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### **Instruction-Based Action Guidelines Based on Blooms Revised Framework: Setting Objectives for Entrepreneurship Teaching**

Bloom's revised framework is used to develop action guidelines for teaching, learning and assessing entrepreneurial skills. The guidelines distill a small number of key concepts, convert key concepts into word pictures, link process instructions to key concepts, and provide indicative rather than prescriptive application scenarios and is intended for publication in the third stream of entrepreneurship research identified by Hindle, Anderson and Gibson in the November 2004 issue of the *Journal for Small Business and Entrepreneurship*.

The author has been an active participant in the Management Education Division (MED) of the Administrative Sciences Association of Canada (ASAC) serving as academic reviewer and division chair. Each year roughly twenty papers are presented dealing with management education. Earnest attempts are made to reference the papers and presentations to the body of management knowledge and practice. Yet a paradox exists -even though the division contains the descriptor "education" there has been no substantive attempt made to reference the educational or instructional literature. It is the author's opinion that this presents an opportunity for entrepreneurship educators.

This article will meld these two streams of knowledge, education and entrepreneurship, by using Bloom's revised taxonomy to develop general principles for learning, teaching and assessing entrepreneurial skills. A tutorial for enhancing idea generation skills during the early stages of venture formation will be used as an exemplar. The intent will be to showcase techniques that transform inert knowledge into active knowledge and assist the learner in accomplishing their entrepreneurial objectives. The proposed action guidelines, as per the Hindle, Anderson and Gibson proposal: "distill a small number of key concepts, convert key concepts into word pictures, link process instructions to key concepts, provide indicative not prescriptive application scenarios and indicate broad possibilities not detailed consulting tools" (Hindle, Anderson, & Gibson, 2004). The reader is presented with the principles of instructional design/learning theory set in the context of the entrepreneurship dynamic. The assumption is that entrepreneurship curriculum will benefit from a framework that allows faculty to use appropriate educational objectives and organize them so that they are clearly understood and easy to implement.

The idea generation tutorial is a natural antecedent to the Shane and Venkataraman example used in the Journal of Small Business and Entrepreneurship (JSBE), *A practical strategy for discovering, evaluating, and exploiting entrepreneurial opportunities: Research-based action guidelines* (Hindle, 2004). In the fall of 2004 a third stream of publication was introduced in the *Journal for Small Business and Entrepreneurship* (JSBE) and *Small Enterprise Research* (SER) and five general principles for turning entrepreneurship research findings into practical action guidelines were presented (Hindle, 2004; Hindle, Anderson, & Gibson, 2004). This article is intended for publication within the third stream and flows naturally from the Shane and Venkataraman example used in the Journal of Small Business and Entrepreneurship (JSBE), *A practical strategy for discovering, evaluating, and exploiting entrepreneurial opportunities: Research-based action guidelines* (Hindle et al., 2004).

## **A Taxonomy for Learning Teaching and Assessing: Using a 4 by 6 Learning Matrix**

### **Bloom's Original Framework**

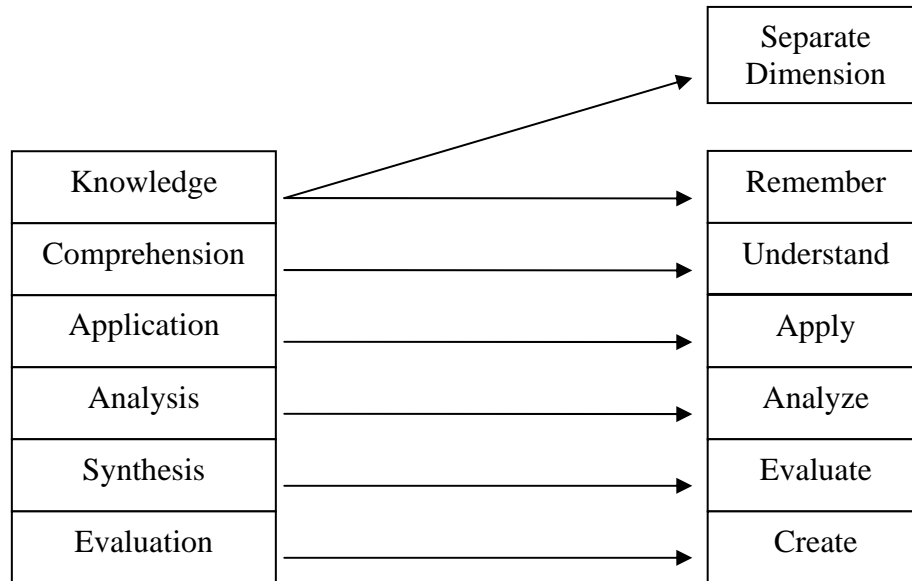
The publication of Bloom's original *Taxonomy of Educational Objectives* in 1956 presented a one dimensional and hierarchical explanation of how humans gained new knowledge. It proposed a progression of knowledge scaffolds that saw a learner move from lower levels to higher levels of learning – knowledge, comprehension, application, analysis, synthesis and evaluation (Bloom, 1956). The original authors of the handbook were largely university and college examiners who anticipated that the initial use would be to exchange test items among institutions.

