



## **Analyzing the Expected Learning Outcomes of Entrepreneurship Business Plan Development Activities Using Bloom's Taxonomy**

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## **Abstract**

Entrepreneurship education is increasingly being offered to engineering students as a way to broaden their skills and differentiate themselves in the job market. Entrepreneurship courses and programs typically include experiential learning activities to help students gain skills and confidence in a number of areas. There is limited literature related to the specific content these experiential learning activities encompass and the manner in which they are assessed. The purpose of this study is to explore and analyze business plan development, which is among the most commonly used experiential learning activities. Business plan development content areas were identified and categorized, and expected learning outcomes were created, using Bloom's revised taxonomy. The intent of the research is to: 1) begin to build consensus around some of the key elements of entrepreneurship education through the analysis of the skills and knowledge required to develop a business plan for a new venture, and 2) provide a foundation for better understanding the value and relevance of entrepreneurial knowledge and skills increasingly being delivered to engineering students.

## **Introduction**

In order to equip engineering students with the skills they need to succeed in today's turbulent economy, engineering programs are increasingly offering some form of entrepreneurship training to their students (Shartrand, Weilerstein, Besterfield-Sacre, & Golding, 2010). One characteristic of entrepreneurship education is that it often comprises experiential learning activities which are designed to increase students' proficiency in entrepreneurship (Solomon, Duffy, & Tarabishy, 2002). In some cases, these activities have been described as being as or more effective and valuable than traditional classroom learning, however, the extent to which this is the case has not been explored or measured to any great extent in the literature. The outcomes of experiential activities in entrepreneurship education can be difficult to measure because they cover a wide range of topics and skills, at various levels of depth, ranging from product innovation to business development (Duval-Couetil & Dyrenfurth, 2012). An essential first step in measuring the effectiveness of experiential learning activities is to analyze, organize, and classify the breadth of their expected learning outcomes.

Over the past several decades, one of the most common experiential learning activities found in entrepreneurship education is the development of business plans (Gartner & Vesper, 1994; Gorman, Hanlon, & King, 1997; Hills, 1988; Kuratko, 2005). This activity has been used widely because it draws on a wide range of skills that students need to become effective entrepreneurs and because it is representative of the due diligence that has been required historically for those seeking capital from banks, venture capitalists, or angel investors. While there has been a strong movement, very recently, away from writing a business plan to a focus on the development of viable business models and feasibility analysis, the business plan can be useful as an underpinning of the range of topics relevant to entrepreneurship education.

In general, research related to entrepreneurship pedagogy is fairly limited and the many content areas, procedures, cognitive processes and learning outcomes students are expected to achieve through courses and experiential learning are not always clearly articulated (Duval-Couetil, (*in press*)). Business plan creation suffers from the same lack of clear articulation due to the many content areas it comprises. This leads to interesting research questions, such as: What specific knowledge and skills do students gain as they create business plans? What is the extent and type of prior knowledge that students need to develop an effective business plan? To what degree should engineering students be competent in each of the content areas of business planning? What is the value of doing business plans over other experiential activities? And, how might this differ for students in non-business disciplines such as engineering?

This paper contributes to answering these questions, at a very basic level, by breaking down the experience of creating a business plan using Bloom's revised taxonomy, which has been used by scholars as framework to classify activities and outcomes into different knowledge and cognitive process dimensions. The intent is to allow educators to see, on a more specific level, the wide range of skills, knowledge, and literacy that is required to operate as an entrepreneur and what students should be able to do as a result of developing a business plan. The analysis will serve as a foundation for future research related to developing curriculum for and assessing entrepreneurship education. It will also be of benefit to engineering educators who are interested in understanding the degree to which entrepreneurship education supports the goals of engineering education.

### *The Rise of Entrepreneurship Education*

In recent decades, entrepreneurship has been increasingly emphasized as an engine for economic growth in developed and developing countries. Many key measures of economic growth have been stronger in small startups than in large established firms (Acs & Audretsch, 1987; Audretsch, 2002). The need for innovation and entrepreneurship has become more apparent as they have been tied to job creation (Drucker, 1985).

