Learning Strategies and Learning Traits Critical to Practicing Engineers after College

Mr. Daniel Michael Ferguson, Purdue University, West Lafayette

Daniel M. Ferguson is a graduate student in the Engineering Education Program at Purdue University and the recipient of NSF awards for research in engineering education. Prior to coming to Purdue he was Assistant Professor of Entrepreneurship at Ohio Northern University. Before assuming that position he was Associate Director of the Inter-professional Studies Program and Senior Lecturer at Illinois Institute of Technology and involved in research in service learning, assessment processes and interventions aimed at improving learning objective attainment. Prior to his University assignments he was the Founder and CEO of The EDI Group, Ltd. and The EDI Group Canada, Ltd, independent professional services companies specializing in B2B electronic commerce and electronic data interchange. The EDI Group companies conducted syndicated market research, offered educational seminars and conferences and published The Journal of Electronic Commerce. He was also a Vice President at the First National Bank of Chicago, where he founded and managed the bank’s market leading professional Cash Management Consulting Group, initiated the bank’s non credit service product management organization and profit center profitability programs and was instrumental in the breakthrough EDI/EFT payment system implemented by General Motors. Mr. Ferguson is a graduate of the University of Notre Dame and Stanford University.

Mr. James Edwin Cawthorne Jr., Purdue University, West Lafayette

Mr. Corey T Schimpf, Purdue University, West Lafayette

Corey Schimpf is a PhD student in Engineering Education. His research interests include examining how cyberlearning and informal learning environments can be brought into the engineering curriculum. His dissertation explores how a gaming platform can be used to facilitate early college engineering students design skills development.

Dr. Monica E Cardella, Purdue University, West Lafayette

Monica Cardella is an Assistant Professor of Engineering Education at Purdue University. She is also the Director of Informal Learning Environments Research for the Institute for P-12 Engineering Learning and Research (INSPIRE). She conducts research on undergraduate engineering students’ design and mathematical thinking in formal and informal contexts in addition to research on how children develop engineering thinking in informal learning environments.
Assessing an Introductory Entrepreneurial Thinking Course

Abstract

This purpose of this paper is to describe the redesign of a course, Principles of Entrepreneurship (Principles), undertaken to improve the course to focus more effectively on student learning outcomes. Such introductory courses in entrepreneurship serve a variety of majors and matriculation levels and are offered at many universities as a means of attracting students to an entrepreneurship course sequence or introducing students to entrepreneurial activity. The benefit of examining the redesign of Principles is to offer suggestions for how such introductory entrepreneurship courses can be improved as measured by improved student learning.

Principles is a course that has no prerequisites and can be a stand-alone experience or the first course in an entrepreneurship course sequence. The lead author has taught such a course many times to several hundred students. The course described in this paper, however, has not been taught in its entirety by the authors, rather the proposed Principles design (or redesign) is based upon the author’s experience in teaching a predecessor to Principles and applying the learning objectives, assessment and pedagogical models of Wiggins and McTigue, Pelligrino, and Perkins to the redesign of Principles.

Wiggins and McTighe have defined a hierarchical model for describing what learning outcomes should be the objectives of a student learning experience and therefore what to
emphasize in a hierarchical order once critical learning outcomes are identified. In Principles among the most important learning outcomes are the ability to recognize entrepreneurial opportunities and to communicate the benefits of those opportunities to others whether they are customers, partners, employees or investors. In the model of Wiggins and McTighe learning outcomes are organized into three levels of learning importance: 1. enduring understandings, 2. important to know insights, and 3. good to know information. These learning outcomes establish what the student is expected to know or be able to do as a result of participating in the Principles course.

Pelligrino’s assessment triangle approach includes in one integrated assessment model; the desired student outcomes (as captured by the Wiggins and McTighe framework), the student learning activities (as designed by the Perkins’ approach to student learning activities) and the generation and analytic use of student performance or measurement data to assess student learning (which completes the Pelligrino assessment triangle). The assessment triangle approach as proposed by Pelligrino is illustrated for Principles for three enduring understandings: evaluate new venture opportunities, exhibit presentation skills, and assess entrepreneurial competencies.

Perkins identified seven types of learning experiences to incorporate into an overall integrated and reinforced learning experience that aids students in acquiring and retaining the desired knowledge and skills associated with entrepreneurship (or any desired learning outcomes). Each of these seven learning techniques is examined with respect to student learning activities that can be or were designed into an actual Principles course. Applying the seven learning guidelines of Perkins to student activities establishes how the students will achieve the
Principles learning outcomes. The emphasis in these student activities is arranged according to learning priorities established by the Wiggins and McTighe hierarchy.

Introduction

This paper illustrates the processes of course redesign using proven learning and assessment models as applied to an introductory course in entrepreneurship. The purpose of the paper is to demonstrate how to apply these course design models to undergraduate courses, selecting an introductory entrepreneurship course as the subject of the redesign process. Principles of Entrepreneurship (Principles) is as an elective introductory course on entrepreneurship open to any major in any college (e.g., engineering, science, pharmacy, liberal arts or business) and designed for students in any matriculation year (freshmen to seniors). Principles introduces students to entrepreneurial thinking and to key entrepreneurial thinking skills, e.g., opportunity recognition \(^1\text{-}^5\) and presentation skills \(^6\text{-}^9\). There are no prerequisites for the redesigned course (nor were there for the predecessor course) and students will engage in several individual and group learning activities throughout the term. Our motivation for writing this paper about the redesign of Principles was to investigate how through a better designed course we can potentially influence more students, particularly engineers, toward developing or enhancing their entrepreneurial mindset and becoming more entrepreneurial in whatever they chose to do. Better design was assumed to mean a course more aligned with curriculum design models known to produce superior learning results in undergraduate students. Entrepreneurial mindset was assumed to be a set of individual factors related to the knowledge, skills and attributes that research has shown lead to a higher probability of entrepreneurial success\(^10\text{-}^14\).
This paper also introduces the learning outcomes model of Wiggins and McTighe\textsuperscript{15}, the assessment triangle model of Pelligrino\textsuperscript{16} and the student learning activities model of Perkins\textsuperscript{17} as tools to use to redesign undergraduate courses, in particular an introductory entrepreneurship course or any course where undergraduate student learning is an important element in the rationale for the course. In this paper Wiggins and McTighe's model is used for determining 'what' should be learned combined with external research on important attributes of successful entrepreneurs and to help establish criteria for what concepts or skills are more or less important for students to attain.

Pellegrino's approach to course assessment is used to construct the assessment models which will help the instructor determine whether the learning goals have been achieved, that is, to collect and use the data to measure what skills or knowledge have been acquired and how to best manage the acquisition of those skills. Perkins 'Learning by Wholes' curriculum design strategy identifies 'how' students can best learn the course content and assist the instructor in designing the pedagogy of the Principles course. These course assessment and learning design techniques, or in this case course redesign techniques, are the critical elements in the proposed redesign of Principles.

Where they are available from the predecessor course to Principles, artifacts that explain the content selections, give substance to actual and proposed assessment practices, or describe or illustrate actual or potential student learning activities are provided in appendices. The attached appendices include:

1. The prior course syllabus revised for the new course design.
2. An example of a guest speaker biography (used in the prior course for the Tuesday night 9:00 pm free pizza talk).

3. Rubrics that will be used to judge the quality of the presentations by guest speakers as well as students and to guide the reflections written on guest speakers and student presentations to help students learn to identify and judge entrepreneurial competencies.

4. A description and guidelines for playing and for writing reflections for the individual student online business game—which were transferred from the prior course.

5. A description and guidelines for participating as a team in the’$5.00 create a business game’ which is intended to help students integrate the content of the entire Principles course as well as focus on achieving the enduring understandings identified for the new Principles. The $5.00 game was transferred from the prior course without significant changes.

