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Practical Guidelines for Opportunity Recognition Instruction

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The need to establish practitioner action guidelines arising from research has resulted in a new stream in the entrepreneurship literature (Hindle, Anderson, & Gibson, 2004) and the first set of guidelines was based on opportunity recognition (Hindle, 2004; Shane & Venkataraman, 2000). An initial article by the author proposed a framework for entrepreneurship instructional objectives (Leach, 2006, 2007) while this article suggests guidelines specific to opportunity identification based on a taxonomy which identifies three processes of opportunity identification – recognition, discovery and enactment (Sarasvathy, Dew., Velamuri, & Venkataraman, 2003). It is the author's contention that enhanced opportunity finding skills will be positively related to the generation of economic value in at least two ways. There will be greater retention of current venture participants due to the moderation of failure rates attributable to the pursuit of sub-optimal opportunities. There will also be incremental economic value attributable to the commercialization of higher value opportunities by current and future entrepreneurs.

Teresa Amabile, a Harvard researcher, has provided a framework for how creativity, innovation and entrepreneurship interact to produce value with creativity defined as the production of novel and appropriate solutions to open ended problems in a domain of knowledge (Amabile, 1997). Innovation is seen as the implementation of these solutions. Entrepreneurship is a form of innovation that sees the implementation of creative ideas that result in a new organization or a new initiative within an existing

organization (Amabile, 1997). A three stage process of recognition, development, and evaluation leading to venture formation has been proposed. Five factors are put forward as influencing the opportunity recognition process: entrepreneurial alertness, information asymmetry and prior knowledge, personality traits (with an emphasis on optimism, self-efficacy and creativity) and finally the nature of the opportunity itself (Ardichvili, Cardozo, & Ray, 2003).

Innovative acts, and the resulting "creative destruction" are seen as central to creating value and distributing wealth in an economy (Drucker, 1985; Schumpeter, 1936; Schumpeter, 1942). Since the mid 1960's there has been an explosion in the number of entrepreneurship courses and complete entrepreneurship programs offered at North American Universities (Timmons & Spinelli, 2006; Vesper & Gartner, 1997). Concurrent with the growth in entrepreneurship education there have been ongoing efforts to train people to be more creative or to better access their innate creativity (Hisrich, Peters, Shepherd, & Mombourquette, 2006; Kelley & Littman, 2005) and how to become more creative when working in teams (Basadur & Head, 2001).

The economic roots of entrepreneurship and the evolution of the entrepreneurial process provide context for the discussion. This is followed by an in depth discussion of the theory supporting opportunity identification with an emphasis on identifying the key constructs. The review of the opportunity identification literature examines appropriate search strategies, the nexus of opportunity and entrepreneur versus the duality of entrepreneur and opportunity, the role of novelty and newness, the role of creativity as identified in the entrepreneurship literature. This discussion is then melded with principles from the instructional and creativity literature to develop guidelines that support creativity instruction in post secondary education.

Entrepreneurship Context

The discipline of economics has provided two differing views of the role of an entrepreneur, and the place of opportunity recognition in economic development. Schumpeter's entrepreneur creates opportunities by creating disequilibria while Kirzner's entrepreneur finds opportunities by identifying disequilibria (Kirzner, 1973; Schumpeter, 1934). Schumpeter, an Austrian economist, based at Harvard, is oft cited in the entrepreneurship literature due (Schoonhoven & Romanelli, 2001) to his views on innovation and the role that entrepreneurs play in a process he called creative destruction. Schumpeter proposed that development, the thing that moves an economy forward, "consists primarily in employing existing resources in a different way, doing new things with them, irrespective of whether these resources increase or not", making a new combination. New combinations generally take place in new firms not from existing firms. Being an entrepreneur is neither a profession nor a social class and is often of a transient nature, in essence a form of serial entrepreneurship. In Schumpeter's view the entrepreneur created market disequilibria (an opportunity) through innovation and then

took advantage of it (Schumpeter, 1936). Kirzner on the other hand posits a group of market players who are able to perceive the opportunities for entrepreneurial profits, selling goods at prices higher than they can be bought, "who immediately notice profit opportunities that exist because of the initial ignorance of the original market players". Kirzner asserted that entrepreneurship is inherent in the competitive market process, and that the role of the entrepreneur is that of an arbitrageur who is constantly looking for economic disequilibria (opportunities) to pursue(Kirzner, 1973). Schumpeter's entrepreneur acts to disturb an existing equilibrium by innovating while Kirzner's entrepreneur looks for disequilibria (recognition of an opportunity) and then moves the market back to equilibrium by seizing the opportunity (Swedburg, 2000).. Both of these views support the importance of instruction that improves the performance of entrepreneurs in finding opportunities on the productive functioning of the economy.

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). 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. Bhave described an "iterative, non-linear, feedback driven, conceptual and physical process". 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). Both of these process models were precursors to the Ardichvili model discussed under opportunity identification (Ardichvili et al., 2003).

Opportunity Identification Theory

In this section the importance of opportunity identification to the field of entrepreneurship will be established and three types of opportunities identified – recognized, discovered and created (Sarasvathy et al., 2003). A process model of venture creation will be used to provide context for how entrepreneurial alertness contributes to the identification of opportunities and how the antecedent constructs of personality traits, social net works and prior knowledge contribute to entrepreneurial alertness (Ardichvili et al., 2003).