The impact of the original *Handbook*, within the United States and internationally, was the subject of a National Society for the Study of Education yearbook (Anderson & Sosniak, 1994). Following the publication of the Anderson and Sosniak yearbook a planning meeting was held in Syracuse New York with subject matter experts in cognitive psychology, curriculum theorists and instructional researchers, and testing and assessment. The original framework (Appendix A) included six major categories and many subcategories (shown in brackets): knowledge (12), comprehension (3), application (0), analysis (3), synthesis (3), and evaluation (2). The five categories following knowledge were labeled intellectual skills and abilities. The categories and subcategories were presumed to lie on a continuum from simple to complex and from concrete to abstract.

### **The Revised Framework**

In 2001 a two dimensional, non linear progression, model was introduced with David Krathwohl (one of Bloom's colleagues) a contributing editor. There were four

revisions in emphasis: use in planning curriculum from original focus on assessment, broadening the audience, use of sample assessment tasks to convey meaning – given that the original has stood the test of time in this respect, and on extensive description and illustration of subcategories as a way of providing context for the major category. There were four changes in terminology (Figure 1).



**Figure 1: Summary of Structural Changes from the Original Framework to the Revision** (Anderson & Krathwohl, 2001)

The new model proposed a knowledge dimension (factual, conceptual, procedural and meta-cognitive) and a cognitive-process dimension (remember, understand, apply, analyze, evaluate and create) (Anderson & Krathwohl, 2001). In this model the higher order thinking skills occur in the lower right hand corner of Figure 2. The Knowledge dimension includes four major types of knowledge. Factual knowledge contains the basic elements learners must know to be acquainted with a discipline or to solve problems in it. Conceptual knowledge is knowledge of the interrelationship among the basic knowledge elements within a larger structure that enable them to function together. Procedural knowledge is knowledge of how to do something, methods of inquiry, and criteria for using skills, algorithms, techniques and methods. Meta-cognitive knowledge is knowledge of cognition in general as well as awareness and knowledge of one’s own cognition.

The cognitive process dimension has six categories. The process of remembering is the retrieval of relevant knowledge from long term memory. Understanding, constructs meaning from instructional messages, including oral, written, and graphic communication. Applying is the carrying out or use of a procedure in a given situation. Analyzing breaks material into its constituent parts and determines how the parts relate to

one another and to an overall structure or purpose. Evaluating makes judgments based on criteria and standards. Finally, creating is the process of putting elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure. Details and examples of the types and sub-types of knowledge and categories and subcategories of cognitive process can be found in Appendix B and Appendix C respectively.

**The Knowledge Dimension (Noun)**

**The Cognitive Process Dimension (Verb)**

	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual						
B. Conceptual						
C. Procedural						
D. Meta Cognitive						

**Figure 2:** Revision of Bloom’s Taxonomy of Educational Objectives

**Instructional Design Issues**

Those who have been introduced to the abstract and theoretical aspects of general situations may never build the practical routines required to perform in a situation. They are only able to talk smart, not do smart (Pfeffer & Sutton, 1999). Moreover it has been found that many students do not connect the concepts they learn in the classroom to an understanding of their lives outside the classroom (Bereiter & Scardamalia, 1998; Bransford, A, & Cocking, 1999). The author holds the opinion that this can and should be avoided. Entrepreneurship curriculum needs to support both “knowing” and “doing”.