From a sample of 100 students at a private midwest university, the student mix in the predecessor course was roughly 25% engineers, 25% pharmacy students, 25% liberal arts students and 25% business students. In addition 75% of the students were juniors and seniors and 25% freshmen and sophomores. No statistically significant differences in course performance were found based on differences in matriculation year or college/major. As a personal observation, engineering and business students were more comfortable with financial analysis while pharmacy and liberal art students were more comfortable with customer/market related questions.
Principles Course Content

The 'enduring understandings' that a student should take away from Principles are established based upon prior entrepreneurship research that identified critical entrepreneurial skills and are assumed to be the following: 15

- Opportunity Recognition 18 (Mitchelmore, S. & Rowley)
- Presentation Skills 9 (Hood and Young)
- Entrepreneurial Competencies 18 (Mitchelmore, S. & Rowley)

Mitchelmore, S. & Rowley cite the ability to recognize and evaluate a new venture opportunity as a dominant entrepreneurial thinking skill as do many other researchers 18-20. Acquiring the resources to take advantage of the recognized opportunity is equally important to entrepreneurial successes 1,18 and this skill rests fundamentally on your persuasive presentation skills, both oral and written and are confirmed again by Mitchelmore, S. & Rowley’s research and that of many other researchers including Hood and Young 18,9. Finally, many different entrepreneurial thinking skills or personal traits and skills are associated with successful entrepreneurs, like risk-taking propensity, decision making, motivation, leadership, exploitation and many other traits and skills along with the recognition of unique combinations of these skills resident in individual entrepreneurs 18,21.

The understandings that are ‘important to know’ based upon prior entrepreneurship research include: 15
• Techniques for assessing a new venture idea: customer/value analysis, competition analysis, people and production strategies, and financial analysis 22,23 (Baringer, Kuratko, and Vesper)

• Best practices for preparing persuasive presentations 9,24 (Abrams, R. & Vallone, J)

Standard techniques for assessing a new venture idea (market analysis, competitor analysis, people and production strategies, and financial analysis) are identified in all of the leading entrepreneurship texts in including those by Baringer, Kuratko, and Vesper 22,23,25 and skills incorporating this knowledge are cited as critical aspects of entrepreneurial behavior by Mitchelmore, S. & Rowley’s and Fiet’s research 18,19.

The understandings that are ‘good to know’ based upon prior entrepreneurship research by Vesper cover the following: 15,26

• Where to find and use market, product, competitor, and customer data (Baringer) 23
• What kinds of tasks and decisions are made in starting a new venture (Baringer) 23
• The value of practice and feedback in preparing and making persuasive presentations (Abrams, R. & Vallone, J)

‘Where to find and how to use data and how do you start a new venture? ’ are good to know’ understandings and are covered as key chapters in the popular entrepreneurship textbooks of Baringer, Kuratko, and Vesper 22,23,25 as well as in the identification of entrepreneurial thinking traits and skills by Mitchelmore, S. & Rowley 18. The importance of practice is emphasized in leading texts on persuasive speaking, for example by Abrams, R. & Vallone, J 27, and research in the development of skills has established that people move through several stages
of skill development from novice to expert, usually starting at a novice level\textsuperscript{28,29} which is where most students in Principles start given the cross-university colleges and multiple grade levels of the students.

Figure 1: Wiggins-McTigue’s Concept of Value Model applied to Principles

- **Good to Know**
  - Where to find and how to use market, product, competitor, and customer data.
  - What kinds of tasks and decisions are made in starting a new venture.
  - The value of practice and feedback in preparing and making persuasive presentations.

- **Important to Know**
  - Techniques for assessing a new venture idea: customer/value analysis, competition analysis, people and production strategies, and financial analysis.
  - The best practices for preparing persuasive presentations.

- **Enduring Value**
  - Opportunity Recognition.
  - Presentation Skills.
  - Entrepreneurial Competencies.

Figure 1 above displays these levels of understanding in the Wiggins and McTighe egg diagram\textsuperscript{15} and Table 2 below displays the top three ‘understandings’ value-rated in importance by the authors according to the learning outcome filters suggested by Wiggins and McTighe.
Table 2: Evaluating Enduring Understandings According to the Wiggins and McTighe's Filters (Wiggins & McTighe, 1998).

<table>
<thead>
<tr>
<th>Understandings / Filters</th>
<th>Big idea beyond the classroom</th>
<th>Heart of discipline</th>
<th>Require uncoveryage</th>
<th>Engage students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate a new venture opportunity</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Deliver a persuasive presentation</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Know entrepreneurial competencies</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

Learning Objectives of Principles

The learning objectives of Principles are shown in Figure 2 below and were reorganized in terms of the three levels of Wiggins & McTighe understandings as described above. To specify these learning objectives we also were forced to answer the question; just exactly what will the Principles students be able to know or do as a result of the course? The answer to this question is also a key input to the Pelligrino assessment triangle that we will discuss.
Figure 2: Learning Objectives of Principles

1. Opportunity Recognition: Student will be able to:

- Recall or locate data in the text for quizzes
- Create ideas for the idea pitch and new venture analysis
- Acquire customer/market data
- Analyze customer/market data
- Prepare a customer/market analysis
- Acquire competition data
- Analyze competitor data
- Prepare a competitor analysis
- Acquire data for a product design and/or production plan/team plan/organization plan
- Prepare a product design and/or production plan/team plan/organization plan
- Construct a scenario based financial analysis
- Integrate the four feasibility analysis components into a final report

2. Presentation Skills: Student will be able to:

- Develop a two minute persuasive Idea Pitch
- Deliver a two minute persuasive Idea Pitch
- Develop a 10 minute feasibility analysis presentation
- Deliver a 10 minute feasibility analysis presentation
- Assess the quality of idea pitches given a rubric

3. Entrepreneurial competencies: Student will be able to:

- Create a reflection analyzing entrepreneurial competencies
- Create a reflection that compares entrepreneurial competencies
- Appraise strengths and weaknesses in entrepreneurial competencies
- Assess their personal entrepreneurial competencies

This specification of learning objectives details is much more detailed than anything we had done previously for the original Principles course and is inspired or required by the need to be able to measure whether or not students have really gained the knowledge or skills that we had previously assumed they acquired. Measurement and analysis of attainment of learning objectives is at the heart of the Pelligrino approach to learning assessment. However this collection of data is but one facet of the learning skills design process. We also need to design the learning so that the cognitive tasks are of higher order because that’s the type of learning that actually sticks-to or cements-itself-into the learner. To evaluate the cognitive difficulty of our
learning objectives we turned to Anderson and Krathwohl’s revision of Bloom’s cognitive taxonomy. How difficult is it to acquire these skills and knowledge specified by our learning objectives?

The learning taxonomy of Bloom as revised by Anderson and Krathwohl has 6 levels of cognitive difficulty ranging from remembering to creating/synthesizing. The kind of learning that cements an enduring understanding in a student is a level 5 or 6 cognitive learning experience. Table 3 below places the detail of the revised Principles learning objectives in the revised cognitive taxonomy of Bloom. X's in the matrix of Table 7 indicate the anticipated cognitive requirement of the learning objective.

Table 3.1 Levels of Cognitive Difficulty for the Learning Objectives of Principles

<table>
<thead>
<tr>
<th>Principles Learning objective/Conceptual levels&gt;</th>
<th>Remembering</th>
<th>Understanding</th>
<th>Applying</th>
<th>Analyzing</th>
<th>Evaluating</th>
<th>Creating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate new venture opportunities</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recall or locate data in the text for quizzes</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create ideas for the idea pitch and new venture analysis</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquire customer/market data</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze customer/market data</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare a customer/market analysis</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquire competition data</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analyze competitor data</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare a competitor analysis</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquire data for a product design and/or production plan/team plan</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare a prototype product design and/or initial production plan/team plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Decide what data, Acquire financial data</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create financial models for their new venture idea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Construct a scenario based financial analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Integrate the four feasibility analysis components into a final report</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Table 3.2 Levels of Cognitive Difficulty for the Learning Objectives of Principles

<table>
<thead>
<tr>
<th>Principles Learning objective/ Conceptual levels &gt;</th>
<th>Remembering</th>
<th>Understanding</th>
<th>Applying</th>
<th>Analyzing</th>
<th>Evaluating</th>
<th>Creating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exhibit and Assess presentation skills</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop a two minute persuasive Idea Pitch</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliver a two minute persuasive Idea Pitch</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop a 10 minute feasibility analysis presentation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deliver a 10 minute feasibility analysis presentation</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess the quality of idea pitches, given a rubric/ Self Assess idea pitch</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Assess entrepreneurial competencies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a reflection analyzing entrepreneurial competencies</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create a reflection that compares entrepreneurial competencies</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraise strengths and weaknesses in entrepreneurial competencies</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assess their personal entrepreneurial competencies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Table 3.2 above, which we created based upon our subjective judgment of the cognitive difficulty of the tasks, shows that the cognitive requirements of Principles are set at high cognitive levels for the final course deliverables for each of the overall learning objectives. Our judgment on the cognitive level or difficulty of a task was primarily based upon the use of key verbs in the task description, e.g., create, analyze, evaluate, or construct are high levels of cognitive difficulty whereas recall, deliver or acquire are lower levels of cognitive difficulty.

