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Opportunity Identification and Its Role in the Entrepreneurial Classroom: A Pedagogical Approach and Empirical Test

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Opportunity identification is emerging as an important content area in entrepreneurship education. We propose that opportunity identification is a competency that can be developed as are other unique competencies and that the entrepreneurship classroom is an appropriate venue for developing the skills necessary to improve the ability to identify opportunities. Using a variation of a Solomon Four Group Designed experiment, our results show that individuals can learn processes of opportunity identification and improve both the number of ideas generated and the innovativeness of those ideas. In addition, the results indicate that a predisposition toward innovation does not significantly alter the ability to learn processes of opportunity identification.

Our research is focused on opportunity identification as an important content area of entrepreneurship education. Opportunity identification has been identified as an essential capability of entrepreneurs and has become an important element of the scholarly study of entrepreneurship (Ardichvili, Cardozo, & Ray, 2003; Gaglio & Katz, 2001; Shane & Venkataraman, 2000). Ardichvili et al. (2003) contend that identifying opportunities for new businesses is one of the most important abilities of successful entrepreneurs. Gaglio and Katz claim that "understanding the opportunity identification process represents one of the core intellectual questions for the domain of entrepreneurship" (2001: 95). Shane and Venkataraman state that one of the fundamental entrepreneurship research questions is "why, when and how some people, and not others, discover and exploit opportunities" (2000: 218).

Although the above-mentioned scholars highly value the study of opportunity identification, discussions are ongoing about whether it should be the central focus of the field. While some scholars view the nexus of individuals and opportunity identification—within new and established organizations—as a central focus of the field (e.g., Shane & Venkataraman, 2000), others (e.g., Gartner, 2001; Zahra & Dess, 2001), argue that this focus is too narrowly defined. Regardless of whether opportunity identification should be the focus of entrepreneurship research or a subfield, the ongoing discussions point to a significant role for opportunity identification within entrepreneurship education.

Currently few researchers focus their studies on how and why opportunity identification is an integral component of entrepreneurship education (see the research by Fiet, 2002 for an exception) despite their call for entrepreneurship students to practice opportunity identification (Knight, 1987; Kourilsky, 1995; Solomon, Duffy, & Tarabishy, 2002; Vesper & McMullan, 1988). As Kourilsky points out, "current entrepreneurship education tends to migrate towards its natural focus of 'least resistance'—the traditional business management process areas"; however, entrepreneurship education cannot succeed "without business management's seminal antecedents-opportunity recognition, marshaling of resources, and creation of the business venture" (1995: 14).

Although there is a call in the literature for

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opportunity identification to be included in entrepreneurship education, is there theoretical justification for this? Fiet (2000) argues that entrepreneurship educators must include theoretical content in their courses if they expect students to develop the cognitive skills necessary to make better entrepreneurial decisions. Recent researchers into resource-based theory (Brush, Greene, & Hart, 2001) have extended the boundaries of the theory (Alvarez & Busenitz, 2001) to include recognition of opportunities as a resource that, through the process of exploitation, can lead to competitive advantage. The firm's resources that differ from those of competitor firms are potentially the most valuable (Alvarez & Busenitz, 2001); thus, the individual's ability to recognize opportunities, both independently and within the parameters of the firm (corporate entrepreneurship), is a resource worth developing. The current research develops the view that opportunity identification is a unique capability that can be developed much in the same way in which entrepreneurs might develop other unique capabilities (e.g., management capabilities, social network building capabilities).

If opportunity identification is a unique capability that should be included in the entrepreneurship education content, the question becomes "how" or what are the pedagogical methods that will increase an individual's ability to identify opportunities? Some researchers have taken the perspective that entrepreneurial discoveries are the result of systematic search (e.g., Herron & Sapienza, 1992). Fiet (2002) based his recent research on the systematic search model, proposing that students of entrepreneurship would be best served by developing consideration sets (a group of information channels which entrepreneurs can select and search based on their prior knowledge). However, researchers focusing on systematic search do not take into consideration the fact that many discoveries appear to occur randomly or fortuitously, and entrepreneurs often do not follow rational search processes (Shaver & Scott, 1991) or use heuristic-based logic (Busenitz & Barney, 1997) rather than factual-based logic.

In addition, approaches espousing systematic search are based on a theoretical perspective of reductionism. Reducing the number of stimuli may be important to deepen our understanding of a singular topic; however, "overemphasis of reductionism is the rule rather than the exception particularly in universities where students are trained within the narrow perspective of a confining discipline," (Bundy, 2002: 163) suggesting that a broader base of understanding (holism) might better contribute to our ability to be creative. This perspective is expressed by Blade in his essay on creativity in the sciences: "[O]ne of the occupational difficulties of observing is that one tends to notice only those things toward which his mind happens to be directed, and he is relatively insensitive to all other matters" (1963: 203). Therefore, although the process of reductionism as prescribed by Fiet (2000) may work for some individuals, it would be incorrect to assume that we can, in the classroom, teach prospective entrepreneurs all the information within each individual's consideration set or knowledge corridor that they need to identify such opportunities. In this research we propose that aspiring entrepreneurs must be able to creatively interpret the external environment so that each individual will be able to identify opportunities that relate to his/her own knowledge corridor. This "training" allows an individual to incorporate learning that occurs throughout life and would not be limited to one consideration set. As an individual builds knowledge, whether through experiences or education, the skills learned in this "training" allow identification of even more opportunities. Mitton states "entrepreneurs have a knack for looking at the usual and seeing the unusual, at the ordinary and seeing the extraordinary. Consequently, they can spot opportunities that turn the commonplace into the unique and unexpected" (1989: 12).