The field of psychology and in particular the study of memory offers some explanations for the phenomena. Knowledge is internalized when facts, abstractions of situations etc. are encoded and placed in long term memory. Further internalization occurs when the encoded knowledge is organized by developing relationships between knowledge units and is used to develop new opinions, perspectives and judgments. Internalization seems to be a hierarchical process of: transferring new knowledge in the form of information into long term memory and episodes into episodic memory;

analyzing and interpreting information to build patterns, scripts are built from events and episodes; building associative links; chunking into knowledge units into larger abstractions, schemas are formed from scripts and episodes; developing new knowledge from focused or intense reasoning; organizing knowledge to increase access, index knowledge for storage in lexical part of semantic memory.

Embedded within the internalization hierarchy above are definitions that are helpful in understanding how knowledge may become routine. Events are the isolated occurrences within a given situation and are concrete, detailed and normally observable. Episodes relate to an independent incident or scene that is part of a larger context and episodes unlike events have meaning. Scripts are general sequences that underlie a referenced type of situation and include general expectations and directions. Schemas are mental models by which both static and dynamic situations can be understood; it is a plan or scheme for a class of situations. Routines are regular, unvarying procedures that inform expectations and handle a specific kind of situation. Routines are by definition detailed, concrete and inflexible. As individuals become more familiar with a situation they internalize their knowledge and are able to respond almost automatically. Paradoxically knowledge in these situations does not require a deep understanding of the situation but may in fact be based on shallow, operational and concrete knowledge (Wiig, 1993).

### Setting Instructional Objectives

Objectives can be thought of as a continuum stretching from quite general to very specific and encompassing three levels: global, educational and instructional (Krathwohl & Payne, 1971). Each level of objective can then be thought of in terms of scope – broad moderate or narrow; time needed to learn – one or more years, weeks or months, hours or days; and purpose or function – provide vision, plan units of instruction, plan daily activities (Anderson & Krathwohl, 2001). Figure 3 illustrates these constructs and relates them to entrepreneurship education. Appendix D contains a template for identifying the types of knowledge and cognitive processes to be used in a given instructional element.

	<b>Level of Objective</b>		
	<b>Global</b>	<b>Educational</b>	<b>Instructional</b>
<b>Scope</b>	Broad	Moderate	Narrow
<b>Time Needed to Learn</b>	One or more years (often many)	Weeks or months	Hours or days
<b>Purpose or Function</b>	Provide vision	Design curriculum	Prepare lecture plans
<b>Example of Use</b>	Plan a multiyear curriculum (e.g. Entrepr. major)	Plan units of instruction (courses)	Plan daily activities, experiences and exercises

**Figure 3:** Relationship of Global, Educational and Instructional Objectives

## Idea Generation Tutorial

*The promise of entrepreneurship as a field of research* provides an integrating framework for the entrepreneurship field which helps entrepreneurship researchers “recognize the relationship among the multitude of necessary, but not sufficient, factors that compose entrepreneurship” (Shane & Venkataraman, 2000). Research-based action guidelines based on this integrating framework were provided by Hindle and Anderson in their article *A practical strategy for discovering, evaluating, and exploiting entrepreneurial opportunities* (Hindle, 2004). Idea generation is a first step in generating and then evaluating opportunities. This section reviews the opportunity recognition literature, locating where idea generation occurs on the opportunity recognition continuum, and then proposes objectives for an idea generation tutorial.

### Opportunity Recognition Literature

Opportunity recognition has been recognized as a core tenet of the entrepreneurial process (Stevenson & Jarillo, 1990; Timmons, Muzyka, Stevenson, & Bygrave, 1987; Timmons & Spinelli, 2004). While there is agreement on the value of the entrepreneur and the importance of opportunity recognition there are differing views on how entrepreneurs impact the economy - initiators who create instability (Schumpeter, 1936) versus alert individuals who look for disequilibria (Kirzner, 1973). As the field of entrepreneurship matured researchers developed process models to explain opportunity recognition as an initial step that could ultimately lead to venture formation (Bhave, 1994; Long & McMullan, 1984). Later research looked at differences in opportunity recognition behaviours between solo entrepreneurs and network entrepreneurs (Hills, Lumpkin, & Singh, 1997; Singh, 2000; Singh, Hills, & Lumpkin, 1999) and described expert opportunity finders within an expert information processing framework (Gaglio & Katz, 2001).