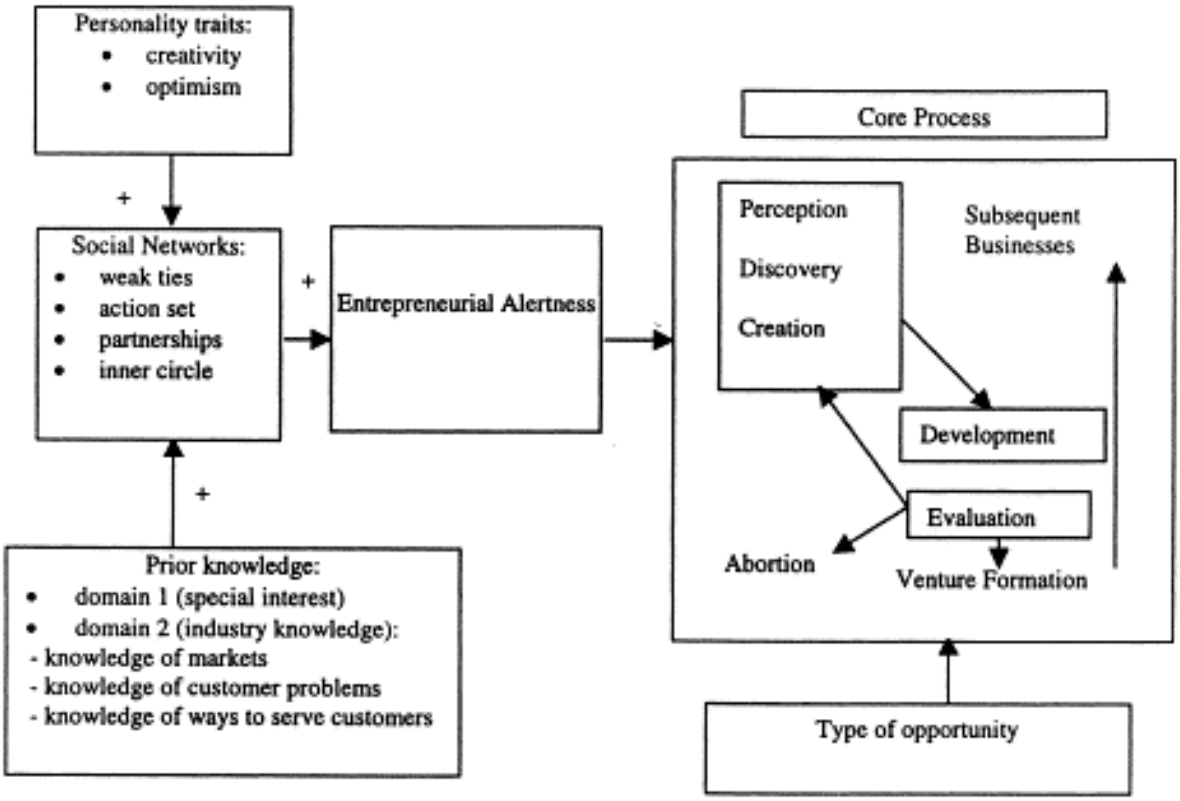
Opportunity recognition is a core tenet of the entrepreneurial process where opportunity is embedded into the definition of entrepreneurship, whether it be the pursuit of opportunity without regard to the resource currently controlled (Stevenson & Jarillo, 1990)or a way of thinking, reasoning and acting that is opportunity obsessed (Timmons & Spinelli, 2006). Not all opportunities are created equally. Three views of opportunity

can be used to construct a typology of entrepreneurial opportunities based on the pre-conditions for their existence. Opportunities can be recognized, discovered or enacted. The original labels used by Sarasvathy were allocative, discovery and creative. Allocative was changed to recognized to better fit with the OR literatures while creative was changed to enacted to minimize confusion when discussing the role of creativity. Table 6 below compares these three views along the dimensions of opportunity actualization, focus, method, the existence of known sources of supply and demand, information assumptions, management of uncertainty, definition of success, basis of competition and strategic view (Sarasvathy *et al.*, 2003). The purpose of the typology is not to suggest the superiority of one view over the other but rather to define the playing field and enable of a discussion of core opportunity recognition constructs.

Table 1: Comparison of Three Views of Entrepreneurship (Sarasvathy et al.2003, p29)

View	Recognized	Discovered	Enacted
Opportunity Actualization	Using resources to achieve ends	Correcting errors and creating news ways to achieve end	Creating new means as well as new ends
Focus	System	Process	Decisions
Opportunity Method	Recognized through deductive reasoning	Discovered through inductive reasoning	Created through abductive reasoning
Supply/Demand	Both supply and demand known	Only supply or demand known	Both supply and demand unknown
Information Assumptions	Complete information available at aggregate and individual levels	Complete aggregate information available but imperfectly distributed among agents	Partial information at the aggregate ignorance is key to opportunity creation
Uncertainty Management	Through diversification	Through experimentation	Through effectuation
Definition of Success	Statistical artifact	Outliving failures	Mutually negotiated consensus among stakeholders
Basis of Competition	Resources	Strategies	Values
Strategic View	Risk management	Failure management	Conflict management

Ardichvili explained the opportunity identification and development process using descriptors of perception discovery and creation. In this conceptualization entrepreneurial alertness, the ability to recognize potentially worthwhile goals or resources (Kirzner, 1973, 1979), was critical in perceiving, discovering or creating opportunities that could lead to venture formation.. Three constructs, personality traits, social networks and prior knowledge were seen as antecedents contributing to the overall level of entrepreneurial alertness (Ardichvili et al., 2003). A graphic presentation of how these constructs contribute to the core process of venture formation is presented in Figure 1 below. The discussion that follows will explore the connections in the literature to these constructs.