Embedded in these trends is a belief by some that contemporary college graduates will be increasingly unable to rely on large institutions for long-term employment that will provide them with the necessities of life (Kirby, 2004). Kirby describes how globalization has increased interdependency between individuals across the world, but that, paradoxically, individuals are also less able to rely on the institutions of business or the government to provide them with adequate salaries and employee benefits such as healthcare. He also argues that many of the skills and attitudes required to be competitive in today's economy such as creativity, risk-taking, effecting change, persuasion, negotiation, and critical thinking are not adequately taught in schools, which creates the need for new programs. This view has been echoed by a number of other researchers who propose that economic conditions require students to have a broad range of skills that include the ability to recognize and capitalize on new opportunities, understand consumer needs, create business models, and conduct market research (Minniti, Bygrave, & Autio, 2006; Osorio, 2011).

Increased attention pointed toward entrepreneurship as an economic necessity and a potential source of jobs for college graduates has led to a dramatic increase in the number of

entrepreneurship education programs over the past few decades. The number of entrepreneurship courses and programs offered in U.S. universities has increased from only a handful in the 1970s to over 1,600 in 2005 (Kuratko, 2005). Historically, entrepreneurship education was only offered to business students, but in recent years, it has been offered to students in a broader range of academic disciplines (Streeter & Jaquette, 2004). In more recent years, attendance at entrepreneurship education conferences leads one to believe that the growth and breadth of curricular and non-curricular offerings continue to proliferate across academic disciplines.

### *Entrepreneurship in Engineering Education*

Although engineering graduates are considered to be in great demand relative to students in other fields, they are not immune to the pressures being caused by a struggling and constantly shifting economy and they find that they need additional skills that were not part of their academic programs (Wei, 2005). In a review of David Bodde's *The Intentional Entrepreneur: Bringing Technology and Engineering Into the Real New Economy*, the author Rover (2005) described some changes taking place in many engineering programs that are designed to address these issues. She cites the rise in entrepreneurship and innovation programs and courses within engineering programs as evidence of the change. She also says that engineers who stay in more traditional engineering industries still find their roles expanding within the organizations that employ them.

There is growing evidence of the spread of entrepreneurship education to undergraduate engineering students. One study showed that over half of the ASEE registered universities offered some sort of entrepreneurship content to engineers, with over 25% reporting more structured offerings like minors, certificates or entrepreneurship centers (Shartrand et al., 2010). There are even some engineering schools, like Olin College, that attempt to incorporate entrepreneurship in all parts of the engineering curriculum (Fredholm et al., 2002). Further evidence of movement toward equipping engineering students with entrepreneurial competencies is the National Science Foundation's \$10 million award in 2011 to launch a national STEP center focused on what is described as a critical need for entrepreneurial engineers across the United States. The center based at Stanford University is intended to "catalyze major changes in undergraduate engineering programs by developing an education, research and outreach hub for the creation, collection and sharing of innovation and entrepreneurship resources among the almost 350 engineering schools in the U.S." (NSF, 2012).

Aligned with this are recent change in ABET accreditation standards, in particular, the new "professional skills" competencies (Shuman, Besterfield-Sacre, & McGourty, 2005). Many of the major themes in entrepreneurship education (Kuratko, 2005) appear to align well with those addressed in recent ABET standards. Several researchers have explored the intersection of ABET with entrepreneurship, in engineering design courses (Ochs et al., 2006) and in efforts to develop an entrepreneurial mindset among engineering students (Petersen, Jordan, & Radharamanan, 2012). Better communication of the manner in which entrepreneurship education objectives meet ABET criteria could be a catalyst for programs to adopt more entrepreneurship-related objectives and for faculty to embed more entrepreneurship-related curriculum and

activities into foundational or required courses (Duval-Couetil, Kisenwether, Tranquilo, & Wheadon, 2013).