Using a variation of a Solomon Four-Group Designed experiment, we test the impact that specific skill training (as indicated by the Generativity Theory of Creativity) has on the number and degree of innovativeness of opportunities identified. In addition, we explore each participant's preintervention level of innovativeness using the Kirton Adaptor Innovator inventory. We proceed by reviewing the literature with respect to theoretical explanations for how opportunities are identified, followed by a review of creativity and opportunity identification and development of the SEEC model of training intervention. Following this, we develop hypotheses which relate a participant's preintervention propensity to innovate on both number and innovativeness of ideas, the effect of the training intervention on both number and innovativeness of ideas and contingency relationships between preintervention level of innovativeness and the training intervention on both number and innovativeness of ideas. Next, we detail the methodological approach for addressing the hypotheses including study participants, experimental design and conditions, procedures followed, and operational measures. Finally, we discuss data analysis, results of the study, implications and contributions of this research.

THEORETICAL VIEWS OF OPPORTUNITY IDENTIFICATION

The opportunity identification literature indicates four ways in which opportunities are identified: active search, passive search, fortuitous discovery, and creation of opportunities. Active search, passive search, and fortuitous discovery adopt the ontological perspective that opportunities "exist out there," and it is the job of the entrepreneur to uncover these opportunities. The creation perspective is consistent with the ontological perspective that opportunities are a product of one's mind.

There are marked differences between these four models of opportunity identification with respect to ontological perspective and the roles of the environment and the individual. Although we developed our research based primarily upon the passive model, which views creativity as an important and learnable characteristic, we begin here by discussing each of these models in more depth.

Active Search

The theoretical foundation for those espousing that opportunity is best recognized through active search is consistent with the neoclassical view of economics (e.g., Stigler, 1952). Proponents of the neoclassical view see markets as operating in equilibrium. Entrepreneurs are economic agents who see temporary shifts away from equilibrium and step in to take advantage of it.

In the active search model, entrepreneurial rents accrue to individuals and organizations with superior search skills. These searches are predicated on an underlying assumption that an objective opportunity is present in the environment that can be defined clearly enough to initiate a systematic search. Much of the existing literature in entrepreneurship is based on models consistent with these assumptions in which goal setting, environmental scanning, competitive analysis, and strategic planning play an important role (e.g., Baum, Locke, & Smith, 2001; McDougall, Covin, Robinson, & Herron, 1994; Dess, Lumpkin, & Covin, 1997). The concepts of goal satisficing and bounded rationality provide a more realistic search model (March & Simon, 1958), yet, even in models with relaxed assumptions, search is envisioned as a sorting or winnowing through already existing opportunities and human creativity is not theorized to play a major role.

Passive Search and Fortuitous Discovery

The passive search (Ardichvili et al., 2003) and fortuitous discovery (Kirzner, 1997) perspectives are closely aligned with respect to their ontological underpinnings and the processes for discovering opportunity. Both processes assume that objective opportunities exist in the environment; however, neither assumes that the opportunity can be clearly defined before it is discovered. Both approaches assume that entrepreneurial profits occur when markets are operating in disequilibrium (Kirzner, 1997). In such circumstances, individuals and organizations do not initiate active search processes because the opportunity sought cannot be clearly described ex *ante*, rather they keep their eyes open for as yet unspecified opportunities. The major difference between these two perspectives is that passive search requires individuals to operate at a consciously heightened state of sensitivity to the environment—which may be a learned capability—whereas Kirzner's (1997) fortuitous discovery stipulates that inherent alertness allows discoveries to be made when not searching and results in surprise when something is found. Both perspectives require a flash of creativity as the connection is made between objective reality and future possibilities. In their passive search model, Ardichvili et al., (2003) identify creativity as one of the five key factors in the opportunity identification process.

Opportunity as Creation

More extreme than the passive search or fortuitous discovery approaches is the opportunity as created perspective. Shackle (1961) implies that through imagination, an individual, can create an opportunity from almost nothing. Therefore, the opportunity resides only in the individual's mind and emerges through action. Whereas in the neoclassical view the environment is the source of opportunities, and in the passive search or fortuitous discovery views, alert individuals discover opportunities that align with their personal knowledge and aspirations, in Shackle's (1961) view, the individual is the source of opportunities.

One of the first to identify creativity as a major component of entrepreneurship was Schumpeter (1934), who believed that opportunities are created as new resource combinations result in new or substantially superior products, services, or processes. The entrepreneur not only introduces the new product or service, but also creates or changes the market conditions within which the product or service is sold. Even though Schumpeter and Shackle have different ontological perspectives, both require high levels of individual creativity, minimize the role of the environment, and view opportunity as being created through action.

Creativity and Opportunity Identification

Although we acknowledge the existence and possible efficacy of different approaches for identifying opportunity, we specifically focus here on the passive search perspective. Proponents of passive search view the creativity used for opportunity identification as a learned or learnable characteristic, specify an important role for creativity in the opportunity identification process, and focus on matching external stimuli with individual specific knowledge and capabilities. The other approaches to opportunity identification are less appropriate to our research here for the following reasons: Active search depends on systematic search skills and provides a limited theoretical role for creativity; the fortuitous discovery perspective views alertness as an inherent unlearned characteristic; and the created opportunity perspective, although it does provide a strong role for creativity, generally ignores the role of environmental cues. Below we discuss the specific role of creativity in passive search approaches and how it applies to our training intervention model.

The idea that opportunity identification is related to creativity is not new to the entrepreneurship literature. For example, Long and McMullan (1984) model opportunity identification as a creative structuring process (1984), and Hills, Shrader, and Lumpkin (1999) provide empirical evidence that, in their study, opportunity identification is essentially a creative process. In defining creativity most authors include a component of opportunity identification (Fox, 1963; Plesk, 1997). Plesk, in his desire to define creativity, surveyed a large number of creativity definitions and proposed the following consensus definition of creativity: "[C]reativity is the connecting and rearranging of knowledge—in the minds of people who will allow themselves to think flexibly—to generate new, often surprising ideas that others judge to be useful" (1997: 28). Here we use creativity theory, specifically the theoretical perspective that describes the origin of new ideas, to provide the theoretical foundation for understanding opportunity identification under conditions of passive search.