Our actual teaching of the predecessor course showed that freshmen and non-business majors require significant scaffolding in terms of their cognitive development but that additional assistance did not necessarily diminish the quality of their final deliverables. We used a mastery approach and substantial peer interaction between business and non-business majors and
freshmen and seniors to level out any preparation or cognitive maturity disparities in the students and our observed results in the predecessor course substantiated this assumption as valid. These insights and experiences were crucial in the pedagogical process of designing the new learning experiences. In the new course design assessing entrepreneurial competencies, presentation skills and the feasibility analysis components are scaffolded towards increasingly difficult cognitive challenges so that the student can move toward those goals at differentiated paces. Knowing where scaffolding may be required due to the inherent cognitive challenges of a learning goal was the major benefit of applying the revised Bloom cognitive taxonomy in the course redesign process.

Assessment Triangle for Entrepreneurial Competencies...

Knowing what we wanted to students to learn at a much more specific and detailed level as well as the cognitive difficulty in that learning lead us to applying the next course design model, the Pelligrino assessment model. With this model we designed how we will measure or assess whether the students actually attained the learning outcomes specified, i.e., what data are we going to collect and evaluate to assess the progress in student learning. While many of the assignments from the original Principles class remain in the redesigned Principles course, the specificity of the data collection and therefore grading and student feedback will be significantly different. We believe this is because we will be referring to specific learning goals (shown in figure 2) that are measurable and referring to specific data as to how well a student or team performed relative to those learning goals.

The Pelligrino assessment triangle for entrepreneurial competencies is shown in Figure 3 below. The cognitive corner is based on students learning entrepreneurial competencies through experiential learning, being guided towards mastery by apprentice modeling and through social
construction of their knowledge. The assessment evidence is gathered through submission of student reflections on guest speakers and themselves. Interpretation of the reflections is done by reference to rubrics developed for the assessment of the reflections. Observations of the student’s in-class discussions can also confirm insight or lack of insight and understanding of entrepreneurial competencies and guide the student scaffolding. The entrepreneurial competencies referenced are those identified by Mitchelmore, S. & Rowley. The assessment triangle is complemented and further explained by the assessment worksheet which immediately follows the diagram. The assessment triangle and assessment worksheet are documents are co-developed to show the flow of activities and detail the decisions, collection of data, application of judgment and analysis of both instructors and students relative to a learning objective.
Assessment Worksheet for Entrepreneurial Competencies

The Entrepreneurial Competencies assessment worksheet in Table 4 discusses how to determine if the student has attained the cognitive skill of assessing entrepreneurial competencies and to what level this cognitive skill was developed. The primary evidence will be contained in reflections scaffolded across multiple exercises culminating in a self-assessment of entrepreneurial competencies. The interpretation of the evidence will be based on a grading rubric for the reflection (see Table 5 below) which is shared with the students. Pedagogical
changes will be made based upon the evidence in the reflections and from observations of in-
class think/pair/share exercises discussing the guest speaker reflections. The grading of reflection
criteria 3 and 4 in Table 4 determine the student's progress and guide class discussions.

Writing for grammar and spelling criteria apply to all reflections. Requirements for the
assessment of entrepreneurial competencies vary depending on the assignment. The mastery
writing goal is no spelling errors and no grammatical errors. Also, a good writing style must be
used for the paragraph or paragraphs that are submitted. The third and fourth criteria for each
reflection relate to the content as the reflection must identify competencies and address the
assigned analysis question(s). Scaffolded scoring for evaluating the reflections is shown in Table
4 below. Rating is on a Likert 1-5 scale: 1 is poor, 3 is expected, and 5 is excellent.

Table 4.1: Assessment Worksheet: Assess Entrepreneurial Competencies

<table>
<thead>
<tr>
<th>Learning Goal</th>
<th>Assessment</th>
<th>Instructor Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student will be able to assess and compare</td>
<td>General: Four written reflections of increasing difficulty, in class</td>
<td>1. Share reflection examples and reflection rubrics</td>
</tr>
<tr>
<td>entrepreneurial competencies evidenced by the</td>
<td>discussions of guest speakers, final self-assessment of entrepreneurial</td>
<td>2. View entrepreneur videos in class and practice assessment as a think/pair/share</td>
</tr>
<tr>
<td>entrepreneur guest speakers and appraise their</td>
<td>competencies</td>
<td>exercises</td>
</tr>
<tr>
<td>own entrepreneurial competencies</td>
<td></td>
<td>3. Give comments back to each student on each reflection regarding their analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>of significant entrepreneurial skills or characteristics of guest speakers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Comment back to students after course complete on their final reflection</td>
</tr>
<tr>
<td></td>
<td>Claim:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Students will recognize and evaluate the entrepreneurial competencies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evidenced by the entrepreneur guest speakers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Students will discuss their insights in class and deepen their</td>
<td></td>
</tr>
<tr>
<td></td>
<td>understanding through social construction of the analysis.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Students will appraise their own entrepreneurial competencies as a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>summative learning exercise.</td>
<td></td>
</tr>
</tbody>
</table>
Table 4.2: Assessment Worksheet: Assess Entrepreneurial Competencies

<table>
<thead>
<tr>
<th>Learning Goal</th>
<th>Assessment</th>
<th>Instructor Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comments</strong></td>
<td>Task:</td>
<td><strong>Formative evidence:</strong></td>
</tr>
</tbody>
</table>
| Misconceptions about entrepreneur behavior or beliefs are addressed in the text, readings, and in quiz questions. | 1. Attend talks or watch videos of 4 guest entrepreneur speakers.  
2. Write reflections about what they thought were important characteristics displayed in the 4 entrepreneur's talks.  
3. Write final reflection assessing their own entrepreneurial skills | Scaffold the reflections across the speakers to deepen learning:  
Refections:  
1. identify competencies  
2. compare competencies  
3. assess competencies |
| **Task:** | **Evidence** | **Summative Evidence** |
| | 1. Four written 1 page guest speaker reflections.  
2. Quiz results from Barringer text chapter on traits and beliefs of entrepreneurs which also deals with myths and misconceptions.  
3. One written one page personal assessment of entrepreneurial skills. | 1. 4th reflection summarizing across all 4 guest speakers  
2. Personal assessment of entrepreneurial competencies  
3. Assess competencies |
| Speakers address other behaviors and beliefs or reinforce the corrections, e.g., entrepreneurs don’t do it for money | **Criteria for evaluating evidence** | **Passing Grade:** 3 out of 5 average on rubric criteria, assignments handed-in on timely basis |
| | 1. Spelling and grammar  
2. Writing quality  
3. Question(s) in assignment addressed  
4. Overall quality of reflection. | |

Table 5: Grading Criteria for Reflection Assignments and Expectations

<table>
<thead>
<tr>
<th>Reflection Assignment</th>
<th>1. Spelling and grammar</th>
<th>2. Writing quality</th>
<th>3. Analysis task completion</th>
<th>4. Overall quality of analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflection 1 Identifies competencies</td>
<td>&lt;3 errors</td>
<td>ok</td>
<td>complete</td>
<td>fair</td>
</tr>
<tr>
<td>Reflection 2 Compare competencies</td>
<td>&lt;2 errors</td>
<td>better</td>
<td>complete</td>
<td>good</td>
</tr>
<tr>
<td>Reflection 3 Ranks strength and weaknesses of two speakers</td>
<td>&lt;1 errors</td>
<td>better</td>
<td>complete</td>
<td>Very good</td>
</tr>
<tr>
<td>Reflection 4 compare all 4 speakers</td>
<td>No errors</td>
<td>good</td>
<td>complete</td>
<td>excellent</td>
</tr>
<tr>
<td>Reflection 5 Assesses own entrepreneurial competencies</td>
<td>No errors</td>
<td>Very good</td>
<td>complete</td>
<td>excellent</td>
</tr>
</tbody>
</table>

Assessment Triangle for Presentation Skills...