The foregoing developments in entrepreneurship and engineering education demonstrate the increasing need for engineers to receive some type of entrepreneurial training. It also demonstrates how entrepreneurship can be an important topic in engineering education either through coursework or extracurricular activities. However, the delivery of entrepreneurship education to engineering students poses a number of challenges. Among these are: 1) how to deliver additional education to engineering students given relatively rigid academic programs and limited room given credit hour and accreditation constraints, and 2) curricular models that are most effective for engineers (Duval-Couetil, Shartrand, & Reed-Rhoads, *in review*); Standish-Kuon & Rice, 2002).

### *Challenges in Entrepreneurship Curriculum Development and Assessment*

Although universities have responded to economic and societal changes by developing entrepreneurship programs and courses, there is significant variation in definitions of entrepreneurship education and associated outcomes (Duval-Couetil, *in press*). Scholars have blamed the lack of clarity in entrepreneurship education on the relative newness of the field (Brazeal & Herbert, 1999). Others emphasize the lack of theoretical rigor in the field of entrepreneurship in general (Fiet, 2000). Part of the difficulty likely arises from the broad array of content matter that can inform the creation of new enterprises and the differing needs of students based on their past entrepreneurial experience. In a survey of entrepreneurship education literature, Gorman et al. (1997) described the extremely broad diversity of teaching strategies and curriculum designs. Other challenges include the multidisciplinary nature of the field of entrepreneurship, the various program models that exist, and the differing academic and professional backgrounds of those involved in teaching it (Duval-Couetil, *in press*); Zappe, Hochstedt, Kisenwether, & Shartrand, 2013).

Although entrepreneurship courses, and the scholars who develop them, lack consensus around the specific purposes and content of entrepreneurship education, most agree that students should be provided with experiences and opportunities to act entrepreneurially. Over the years, many scholars have suggested using experiential activities because they see a limit on what can be learned in the classroom and suggest that students need to experience entrepreneurship rather than only learn about it (Timmons, Muzyka, Stevenson, & Bygrave, 1987). Solomon, Duffy, & Tarabishy (2002) reviewed the diversity of experiential learning activities mentioned in the entrepreneurship education literature. They noted the prevalence of the use of business plans (Gartner & Vesper, 1994; Gorman et al., 1997; Hills, 1988; Preshing, 1991; Vesper & McMullen, 1988), but also highlighted the use of other methods such as having the students form an actual startup (Hills, 1988; Truell, Webster, & Davidson, 1998), get advice and work with successful entrepreneurs (Klatt, 1988; Solomon, Weaver, & Fernald, 1994), use computer simulations (Brawer, 1997), participate in behavioral simulations (Stumpf, Dunbar, & Mullen, 1991), scan entrepreneurial environments (Solomon et al., 1994), participate in “live case” activities (Gartner & Vesper, 1994), and participate in field trips or watch videos of existing startups (Klatt, 1988).