Fgure 1. Model and units for opportunity identification and development (Ardichvili et al, 2003, p 118).

Entrepreneurial Alertness

A propensity to notice and be sensitive to information about objects, incidents, and patterns of behavior in the environment, with special sensitivity to maker and user problems, unmet needs and interests, and novel combinations of resources will be used as the working definition of entrepreneurial alertness (Ardichvili et al., 2003). Kirzner, an economist, was the first to delineate the construct of entrepreneurial alertness and suggested that alertness has two dimensions - potentially worthwhile goals that have remained unnoticed as well as unnoticed but potentially valuable resources. The alert entrepreneur is said to be alert to the receipt of information rather than already being in possession of it. Kirzner asserts that entrepreneurship is inherent in the competitive

market process, and that the role of the entrepreneur is that of an arbitrageur who is constantly looking for economic disequilibria (opportunities) to pursue. Kirzner points out that Schumpeter's entrepreneur acts to disturb an existing equilibrium by innovating while he (Kirzner) sees the role of the entrepreneur to be moving the market back to equilibrium (Kirzner, 1973, 1979; Schumpeter, 1934, 1936).

The construct of entrepreneurial alertness can also be thought of in terms of cognitive and psychological properties. Entrepreneurs are opportunistic learners, they constantly filter for opportunities (Hills, Lumpkin, & Singh, 1997). The traditional definition, "to notice without search opportunities that have been previously overlooked"(Kirzner, 1973) was extended to include "a motivated propensity of man to formulate an image of the future" by describing a chronic/habitual schema. It was hypothesized that the alert: are more sensitive to market disequilibria; change their schema while the non-alert change the information; will appreciate the need to balance time to action with the need for complete and accurate information; know when they don't need to know more to make a good decision; will have more complex schema about change; engage in more counterfactual thinking; are more likely to break the existing means ends framework; and more alert to the profit potential of ideas. The non-alert will activate schema from a set already existing and defined by the market. Not all who possess entrepreneurial alertness will become entrepreneurs as opportunity identification is but one step in a larger process that creates successful new ventures (Gaglio & Katz, 2001).

Making new connections is hampered by three decision making heuristics. Representative-ness occurs when stereotypes are used top place unknown chunks of information into a class without to regard to rationality or logic. Availability is the tendency to parse information in the manner most easily recalled where recollection focuses on the most recent and the most frequently seen information. Anchoring is the tendency to stick close to the starting point or initial judgment suggesting that it takes discipline to diverge from our initial judgments and perceptions (Gilad, Kaish, & Ronen, 1988).

Personality traits

Creativity and high intelligence may contribute to alertness (Shane, 2003). A study of engineering students found that the participant's self-perception of creativity and a supportive family environment that promotes creative thinking has predictive value for entrepreneurial intention (Zampetakis & Moustakis, 2006). Recent experimental research has shown that emotional ambivalence is an enabler of being able to make unusual/creative connections among events and that it is possible to induce emotional ambivalence using technique of short duration. It is interesting to note that the impact of the induced emotional ambivalence was moderated by the extent to which the participants perceived the induced state as unusual (Fong, 2006).

Two sets of researchers have made the link between optimism, where optimism is related to self efficacy beliefs, and success in recognizing entrepreneurial opportunities.

An experimental study found that subjects are led to believe that they are very competent at decision making see more opportunities and take more risks. *(Krueger & Brazeal, 1994; Krueger & Dickson, 1994)* . Self-efficacy results from mastery of the activity through creating instances of the desired behaviour and from observing models in which the entrepreneur can see themselves engaging in the activity. It is enhanced through the provision of believable information about the activity and emotional support for performance (Bandura, 1977, 1986, 1995; Zimmerman, 1995).

Social Networks

Solo entrepreneurs develop business ideas on their own and network entrepreneurs obtain their ideas from their social networks Three groups of opportunity recognition behaviors have been 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).

The information search practices of 1176 entrepreneurs were studied and six sources of information widely used: accountants, friends or relatives, other business owners, bankers, lawyers, and generally available books and manuals. When entering unfamiliar fields both experienced and inexperienced entrepreneurs searched less intensively. This implies that the entrepreneur will have to go beyond their established information networks (Cooper, Folta, & Woo, 1995). In a more recent study, three forms of social networking (mentors, informal industry networks, participation in professional forums) showed a direct, positive effect on opportunity recognition by entrepreneurs. The effects of mentors and professional forums were mediated by the strength of the mental schema employed by the entrepreneur informal industry networks were mediated by self-efficacy Alertness to entrepreneurial opportunities can be enhanced by assisting nascent entrepreneurs to obtain mentors and to participate in professional forums (conferences, seminars, workshops) can contribute to their success in identifying potentially valuable opportunities for new ventures by providing information and building social networks (Ozgen & Baron, 2007).