The assessment triangle for presentation skills is shown in Figure 4 below. The cognitive corner indicates that students learn presentation skills through experiential learning experiences.
working towards mastery in an apprentice learning model and through social construction of their knowledge. The assessment evidence is class videos, class ratings by peers, ratings by external judges, scripts and slides that students create and the actual development and delivery of their 2 minute and 10 minute presentations. Interpretation and evaluation of the evidence is done based upon a presentation rubric by the student's peers, the instructor, and external judges.

Figure 4: Assessment Triangle for Persuasive Presentations Skills
Assessment Worksheet for Presentation Skills

The assessment worksheet in Table 7 discusses how to determine the level of presentation skills the student has exhibited. The primary evidence is presentation rating sheets prepared at different times during the term by peers and external judges and videos of class practices, idea pitch competitions and final exam presentations for each student. The interpretation of this evidence is done using the presentation rubrics and adjusting for the prior knowledge and experience of each student. Pedagogical changes are made during the development of the skill based upon the evidence in the videos, competition judging, and feedback from the students who are assessing their peers’ presentation skills.

The example grading criteria for presentation skills in Table 6 are focused on preparation and delivery techniques not content of the presentation which is also evaluated. Content creation tasks are also reinforcing the learning of opportunity recognition skills and students are emulating the entrepreneurial guest speakers that they observed.$^{31,32}$

Table 6.1: Criteria for Idea Pitch and Final Exam Presentation Delivery Skills

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Very poor = 1</th>
<th>Good = 3</th>
<th>Excellent = 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How effectively and passionately does the presenter articulate the problem, solution and call to action?</td>
<td>Stated case is disorganized and not persuasive, No passion, No obvious commitment</td>
<td>Some conviction, good evidence included, and presentation has interesting if not convincing content and delivery.</td>
<td>Clearly passionate about opportunity, excited and committed to solution/idea. Convincing case and call to action.</td>
</tr>
<tr>
<td>2. How effective or accomplished are the speaker’s skills? Did the presenter use movement, props, gestures or staging/dress to communicate their message?</td>
<td>No time control, No eye contact, poor articulation, no vocal emphasis, No enhancement of delivery through props, dress or creative delivery techniques.</td>
<td>Acceptable pitch and delivery, obviously practiced timing. Professionally presented. Helped the audience understand the problem or solution with creative delivery or speaking techniques.</td>
<td>Solid eye contact, very persuasive, proper tone proper dress and facial expressions, timing great. Used creative speaking or message delivery techniques to significantly enhance presentation.</td>
</tr>
</tbody>
</table>
### Table 6.2: Criteria for Idea Pitch and Final Exam Presentation Delivery Skills

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Very poor = 1</th>
<th>Good = 3</th>
<th>Excellent = 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. How well did the speaker answer the questions from the judges?</td>
<td>Speaker did not answer questions or provided answers which were not relevant</td>
<td>Speaker understood the questions and helped clarify points in the presentation to which the judge referred. Speaker repeated the question and made sure the question was answered</td>
<td>Speaker’s answers to judge’s questions strengthened the case for the idea and speaker repeated the question. Speaker clarified the questions points effectively and added evidence to an already well stated case.</td>
</tr>
<tr>
<td>Did the Q/A period strengthen the case for the idea?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 7.1: Assessment Work Sheet: Exhibit Presentation Skills

<table>
<thead>
<tr>
<th>Learning Goals</th>
<th>Assessment</th>
<th>Instructor Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be able to exhibit and critique persuasive presentation skills</td>
<td><strong>General:</strong> 1. Written script evidence 2. Video and observation evidence from idea pitch competition and final exam presentation 3. Judges ratings of presentations</td>
<td>1. Share idea pitch examples. 2. Provide presentation rubrics.</td>
</tr>
<tr>
<td>Claim: 1. Students will create and select ideas for their idea pitch and feasibility analysis of new venture 2. Students will be able to prepare and deliver a two minute and a ten minute presentation 3. Students will appraise the presentations of their peers</td>
<td></td>
<td>3. Schedule class presentation practice. 4. Use peer evaluation with rubrics in class. 5. Use video feedback-peer &amp; self-appraisal.</td>
</tr>
<tr>
<td>Comments Misconceptions about presentation skills and best practices in presentations are covered in the text and in readings.</td>
<td><strong>Task:</strong> 1. Use creativity/idea generation techniques for finding and selecting their course project topics 2. read text: Winning Presentations in a Day 3. Provide script drafts and practice in/out of class their two minutes and 10 minute pitches 4. Review and critique videos of previous classes and winning 2 minute Idea Pitches 5. Reflect on and assess their idea pitch performance</td>
<td>6. Pair up students in class practices to get more individual attention through peer feedback. 7. Video tape and post idea pitch and final exam presentations. 8 Arrange external judges.</td>
</tr>
</tbody>
</table>
Table 7.2: Assessment Work Sheet: Exhibit Presentation Skills

<table>
<thead>
<tr>
<th>Learning Goals</th>
<th>Assessment</th>
<th>Instructor Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grading Criteria</strong></td>
<td><strong>Evidence:</strong></td>
<td><strong>Formative Evidence</strong></td>
</tr>
<tr>
<td>3. How effectively and passionately does the presenter articulate the problem, solution and call to action?</td>
<td>1. Bug lists and idea lists homework</td>
<td>In class ratings of idea pitches using presentation rubrics.</td>
</tr>
<tr>
<td>4. How effective or accomplished are the speaker’s skills? Did the presenter use movement, props, gestures or staging/dress to communicate their message?</td>
<td>2. Presentation scripts and videos of practice in class of their own pitch</td>
<td>In class practice observations.</td>
</tr>
<tr>
<td>5. How well did the speaker answer the questions from the judges? Did the Q/A period strengthen the case for the idea?</td>
<td>3. In class use of rubrics to critiques of idea pitch practices</td>
<td>In class peer reviews of feasibility analysis presentations using presentation rubrics.</td>
</tr>
<tr>
<td></td>
<td>4. Judges ratings from idea pitch competition and final exam presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Students reflection on their idea pitch</td>
<td></td>
</tr>
<tr>
<td><strong>Summative evidence:</strong></td>
<td>Video of their two presentations and external judge’s ratings of both presentation performances based upon presentation rubrics.</td>
<td><strong>Passing Grade</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 out of 5 on presentation skills in final exam</td>
</tr>
</tbody>
</table>

Assessment Triangle for Feasibility Analysis of a New Venture...

The assessment triangle for the evaluation of new opportunities is shown in Figure 5 below. The cognitive corner of Figure 5 indicates students are learning in an apprentice learning model and in an experiential learning framework. Their knowledge is being socially constructed by the feedback from peers and the instructor. The junior games support the experiential learning process that is the underlying theme for this introductory course 17. The assessment evidence is
iterative submissions for each of four analysis models along with a final integrative report which combines the four analysis elements and is the content basis for the final exam presentation. Interpretation of the evidence is accomplished by application of rubrics at formative and summative stages designed for each of the feasibility components. The final report (and final report presentation) is also evaluated by external judges.

Figure 5: Assessment Triangle for Feasibility Analysis of a New Venture
Assessment Worksheet for Feasibility Analysis of a New Venture

The assessment worksheet in Table 9 discusses how to evaluate the new venture opportunity skill. The summative evidence is the final exam report and grading is facilitated by the judge's evaluation of the final presentation's content. Formative evidence is provided during the term and in-class discussions of their work. The interpretation of this evidence is done using the final report content rubric as indicated in the grading criteria. Pedagogical changes are made based upon the interim reports provided for each component and feedback from the students about difficulties with the four component reports.