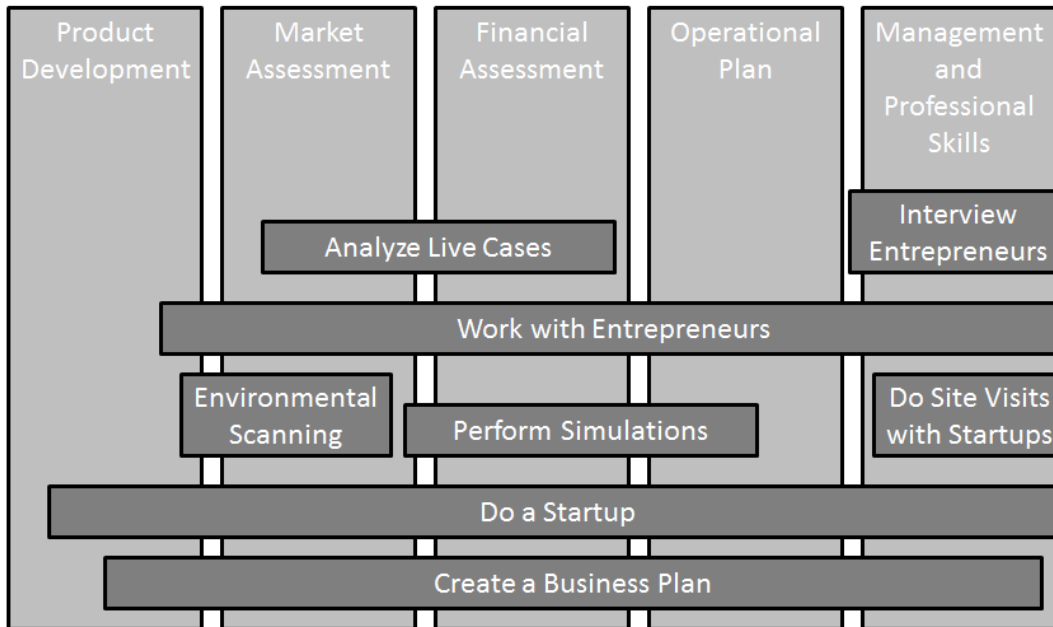


Figure 1. Examples of experiential learning activities in entrepreneurship education

Historically, business plan creation appears to be the most popular learning activity across entrepreneurship courses and programs (Henry, Hill, & Leitch, 2005). Over the years, researchers have questioned the emphasis on business plan creation because it does not comprise all the competencies that students need to be successful entrepreneurs (Wan, 1989). More recently, there has been a movement away developing business plans and a move towards focusing on developing viable business models which is described as the rationale of how an organization creates, delivers, and captures value (Osterwalder & Pigneur, 2010). This is based on the premise that prospective entrepreneurs should be focused not on developing a product they think will appeal to a given market, but instead should develop their product with active input from customers in order to meet their true needs and wants and to provide evidence of a revenue stream, which is essential for any viable business (Blank & Dorf, 2012).

It is clear that a business plan and the business planning process are only as good as the analyses and assumptions on which they are based. Nevertheless, creating the business plan can serve as the representation of the continuum of learning objectives related to entrepreneurship education as it involves development of a rationale for a given product a business, evidence of market, competitive position, financial potential, and the characteristics of team members who are suitable to execute it. Despite the extensive use of this experiential learning activity for decades, minimal research has addressed specific learning objectives and outcomes associated with preparing business plans for new ventures. Thus, little work has been done to rigorously identify the specific competencies that students gain by creating business plans, making it unclear what type of value to provide to students or information on how they should be assessed.

### Purpose and Research Questions

The purpose of this study is to explore business plan development as an experiential learning activity, in order to: 1) begin to build consensus around some of the key elements of entrepreneurship education through the analysis of the skills and knowledge required to develop a business plan for a new venture, and 2) provide a foundation for better understanding the value and relevance of entrepreneurial knowledge and skills increasingly being delivered to engineering students. Organizing and classifying common experiential activities in entrepreneurship courses is important because classification of content contributes to building knowledge about a young field or discipline (Bowker & Star, 1999). A discussion of the purposes of the commonly used activities using established educational theory and taxonomies can facilitate consensus around these issues for scholars of entrepreneurship education.

The research questions addressed are:

- What are the global instructional objectives and specific learning outcomes of business plan creation?
- What types of knowledge and cognitive processes are needed in developing each component of the business plan?

## **Methodology**

The business plan was selected as the foundation for this analysis because it is one of the most commonly used experiential learning activities in entrepreneurship education and because it represents the synthesis of a broad range of topics pertinent to the entrepreneurial process.

### *Defining Specific Learning Outcomes in Business Plan Development*

The first step in the analyses was to break down the business plan into content areas or categories, referred to as *Global Instructional Objectives* (GIOs) (Miller, Linn, & Gronlund, 2008). These content areas were identified using entrepreneurship textbooks that focus on business plan creation which were written by very established entrepreneurship educators (Barringer & Ireland, 2010; Barringer, 2009). After the GIOs were identified, they were broken down into more specific discrete activities called *Specific Learning Outcomes* (SLOs) (Miller et al., 2008). The instructional objectives and specific learning outcomes were refined by the researchers to represent language most commonly used by entrepreneurship educators and practitioners.