Prior Knowledge

Two domains of prior knowledge are relevant to the identification process. The first domain contains knowledge that is of special interest to the entrepreneur – it is fascinating and fun. The second domain is accumulated over the years and reflects familiarity with customer problems and issues.(Ardichvili et al., 2003). It is the special interest/resonance of the first domain that drives the entrepreneur to deepen their competence resulting in a profound knowledge about the topic (Shane, 2003; Sigrist, 1999. Some entrepreneurs are able to discover a given opportunity because they are in possession of the necessary prior knowledge as well as the cognitive ability to value it {Shane, 2000 #375). Idiosyncratic information corridors influence the ability of an entrepreneur to recognize a specific opportunity where the prior information is

complementary with the new information, which triggers an entrepreneurial conjecture (Kaish & Gilad, 1991).

Prior knowledge and prior experience are the primary source for searching for opportunities. In a study employing in depth interviews with 15 repeat entrepreneurs (who had collectively founded 65 ventures) it was found that these entrepreneurs narrowed their search to areas where they had specific prior knowledge (Fiet, Clouse, & Norton, 2004). The idiosyncratic nature of prior knowledge suggests that not all people possess the same information at the same time and as a result any given opportunity is not obvious to all potential entrepreneurs (Ardichvili et al., 2003).

Instructional Insights

Opportunities can be recognized, discovered or enacted (Sarasvathy et al., 2003). Ardichvili proposed a process model for venture creation built on these three types of opportunity where entrepreneurial alertness was a key determinant in identifying opportunities where alertness was supported by three antecedent constructs: personality traits, social networks, and prior knowledge (Ardichvili et al., 2003). It is important to note that identification of an opportunity is a necessary but not the sole step in being able to initiate a venture. The original idea is likely to bear little resemblance to the product or service that eventually reaches the market due to the recursive and iterative nature of the evaluation process prior to deployment in the market (Bhave, 1994; Long & McMullan, 1984; Lumpkin., 2005).

Issues Arising from Opportunity Identification Theory

This section will first discuss the different opportunity search strategies and how they relate to the three types of opportunity – recognized, discovered or enacted. A separate section will be devoted to comparing and contrasting the assumptions underlying recognizing and discovering opportunities versus enacting them. Next the role of newness and novelty in the generation of valuable venture ideas will be described. There is substantial linkage between creativity and opportunity identification and these linkages will be identified. Finally issues that impact the instruction will be reviewed.

Opportunity Type – Appropriate Searching Strategies

Three types of opportunities have been identified – those that are recognized, those that are discovered and those that are enacted. Appropriate search strategies are a function of the type of opportunity. For opportunities that are recognized, deductive reasoning is used to either actively or passively filter for venture worthy ideas.(Sarasvathy, 2001). Entrepreneurial alertness is deemed to be the behaviour that enables recognition because the entrepreneur is sensitive/alert to information available in

the environment. Personal insights and intuition are as important for identifying opportunities as a purposeful search (Singh, Hills, & Lumpkin, 1999). Accidental recognition occurs in the passive search mode and is more likely when the entrepreneur possess heightened entrepreneurial alertness (Ardichvili et al., 2003). There is evidence to suggest that firms founded on the basis of accidental recognition reach breakeven sales faster than a more formal process (Teach, Schwartz, & Tarpley, 1989).

Purposeful search is appropriate for opportunities that are discovered. Some argue that alertness does not account for the success of repeat entrepreneurs in finding opportunities. One study used in depth interviews with 15 repeat entrepreneurs to explore their use of systematic search to discover opportunities. Collectively they had launched 65 successful ventures. It was found that these entrepreneurs narrowed their search to areas where they had specific prior knowledge. None indicated that they relied on alertness.(Fiet, 2002; Fiet et al., 2004).

The third type of opportunity is based on the principle of enactment where the entrepreneur creates new means as well as new ends by using effectual reasoning which reasoning includes three types of means: the entrepreneur themselves, prior knowledge and experience, whom they know (social and professional networks fro example). From these means the entrepreneurs begin to imagine (rather than recognize or actively search) for opportunities that represent the implementation of a variety of possible futures.(Sarasvathy, 2001; Sarasvathy et al., 2003).

Nexus versus Duality (Causation versus Effectuation and Structuration)

Both the recognition and discovery types of opportunity assume that the opportunity has objective existence over time and that the entrepreneur will either recognize it through entrepreneurial alertness or discover it using systematic search techniques. Prior knowledge, experience, passion and social networks are seen as enablers of either the recognizing or discovery of the opportunity (Ardichvili et al., 2003; Baron, 2004, 2006; Fiet, 2002; Fiet et al., 2004; Shane, 2003; Shane & Venkataraman, 2000). In a study of 1,686 owner/managers participants saw opportunities as external and stable where the opportunity would existed for a sufficiently long period of time to allow discovery by the entrepreneur (Gartner & Shaver, 2004). Sarasvathy describes this as causal logic where it is assumed that future can be controlled by predicting it (Sarasvathy, 2001).