The grading criteria and rubrics are shown in Table 8 below and are specific to each category of feasibility analysis. The analysis quality expected of all non-business majors or freshmen in business is that of a novice in business concepts but sufficient to evaluate a new venture opportunity. Text and class lectures demonstrate how to acquire the data, frame the analysis and give direction to the learning of how to assess new venture opportunities.

Table 8.1: Grading Rubrics for Learning of Opportunity Evaluation

<table>
<thead>
<tr>
<th>Grading Criteria</th>
<th>1= poorly done</th>
<th>3 = well done</th>
<th>5 = very well done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer /market- must identify who customer is and size of market, initial and potential market share and use market research course site.</td>
<td>No data collected, no evidence, did not think about customers or market</td>
<td>Framed answer/analysis based on some data and assumptions about market and customer penetration initially and longer term which are reasonable</td>
<td>Located or created market research that addressed important customer and market questions, realistic market share, used market research course site</td>
</tr>
<tr>
<td>Competition- must identify 3 competitors and 5 features of how they will compete, rating the competitors</td>
<td>Missed either or both competitors or features data in their analysis or data is not believable</td>
<td>Included both competitors and features in an analysis but did not assume or find reasonable data</td>
<td>Conducted research or located some competitive analysis that assisted the ranking and identification of 3 competitors and 5 features</td>
</tr>
</tbody>
</table>
Table 8.2: Grading Rubrics for Learning of Opportunity Evaluation

<table>
<thead>
<tr>
<th>Grading Criteria</th>
<th>1 = poorly done</th>
<th>3 = well done</th>
<th>5 = very well done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/process/team- must identify the resources needed and how they will acquire and use these resources over time.</td>
<td>Did not cover 2 of three types of the resources needed</td>
<td>Discussed all the types of resources needed and have realistic assumptions about what can be accomplished in near term</td>
<td>Have a plan that appears feasible and well thought out in terms of all resources needed and how to integrate and implement them</td>
</tr>
<tr>
<td>Financial Scenarios- must do three income statements, worst and best case and go-to-hell case when nothing goes right, how will they survive?</td>
<td>Do not have one complete financial statement</td>
<td>Did the three required scenarios using realistic data</td>
<td>Have used data from other parts of feasibility analysis to create the three financial scenarios and a financial plan that appears realistic</td>
</tr>
</tbody>
</table>

Table 9.1: Assessment Work Sheet: Evaluate New Venture Opportunities

<table>
<thead>
<tr>
<th>Learning Goals</th>
<th>Assessment</th>
<th>Instructor Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students will be able to construct and integrate customer/market, competitor, organization/product and financial analysis</td>
<td><strong>General:</strong> 1. Class quizzes on text content 2. Interim reports submitted on each of four components 3. Written evidence in interim and final reports 4. Verbal evidence in final presentation</td>
<td>1. Provide samples of previous feasibility analysis reports.</td>
</tr>
<tr>
<td>Customer/market- must identify who customer is and size of market, and use market research course site.</td>
<td><strong>Claim:</strong> 1. Students select an idea for a new product or service that they use for feasibility analysis 2. Students take quizzes on text chapters models, definitions and processes 3. Students prepare and discuss in class interim reports for feedback from peers and instructor</td>
<td>2. Discuss instructions for accessing information sources and use of analysis models 3. Critique and give feedback on interim reports</td>
</tr>
</tbody>
</table>
### Table 9.2: Assessment Work Sheet: Evaluate New Venture Opportunities

| Competition: must identify 3 competitors and 5 features of how they will compete, rating the competitors | Task: 1. Read text and take quizzes 2. Research their ideas to provide data the required four component analysis 3. Use information sources and analysis matrices for component analysis 4. Discuss interim reports in class sessions 5. Deliver a presentation on feasibility analysis | 4. Adjust final 2 weeks of classes based on student feedback to address their weak points in feasibility analysis process  
**Formative data**  
Quizzes, class discussion and interim reports |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/process/team: must identify the resources needed and how they will acquire</td>
<td>Evidence: 1. Text quiz results 2. Drafts of report sections as formative data 3. Class discussions on individual report sections, 4. Final written report and/or presentation slides and final presentation.</td>
<td></td>
</tr>
</tbody>
</table>
**Summative data**  
Final report and final presentation  
**Passing Grade**  
All 4 component analysis parts completed with level 3 average required content. |
| Financial Scenarios: must do three income statements, worst case, best case and go-to-hell case-when nothing goes right how will they survive? using excel |  
Design of course activities: the pedagogy of the new Principles course.  
Perkins' first design principle is to have students 'Play the whole game' to "understand the larger context of what they are learning." Principles has two project experiences that help the students play a junior version of the whole game. The first junior experience is playing a computer simulation game for one week called Johnny Money or a similar substitute since Johnny money is no longer available from NFIB. This business game involved starting a business and making the types of initial marketing, sales, competition, product, people, and financial decisions that any new business has to make. It was also a competitive game which synchs with the leisure activities of many college students. In Johnny Money you scored points against the game but can compare your score nationally to other players and locally to everyone in your class. These types of learning games have proven effective in supporting learning in |
many venues. You can play the game more than once and I had one student play it over 20 times \( (1/2 \text{ hour each time}) \) until he got the high score in his class. Johnny Money is described in Appendix 4: Johnny Money Business Game.

A second junior game experience is the $5.00 student team game. This game requires each student to invest $5.00 and figure out a way, by creating a small business and delivering a product or service, to create revenue equal to 10 times their investment in 3 weeks. There are simple rules for the $5.00 game, like not just writing a check or not doing anything unethical or illegal, and these game rules are described in Appendix 5: $5.00 Game. Students experience many of the innovation, communication, coordination and financial problems of a real businesses involving multiple people. Most teams succeed in reaching their goals and usually target the stakeholders they know best—students on their campus. Student reports provided include financial, marketing, peer reviews and reflections. The $5.00 game emulates entrepreneurial startups, can be considered a junior experiential project and is popular in similar forms in many entrepreneurship programs.

In addition, students have their own version of 'Shark Tank' in the Idea Pitch competition and final exam feasibility analysis presentation in front of external judges. Students are also asked to judge the entrepreneurial competencies of successful entrepreneurs who most often talk about both their successes and failures, thereby casting judgment on 'The Whole Game' of the guest speakers.

Perkins' second design principle is 'to make the game worth playing' by including practices that help the students experiment without fear of failure and connect what they are
learning to their lives in a way that helps generate deeper learning. Perkins calls this latter point generative learning.  

Generative learning is included by first having the students select the ideas for their 2 minute idea pitches from bug lists or idea generation lists that they create. Their ideas are fun, personal and talking about them passionately in an idea pitch helps deepen the memory of the presentation techniques that they learn along with 'talking about something that bugs them'  

Second in their big multi-part feasibility analysis project they select the case topic, the strategies they believe worth pursuing, and shape the feasibility analysis to their interests and capabilities. This process builds student confidence and gives the student more control of their learning. Every student pitches their own idea and selects and builds their own case, an inherently motivating step.  

Finally, in terms of the types of students in these classes and the level of their cognitive development (Perry 2-4) the instructor must provide structure and guidance suitable to their cognitive levels. Rubrics are provided for each of the major learning goals and the course map (as shown in Figure 5 below) and Principles’ learning goals are shared with students. Feedback from peers and the instructor also occurs many times throughout the course and weekly from peers, the instructor or the game software.  

Perkins' third design principle is to work on the hard parts. Breaking down hard parts into component pieces and having students reconstruct the whole is the primary strategy for dealing with hard parts. Breaking a cognitive skill into component pieces is done by identifying possible entrepreneurial competencies to identify and providing detail steps for preparing good presentations. For the feasibility analysis the Barringer text provides analysis models and
techniques for each required analysis and is supplemented by instructions and examples for access to data sources provided by the instructor (e.g., US Census data).