Entrepreneurship writers initially saw opportunity as arriving as a complete idea, an epiphany, requiring no further development (Gaglio & Taub, 1992; Kirzner, 1973, 1979; Long & McMullan, 1984). Ultimately many came to view opportunity recognition as a process. One group of researchers proposed a process consisting of four stages: pre-vision, point of vision, opportunity elaboration and the decision to proceed. The pre-vision stage requires substantial work. In the point of vision stage initial ideas are often “aha” moments but are rarely venture ready. In the elaboration stage additional creative thought is required to fill in the gaps and cope with anticipated problems. When the elaboration stage is completed the entrepreneur needs to once again invest considerable effort to ensure that the opportunity is business ready. Opportunity identification takes place over an extended period of time even though the point of vision may have been a distinct moment in time (Long & McMullan, 1984).

Bhave built a process model of entrepreneurial venture creation which was described as an “iterative, non-linear, feedback driven, conceptual and physical process”. This model delineated four stages: opportunity, technology setup, organization creation

and exchange. Of particular interest were the discrimination between externally stimulated entrepreneurs (they already knew that they wanted to create a business) and internally stimulated entrepreneurs (opportunity recognition preceded the decision to start a venture) and the suggestion that the opportunity recognition process between the two differs. It was found that novelty, while identified as a desirable quality in venture formation, increases the difficulty and time needed to found a venture (Bhave, 1994). The model can act as a road map for prospective entrepreneurs that will alert them to strategic issues at each stage in the venture creation process especially when significant levels of novelty are introduced. Such a road map would be a valuable instructional aid in the proposed tutorial.

Subsequent research explored differences in opportunity recognition behaviours between solo entrepreneurs (developed business ideas on their own) and network entrepreneurs (obtained their ideas from their social networks). In one study ventures founded on “accidentally” discovered venture ideas achieved breakeven sales faster than those who followed a formal process. The construct of entrepreneurial alertness to new business opportunities was studied as a unique set of cognitive skills and strategies reinforcing the fact that entrepreneurs are opportunistic learners, they constantly filter for opportunities. Three groups of opportunity recognition behaviours were categorized: solo – special alertness, opportunistic, very creative, seeing new opportunities comes naturally, the idea was theirs alone; network – opportunities in the long term are largely unrelated to each other, ideas came from an accidental process; informal – ideas come when relaxed, gut feel is most important in judging potential, opportunities are easier to see after entry (Hills et al., 1997). Consideration will be given to identifying the solo and network preferences in the baseline survey for the proposed research and also to prompting both behaviours as options in the proposed tutorial.

An idea is recognized, and then, months later, steps are taken to shape it into an opportunity and then months or years after that a venture may be launched. Respondents recognized an average of 6.6 ideas and 3.3 opportunities in the past year. The results indicate that personal insights and intuition are as important for identifying opportunities as a purposeful search (Singh et al., 1999). Entrepreneurs filter opportunities using several criteria: financial rewards, enjoyment, interest, motivation, excitement and fun (Orwa, 2003). The sources of entrepreneurial ideas could be incorporated into the front end of the proposed tutorial and used to stimulate the generation of possible ideas.

### **Instructional Design Issues**

The field of instructional design offers specific strategies for problem solving instruction (Anderson & Krathwohl, 2001; Gronlund, 2004; Smith & Ragan, 2004). Relevant strategies were also located in a formulary of active ingredients arising from 172 idea generation techniques (Smith, 1998). Problem solving projects integrate learning and skills from a variety of areas, develop higher level thinking skills, provide self-assessment opportunities (the ability to enhance venturing scripts), and independent learning (a style of learning particularly suited to entrepreneurial learners). Extended problem solving projects are defined as broad in scope, dealing with poorly

structured/fuzzy problems, having multiple solutions and typically students select their own problem which leads to higher levels of engagement for the learner. Performance outcomes for extended problem solving projects may include the following areas: identifying and solving a problem, locating relevant resources, writing a report and describing the project, conducting an experiment, preparation of display materials, oral presentation and defense, effectiveness in group problem solving (Gronlund, 2000).

Three macro strategies for problem solving instruction hold promise for the instructional design of the proposed tutorial: the elaboration model which involves the presentation of carefully sequenced problem sets; anchored instruction which provides learners with meaningful context and realistic, interesting problems; and problem based learning (PBL) which when well constructed should lead to high student interest and motivation (Smith & Ragan, 1999). Additional instructional strategies were identified from a formulary of active ingredients arising from 172 idea generation techniques. The search strategies of past experience, recalling past experiences relevant to the current problem (transfer analysis) and analogy, looking for things similar to the problem situation (Bionics), should actively engage the learner. Habit breaking strategies will allow learners to identify and then challenge the assumptions and beliefs related to the problem they have identified (escape). Stimulation tactics include: personal experience, involving the learner experientially in solving the problem (experience kit); elaboration, enriching the context to provide idea generation material (story writing); and display, mapping ideas graphically (mind mapping). Motivational enablers such as personal involvement are likely to increase intrinsic motivation (systematized direct induction). Extra effort enablers like mass production will assist in generating lots of ideas (Crawford slip method) (Smith, 1998).