There is an emerging field of study in entrepreneurship that looks beyond Shane's nexus of entrepreneur and opportunity (Shane, 2003) where rather than the opportunity having objective existence awaiting recognition or discovery by the entrepreneur there is a duality rather than a nexus of entrepreneur and opportunity (Sarason, Dean, & Dillard, 2006). Sarasvathy's effectual logic suggest that we do not need to predict the future if we can control the future. The future is out there to be created not to be discovered. Effectual reasoning rather than starting with a predetermined goal, begins with a given set of means and allows the goals to emerge (Sarasvathy, 2001; Sarasvathy et al., 2003). Competent entrepreneurs are able to think well in both causal and effectual modes.

An extension of the use of effectual logic is a structuration view of how opportunities are created and then enacted. Sarason proposes a duality where the opportunity and the entrepreneur cannot be understood nor exist independently and that this interdependence must be part of the description of how opportunities are actualized. In the structuration view entrepreneurial ventures are seen as recursive processes that evolve as a result of the interface between the entrepreneur and the sources of opportunity as the entrepreneur engages in the venturing process (Sarason et al., 2006). The actors (entrepreneurs) are said to create the entrepreneurial process while at the same time being created by the entrepreneurial process (Giddens, 1992). Structuration theory enables the study of the influence entrepreneurs exert on their environment to achieve the entrepreneur's purposes.

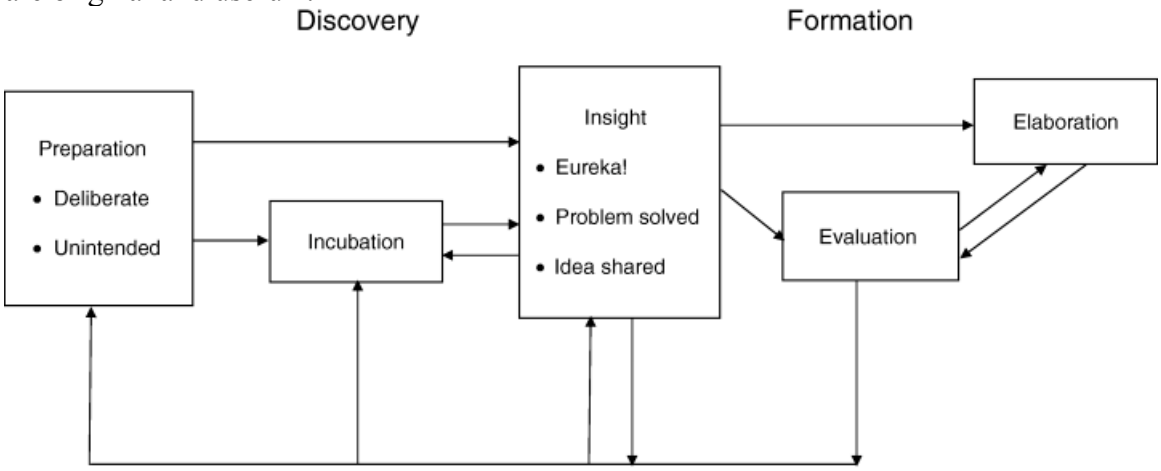
Novelty and Newness

Novelty and newness are seen as integral components in the entrepreneurial process (Amabile, 1997; Ardichvili et al., 2003; Shane, 2003; Timmons & Spinelli, 2006). Some studies have used the degree of innovativeness to discriminate among ideas generated by study participants - the more innovative the idea the better the idea (Basadur & Head, 2001; DeTienne & Chandler, 2004). Unfortunately the relationship between the worth of an idea is not as straightforward as it would at appear at first glance. Strategists have pointed out that initiating a venture with a product or service that is new to the world requires the overcoming of significant resistance from users (Aldrich & Fiol, 1994; Bhave, 1994). Current research suggests that most patents (more than 85%) are filed as improvements on existing patents (Hisrich et al., 2006). Investing in blockbuster innovations can lead organizations to concentrate on a small number of opportunities while ignoring others, that if nurtured, have potential and that they may hold the kernel of an idea for follow on opportunities. The process of innovation needs to be culturally embedded across an organization not focused solely in product development. Kanter suggests a portfolio approach to innovation with a few major project at the top which attract most of the investment, a larger number of ideas in the test stage at the middle of the pyramid and a large number of early stage ideas at the base of the pyramid. Within the portfolio there is a flow up and down as ideas are evaluated (Kanter, 2006).

Role of Creativity

Richard Florida's evangelical road show has made creativity and the "creative class" part of the vernacular in economic development where economic growth is fuelled by both the ability to attract the "creative class" as well as the ability translate that advantage into economic outcomes. Florida's Creativity Index (CI) is a mix of four equally weighted factors: the creative class share of the workforce; an index of high-tech industry; innovation, measured as patents per capita; and diversity, measured by the Gay Index as proxy for an area's openness to new ways of thinking. (Florida, 2003; Lee, Florida, & Acs, 2004).