### *Using Bloom's Revised Taxonomy*

Once identified, each SLO was categorized using Bloom's revised taxonomy. Bloom's revised taxonomy is a framework for categorizing intended learning outcomes of an instructional activity (Krathwohl, 2002). It is a revision of Bloom's original taxonomy of learning objectives developed over a half century ago (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). Bloom's taxonomy has been used extensively over the last five decades to create a common language to classify learning objectives in education.

Bloom created six categories in which educators classify the learning outcomes of their instruction. The original categories were *knowledge, comprehension, application, analysis, synthesis, and evaluation*. In the relatively recent revision, Bloom’s students and other researchers changed the names of the categories of cognitive processes and added a new dimension to the taxonomy that included the types of knowledge (Krathwohl, 2002). The new taxonomy is displayed in a grid with the *cognitive process dimension* across the top and the *knowledge types* down one side (Table 1). With this taxonomy, educators determine what type of knowledge is expected to be gained and what students should be able to do with that type of knowledge for each learning activity.

Table 1: Bloom’s Revised Taxonomy Table

	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge						
Procedural Knowledge						
Metacognitive Knowledge						

The SLOs that were identified were coded and categorized into one of four knowledge types from Bloom’s revised taxonomy: *factual knowledge, conceptual knowledge, procedural knowledge, and metacognitive knowledge*. *Factual knowledge* consists of the basic facts that must be known to work within a domain. *Conceptual knowledge* provides connections between discrete facts and shows how they interrelate. *Procedural knowledge* describes how to carry out a task or set of tasks. *Metacognitive knowledge* concerns knowledge of cognition and awareness of one’s own knowledge and cognition (Krathwohl, 2002).

The SLOs were then assigned to one of the six categories in the *cognitive process dimension*. These six categories are *remember, understand, apply, analyze, evaluate, and create*. *Remember* describes the ability to recognize or recall relevant knowledge. *Understand* is the ability to interpret, classify, or compare information. *Apply* is the ability to execute or implement a procedure in the right situations. *Analyze* comprises differentiating or organizing information. *Evaluate* is about making judgments about given information. *Create* involves generating, planning, or producing new information.

It should be noted that in using the taxonomy, if an activity draws upon the higher cognitive processes, the lower processes are assumed to be included. This means that if, in business plan development, students are expected to *analyze* marketing trends, they should also be able to *remember, understand, and apply* information on the same topic.

## Results



Using Bloom’s revised taxonomy, the learning outcomes related to business plan development were placed in the matrix shown in Table 2. In the table, the first column lists the Global Instructional Objective (GIO) in the business plan creation activity. These larger content areas consist of *opportunity recognition, opportunity assessment, feasibility analysis, components of the written plan, industry analysis, market analysis, marketing plan, company structure, operations plan, financial plan, and effective presentation*. Within each of the GIOs there are a number of Specific Learning Outcomes (SLOs). These describe, in greater detail, the expected learning outcomes of the activities.

Table 2: Learning Outcomes in Business Plan Development

Global Instructional Objectives (GIOs)	Specific Learning Outcomes (SLOs)	Knowledge type	Remember	Understand	Apply	Analyze	Evaluate	Create
General								
	Components of the written plan	Factual	•					
Opportunity recognition								
	Common sources of new venture ideas	Conceptual		•				
	Environmental Trends	Conceptual				•		
	Unsolved Problems	Conceptual				•		
	Gaps in marketplace	Conceptual				•		
	Creativity methods	Procedural			•			
Opportunity assessment								
	Strength of idea	Conceptual					•	
	Industry, market, and customer factors	Conceptual				•		
	Founder factors	Conceptual				•		
	Financial factors	Conceptual				•		
Feasibility Analysis								
	Elements of a feasibility analysis	Factual	•					
	Product/service demand	Conceptual				•		
	Target market attractiveness	Conceptual				•		
	Industry attractiveness	Conceptual				•		
	Concept testing	Procedural			•			
	Consumer behavior/feedback	Procedural			•			
	Organizational feasibility	Conceptual				•		
	Financial feasibility	Conceptual				•		
Industry analysis								
	Industry definition	Conceptual		•				
	Industry structure	Conceptual				•		
	Industry size	Conceptual		•				
	Industry growth rate	Conceptual		•				
	Industry trends	Conceptual				•		
	Nature of participants	Conceptual				•		
	Industry success factors	Conceptual				•		
	Relevant performance metrics	Conceptual				•		
Market Analysis								
	Market	Conceptual				•		