Eisner identified expressive outcomes that provide a “fertile field for personal purposing and experience”(Eisner, 1979). Activities that use expressive outcomes provide an experience where each student will be uniquely changed in some way. The common element in many of these strategies is the potential to appeal to the intrinsic motivation needs of the learner which has been shown to be central to motivating creative behaviour (Amabile, 1997).

## **Creativity**

If creativity is seen as an enabling pedagogy in the production of entrepreneurial ideas (Hisrich & Peters, 2001; Kuratko & Hodgetts, 2003; Kuratko & Welsch, 2003; Timmons & Spinelli, 2004) then it is important to understand the relationships between creativity, innovation and entrepreneurship. Creativity is the production of novel and appropriate solutions to any domain of human activity. Innovation is the implementation of the ideas generated in the creative process. Entrepreneurship can then be said to be a particular form of innovation that results in the creation of a new business, or a new initiative within an existing business. Entrepreneurial creativity can include ideas that may have to do with: products or services themselves, identifying a market, ways of producing or delivering, ways of obtaining resources (Amabile, 1997). Amabile’s early work suggested that while intrinsic motivation is conducive to creativity extrinsic

motivation is detrimental (Amabile, 1983). When creativity is encouraged in educational settings dissonance is likely to result as creative behaviours are often out of tune with the behaviours that lead to academic success. In the educational system it is acknowledged that breaking the rules is what makes you smarter yet this behaviour may well lead to confrontation with instructors (Mauzy, Harriman, & Arthur, 2003).

Creative problem solving is particularly well suited to idea generation which involves dealing with poorly structured/fuzzy problems, having multiple solutions. Basadur has delineated an eight step model versus previous linear CPS models that had three steps (Osborn, 1963), five steps (Parnes & Biondi, 1975) and six steps (Isaksen & Treffinger, 1985). Basadur's "complete" process model of creative problem solving incorporates divergent and convergent thinking within each of the eight steps (Basadur, Graen, & Gren, 1982). Basadur represented his process model as a circular, continuous process with three stages; problem formulation, solution formulation and solution implementation. Within Basadur's three stages are eight steps: problem finding, fact finding, problem definition, idea finding, evaluation/ selection, planning, acceptance and action. Basadur has trademarked the name Simplex<sup>®</sup> to represent the commercial applications of his eight step model, which has been used in workplace settings to enhance the problem solving skills of organizational executives (Basadur, Taggr, & Pringle, 1999; Basadur, 1987, 1994).

Basadur hypothesized that attitudes toward ideational thinking are an antecedent behavior to actively practicing divergent thinking to identify opportunities and developed a 14 item questionnaire to measure it (Basadur et al., 1982). The final instrument contains 6 questions that test preference for ideation and six that test for tendency to premature critical evaluation. Validity and reliability were established for the preference for ideation construct. Ideation/evaluation is a separate, sequenced, two step thinking process. They suggested that training should first assess the existing attitudes toward ideation and then preferentially target the attitudes most in need of modification (Basadur & Finkbeiner, 1985). Ideation is defined as the "generation of ideas without evaluation". During ideation, all rational, judgmental and algorithmic thinking is deferred while during evaluation the opposite is true (Basadur et al., 1982).

The Creative Problem Solving Profile (CPSP) is an instrument that describes a learner's unique personal style and preference for problem solving based on Basadur's eight step model. Using the CPSP instrument it was found that a disproportionate number of the business students in a study fell into the optimizer (37%) and implementer (33%) quadrants while only 13% fell into the generator and 17% into the conceptualizer quadrants (Basadur, Wakabayashi, & Graen., 1990). These results reinforce the anticipated dissonance/discomfort (Cheung, 2003; Mauzy et al., 2003) of participants in the proposed tutorial as they are required to use divergent thinking to generate options.