The second strategy for working on the hard parts is to give students timely feedback through in-class peer and instructor feedback on each assignment based on the rubric shared with them. This feedback, however, needs to come with some training for peers so it has the desired positive effect and therefore the instructor must train the class peers to give "clarification, appreciation and suggestive feedback". The opposite side of this coin, however, is to ask the students periodically to identify the hard parts for them and to shift class activities to specifically address their difficulties.

Perkins' fourth design principle is to 'play out of town' which relates to transferring knowledge from what they are sensing, have sensed, to a new situation. Perkins describes two situations of transfer, surface transfer and deep transfer. In the new Principles there are multiple opportunities for surface transfer: 1. listening to the entrepreneur guest speakers provides a chance to use their strategies in your idea pitch or feasibility analysis; 2. every student in the class has a different new venture idea in their idea pitch or feasibility analysis idea so the students are constantly confronted with transferring their entrepreneurial thinking knowledge to a different topic, and 3. cases and examples in every chapter in the Barringer text are also based on different facts and assumptions which students must transfer to their own work. In terms of deeper knowledge transfer there are two key opportunities designed into Principles: 1. Reflecting on your own entrepreneurial competencies provides a chance to appraise your own skills and knowledge compared to that of the guest speakers and reflect on all that you learned about entrepreneurial competencies during the term leading to deeper retention of knowledge and 2. integrating the 4 types of feasibility analysis tools into one final report requires a level of
mastery of those skills that may lead to longer retention of these models and analysis heuristics

Perkins' fifth design principle is 'to uncover the hidden game'\textsuperscript{17}. There are three junior games in Principles, Johnny Money, The $5.00 game, and student's idea for their feasibility analysis to give students junior experiences in playing the real game. Students are also using four actual case stories about the hidden game in entrepreneurship in the form of four entrepreneurial speakers who talk about how they play their game (see one example of a guest speaker in Appendix 2). Finally sharing with the students the entrepreneurial myths raised by Kuratko\textsuperscript{25}, the false presentation assumptions identified by Brody\textsuperscript{24} and encouraging the students to recognize and assess the diverse combinations of skills possessed by entrepreneurs\textsuperscript{18} uncovers the hidden game. In the student's final report a key section of their conclusion is whether they would chose to play the game they have analyzed. The purpose of asking them to address this question and do their final personal reflection on their own entrepreneurial competencies is asking them whether they have seen inside the hidden game of entrepreneurship.

Perkins' sixth design principle is 'to learn from the team'\textsuperscript{17}. Principles has two significant team learning experiences built into the curriculum strategy. First there is time devoted to think/pair/share exercises in several activities of the course; entrepreneurial competency investigation, presentation skill development and learning of feasibility analysis techniques. Second the $5.00 game is a team adventure where the student team finds an opportunity, creates their product or service, performs the work, earns the money, reports on their results and reflects on and evaluates their performance. Grading for the $5.00 game is not based on the financial results but on the playing of the game and each team in the class has a different business idea and
most likely business model so that students learn about the game not only just from their own team experience but from observing the experiences of other teams in the class. 

Perkins' final design principle is 'to put the students in the driver's seat'. In Principles students start in the driver's seat in the 2nd class coming up with things that bug them which lead them to thinking about possible innovations in their life (I can't stand my roommate's loud radio says one student-another student says: "so buy head phones"). Dani Raviv at Florida Atlantic uses creativity exercises about things on campus that bug people-like speed bumps-and finds that students can quickly come up with scores of ideas to address common problems. Students select their idea pitch topic, their feasibility analysis topic and do their own case research, analysis, writing and presenting-all driver seat positions.

Helping students become proactive learners in the game of entrepreneurship and motivating them to make that decision is at the heart of putting the student in the entrepreneurship driver's seat, a goal that many educators in the field of entrepreneurship have as their goal.

Table 10.1: Summary of Perkins 'Learning by Wholes' Curriculum Strategy for Principles

<table>
<thead>
<tr>
<th>Perkins 7 Principles of learning by wholes</th>
<th>Learning Objective</th>
<th>Learning Objective</th>
<th>Learning Objective</th>
<th>Learning Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess Entrepreneurial Competencies</td>
<td>Exhibit Presentation Skills</td>
<td>Evaluate the feasibility of new ventures</td>
<td>Evaluate the feasibility of new ventures</td>
<td></td>
</tr>
<tr>
<td>1. Play the whole game</td>
<td>1. Reflect on 4 entrepreneur guest speakers</td>
<td>2. Reflect on their own entrepreneurial competencies</td>
<td>1. Compete in Idea Pitch competition</td>
<td>2. Present to external judges the new venture feasibility analysis as the final exam</td>
</tr>
<tr>
<td></td>
<td>1. Play the Johnny Money game</td>
<td>2. Play the $5.00 game</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning Objective</td>
<td>Learning Objective</td>
<td>Learning Objective</td>
<td>Learning Objective</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>2. Make the activity worth pursuing</td>
<td>1. recognizing their own entrepreneurial competencies is inherently satisfying</td>
<td>1. choosing the idea they pitch is motivating.</td>
<td>1. choose the case that they evaluate for the feasibility analysis is motivating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. practice and compete with peers, receive peer feedback, and share the success /failures</td>
<td>2. receive peer help and feedback in improving their analysis.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Work on the hard parts</td>
<td>1. we will read and discuss articles identifying the entrepreneurial competencies</td>
<td>1. preparing and delivering presentation broken down and reconstructed</td>
<td>1. feasibility analysis broken into smaller parts and reconstructed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. We will discuss each reflection in class in a think/pair/share mode</td>
<td>2. emphasis will be on learning through trial and error with 'trained' peer feedback</td>
<td>2. students will guide the class focus onto hard parts</td>
<td></td>
</tr>
<tr>
<td>4. Help students transfer their learning</td>
<td>1. understand entrepreneurial competencies in 4 different settings/ guest speakers</td>
<td>1. do a two minute persuasive talk and rate your peers</td>
<td>1. prepare their own new venture analysis based upon analysis models</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. reflect on whether they-the student-are or want to be more entrepreneurial</td>
<td>2. present an analysis of a new venture in ten minutes and rate your peers</td>
<td>2. critique their peer's analysis with the criteria to be applied to all new venture analysis</td>
<td></td>
</tr>
<tr>
<td>5. Uncover the hidden rules</td>
<td>1. uncover Kuratko's myths</td>
<td>1. reveal Brody's falsehoods</td>
<td>1. use Vesper's guidelines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. explain how to use personality and preferences data</td>
<td>2. rate your peers with rubrics and discuss with peers</td>
<td>2. use peer reviews based on rubrics</td>
<td></td>
</tr>
<tr>
<td>6. Help students learn from each other and the team</td>
<td>1. share speaker reflections with peers</td>
<td>1. design and practice idea pitch with peers</td>
<td>1. share each deliverable with peers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. use peer review feedback and reflection</td>
<td>2. fill out rubrics as peer feedback in class</td>
<td>2. use $5.00 game as jr game</td>
<td></td>
</tr>
<tr>
<td>7. Foster proactive self regulated learning in students</td>
<td>1. start with creativity exercises to build confidence in creativity skills</td>
<td>1. ask for self-assessed Idea Pitch based on rubrics</td>
<td>1. working on your own case idea is more fun and self-motivating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. ask students to assess themselves in entrepreneurial competency as a final exercise</td>
<td>2. the idea pitch competition is fun and motivating</td>
<td>2 reflecting on your case idea is asking for visionary thinking</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion and course overview

This course was redesigned to be an enhanced experiential learning and project-based learning course fashioned to improve understanding of entrepreneurial competencies, presentations skills and evaluation of new venture opportunities by a mixed group of undergraduate student majors. Kolb's learning cycle for experiential learning embodies the pedagogical strategies used to achieve each of the enduring understandings which are at the heart of the course, that is, the students conceptualize, experiment, experience and reflect on each of the enduring understandings central to the learning experience. The project-based learning in Principles emphasizes applying and integrating knowledge and skills for each of the enduring understandings. The curriculum design of the course is also guided by the approach of Perkins' seven principles for the design of curriculum.