According to Henry (1991) there are five schools of thought or major theoretical perspectives that explain the origin of creativity and the source of new ideas: (1) grace, (2) accident, (3) personality, (4) association, and (5) cognition.

In the grace perspective, creativity is something of a mystery, and ideas seem to come from nowhere—sort of a divine gift (Proctor, 1995). The accident perspective suggests that ideas arise by chance. An example of this type of discovery is Fleming's discovery of penicillin, which occurred when mold was blown in through an open window and killed a strain of bacteria he was investigating.

Personality theory generally holds that creativity and the ability to discover ideas is a natural human trait; some have it and some do not. The Kirton's adaptor innovator theory (KAI theory) is one example of theory developed based upon personality. Kirton (1988b) states that an individual's problem-solving style is relatively stable and that individuals tend to solve problems either as innovators who see existing guidelines and frameworks as part of the problem and solve problems through radical or frame-breaking solutions, or as adaptors who are characterized by precision, reliability, efficiency, discipline, and conformity. Kirton states that one of the sets comes naturally to people and that the opposing set has to be learned as part of the coping behavior. Although this thinking does not preclude the possibility that people can be taught to be more innovative in their thought processes and behaviors, the personality, grace, and accident perspectives provide little guidance with respect to how individuals might be taught to better recognize opportunity.

The association perspective suggests that "applying procedures from one area of knowledge to another can give rise to novel associations and these associations can form the basis of creative ideas" (Proctor, 1995: 43). An example of this might be the well-known method popularized by Edison in his expectations of his new assistants. Edison would ask new assistants to spend their morning wandering through the village writing down 20 things that interested them. After returning to the lab they would be asked to list 10 items in each column and then combine the items, two at a time, and seek to "discover" an invention which combined those two ideas. The association perspective is not inconsistent with the cognitive perspective, which states that creativity draws upon normal cognitive processes (Perkins, 1981; Weisburg, 1986). Those taking the cognitive perspective maintain that although it appears that opportunities are identified serendipitously, in fact they are identified because individuals cognitively have prepared their minds to identify them. Creativity theorists (e.g., Amabile, 1988) have long recognized that individuals can be taught to recognize opportunities.

Creativity researcher Robert Epstein states "the people we tend to label 'creative' have special skills, which anyone can master" (1996: 51). Louis Pasteur epitomizes this theoretical perspective by his well-known quote, spoken well in advance of

the discoveries for which he is known: "In matters of observation, chance favors only the prepared mind." Norm Wynett, general manager of future growth initiatives at Procter & Gamble, indicates that this perspective applies well to his organization when he states, "The perception of the creative process is still based on self-limiting assumptions about eureka light bulbs flashing over the head of some inspired genius rather than the well-managed diligence of ordinary people. At P&G, we think of creativity not as a mysterious gift of the talented few, but as everyday tasks" (Harvard Business Review, 2002). The cognitive and association perspectives—individuals can, through cognitive exercises, train their minds to recognize opportunities—are central to this research.

Research into cognitive processes has led to two conclusions that are important to our discussion: (1) "Normal thought processes are not optimized for creative thinking" and (2) "despite this suboptimization, we can purposefully take mental actions that lead to creative thoughts" (Plesk, 1997: 32). Suboptimization results because individuals are able to process only a minute amount of the stimuli they encounter. "To make sense of the stimuli that do come to their attention, they create organizing schema or knowledge structures" (Huff & Huff, 2000: 15). Although we would be unable to function without these knowledge structures, they inhibit creative thinking, because they guarantee that when observing a familiar situation, individuals will only see and encode what they have always seen.

Experts in the field are quick to point out that we can learn how to be creative through specific training as well as through natural experience (Amabile, 1988; Isaksen, 1988; Torrance, 1980). According to Amabile, "creativity-relevant skills depend on training, through which they may be explicitly taught, or simply on experience with idea generation" (1988: 153). If training can aid creativity and hence idea generation, the question then becomes "Which methods of training are likely to lead to more and better identification of opportunities?" We develop and test here one specific training intervention model based on generativity theory (Erikson, 1980; Epstein, 1985), which provides the foundation to determine the "skills" required for individuals to act creatively and to identify opportunities. Generativity theory focuses on understanding the emergence of novel or creative behavior continuously in time. The theory states that competing behaviors produce new behaviors; the process is orderly and probabilistic; and that by influencing the type and number of competing behaviors, we can accelerate and direct creativity.

Epstein identifies four skills that follow directly from generativity theory as means to enhance creativity (1996: 220). These skills include (1) securing—the ability to pay attention to and preserve new ideas; (2) expanding—acquiring new skills and knowledge, thus increasing the number of repertoires available to compete; (3) exposing—opening oneself to multiple controlling stimuli; and (4) challenging—opening oneself to new challenges through failure. In his original work, Epstein (1996) used slightly different terminology to title the four areas (e.g., he used *broadening* instead of *expanding*). We have slightly modified two of the titles, without changing the meaning applied, to develop the acronym SEEC (a softer "seek" indicating passive search!) to aid in facilitation of the four skills as defined by Epstein (1996).

SEEC Training

The components of the SEEC (securing, expanding, exposing, and challenging) model and their relationship to opportunity identification are below followed by the generation of specific hypotheses. Table 1 below lists idea-enhancing exercises that correspond to each of the four components of SEEC.