## Using the Templates to Lay Out the Idea Generation Tutorial

I have chosen to place the idea generation tutorial in the third week of a third year course called New Venture Creation. The course is one component in a multi-year/multi course program known as the Entrepreneurial Skills Program (ESP). Figure 4 locates the tutorial within the frame of the course and the program. The final deliverable in the course is a business plan. The tutorial is intended to be the initial step leading to a fully functional venture plan.

	Level of Objective		
	<u>Global</u> <i>ESP</i>	<u>Educational</u> <i>Management 3907</i>	<u>Instructional</u> <i>Idea Generation Tutorial</i>
<b>Scope</b>	Broad	Moderate	Narrow
<b>Time Needed to Learn</b>	One or more years (often many)	Weeks or months	Hours or days
<b>Purpose or Function</b>	Provide vision	Design curriculum	Prepare lecture plans
<b>Example of Use</b>	Plan a multiyear curriculum	Plan units of instruction	Plan daily activities, experiences and exercises

**Figure 4:** Relationship of Global, Educational and Instructional Objectives

The tutorial will have two separate audiences but one common purpose. Some students will use the tutorial to generate an idea that they will then refine into a venture opportunity. Others will already have a venture idea in mind (Bhave, 1994). It has been the author's experience that the students who already have an idea in mind resent being asked to slow down to ideate. The tutorial will be positioned as an opportunity to practice Basadur's divergent/ convergent cycle for creative problem solving (Basadur et al., 1982). For students without an idea it is an opportunity to find one while for those who already have an idea it is an opportunity to refine their existing idea. For both audiences the diverge/converge technique will serve them well when they encounter fuzzy problems they need to solve.

The instructional design will ask students to generate ideas that connect with their own interests and passions. As noted in the instructional literature such tasks will lead to higher levels of engagement (Amabile, 1997; Gronlund, 2000; Smith, 1998), Figure 5

use the 4 by 6 Learning Matrix to lay out the learning objectives for the tutorial. The tutorial will focus on the acquisition of procedural knowledge (shaded areas): the remembering of procedural knowledge, the understanding of procedural knowledge, the application of procedural knowledge, the analysis of meta-cognitive knowledge, the evaluation of out put from the procedural knowledge and the use of meta-cognitive knowledge to filter output generated from the procedural knowledge. This procedural knowledge is given context by the objectives in the un-shaded areas which require: remembering of factual knowledge, understanding of conceptual knowledge, procedural knowledge needed to create a venture opportunity and the meta-cognitive knowledge that will connect the venture opportunity to the passions of the entrepreneur.

The Knowledge Dimension	The Cognitive Process Dimension					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge	Definition of entrepreneurship as being opportunity centric  The stages of the venturing process  Singh's sources of venture ideas					
B. Conceptual Knowledge		Venturing Process  Role of ideation and divergent thinking  Role of convergent thinking  Finding problems worth solving				

The Knowledge Dimension	The Cognitive Process Dimension					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
C. Procedural Knowledge	Definition of brainstorming	Rules of brainstorming	Generate a list of venture ideas		Develop a set of criteria to evaluate the idea  Evaluate the idea	Develop the idea into a venture opportunity
D. Meta-Cognitive Knowledge				Reflect on the process used to generate ideas	Connect the evaluation process to learner's knowledge of self – what matters to them	Ensure that the venture opportunity feeds into personal core values and interests

**Figure 5:** Idea Generation Tutorial:  
Placement of the objectives and Instructional Activity in the Taxonomy Table

### Conclusion

Bloom's revised framework provides tools for learning, teaching and assessing entrepreneurial skills. The level of educational objectives template (Figure 3) aided the creation of objectives that were consistent in the larger frame of the course and program objectives while the template in Appendix D aided in the placement of the instructional objectives for a tutorial within the knowledge and cognitive process dimensions of the revised taxonomy. While this example dealt with a short duration tutorial, both templates may be used to aid in the design of instruction at the educational and global levels. Furthermore it should be noted that the idea generation tutorial is offered only as an exemplar. The tutorial reflects the author's education, interests, experience and approach to teaching. It would be an unusual event indeed, if others used this approach and ended up with the same objectives. It is anticipated that the instruction based research action guidelines will be used to design and then test the efficacy of a variety of entrepreneurship education protocols.