Figure 6 below shows how the experiential student learning tasks and individual and group projects in Principles are related and sequenced. Circles capture assessing entrepreneurial competencies, doing a feasibility analysis and the presentation skill training. The boxes represent the starting events and the programmed activities in Principles.
Figure 6: Overall Course Map for Principles
Summary and next steps

This redesigned Principles course is built around experiential learning and assessments that are aligned and pedagogies adjusted in a scaffolded manner according to the learning that students exhibit. Student learning is managed by using an apprentice learning model and recognizing and adjusting to the varying levels of cognitive ability and prior knowledge that the students possess. Students construct their cases, assess their skills, create and deliver their strategies and determine the pace of their learning process. Student's prior knowledge, cognitive development levels and learning styles are reflected in their interim and final assessments and the instructors adjustments to the pedagogy. Students will be motivated by the active learning processes, their degree of choice, and the individual and group competitions. The next step is to teach the new Principles course and evolve the new Principles design to reflect the reality of actual students engaging in these redesigned learning experiences.

References


Nathan, R. *My Freshman Year* * What a Professor Learned by Becoming a Student*. (Penguin Books Ltd., 2006).

Tan, S. S. & Ng, F. C. K. AN INNOVATIVE APPROACH TO ENTREPRENEURSHIP EDUCATION USING PROBLEM-BASED LEARNING. (Republic Polytechnic, 2004).


Vijayaraghavan, G. & Kaner, C. in *STAR EAST*.


Radenski, A. in *ITiCSE*. 21-25 (ACM).


Raviv, D., Morris, M. & Ginsberg, K. in *American Society for Engineering Education Annual Conference & Exposition*.


Appendices

Appendix 1: New Principles  Syllabus

**Instructor**

Professor:  
Class:  MTRF:1100-1150 xx 207  
MR:  3:00-5:00pm.xx 228  
Office:  
Office Hours:  MW 9-1030am, MW.  
Email:  
Cell Phone:  
Course Location:

**Course Objectives**

Entrepreneurship can occur anywhere and is not associated with any particular discipline (e.g. business, music, engineering, theater,). Entrepreneurship is really a way of thinking and acting, that is, being creative and innovative. It is a mindset.

**In this course you will learn how to** assess entrepreneurial competencies, do new venture opportunity recognition and evaluation and develop your persuasive presentation skills. When passion and process collide, the seemingly unconnected become connected.

In this course the students will

- Do idea pitches,
- Generate ideas for their own case analysis
- Evaluate a new venture idea of their choosing
- Play a computer game
- Work in a team on a new venture game
- Meet 4 real entrepreneurs and enjoy pizza while doing so
- Work with the instructor to manage the course

In this course the Instructor will

- Provide guest speakers
- Record and make available practice and competition video of presentations
- Provide timely feedback on all written or verbal assignments
- Be available for weekly consultations inside or outside of office hours
- Help you chose your case ideas and support your analysis processes
- Lead class discussions about text material
- Consult with students on the timing, focus and use of course or learning materials
Course Materials

Books (required)


Cases to be discussed are in the text or will be provided to you.


Course Grading

A detailed course grading matrix will be provided to you and updated as necessary throughout the quarter.

Grade Points are assigned as follows:

- **Barringer chapter tests** [3 tests] **open book, open grading** 300+bonus questions,
- **Individual feasibility analysis project** [8 parts totaling 400+ points] up to 425 pts
- **Idea Pitch Competition Results**, 1st round, final round, winner, reflection 100-150
- **Johnny Money Game**, [% of max score, or 100 if business value>= 100mm], reflection, up to 100 pts, winners bonus of 50 pts
- **$5.00 team project** [as % of $goal, team report, reflection, peer review], up to 200 pts, 50 bonus pts
- **Extra credit** for speaker reflections and other assignments to be determined up to 150 pts

Unexcused class absences will result in a deduction against total grade points amounting to up to 50 grade points per occurrence. A late email to the professor will not automatically be accepted as submitted on time. Unexcused late assignments are subject to a 20% reduction in grade points per day late.

Letter grade determination

- A 900-1050 points
- B 800-950 points
- C 700-800 points
- D 600-700 points
- F below 600 points
Announcing the 9th 2009/2010 Entrepreneurship Speaker

Fergus Gamble, President & CEO of Market Research, Toronto, Canada

Date: Time: 9:09pm. Pizza will be served! Location:

FERGUS GAMBLE


Particular among his strengths is providing a strategic perspective and insight for the development of his clients’ business. A second generation marketing researcher (his father was MR Manager at P&G), Fergus became fascinated by the business as a teenager, and determined to make it his career. It remains his professional passion. As if to drive home the point, he married another marketing researcher (eventually his business partner) over 35 years ago. He has never been disappointed by either decision!

Fergus sees his CEO title as meaning Chief Enabling Officer with the primary responsibility of supporting the amazing talents of the Radix team and matching them to the needs of our clients. Outside of his professional life Fergus has recently concluded 10 years service on the Board of Directors of the Toronto Philharmonia Orchestra to support his love of classical music and is a life-long cottager.
### Appendix 3: Idea Pitch Competition Presentation Rubrics

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
<th>1-Very poorly done</th>
<th>2-Poorly done</th>
<th>3-Solid performance</th>
<th>4-Well done</th>
<th>5-Very well done</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How well does the pitch articulate a specific problem or unmet need and identify the customer/potential customer?</td>
<td>Rating for question 1</td>
<td>1-Very poorly done</td>
<td>2-Poorly done</td>
<td>3-Solid performance</td>
<td>4-Well done</td>
<td>5-Very well done</td>
</tr>
<tr>
<td>No clear problem statement</td>
<td>No clear customer identification, Information confusing</td>
<td>Either the problem statement or the customer identification is well done. Effective in presenting problem and evidence supporting statements.</td>
<td>Both the problem statement and the target customer are very clearly identified and easy to understand.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. How unique and/or viable is the proposed solution in addressing the identified need? How well researched is the idea for the profit or non-profit business activity?</td>
<td>Rating for question 2</td>
<td>1-Very poorly done</td>
<td>2-Poorly done</td>
<td>3-Solid performance</td>
<td>4-Well done</td>
<td>5-Very well done</td>
</tr>
<tr>
<td>No uniqueness to the idea. Business idea does not appear viable as presented or does not address the need as presented.</td>
<td>Idea has some good features, and may be viable based on evidence still to be developed. Some research is presented which supports the idea or problem solution.</td>
<td>Unique idea and idea appears viable as a business, and addresses the identified problem/need. Logic or reasons given for idea/solution working are well documented and researched.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. How effectively and passionately does the presenter articulate the problem, solution and call to action?</td>
<td>Rating for question 3</td>
<td>1-Very poorly done</td>
<td>2-Poorly done</td>
<td>3-Solid performance</td>
<td>4-Well done</td>
<td>5-Very well done</td>
</tr>
<tr>
<td>Stated case is disorganized and not persuasive, No passion, no obvious commitment</td>
<td>Some conviction, good evidence included, presentation has interesting if not convincing content</td>
<td>Clearly passionate about opportunity, excited and committed to solution/idea. Convincing case and call to action.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. How effective or accomplished are the speaker’s skills? Did the presenter use movement, props, gestures or staging/dress to communicate their message?</td>
<td>Rating for question 4</td>
<td>1-Very poorly done</td>
<td>2-Poorly done</td>
<td>3-Solid performance</td>
<td>4-Well done</td>
<td>5-Very well done</td>
</tr>
<tr>
<td>No time control, No eye contact, poor articulation, no vocal emphasis, No enhancement of delivery through props, dress or creative delivery techniques.</td>
<td>Acceptable pitch and delivery, obviously practiced timing. Professionally presented. Helped the audience understand problem or solution with creative delivery or speaking techniques.</td>
<td>Solid eye contact, very persuasive, proper tone proper dress and facial expressions, timing great. Used creative speaking or message delivery techniques to significantly enhance presentation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. How well did the speaker answer the questions from the judges? Did the Q/A period strengthen the case for the idea?</td>
<td>Rating for question 5</td>
<td>1-Very poorly done</td>
<td>2-Poorly done</td>
<td>3-Solid performance</td>
<td>4-Well done</td>
<td>5-Very well done</td>
</tr>
<tr>
<td>Speaker did not answer questions or provided answers which were not relevant to the judges questions or defensive.</td>
<td>Speaker understood the questions and helped clarify points in the presentation to which the judge referred. Speaker repeated the question and made sure the question was answered</td>
<td>Speaker’s answers to judges questions strengthened the case for the idea and speaker repeated the question. Speaker clarified the questions points effectively and added evidence to an already well stated case.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4: Johnny Money Business Game

Johnny Money Online Game
Student Worksheet
Student Name ___________________________________________________
Class Period ___________________________________________________
Class Code ___________________________________________________

Johnny Money Online Game is a virtual entrepreneurship simulation game where you will set up and run a business for 24 months. You will have the opportunity to make decisions regarding what kind of store to run, what to sell in your store, how to price inventory, manage employees, and more. The purpose of this exercise is to give you experience running a small business in a virtual environment and for you to face decisions entrepreneurs encounter on a daily basis. As a class, you all will be able to see how your peers’ businesses are faring by comparing Business Values through the Scores function at the top of the screen.