Securing

According to Epstein (1996), securing, or capturing, is the most important skill required to enhance creativity. To be alert to new possibilities as well as to capture these thoughts is critical. Other researchers (McGrath & MacMillan, 2000; Proctor, 1995; Wallas, 1926) reinforce the importance of capturing ideas. Proctor states, "[I]deas are mental phenomena which somehow drift into the mind, wander through it and often vanish into obscurity, never to be recalled again" (1995: 39). Graham Wallas (1926) tells the story of a man who came up with such a brilliant idea that he dropped to his knees to thank God for it. However, upon arising, realized he had forgotten the idea and never recalled it again (Proctor, 1995). In their research into the entrepreneurial mind-set McGrath and MacMillan state, "one skill typical of successful entrepreneurs is the ability to hold onto their ideas over time, not necessarily moving on them right way, but not forgetting about them either" (2000: 17). They propose an opportunity register as one simple way to hold onto good ideas. Therefore, according to generativity theory, activities as simple as keeping a written opportunity log may significantly enhance an individual's ability to secure ideas.

TABLE 1
Components of the SEEC Model

Skills/Exercises	Description	Resources/Researchers
Securing		
Opportunity Register	Recording into journals ideas that occur throughout the day.	Epstein, 1996; McGrath & MacMillan, 2000; Proctor, 1995; Wallas, 1926
Expanding		
Idea Generation Exercise	Individuals are given an opportunity to list several recent problems they have encountered in daily life. They are then asked to individually design a web of possible solutions. These solutions are then shared with the class.	Amabile, 1988
Knowledge Sharing	Students are asked to share "their best idea so far" in their idea notebooks.	Epstein, 2000
Team Organization	Teams are organized using a "job fair" approach where individuals are required to interview prospective "employees" and employees have an opportunity to seek out top ideas.	
Idea Presentation	Students are asked to share their best idea in a one minute "elevator talk." They are to assume that they have gotten into an elevator with a venture capitalist on the 1st floor and have until the 15th floor to garner interest in their idea.	
Exposing		
Brainstorming	A group exercise designed to find a solution for a specific problem by generating as many ideas as possible—the wilder the ideas the better.	Osborn, 1957; Proctor, 1995
Brainwriting	Brainwriting is a group exercise similar to brainstorming with one difference—individuals brainstorm solutions on a piece of paper which are then passed to other group members who are able to build upon previous ideas. This allows individuals who would be intimidated to participate.	Woods, 1979
Creative Product Development	A group exercise wherein students are asked to observe everyday items such as table salt, masking tape, or an empty juice bottle and develop as many uses for the product that they can within an established time period (approx 10 min.).	Group Creativity—Bundy, 2002; Isaksen, 1988
Creativity Readings	"Why didn't I think of that? Bizarre origins of ingenious inventions we couldn't live without" "*The Big Book of Creativity Games*" "A Whack on the Side of the Head" "*Cracking creativity: The Secrets of Creative Geniuses*"	Freeman & Golden, 1997; Epstein, 2000; Von Oech, 1983; Michalko, 2001
Challenging		
Elevator Talk Presentations Judged by Peers	Elevator talks described above are judged by peers, allowing some to be selected and others to fail.	
Relevant Information Competitive Searches	A group "scavenger hunt" for information, which is a competitive search with some groups receiving prizes for completeness and timeliness.	

Expanding

Expanding, or broadening, refers to the requirement that individuals acquire new skills, thus increasing personal possibilities. In entrepreneurship education, this expanding often takes the role of experiential exercises (Kourilsky, 1995). Although experiential learning is emphasized for all management learning (Kayes, 2002), it is particularly important to entrepreneurial education. Allowing future entrepreneurs to experience aspects of entrepreneurship such as idea generation exercises, idea presentation, knowledge sharing, team organization, and venture capital presentations expands the knowledge repertoire from which students operate and may significantly enhance the development of entrepreneurial ideas.

Exposing

Exposing refers to the skills required to open one to diverse and changing situations. If the culture of the class is maintained in such a way so that

individuals are always a bit "unsure what might come next" and are in a sense operating at the edge between structure and chaos, this increases the amount of exposure to diverse and changing situations. There must be enough structure that individuals can function, but enough chaos that individuals can be creative. Ronstadt states it this way: "[S]tudents must be prepared to thrive in the unstructured and uncertain nature of entrepreneurial environments" (1990: 80). According to Bundy, "nonlinearity is a dominant principle of creativity" (2002: 162). There must also be an "openness" that allows individuals to suggest unusual ideas and thoughts. Exercises that require individuals to be open to diverse and changing situations are brainstorming exercises, brainwriting exercises, creative product development exercises, and readings that emphasize the importance of exposing oneself to diverse situations. The absence of such stimuli may inhibit individual creativity. Von Oech (1983) discusses how difficult it is to becoming creative in a stifling and controlled environment.

Challenging

Challenging refers to the process of opening oneself up to new challenges through failure. Failure sets into motion a behavioral process referred to as resurgence (Epstein, 1983). *Resurgence* is the reappearance of multiple, previous behaviors that previously worked in situations like the current one. When multiple behaviors begin to compete with each other, creativity, or new ideas are born. Successful entrepreneurs seem especially adept at building upon previous failures and using heuristics they have developed over time to solve a current problem. McGrath (1999) contends that although learning does occur, failure can be costly and painful for the stakeholders. Experiencing failure within the confines of the classroom can be considerably less expensive and less painful than in the market. As students experiment and then experience success or failure, learning occurs and provides the basis for creativity. Exercises which allow students to experience "low-cost failure" include elevator talk presentations, which are judged by peers as to the viability of an idea, competitions, which pit groups of individuals against each other in the search for relevant business information and the development of a business idea through a feasibility study, which ultimately determines the likelihood of success of a given idea.