The relationship between creativity and opportunity identification has been established as the ability to rapidly understand the relationship between problems and their possible solutions by identifying novel associations or by utilizing available resources in a novel way (Hills et al., 1997; Lumpkin, Hills, & Schrader, 2004). Figure 2 below builds on the pre-vision, point of vision and elaboration model (Long & McMullan, 1984) describes a staged and recursive opportunity recognition process with a discovery phase consisting of preparation, incubation, and insight, and a formation phase consisting of evaluation and elaboration (Lumpkin., 2005). Opportunity recognition employs a recursive process that is akin to the recursive nature of creativity. This matches well with Amabile's hierarchy of creativity leading to innovation leading to the creation of new ventures where entrepreneurial creativity is the implementation of novel useful ideas to establish a new business or new program to delivery products or services (Amabile, 1997). make the point that "entrepreneurship is a form of creativity and can be labelled as business creativity or entrepreneurial creativity because often new business are original and useful".



*Based on Lumpkin, Hills, & Shrader, 2004; Hills, Shrader, & Lumpkin, 1999.

Figure 2: Venture formation process model (Lumpkin 2005, p. 458)

IDEO is a leading edge design firm based in Palo Alto California where they have found that the best ideas for creating or improving products comes from keen observation of the interaction of users with their daily environment (Suri, 2005). This observation of how users interact with their environment leads to the identification of problems worth solving. The IDEO team then employs a brainstorming technique using divergent thinking skills to generate as many solutions as possible and in the process the brainstorming participants suspend judgment until it is time to use convergent thinking to choose among the alternatives generates (Kelley & Littman, 2001, 2005). One of the instruments used to measure divergent thinking is the RAT (Remote Associates Test) developed by Mednick. The RAT measures divergent and creative thinking by scoring the capacity of subjects to make associations between words that are not normally thought of as being associated. Higher RAT scores correlate with higher levels of creativity (Mednick, 1963; Mednick, Mednick, & Mednick, 1964). This instrument was used in Fong's study where it was found that being in a state of emotional ambivalence allowed subjects to make more novel associations (Fong, 2006).

Given that the ability to make unusual connections is deemed to be part of the creative process it is relevant to understand how these connections are made and may be able to be enhanced. Pattern identification, signal detection theory and regulatory focus theory are posited as relevant perceptual and cognitive factors in opportunity recognition. Baron suggests that pattern recognition is a learned skill that could be used to increase alertness to opportunities (Gaglio & Katz, 2001) or could be used to discover opportunities through purposeful search (Fiet, 2002; Fiet *et al.*, 2004). Research on human cognition suggests that entrepreneurs identify opportunities by employing cognitive frameworks acquired through experience that then allow them to perceive connections between seemingly unrelated events or trends. It is the patterns they perceive that suggest ideas for new products or services. Pattern recognition is defined as the process through which individuals perceive complex and seemingly unrelated events and place them in identifiable patterns (Matlin, 2002).

In a study of experienced entrepreneurs (started more than four ventures) it was found that the active search process was restricted to areas in which they already possessed significant knowledge. In effect they were employing their existing cognitive frameworks and knowledge to arrange the stimuli provided by their environments into patterns that could allow them to perceive opportunities (Fiet *et al.*, 2004). It is likely that the experienced entrepreneurs were using one of two cognitive models – prototypical models where connections are sought between newly encountered events and existing idealized models or exemplary models where newly encountered events are compared with pre-existing and relevant concepts. It is Fiet's contention that his experienced entrepreneurs were accessing a robust set of exemplars (Fiet, 2002; Fiet et al., 2004). Baron proposes that a pattern recognition perspective helps integrate into one basic framework - engaging in an active search for opportunities; alertness to them; and prior knowledge of an industry or market. The interaction among the three factors is also informative, for example active search may not be required when alertness is very high. Prior knowledge broadens the field of view for the entrepreneur – hence they perceive more opportunities (Baron, 2004, 2006).

Educational Issues

In traditional classrooms students are taught a causal approach in the face of known practice – where causal logic starts with a pre-determined goal, a given set of mean and seeks to identify the optimal strategy to achieve the stated goal. It is Sarasvathy's assertion that while causal thinking may or may not involve creative thinking effectual thinking is inherently creative (Sarasvathy, 2001; Sarasvathy et al., 2003). This problem was echoed in a study of two groups of master's students, one in engineering and one in business. The study identified the dissonance between the need for entrepreneurs to pursue novelty, innovation and creativity and the traditional academic demands for rigor and analysis (Berglund & Wennberg, 2006). Traditional educational methods such as testing impact creativity because traditional testing requires convergent thinking where there is typically one right answer. In spite of this it is possible to adapt test instructions to encourage creative thinking and to design activities

that are presented in permissive and game-like fashion. It is also possible for instructors to model creative behaviours resulting in a positive impact on teaching quality (Runco, 2004). The learning of opportunity recognition skills is best suited to the experiential style described by Kolb as a process that creates knowledge through the "transformation of experience" (Corbett, 2005; Kolb, Boyatzis, & Mainemelis, 2001).

