The subject matter of this example project was to propose an assistive technology for a disabled client. The approach was to work together to fill in a matrix that pairs personas with stages in the sequence. The task was to completely fill out each column before moving to a subsequent column. To fill in each cell, imagine taking on the persona listed in column one and then respond to the following questions. The last row represents the desired persona, so be sure to point out that the students should strive to avoid the failure mode personas and think clearly about the client’s situation.

The following questions serve as thought starters for each cell:

- **OUGHT:** Describe how our client’s day-to-day living **OUGHT** to be.
- **IS:** Describe what our client’s situation really **IS**.
- **CAN:** List alternatives that your team **CAN** possibly execute.
- **WILL:** Describe your team’s vision of success. This is the team’s **WILL**.

In addition to the in-class exercise, the following assignments can be given. Each assignment is designed to reinforce the steps in the sequence and to highlight the behaviors of the personas.
Assignment - OUGHT: Students can work on problem statement development. As they develop a problem statement, they should actively consider moral and ethical aspects of the problem. They should consider their own conscience, value system and beliefs.

Assignment - IS: Typical assignments such as benchmarking, patent search, ethnography are good methods to reinforce the lesson of searching for realities, without being clouded by personal bias. Ask the students to make clear distinctions between facts and opinions.

Assignment - CAN: Numerous idea generation techniques can be used to help the students explore what can be done. A good reference is the book “The Innovator’s Toolkit”. It includes over 50 such techniques3. Brain-writing was one of the techniques described above.

Assignment - WILL: Given the aforementioned problem statement, the students should be required to define deliverables and produce visionary statements of their own. They should be required to explain the potential benefits and consequences of their chosen course of action.

Table 1: Example from an in-class exercise on the innovation sequence

<table>
<thead>
<tr>
<th>Persona/Stage</th>
<th>OUGHT</th>
<th>IS</th>
<th>CAN</th>
<th>WILL</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAILURE MODE:</td>
<td>He OUGHT to deal with problems like I have to deal with problems.</td>
<td>We used a wheelchair for one day, so we know what his life IS like.</td>
<td>We CAN design a device that suits how we would like to use it.</td>
<td>Our WILL is to design a product that makes us proud.</td>
</tr>
<tr>
<td></td>
<td>It’s not up to me; it is up to government to decide what OUGHT to be.</td>
<td>Check to see if his home IS up to government codes and standards.</td>
<td>We CAN only fix the items that are not up to code.</td>
<td>Our WILL is to meet the requirements dictated by the government.</td>
</tr>
<tr>
<td></td>
<td>Nothing matters he OUGHT to be happy regardless.</td>
<td>Our situation IS all that matters. Our reality IS the only reality.</td>
<td>We CAN do whatever we feel like doing.</td>
<td>Our WILL is to complete the task and move on.</td>
</tr>
<tr>
<td>DESIRED PERSONA:</td>
<td>* Our Conscience: He OUGHT to be allowed to make his own choices. He ought to have a fair assortment of technologies available to him.</td>
<td>* Reality Check: We assess whether our client IS allowed to make choices. Our assessment will include interviews with client and the people that know him.</td>
<td>* Our Options: We create a list of CAN-do ideas. We prioritize the list to address the lack of choices or the limited availability of technology.</td>
<td>* Our Vision: Our WILL is to improve the day to day choices for our client and to make at least one new assistive technology available to our client.</td>
</tr>
</tbody>
</table>
Assessing outcomes of the sequence lesson

The desired outcomes of the sequence lessons are described in the following paragraphs. The sequence lessons are intended to give students understanding of corporate culture before they enter the workforce. With this insight they will be better equipped to adapt to corporate culture, whether they are dealing with an innovative idea or executing a mundane assignment.

As the course progresses brief 10-minute assignments, called “minute paragraphs,” can be used to assess the student’s recognition of behaviors. The students are asked to write brief paragraphs regarding the progress of their project. An example prompting question might be: “In one half page or less, describe how your team will know if you are doing the right thing for your customer.” This question is testing their understanding of the “ought” and “will” stages of the sequence. The students should respond with short paragraphs that include behavioral key words such as “motivation,” “conscience,” “ethics” and “values.”

The students should become aware of how corporate culture affects human reactions to innovative ideas. The evidence of this will appear in meeting minutes, presentations and reports. If they understand the importance of the ought-is-can-will sequence, their reports will include comments about how they checked their personal bias during the execution of the project. Key words and phrases should show an appreciation for how their own persona-like behaviors will affect the approach to innovation and influence their designs, either positively or negatively. When they recognize personal and corporate motivations, they will be better equipped to promote their innovations and inventions.

Student strategies to prepare for corporate culture

Students can get a competitive advantage by recognizing and acting with respect to the sequence. These strategies will help students advance their ideas and reduce their frustration as new ideas face many corporate hurdles.

First, the students should recognize their own behavior patterns and try to avoid the negative personas. Emphasize the clear-eyed behavior.

Next, students should practice observing the sequence in action. Attempt to identify who sets the moral and ethical direction of the company. Does the company’s moral compass align with their own personal value system and beliefs?

For each step of the sequence, identify who is the key decision maker. Who holds the moral compass and decides what ought to be? Who has the wisdom to assess the reality of the marketplace and the company’s position among the competition? Who makes decisions about what can reasonably be accomplished? Who has the foresight to provide a vision for the future?
Conclusion

Recognition of the sequence and the innovator’s dilemma is valuable knowledge for the novice engineer that is attempting to navigate the rapidly changing world of corporate innovation. Students that have developed personal strategies for innovation will have a competitive advantage over those that are not aware of how corporate culture affects innovation.

Bibliography


the AP Capstone Program 33 AP Capstone Course Audit Steps 34 Ensuring Students Understand the Directions for the Performance Tasks 34 Teacher Roles During the AP Capstone Performance Tasks 34 Submitting Student Work Using the AP Digital Portfolio 35 Digital Submission for AP Capstone 35 Technical Requirements and Recommendations for the AP Digital Portfolio 36 Due Dates for AP Seminar and AP Research. Performance Tasks 36 Scoring Student Work 36 AP Seminar End-of-Course Exam Date 36 Getting Involved with the AP Reading 37 For AP Coordinators 37 Role of the AP Coordinator in AP Capstone 37 Crea Capstone courses are expected to prepare students for the â€œreal worldâ€ by putting them into a microcosm of the real world. In these courses, students are given a problem of some complexity, and are expected to exercise and develop problem-solving skills as they address the problem. Within our Computer Science and Engineering program we have, over the past eight years, successfully scaled up the Capstone courses.Â Next, the authors discuss the national context of transition courses, perspectives of various stakeholders, and lessons learned from the UCSF experience. Finally, they consider future directions, suggesting that internship transition courses be a standard part of the medical school curriculum. View. Corporate Innovation Capstone Assessment. Prerequisite Syllabus Instructors Conceptor Platform Reviews. Go to course arrow_forward.Â After completing the four content courses in the MicroMasters program, students are encouraged to complete the Capstone Assessment and earn their MicroMasters credential from UQx. This capstone offers students the opportunity to bring their learnings together and exhibit their knowledge and growth through four activities: A traditional knowledge test derived from the questions already posed following each MicroMasters topic. An oral presentation (video) based around a photo essay: a series of pictures that identify an innovation, how that innovation is supported by economy and how the innovati...