Global Instructional Objectives (GIOs)	Specific Learning Outcomes (SLOs)	Knowledge type	Remember	Understand	Apply	Analyze	Evaluate	Create
	segmentation							
	Target market selection	Procedural			•			
	Target market size and trends	Conceptual				•		
	Buyer behavior	Conceptual				•		
	Identification of competitors	Conceptual				•		
	Competitive analysis grid	Procedural			•			
	Sales and profitability estimation	Procedural			•			
Marketing plan								
	Positioning	Conceptual				•		
	Product differentiation/ competitive advantage	Conceptual				•		
	Business model	Conceptual					•	
	Pricing	Procedural			•			
	Promotion	Conceptual		•				
	Distribution channels	Conceptual		•				
	Sales process	Procedural			•			
Company structure								
	Legal entity	Conceptual		•				
	Management team	Conceptual					•	
	Board of directors	Conceptual					•	
	Formal/informal advisors	Conceptual					•	
	Organizational charts	Conceptual		•				
Operations plan								
	Intellectual property	Conceptual		•				
	Prototyping	Procedural			•			
	Testing	Conceptual					•	
	Supply chain	Conceptual				•		
	Costs	Conceptual				•		
	Risks	Conceptual				•		
	Business location	Conceptual		•				
Financial plan								
	Sources of funding	Conceptual		•				
	Types and amounts of funding required	Conceptual				•		
	Income statements	Procedural			•			
	Balance sheet	Procedural			•			
	Cash flow	Procedural			•			
	Financial ratios	Conceptual				•		
	Assumptions	Metacognitive					•	
Effective presentations								
	Types of pitches/ presentations	Conceptual		•				
	Knowing the audience	Conceptual			•			
	Connecting with audience	Conceptual			•			
	Use of presentation software	Procedural			•			
	Time management	Conceptual		•				

This table shows the identified learning outcomes, their assigned knowledge type and cognitive process.

## *General*

The first learning outcome is that students should remember the components of the written business plan. It is listed on its own because it did not fit within any of the identified GIOs. This outcome was classified as remembering factual knowledge because students must be able to recall each of the components and are only required to be sure that their plan contains all of them. The remainder of this section will briefly discuss the classification of each learning outcome within its GIO grouping.

## *Opportunity Recognition*

The majority of the outcomes under opportunity recognition are classified as *analyze* level cognitive processes. These all have to do with students organizing and differentiating data on environmental trends, unsolved problems, and gaps in the marketplace. Students must also *understand* how these sources of new venture ideas are interrelated. In recognizing new opportunities, students must also generate new venture ideas, which is a *create* level cognitive process. In an undergraduate entrepreneurship course, however, it is difficult to train students to become proficient in generating new ideas. Instead, some entrepreneurship courses teach students to *apply* procedures that help them create new ideas, which consist of brainstorming activities, focus groups, research, or anthropological observations (Barringer & Ireland, 2010).

## *Opportunity Assessment*

When students have chosen a new venture idea, they need to perform a preliminary *evaluation* of its strength. This is done by *analyzing* industry, market, and customer factors and *analyzing* how the founders of the venture will impact its success. They must also perform a preliminary *analysis* of financial factors.