Ready to Play?
1. Visit www.johnnymoney.com and click the “Play Now” button.
2. At the next screen select “New User.” Create your user name, password and then write them below.
   3. User name: ____________________________________________
      Password: _____________________________________________
4. Play as a student and enter the Class Code from above.
5. Read and follow the directions to begin the simulation.

Things to Keep in Mind While You Play
1. You will begin with $50,000 to start your business. If you feel you need more to get your business started, you may take a loan out from the bank.
2. At the end of every month, you will see a Monthly Report of your activities. Be sure to pay attention to the information presented as it will help you make better decisions about the future of your business. Monthly Reports are stored in your filing cabinet, which you may access from your store (see the sample screen shot below).
3. After you see your Monthly Report, you’ll enter a Management Phase that lets you order more product, change your prices, pay your bills, etc. Be thoughtful in your decisions as you only get to make changes once per month.
4. At least two times during the game you will have the opportunity to play a mini-game called Winventory. Depending on how well you score, you could receive free inventory for your store and help increase your sales.
5. If we run out of class time or you are not able to finish, click the red Exit Game button at the top of your store’s screen (see the sample screen shot below). This will save your progress and allow you to come back and begin where you left off.
Activity 4: Reflections Guidelines for Entrepreneur Speakers

The purpose of writing a reflection is to help you integrate your observations and experiences from a specific event or experience and retain that learning over time.

**DUE DATE:** Up to three days or the next class after the event date whichever is sooner, not counting term breaks. Later unexcused submissions are subject to a 20% deduction per day late.

**Reflection Grading:**
- **Attending and participating in the event, if speaker:** 10 points
- **Personal reflection, (can be done from video), if speaker:** Up to 10 points

**Total:** Up to 20 points

**Length:** maximum one page single spaced
- **Reflection one:** identify the speaker’s entrepreneurial competencies
- **Reflection two:** rate the strengths and weaknesses of their entrepreneurial competencies
- **Reflection three:** compare strengths and weaknesses of any two guest entrepreneur speakers
- **Reflection four:** identify the guest speaker strongest on any of five different entrepreneurial competencies
- **Final Self-reflection:** identify your own strengths and weaknesses in entrepreneurial competencies

**Submitting the reflection**

Reflections must be submitted up to 3 days after the event and in paper.
“THE FIVE-DOLLAR PROJECT”

Each person on your team brings $5 and puts it into a team pot. This pot will amount to either $15 to $25 dollars, depending on your team's size. Your assignment is for your team to earn 10 times this amount [money in the pot after all bills are paid] in a short time by running a temporary (although it could become longer term) business in which you sell a product or service.

DUE DATE: Three weeks from start date.

The Rules:
- No gambling or gaming (or anything that even smells like it), no raffles, no collections of cash, no short term money schemes, nothing involving alcoholic beverages, tobacco, nothing related in any way to illegal substances or activities, absolutely nothing illegal or you fail the assignment.
- You cannot write personal checks or pull cash out of your own funds.
- You must provide proof at the end of the assignment period that you actually earned the money honestly by selling a product or service.
- The assignment is to be done as a team. Everyone on the team must be selling the same basic product or service; you cannot each go out and do your own thing independently of one another, you must coordinate your efforts.

More Guidelines:
- Write up a report (due 3 weeks from the start date) of how you arrived at your decision of what to sell, how and when you used creative thinking, and your observations about integration of various business tasks in the process.
- Provide the class with a brief presentation about your project.
- Critically reflect about the assignment in order to identify what you did well, and what could be improved to generate long term success of your ideas. The reflection questions are at the end of this document.

ANY MONEY [NET PROCEEDS] DISTRIBUTION IS DETERMINED BY THE PROFESSOR AT THE END OF THE TERM IN CONSULTATION WITH THE TEAMS. ALL NET PROCEEDS ARE TURNED OVER TO THE PROFESSOR AT THE CONCLUSION OF THE GAME.

BEFORE the project starts: Plan and organize!
1. **Set your group expectations** by establishing a balance of responsibility, rewards and punishments through completing the psychological contract (due xxxxxx in class).

2. **Plan for Record Keeping**: keep detailed records of all cash transactions, costs, and revenues. It is up to you to design a way to do this. Keep in mind that records will help you demonstrate that you actually raised the amount of money that you will present.

3. You will need to apply what you have learned to date in the course to make sure you have an idea with success potential.

---

**DURING: Lead and control the project!**

1. Hold regular meetings and take minutes.
2. **Keep detailed records of Cash flows and all transactions**
3. Record observations about **customer behavior** or the selling process that might help you analyze your results.
4. Write down observations about the motivation and time group members devote to the project.

---

**AFTER: Prepare your written report, as a team. The written report asks you to describe what you did.**

The written report should include the following information:

1. Thoroughly describe your product or service **value offering**, including:
   a. **Product or service**: thoroughly explain the product or service and its rationale, highlighting the key benefit(s) it provides to buyers. Why do you think people purchased your product or service?
   b. **Price**: identify how you priced the product or service; explain your reasoning for the price, and identify (with numbers) the **margin** you generated with the sale of each unit.
   c. **Place**: explain how you distributed (includes delivery) your product or service. Explain your reasoning for doing it this way.
   d. **Promotion**: identify and explain all the ways you communicated persuasively with your **target market** that your value offering was there for them to buy. List any expenses involved with this task.
   e. **Target Market**: these are your buyers. Describe who they are in as much detail as possible. Provide evidence from your record keeping as to who they are. Were your actual buyers the same as your intended buyers? Explain

2. **Production**: explain how you made the product or created and delivered the service, including the costs you incurred in obtaining the **raw materials** and in the **transformation process**
3. **Demand and Market Forces:**
   a. What level of **demand** did you forecast and why? Provide evidence to support your forecast, and show whether the actual demand met the forecasted level.
   b. Identify any competitive forces in your market. In what type of **market structure** is this product or service competing? Are there many sellers? Homogeneous product? How easy is it to enter/exit the market? What does this tell you about the type of business tactics you can use?

4. **Success?** Finally, explain whether you were successful in the project, and how you know. Show (in numbers) whether and how you met **revenue** and **profit** goals (profit equals revenue minus expenses). Any other basis for success?

5. **Appendix:** should contain your records of cash flows and transactions

---

**PROJECT GRADING THIS SEMESTER:**

- **Goal Attainment (10 times initial pot of money)**: 150 points
- **Written Report and individual reflection, each 50 points**: 100 points
- **Peer Evaluation, up to 75 points each based upon actual scores**: 75 points

**Total**: 325 points

**Personal Critical reflection** involves discussing the following 10 statements or questions:

- 1. Your analysis of why you did or did not achieve your financial goals.
- 2. Your analysis of your team set up and whether it was effective or not.
- 4. Your analysis of the sustainability of your product/service idea and its future.
- 5. Your use of planning and management processes.
- 6. Your analysis of any ethical issues that may have arisen in the process of developing and selling your product.
- 7. Your **creativity** as a team.
- 8. Your use of Barringer or Abrams concepts.
- 9. Your **decision making and problem solving processes**.
- 10. What lessons about business did you learn during the **$5.00 game**.