Generativity theory posits that use of these skills will lead to more creativity and the identification of more ideas. Other researchers (Osborn, 1957; Proctor, 1995) indicate that creativity training leads to more ideas and contend that the more ideas generated, the greater the probability that a high-quality solution will be found. However, some researchers dispute the "more is better" perspective. Ford suggests, "[C]reativity is a domain-specific, subjective judgment of the novelty and value of an outcome of a particular action" (1996: 1115). This definition points to the importance of defining creative acts with respect to specific actions and outcomes (value or innovativeness of an idea). In opportunity identification research, the long-range measurable outcome might be product development or the first sale; however, in the short run, the value of an outcome is best measured by innovativeness. In his study of both alertness groups and systematic search groups, Fiet (2002) found that the alertness group discovered more opportunities than did the systematic search group, but the systematic search group discovered opportunities that were more likely to lead to wealth creation. Therefore, it is important in studies of this type to measure not only the number of opportunities, but also the innovativeness of those opportunities (Amabile, 1990; Hughes, 1963).

The level of innovativeness represented in business ideas has important implications with respect to initiating opportunities and creating wealth. Drucker (1998) points out that innovation is required to maintain a competitive advantage. This is consistent with Porter's view (1980), indicating that in order to maintain a competitive advantage, businesses must create products or services that are differentiated either by cost or some other factor. This differentiation occurs only when individuals conceive different ways of doing things, since one can only differentiate when doing things differently. Logically, when individuals generate a broader variety of unique business ideas, they are more likely to be able to select value-creating opportunities from that broader portfolio.

In summary, the theoretical rationale for SEEC training is most consistent with the passive search perspective. Using this theoretical basis, we believe SEEC training can modify cognitive processes in such a way that students receiving it will improve their ability to generate more ideas as well as the degree of innovation or uniqueness in those ideas. In the long run, this should provide a point at which a new business can be launched that includes significant differentiation as part of the business model.

HYPOTHESES

The preceding discussion leads to the research model presented in Figure 1. In this model we employ concepts of both personality and learning as they apply to the number of business ideas and the innovativeness of ideas generated by students. Kirton's adaptor innovator theory states that individuals have basic predispositions toward being either an adaptor or an innovator. Thus, we used Kirton's inventory to assess each participant's preintervention level of innovativeness. We then used the SEEC training intervention with an experimental group. We propose that the number of ideas generated and the innovativeness of those ideas will be a function of both the preintervention dispositional propensity to innovate and participation in the SEEC training. Furthermore, we believe that individuals with a predisposition toward innovation will have an even a larger gain than those who do not. This leads to the following formal hypotheses:

Hypothesis 1: *In the entrepreneurship classroom the individual's preintervention propensity to innovate (as measured by KAI) will be a positive predictor of (a) the number of potential business ideas generated; and (b) the degree of innovativeness in the potential business ideas generated.*

Hypothesis 2: *In the entrepreneurship classroom, individuals who are trained in the skills of securing, expanding, exposing, and challenging will generate (a) more business ideas; and (b) ideas that have a higher average degree of innovativeness than they did prior to the training intervention.*

Hypothesis 3: *In the entrepreneurship classroom, individuals who are trained in the skills of securing, expanding, exposing, and challenging will generate (a) more business ideas; and (b) ideas that have a higher degree of innovativeness than an untrained control group.*

Hypothesis 4: *In the entrepreneurship classroom, the interaction effect between the individual's preintervention propensity to innovate (as measured by KAI) and SEEC training intervention will be a positive predictor of (a) the number of potential business ideas generated; and (b) the innovativeness of the business ideas generated.*

METHODS

Study Participants

The participants in this study were 130 senior-level undergraduates at a university in the western United States. All participants were business students and were enrolled in one of four possible sections of a required strategic management course. Although there was not "true" random assignment to one of the four groups (students chose which section they preferred), statistics were com-