## *Feasibility Analysis*

In conducting a full feasibility analysis, students must be able to *remember* the elements of the feasibility analysis. These elements include being able to *analyze* many types of information. This information includes product/service demand, target market attractiveness, industry attractiveness, organizational feasibility, financial feasibility. Although these analyses are more extensive than those performed during the opportunity assessment, they draw upon the same cognitive processes.

In performing a feasibility analysis, students should also be able to *apply* procedural knowledge in order to perform concept testing and collect consumer behavior and feedback data. These activities are categorized in the apply level because there are procedural steps that students can follow to carry them out.

## *Industry Analysis*

Most of the activities that comprise the industry analysis are categorized as *analyze* level cognitive processes because they involve breaking down information and organizing it. These include industry structure, industry trends, nature of participants, industry success factors, and relevant performance metrics. The remaining activities in the industry analysis—industry definition, industry size, and industry growth rate—require only that students *understand* the concepts and their impacts on new ventures.

### *Market Analysis*

Like the previous analyses, the market analysis is mostly composed of *analysis* level cognitive processes. Students should be able to analyze market segmentation, size, and trends, buyer behavior, and competitors. Other elements of market analysis consist of the *application* of procedural knowledge. These elements are target market selection, using the competitive analysis grid, and estimation of sales and profitability.

### *Marketing Plan*

The marketing plan consists of activities that span much of the taxonomy. Students should be able to *analyze* information on the positioning their product within the market and its differentiation and competitive advantage with regards to other products in the market. Another major element of the marketing plan is *evaluation* of the business model. The business model is a major part of the business plan and it is important that students can check and critique it. As part of the marketing plan, students should also be able to *apply* pricing and sales procedures effectively. Finally, they must *understand* the product promotion and distribution channels that they should use in their new venture.

### *Company Structure*

As students plan their new venture, they need to *understand* the different types of legal entities that new ventures can be, and *understand* the use of organizational charts. Students should also be able to *evaluate* elements of the company structure. These include the management team, the board of directors, and any formal and informal advisors.

### *Operations Plan*

As part of the operations plan, students should be able to *understand* intellectual property and how it is protected. Students should be able to *apply* prototyping procedures and then *evaluate* their prototypes through testing. They must also be able to *analyze* information about supply chains, costs, and risks as part of the operations plan. As part of these analyses, students should also *understand* how the location of their business impacts its success.

### *Financial Plan*

The financial plan requires that students *understand* the different sources of funding and the benefits and drawbacks of each. This allows students to *analyze* the types and amounts of funding they will need. In financial planning, students also need to *apply* procedural knowledge

of financial planning tools such as income statements, balance sheets, and cash flow statements. After they have developed financial statements, they *analyze* relevant financial ratios. With the financial plan complete, students should be able to *evaluate* the assumptions they have made in developing it.

### *Effective Presentations*

Making effective presentations relies on the students' ability to *understand* the different types of presentations and pitches. They should be able *apply* information about knowing and connecting with their audience to their presentations. Students also need to *apply* knowledge of the use of presentation software and time management to make effective presentations.

### **Discussion**

Breaking down the experiential learning activity of developing a business plan for an entrepreneurial venture into more specific learning outcomes is helpful in identifying exactly what students should know and do as a result of participating in the activity. Analysis of this type has not been reported in the entrepreneurship education literature despite the widespread use of business plan development as a learning activity over the years. This type of study can be a foundational step in understanding the body of knowledge in an emerging or changing field, as demonstrated in the field of Civil Engineering (ASCE, 2008), as it facilitates understanding and consensus-building by specifically identifying what students gain from instructional activities using a common language.

This work also demonstrates the value of experiential learning in entrepreneurship education by highlighting that very little of business plan creation is concerned with having students remember factual knowledge. The analysis shows that developing business plans is primarily concerned with applying procedural knowledge and performing analysis of conceptual knowledge. These higher-order cognitive processes are better suited to experiences. Students learn to do these processes more easily when they practice them, rather than just learning facts about them.