The author has only scratched the surface of the opportunities for melding instructional principles with entrepreneurship education. Two topics naturally flow from this work. One is the use of the work of Robert Gagne and his events of instruction for planning instructional delivery – gain attention, inform learners of objectives, stimulate recall of prior learning, present the new content, provide guidance, and elicit response and performance (Gagne, 1977; Gagne, Briggs, & Wager, 1992). The second is Robert Gronlund's work on writing instructional objectives for both teaching and assessment. Gronlund discriminates among objectives for: knowledge, comprehension and application; higher level thinking skills, affective outcomes performance of skills and products; and problem solving. Gronlund also links objectives to both achievement assessment and performance and affective assessment (Gronlund, 2004).

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## Appendix A

### Bloom's Original Framework Cognitive Domain

Adapted from *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy Of Educational Objectives (abridged edition)*

(Anderson & Krathwohl, 2001)

#### Category

#### Example

#### Knowledge

The recall of: specifics and universals; methods and processes; patterns structures or settings. Objectives in this area include both remembering and relating. When testing knowledge we are looking for the appropriate signals, cues and clues to assist in retrieving the stored knowledge.

Knowledge of Specifics

Recall of % of Canadians considering entrepreneurship

Knowledge of Terminology

Definition of entrepreneurship

Knowledge of Specific Facts

Ability to list Timmons' acquirable and desirable skills

Knowledge of Ways and Means of Dealing with Specifics

Awareness of Bhavé's venture creation stages.

Knowledge of Conventions

Familiarity with the contents of a business plan.

Knowledge of Trends and Sequences

Ability to articulate the development of entrepreneurial education over time

Knowledge of Classifications and Categories

Awareness of the sources from which venture ideas are generated

Knowledge of Criteria

Ability to articulate the opportunity evaluation criteria proposed by Shane and Venkataraman or Timmons

Knowledge of Methodology

Knowledge of the steps to be taken to investigate the product market match of a venture idea

Knowledge of Universals and Abstractions in the Field

Timmons model for identifying significant opportunities

Knowledge of Principles and Generalizations

Awareness of the historical explanations of entrepreneurial behaviour

Knowledge of Theories and Structures

Recall of the major theories used to conduct research in the field of entrepreneurship

#### Intellectual Abilities and Skills

Refers to the organized modes of operation and generalized techniques for dealing with materials and problems. Objectives emphasize the mental processes of organizing and reorganizing material to achieve a purpose and the materials may be given or remembered.

#### Comprehension

This is the lowest level of understanding and suggests that the learner is unable to abstract the knowledge and apply it to other situations.

Translation	The ability to make financial projections contained in a business plan understandable while being faithful to the original content as well as accurate.
Interpretation	Writing an effective executive summary for a business plan
Extrapolation	The use of Sophisticated Wild Assed Guessing (SWAG) to move from facts to reasonable assumptions to constructing a new venture reality
Application	The ability to identify the elements necessary to write an effective business plan for a new opportunity

### **Analysis**

A communication is broken into its constituent parts or elements so that the relative hierarchy of ideas is made clear and/or the relationship between the ideas expressed is made clear.

Analysis of Elements	Identification of the logic elements used to express a business case
Analysis of Relationships	Ability to identify the key hypotheses relating to venture success
Analysis of Organizational Principles	Ability to identify the implicit and explicit logic structures necessary for a venture proposal to succeed

### **Synthesis**

Making a whole from the constituent parts. The ability to combine pieces, parts, elements etc. in such a way to build a new pattern or structure that was not previously apparent.

Production of a Unique Communication	Developing an effective “pitch” for a venture idea
Production of a Plan or Proposed Set of Operations	The writing of a coherent business plan that speaks to the informational needs of the selected audience and demonstrates how the opportunity will be actualized
Derivation of a Set of Abstract relations	Ability to identify the key hypotheses relating to venture success and where necessary develop new hypotheses that better match the circumstances encountered

### **Evaluation**

The use of qualitative and quantitative criteria to assess how well material and methods satisfy criteria. Criteria can either be generate by or supplied to the learner.