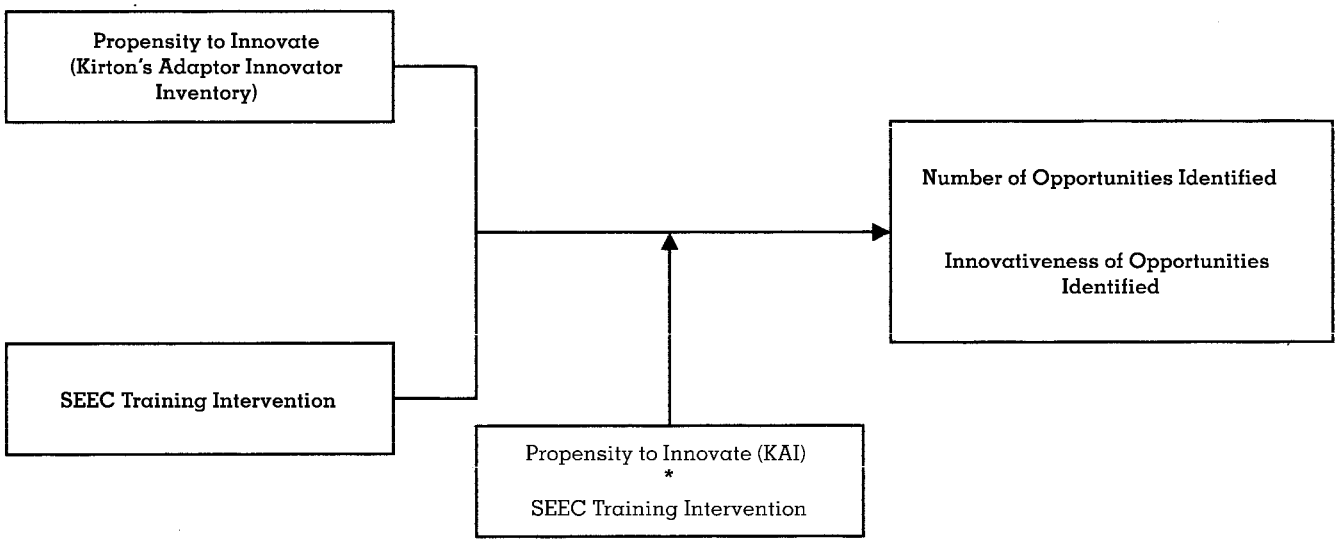

FIGURE 1
Research Model

puted on the following descriptive data—age, gender, number of jobs held in the last 3 years, previous involvement in the creation of a new venture, creativity self-assessment, and predisposition toward entrepreneurship (as measured by the likelihood that they would be involved in an entrepreneurial venture in the next 12 months/sometime in their lifetime)—to verify that there were no statistical differences between groups. We chose these variables because previous researchers indicated that differences in them may impact the validity of the experiment. This data was collected through the use of a short survey in which students were asked to provide pertinent demographic information. See Exhibit 1 below for a complete copy of the survey.

The mean age of the participants was 24 years, and 45.9% of the participants were female. In the 3 years prior to the study, participants held an average of 2.9 jobs that lasted longer than 3 months. These jobs varied by industry, with jobs in the following sectors occurring most often: (1) Retail; (2) Information-Publishing and Communications; (3) Construction; (4) Professional and (5) Food Service. Twenty-seven (20.8%) of the students indicated involvement in the creation of a business that created new wealth. See Table 2 for further descriptive statistics of the test participants.

Experimental Design and Conditions

The experimental design we used is a variation of a Solomon Four-Group Design (Campbell & Stanley, 1963; Solomon, 1949), which allowed us to determine the main effects of testing as well as the ability to test the effects of maturation and history on the results. Maturation (the processes within the respondents operating as a function of the passage of time) and history (the specific events occurring between the first and second measurement in addition to the experimental variable) are specific threats to internal validity in experiments and are controlled for in this design. The design is as follows:

R	O_1	X	O_2
R	O_3		O_4
R			O_5

R indicates random assignment, O refers to some process of observation or measurement and X refers to the treatment effect. The left to right dimension indicates the temporal order, and those variables vertical to one another are simultaneous (Campbell & Stanley, 1963). O_1 and O_2 indicate the pretest and posttest of the treatment group; O_3 and O_4 indicate the pretest and posttest of the first control group; and O_5 is the test of the second control group.

Students from two sections of a strategic management course taught by the same instructor formed an experimental group of 71 students. The first control group (consisting of 24 students) participated in both the pre- and posttest, while the second control group (consisting of 35 students) participated in only the pretest. Students were administered the pretest during the 2nd week of the semester and the posttest during the 13th week of the semester. A pilot study of the instrument was conducted with individuals who were members of a master's in human resources cohort group. Due to comments from these individuals, slight modifications were made to the instrument (e.g., the scale established by Fiet [2002] used to measure innovativeness was altered slightly).

Procedures

Participants in the study were given the following explanation: "The following pages are an effort to combine research into how business opportunities are identified and classroom experiential exercises. The research will be used to better understand how individuals recognize business opportunities, which is an important topic to entrepreneurship scholars and researchers." Participants were not given any extra incentive to take part in the study and were allowed to choose not to participate. Approval to conduct the study was obtained from the institutional review board. Participants were assured that their answers would be kept confidential.

One hundred seventy students participated in the pretest, which asked them to "think back for a moment over the events and activities of your last 24 hours. These might include: commuting, social encounters, classes, homework, hobbies, work, family or organizations in which you are involved. Please list below any business opportunities that you have observed. List any and all ideas that come to mind—it is not necessary to critically evaluate those opportunities as to potential success."

Of the 170 participants in the pretest, 130 completed the posttest and are included in the analysis. Individuals who did not complete both sections were dropped from the study. Reasons for attrition included students dropping out of the class after completing the pretest; absence on date of posttest; or omitting a 4-digit identification code on either the pre- or posttest, which prevented tracking of individuals. The posttest asked students to once again answer the above question followed by the collection of additional demographic information.

EXHIBIT 1
Survey Instrument

1. Please list the last four digits of your social security number or a four digit code that you will remember throughout the semester _____

2. Please list your age in years ____

3. Have you received any other college degrees (for example BS, BA, MS) other than the one you are currently working on? ____Yes ____No
   If yes, please list degrees and area of study _____

4. Have you attended any other training programs? ____Yes ____No
   If yes, what was it and how long did you study? _____

5. Use the following table to list your previous employment history indicating any jobs you have had in the past 3 years that lasted more than 3 months and the industry those businesses were in. Use the codes provided under the table to indicate the industry in which you were employed.

	Job Title	Industry
Example		
#1		
#2		
#3		
#4		
#5		

Codes to use for industry: Agriculture (A); Arts, Entertainment & Rec (AR); Construction (C); Computer Manufacturing (CM); Other Manufacturing (M); Education (E); Finance & Insurance (FI); Food Services (F); Health Care (H); Information—Publishing & Communications (I); Professional (P); Retail Trade (R); Software Development (S); Transportation (T); Other (O).

6. List the number of businesses you have started (by yourself or with others) that have created new wealth. _____(If none, that is fine—simply say "0.")