Prior experience/knowledge enhances the ability to identify new means ends solutions (Shane & Venkataraman, 2000). Opportunities do not exist as singular phenomenon but are idiosyncratic to the individual (Sarason et al., 2006). University learners are likely to have less prior knowledge of customer problems and paradoxically are likely to be more productive in their idea generation (Shepherd & DeTienne, 2005). Baron suggests that pattern recognition is a learned skill that could be used to increase alertness to opportunities discover opportunities through purposeful search (Baron, 2006; Fiet et al., 2004; Gaglio & Katz, 2001). Nascent entrepreneurs, which represents the bulk of the anticipated study participants, will benefit from building social networks and increasing their information base because this will enhance their success in identifying potentially valuable opportunities for new ventures (Ozgen & Baron, 2007{Lumpkin, 2004 #439)}.

Instructional Literature

Creative Problem Solving

The field of instructional design offers specific strategies for problem solving instruction (Smith & Ragan, 2004). Relevant strategies were also located in a formulary of active ingredients arising from 172 idea generation techniques (Smith, 1998). Pedagogical elements specific to enhancing entrepreneurial scripts were found in an article on Expert Information Processing Theory (EIPT) (Mitchell, 1995). A recurring theme was found in the literature related to creativity and post secondary education – business students have been perceived as less creative than other student populations (Cheung, 2003; Eisenman, 1969; Maier & Hoffman, 1961) while the dissonance between the traditional post secondary education and the tools needed to identify venture ideas is discussed (Basadur & Head, 2001; Sarasvathy et al., 2003; Zampetakis & Moustakis, 2006).. Success in enhancing creativity of university students using techniques of relatively short duration has been reported (Fong, 2006; Greer & Levine, 1991).

The author hypothesizes that instruction in creative problem solving will enhance the opportunity finding skills of entrepreneurial participants. Problem solving is defined as "the ability to combine previously learned principles, procedures, declarative knowledge and cognitive structures in a unique way to solve previously un-encountered problems". This definition supports the construct of novelty (unique ways) and acts as a foundation for creative problem solving which includes problems that are frequently ill defined and unlike well defined problems, often have multiple solutions. Problem solving expends effort to identify strategies used by domain specific experts rather than

attempting to identify generic skills. Four cognitive processing steps in problem solving: problem representation, solution planning, solution implementation and solution evaluation are identified (Smith & Ragan, 2004). Instructors and students will find it helpful to identify which of the four steps they are working on. These four steps map directly onto the eight step model proposed by Basadur (Basadur, Graen, & Gren, 1982).

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, 2004).

Problem Solving Instructional Strategies

Three macro strategies for problem solving instruction hold promise for the instructional design: 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, 2004). 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 participants 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). Inert knowledge is the consequence of students not connecting between and among the facts they learn in the classroom and their everyday lives. 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 behavior (Amabile, 1997).

Insights From Bloom's Revised Taxonomy

Bloom's taxonomy of educational objectives (Bloom, 1956) was augmented in 2001 to include a two dimensional framework focusing on knowledge and cognitive processes (Anderson & Krathwohl, 2001). The knowledge dimension has four constructs: factual, conceptual, procedural, and meta-cognitive knowledge. The cognitive process dimension consists of six constructs: remember, understand, apply, analyze, evaluate and create. The taxonomy defines higher order constructs as those that appear later in the list with meta-cognitive knowledge and the "create" cognitive process being the highest order skills. Meta-cognitive knowledge includes general strategic knowledge, knowledge about cognitive tasks and when to use them, and self-knowledge. The "create" cognitive process is described in terms (problem representation, solution planning, and solution execution) taken from the creative problem solving literature. It begins with a divergent phase known as "generating" where learners attempt to understand the task and generate alternate solutions which are followed by a convergent phase resulting in a solution known as the "planning" phase. Finally the solution is constructed in the "producing" phase. In assessing creative tasks it is suggested that a clearly defined criteria for judging the quality of the responses be given to the students in advance of assigning the task.

Enhancing Entrepreneurial Expertise

Expert entrepreneurs outperform novice entrepreneurs because they "recognize immediately that which novices require great effort to discover". Expertise is seen as being domain specific and differences in performance fall along three constructs: willingness, opportunity/ability and arrangements. Opportunity/ability related behaviors include: identifying, capturing and protecting opportunities; possession of domain knowledge as well as industry scripts leading to venturing success; and possession of skills to solve new venture problems with new venture knowledge (Mitchell, 1995). The performance by novice entrepreneurs can be enhanced by: interrogation - the intense observation of experts in context to draw from them and their situation elements that can enhance the novice's script or knowledge structure; instantiation – it requires the novice to be exposed to multiple "instances" of the expert script using falsification to delete non functional elements from the expert script and verification to choose which script elements to retain. Additional suggestions from the field of simulation and gaming include writing or journalizing scripts following a participative activity and debriefing workshops to compare and contrast scripts. Similar discussions are found in the entrepreneur hip literature when discussing the cognitive aspects of opportunity identification (Gaglio & Taub, 1992) or the role that pattern recognition plays in identifying opportunities (Baron, 2006). It will be important to develop constructs that will discriminate novices from experts, to identify strategies used by novices and experts and to look at the differences in performance between novice and expert participants.