This study is intended to be a foundation for conversations related to the value of business planning activities to engineers. Showing the spectrum of topics involved in the business planning process provides a mechanism to review the extent to which they can or should be integrated into educational programs directed at engineering students. The results can be useful to entrepreneurship educators in all fields to understand the specific tasks and learning outcomes involved in business plan development. The analysis can inform the manner in which various components of business plan development are taught and can help in the development of rubrics and assessments to measure performance.

Future research will determine if the findings of this study are consistent with the expectations of other experts. The next phase of this research will be to validate these categories and learning objectives by seeking the input of entrepreneurship educators, engineering educators, researchers and practitioners. In order to create curricula and assessments that can be used widely, it is necessary to determine to what degree the learning outcomes identified in this study are agreed

upon by those who use business plans in their instruction, those that are most pertinent to engineers, and how this varies across disciplines.

Clearly, the value of the business planning process and the deliverable of an actual business plan is dependent on the analyses and assumptions on which they are based. As Sahlman (1997) states in a classic article in the *Harvard Business Review*, too many business plans focus on optimistic predictions at the expense of too little to the information that really matters to intelligent investors such as the business model and key drivers of the prospective venture's success or failure. Thus, it is essential to conduct further research and analysis within and across Global Instructional Objectives to understand the relative importance of topics and how to measure quality. It is also important to study how this may vary across academic disciplines.

There are limitations to focusing on business plans as the basis for such analysis. First, is the extent to which a business plan is truly an experiential learning activity versus a traditional academic assignment. In the literature, experiential learning has a precise definition and its major characteristics have been well agreed upon (Kolb & Fry, 1975; Kolb, 1984). When done correctly, it consists of 4 phases: 1) providing an action for students to experience, 2) having students reflect on the action and experience, 3) guiding students to draw abstractions from the particular experiences, and 4) prompting students to apply the abstract knowledge to new experiences and contexts (Itin, 1999). It is not clear to what degree all of these elements are occurring in courses that are identified as using business plans as an experiential activity. It is clear, however, that in many entrepreneurship courses where business plans are required, some students are creating business plans for real ventures while others are developing them only to fulfill the requirements of the class, with no intention to launch a business. The degree to which this negatively affects the experience, and the degree to which this is the case, will vary significantly across institutions, programs, courses, instructors and even among groups within the same class. It is yet another dimension that must be addressed in future research.

In considering other types of experiential learning opportunities to analyze, it was evident that many activities were comprised of tasks that were included in business plans. Now that the specific outcomes of business plans have been mapped, future research can explore the extent to which the outcomes of other experiential learning activities overlap with these. This could be a benefit to faculty and/or administrators who are developing entrepreneurship programs, courses, and co-curricular activities or who are seeking ways to assess them.

Another limitation is that this paper considered the content of business plans written by management scholars and not from texts directed specifically to engineers. It is possible that what encompasses entrepreneurship for engineers might require a broader definition and outcomes. In engineering curriculum, entrepreneurship education often co-exists with innovation education. As such, it can be considered as part of an innovation continuum, which comprises creativity, product design and development, entrepreneurship/intrapreneurship, and management of the new technology or product (Duval-Couetil & Dyrenfurth, 2012).

The study also only considers cognitive elements of creating business plans. It does not consider affective outcomes of students' participation in the activity. Affective outcomes, such as self-efficacy, interest, motivation, and value are likely to play a role in the effectiveness of

entrepreneurship education. Although they are not a part of this study, including affective outcomes in the analysis of experiential learning activities in entrepreneurship education could be a strong contribution to understanding what students gain as a result of these activities.

## Conclusion

In entrepreneurship education, there is little consensus on the definition and content of entrepreneurship and how it should be taught. This study seeks to help in the formation of consensus by classifying and defining the elements of business plan creation, one of the most often used experiential learning activities. With the expected learning outcomes of business plan creation identified and classified, educators can better understand exactly what students gain by participating. This can be an important step in assessment and improvement of entrepreneurship education and in making recommendations about what elements of entrepreneurship are most important for engineering students.

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