7. Please indicate how creative you believe you are.
   Not at all creative Highly Creative
   1 2 3 4 5

8. Why did you take this section of MHR4880/MHR4890 rather than the other sections available? _____

9. What is the likelihood that you will be involved in the creation of a new venture sometime—
   —*In the next 12 months*
   Highly Unlikely Highly Likely
   1 2 3 4 5
   —*In the next 5 years*
   Highly Unlikely Highly Likely
   1 2 3 4 5
   —*In the next 10 years*
   Highly Unlikely Highly Likely
   1 2 3 4 5
   —*Sometime in your lifetime*
   Highly Unlikely Highly Likely
   1 2 3 4 5

TABLE 2
Descriptive Statistics of Research Participants

Groups		*N*	Age	Gender	No. jobs in 3 yrs.	Previously involved in creation of venture (%)	Creativity self-report	Stating the likelihood to be involved in creation of venture in next 12 mos. (%)	Stating the likelihood to be involved in creation of venture in lifetime (%)
Treatment	*M*	71	24.0	36 (0)	3.03	25.4	3.02	16.9	78.9
Group	*SD*		4.83	34 (1)	1.29		1.06		
Control	*M*	24	23.8	8 (0)	2.83	20.8	3.00	20.8	66.6
Group #1	*SD*		2.10	14 (1)	1.20		.88		
Control	*M*	35	24.2	13 (0)	2.32*	11.4	3.32	20	62.8
Group #2	*SD*		2.06	22 (1)	1.15		1.05		

Note. Under "Gender" 0 = female; 1 = male.
* $p < .05$.

Students in the experimental group were exposed to the following components of the SEEC model described above:

1. Students were asked to maintain an opportunity register, which was collected unannounced twice during the semester. Each student was required to make five journal entries in the register each week and was advised on a regular basis to "begin to look at the world in such a way that you see everyday activities as possible opportunities" and to "make notes as soon as an idea occurs—even writing it on a scrap piece of paper, if necessary—rather than waiting until some later date to make entries."

2. Each time the class met in the first 8 weeks, time was set aside to either share opportunities, new inventions and ideas from the popular press (e.g., Bluetooth wireless technology, smart card technology), or to spend time exploring the origins of everyday products (e.g., Velcro, Ben & Jerry's Ice Cream).

3. Although there was an established syllabus that gave students the structure necessary to feel somewhat in control of their class, in-class exercises were varied and unpredictable. Samples of exercises included brainstorming exercises, brainwriting exercises, information scavenger hunts, and an exercise designed to explore the number of ideas that could be developed from everyday products (e.g., masking tape, table salt).

4. Exercises that allowed students to experience "low-cost failure" included an elevator talk presentation, which is judged by peers as to the viability of an idea, competitions that pitted groups of individuals against each other in the search for relevant business information, and the development of a business idea through a feasibility study which ultimately determined the likelihood of success of a given idea. See Table 1 above for a complete description of SEEC components.

After completion of the pretest and posttest, the data were entered into a spreadsheet exactly as expressed by the participants and rated by two independent coders. Coders were identified for their ability to judge opportunities based upon their academic qualifications, previous work experience, and experience in new venture creation. Coder Number 1 had 27 years of industry experience, an MBA, and had been involved in the creation of four ventures that generated significant wealth. Coder Number 2 had 18 years of industry experience, a PhD in strategy and entrepreneurship, and had been involved in the creation of two ventures that generated significant wealth. Coders assessed each idea expressed by the participants on two dimensions: number of opportunities and innovativeness of opportunities. Using a Pearson bivariate correlation, the interrater reliability for innovativeness of opportunities was .85, indicating high consistency among coders.

Measures

Number of Opportunities

The number of opportunities was the result of a count (for each participant) of opportunities expressed in the experiment. Those ideas that fell into the category of "no apparent innovation or not enough information to make a determination" were not included in the final count. For example, one participant expressed, "I could take pictures at my friend's wedding" and another "I might get into the insurance business." Neither statement was included in the number of opportunities.

Innovativeness of Opportunities

The innovativeness of the opportunities was established based upon a scale developed by Fiet (2002). The scale was altered slightly due to comments obtained during a pilot test of the instrument and comments by the coders during a pre-rating session. To determine the innovativeness of the opportunities, the coders used a 6-point scale based upon the following categories: (1) No apparent innovation or not enough information to make a determination; (2) A product or service identical to an existing product/service offered to an underserved market; (3) A new application for an existing product/service, with little/no modification or a minor change to an existing product; (4) A significant improvement to an existing product/service; (5) A combination of two or more existing products/services into one unique or new product/service; and (6) A new-to-the world product/service, a pure invention or creation.

Kirton Adaption Innovation Inventory

The adaption-innovation theory and the resultant inventory developed by Kirton (1976, 1987) "measures styles of decision-making, problem-solving and, by implication, creativity" (Kirton, 1988a: 65). "According to the adaption-innovation theory, everyone can be located on a continuum ranging from highly adaptive to highly innovative" (Kirton, 1988a: 66). Adapters tend to look for solutions to problems within the established mores of their organization (inside the box) and are concerned with doing things better. Innovators tend to look for solutions outside of their organizations (outside the box) and are concerned with doing things differently.

The inventory consists of 32 items with a theoretical range of 32–160 and a theoretical mean of 96. "The observed mean, however, is nearer to 95 and the distribution conforms almost exactly to a normal curve" (Kirton, 1988a: 73). Entrepreneurs score higher on the KAI than non-entrepreneurs (Brigham, 2002; Buttner & Gryskiewicz, 1993; Dewan, 1982). In a population of Indian managers, Dewan (1982) found that entrepreneurs scored 7.2 points higher than non-entrepreneurs. In their 1993 sample, Buttner and Gryskiewicz found that entrepreneurs scored 114 (19 points above the mean) and Brigham (2002) found that entrepreneurs scored 110 (15 points above the mean).

Participants were asked to complete the 32-item inventory and to self-score their results. Some of the items were reverse scored. Item #1 is a practice item; therefore, we checked the self-scoring processes and made adjustments to scores when errors in computation were observed. The mean KAI score across the entire participant sample ranged from 65 to 118 with a mean of 92.4.