Judgments in Terms of Internal Evidence	Evaluation of a venture opportunity based on personal knowledge and experience
Judgments in Terms of External Criteria	Evaluation of a venture opportunity using Timmons Quick Screen opportunity evaluation tool

## Appendix B

### Major Types and Subtypes of the Knowledge Dimension

Adapted from *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy Of Educational Objectives (abridged edition)*

(Anderson & Krathwohl, 2001)

#### Major Types and Subtypes

#### Examples

##### A. Factual Knowledge

The basic elements learners must know to be acquainted with a discipline or solve problems in it

AA	Knowledge of specific details and elements	The big picture constructs in idea generation – venture process and stages
AB	Knowledge of terminology	Definitions – opportunity, ideation, brainstorming

##### B. Conceptual Knowledge

The interrelationships among the basic knowledge elements within a larger structure that enable them to function together

BA	Knowledge of classifications and categories	Sources of ideas – work experience, active search, friends, serendipity
BB	Knowledge of principles and generalizations	Creativity, innovation and entrepreneurship
BC	Knowledge of theories models and structures	Opportunity recognition/opportunity evaluation

##### C. Procedural Knowledge

How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques and methods

CA	Knowledge of subject-specific skills and algorithms	Articulation of the diverge/converge cycle in creative problem solving
CB	Knowledge of subject-specific techniques and methods	Use of SCAMPER as a brainstorming technique
CC	Knowledge of criteria for determining when to use appropriate procedures	Knowing when to diverge (idea generation) and when to converge (evaluation of ideas)

##### D. Meta-cognitive Knowledge

Knowledge of cognition in general as well as awareness and knowledge of one's own cognition.

DA	Strategic knowledge	Personal strategies of idea generation
DB	Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge	Knowledge of the cues that trigger idea generation behaviours
DC	Self-knowledge	Knowledge of personal passions and interests

**Appendix C**  
**The Six Categories of the Cognitive Process Dimension**  
**and Related Cognitive Processes**

Adapted from *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy Of Educational Objectives (abridged edition)*  
 (Anderson & Krathwohl, 2001)

<b>Categories &amp; Cognitive Processes</b>	<b>Alternative Names</b>	<b>Definitions &amp; Examples</b>
	<b>1 Remember</b>	Retrieve relevant knowledge from long term memory
<b>1.1 Recognizing</b>	Identifying	Pertinent idea generation definitions
<b>1.2 Recalling</b>	Retrieving	Pertinent idea generation definitions
	<b>2 Understand</b>	Construct meaning from instructional messages, including oral, written, and graphic communication
<b>2.1 Interpreting</b>	Clarifying Paraphrasing Representing Translating	Idea generation instructions
<b>2.2 Exemplifying</b>	Illustrating, Instantiating	Idea generation instructions
<b>2.3 Classifying</b>	Categorizing Subsuming	The order of idea generation instructions
<b>2.4 Summarizing</b>	Abstracting Generalizing	Idea generation instructions to other settings and instances
<b>2.5 Inferring</b>	Concluding Extrapolating Interpolating Predicting	When idea generation is appropriate
<b>2.6 Comparing</b>	Contrasting Mapping Matching	Alternative idea generation techniques
<b>2.7 Explaining</b>	Constructing models	Personal idea generation instructions
	<b>3 Apply</b>	Carry out or use a procedure in a given situation
<b>3.1 Executing</b>	Carrying out	Idea generation instructions
<b>3.2 Implementing</b>	Using	Idea generation instructions in alternative settings
	<b>4 Analyze</b>	Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose.
<b>4.1 Differentiating</b>	Discriminating Distinguishing Focusing Selecting	The steps in idea generation

<b>Categories &amp; Cognitive Processes</b>	<b>Alternative Names</b>	<b>Definitions &amp; Examples</b>
<b>4.2 Organizing</b>	Finding Coherence Integrating Outlining Parsing Structuring	Idea generation techniques that fit with personal preferences
<b>4.3 Attributing</b>	Deconstructing	Personal preferences for idea generation techniques
<b>5 Evaluate - Make judgments based on criteria and standards</b>		
<b>5.1 Checking</b>	Coordinating Detecting Monitoring Testing	Which idea generation techniques work best
<b>5.2 Critiquing</b>	Judging	Both personal idea generation techniques and the techniques of peers
<b>6 Create - Put elements together to form a coherent or functional whole; reorganize elements into a new pattern or structure</b>		
<b>6.1 Generating</b>	Hypothesizing	Which techniques will work best for the student
<b>6.2 Planning</b>	Designing	A personal idea generation protocol
<b>6.3 Producing</b>	Constructing	A personal idea generation protocol

**Appendix D**  
**Placement of the objectives and Instructional Activity**  
**in the Taxonomy Table**

The Knowledge Dimension	The Cognitive Process Dimension					
	1. Remember	2. Understand	3. Apply	4. Analyze	5. Evaluate	6. Create
A. Factual Knowledge						
B. Conceptual Knowledge						
C. Procedural Knowledge						
D. Meta-Cognitive Knowledge						