Impact of Creativity Training

An early study, on the impact of creativity training, drew groups from employees of large organizations, business administration students, students enrolled in a human

relations (HR) course and students in an introductory psychology course. Creative solutions were found in descending order of frequency by the introductory psychology students, by those enrolled in the HR course, the business administration students and finally those employed in large organizations. The researchers interpreted the results as supporting the proposition that formal authority relations inhibit creative problem solving and that business may be attracting employees that work comfortably but not creatively in large organizations (Maier & Hoffman, 1961). In a follow on study it was hypothesized that those who are attracted to business studies are inherently less creative than those attracted to other, more creative disciplines. The results found statistically significant differences ($p < .05$) and it was suggested that if relatively non-creative people are attracted to business then upon graduation it will be difficult to find leaders who support creativity in the workplace (Eisenman, 1969). More recently, the development of student's creativity during their university education, where duration and field of study may represent the educational effects were examined. The results indicated a trend of monotonic decline in creativity as students progress through their university careers. As well it was found that there was a general superiority of verbal creativity among students enrolled in the humanities and social sciences whereas business students had the highest scores on self-assessed traits and products(Cheung, 2003).

As much as the writer, a faculty member in a school of business, may be rankled by Eisenman's assertion that business does not attract creative people, it does reinforce the need for research questions that look at differences in creative performance based on program and year of study. It is likely that this legacy continues to manifest itself in both the organizations and business education of today, suggesting that instructors will need to surmount the natural inertia that will resist the ideational approach. In spite of these challenges successful outcomes have been reported in response to creativity training of relatively short duration for college students. In one study the relative effectiveness of three treatments (fantasy induction, intrinsic motivation induction and a combined fantasy/intrinsic motivation induction) on creative writing performance was examined (Greer & Levine, 1991) And in a more recent study the impact of emotional ambivalence on creativity was studied using induction techniques of short duration (Fong, 2006).

Educational Insights

Typically entrepreneurs work with poorly structured/fuzzy problems. The use of techniques to increase the number of alternatives are appropriate and may involve searching past strategies, recalling past experiences, looking for analogies, among others. Student engagement may be increased by providing authentic scenarios and hence appealing to the student's intrinsic motivational needs (Amabile, 1997). Previous studies have reported success in enhancing creativity of university students using techniques of relatively short duration (Greer & Levine, 1991).

Storytelling is a powerful way of engaging participants and building the efficacy beliefs identified as one of the components of personal traits that contribute to entrepreneurial alertness (Ardichvili et al., 2003). A well told story can enable listeners to visualize from a story in one context what is involved in an analogous context. The

audience is engaged by creating a scenario they can see themselves in, one of the basic tenets of enhancing self efficacy (Bandura, 1977, 1986, 1995; Zimmerman, 1995) which will allow entrepreneurs to persist at a task they may otherwise have given up on (Denning, 2000, 2005). Storytelling gives the participants permission to explore in unconventional ways (Kelley & Littman, 2005) and should increase the comfort level with divergent thinking and the attendant need to defer judgment.

Conclusion

The article examined the economic roots of entrepreneurship, and the evolution of the entrepreneurial process to provide context for the discussion. This was followed by an in depth discussion of the theory supporting opportunity identification with an emphasis on identifying key constructs. The review of the opportunity identification literature examined appropriate search strategies, the nexus of opportunity and entrepreneur versus the duality of entrepreneur and opportunity, the role of novelty and newness, the role of creativity as identified in the entrepreneurship literature. This discussion was then melded with principles from the instructional and creativity literature to develop guidelines that support creativity instruction in post secondary education.

Entrepreneurship is a key driver of economic activity and usually begins with an idea that may eventually turn into a commercial opportunity (Bhave, 1994; Long & McMullan, 1984; Lumpkin., 2005). Within this reality there are two differing views of how entrepreneurs recognize opportunities. Schumpter describes initiators who create instability (Schumpeter, 1936) while Kirzner suggests versus alert individuals who look for disequilibria (Kirzner, 1973). The importance of social networks was recognized in later research that identified differences in opportunity recognition behaviors between solo entrepreneurs and network entrepreneurs (Hills et al., 1997; Lumpkin et al., 2004; Singh, 2000; Singh et al., 1999). Searching for opportunities relies as much on intuition and insight as it does on purposeful search (Singh et al., 1999) suggesting that in the proposed research the instruction needs to speak to the intrinsic motivational interests of the learner.

The classic research mantra is “where’s the pain?”. The purpose of this question is to find research problems worth solving and to then construct a method of enquiry that makes them open for enquiry. The premise in the proposed instruction guidelines is the same. Finding worthwhile problems to solve that are connected to the learner’s passions and prior experience hold the greatest potential for recognizing opportunities that can be made venture ready.

Problem solving is well represented in the instructional literature where problem solving is defined as “the ability to combine previously learned principles, procedures, declarative knowledge and cognitive structures in a unique way to solve previously un-encountered problems” (Smith & Ragan, 2004). The task participants will engage during

the training involves the highest order of knowledge (meta-cognitive) and cognitive process (create) defined in Anderson's revision of Bloom's seminal taxonomy of educational objectives (Anderson & Krathwohl, 2001; Bloom, 1956). With this in mind it is important that instructors present fuzzy problems to be solved that requires participants to choose a problem that has personal relevance, thus building engagement.

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