ANALYSIS AND RESULTS

We performed a one-way analysis of variance (ANOVA) to determine if there were statistical differences between the treatment group and the control groups on the following descriptive data—age, gender, number of jobs held in the last 3 years, previous involvement in the creation of a new venture, creativity self-assessment, and predisposition toward entrepreneurship. Results indicated that there were no differences between groups on the above variables, with one exception. The experimental group differed from the second control group on number of jobs held in the previous 3 years. Because number of jobs could indicate previous experience, which might impact number of opportunities identified, we tested for any differences in number of opportunities identified in the pretest between the two groups and found no significant differences. In addition, the second control group completed only the pretest portion of the experiment, and therefore, did not impact the tests of the hypotheses.

We analyzed the data obtained in this study using *t* tests and hierarchical regression. To test Hypotheses 1a and 1b—whether the individual's preintervention propensity to innovate was a positive predictor of number of potential ideas generated and a positive predictor of innovativeness of ideas generated—we used multiple regression. As shown in Table 3 below, Hypothesis 1b was supported in the expected direction. Hypothesis 1a was not supported. Therefore, an individual's propensity to innovate (as measured by the KAI) predicts the innovativeness of potential ideas generated but not the number of ideas generated.

To test Hypotheses 2a and 2b—the impact of the training intervention on the ability to generate more business ideas and more innovative ideas—we used a paired sample *t* test. As shown in Table 4 below, both Hypotheses 2a and 2b were supported ($p < .01$ and $p < .001$, respectively). These results indicate that training in the skills of securing, expanding, exposing, and challenging leads to the identification of more opportunities and more innovative opportunities.

To test Hypotheses 3a and 3b—whether the treatment group identified more ideas and more innovative ideas than the control group—we used an independent samples *t* test. As shown in Table 5 below, both Hypotheses 3a and 3b were supported

TABLE 3
Hierarchical Regression Results for Both the Number and Innovativeness of Opportunities (n = 130)

	No. Opportunities		Innovativeness of Opportunities	
	β	t statistic	β	t statistic
Base Model				
KAI	−.131	−1.373	.235	2.371*
Training	.387	4.05***	.260	2.629**
Constant	2.263	3.781	−.316	−.298
Model's R^2		.174***		.114**
Extended Model				
KAI	−.207	−.981	.209	.956
Training	.383	3.98***	.259	2.596
KAI X Training	.085	.403	.029	.132
Constant	2.723	3.781	−.049	−.022
Model's R^2		.176**		.114*

* $p < .05$. ** $p < .01$. *** $p < .001$.

($p < .05$ and $p < .001$, respectively). These results indicate that training in the skills of securing, expanding, exposing, and challenging leads to the identification of more opportunities and more innovative opportunities than traditional approaches.

Finally, to test Hypotheses 4a and 4b—whether there is an interaction effect between an individual's preintervention propensity to act and the SEEC training (is the training more effective for individuals with high KAI scores)—we used an extended model hierarchical regression. Table 3 above indicates that the interaction variable was not significant for either number of ideas or innovativeness of ideas, and there was no support for Hypotheses 4a and 4b.

Therefore, there was support for Hypotheses 1b, 2a, 2b, 3a and 3b, but no support for Hypotheses 1a, 4a and 4b. We now turn to a discussion of the findings in this study.

DISCUSSION

The crucial finding in this study is that SEEC training had an influence on the students' abilities to generate more ideas for business opportunities that also have the characteristic of being more innovative. This is an important finding for scholars, educators, and entrepreneurs. From a scholarly perspective, the research suggests that passive search models emphasizing creativity are a possible method of opportunity identification. For educators, this finding suggests one appropriate content area and a specific, well-defined pedagogy for entrepreneurship education. From an entrepreneur's perspective, this finding suggests that individuals can learn to become more adept at opportunity identification and that entrepreneurship is not about who the entrepreneur is, but what the entrepreneur does (Gartner, 1988). Also, there is indication from the students who were part of the experimental group that the training had a significant effect on their ability to notice opportunities. After completing the posttest, students were asked the following question: "Do you think that you were able to list more opportunities or opportunities that were more innovative than the previous time you completed this study? Why or why not?" The comments included the following:

> "I feel like I think of things in a different way, because of the idea notebook and always talking about it in class."

> "Because I still think everyday like I have to report to the idea notebook—it became a habit."

> "Yes, I became more aware of the opportunities around me. Also, I became more interested in entrepreneurship and subscribed to a couple of 'latest ideas' websites that send me monthly updates on great opportunities."

However, some intimated the difficulty of being creative in an experimental setting:

> "For some reason there have been so many ideas that we've talked about that it is hard to think of new ones and not copy old ones."

TABLE 4
***T*-Test Results of Treatment Group**

	Mean Pretest Score	Mean Posttest Score
Number of Ideas	2.42	2.87**
Innovativeness of Ideas	1.83	2.16***

* $p < .05$. ** $p < .01$. *** $p < .001$.

TABLE 5
***T*-Test Results of Control Group Versus Treatment Group**

	Mean Control Group Score	Mean Treatment Group Score
Number of Ideas	2.13	2.87*
Innovativeness of Ideas	1.46	2.16***

* $p < .05$. ** $p < .01$. *** $p < .001$.

> "Having to sit and think of ideas doesn't work for me. I do much better while out and about thinking of new products or services."

In addition, we found that the SEEC training has a greater impact on the number and innovativeness of ideas than the individual's predisposition to be innovative (as measured by the KAI inventory). Earlier in this article we listed five major theoretical perspectives that explain the origin of creativity and the source of new ideas. This hypothesis tested the impact of personality on the origination of ideas and found it to be important; however, learned cognitive processes explained more variance in outcomes than preintervention propensities.

Of interest is that there was no support for the interaction hypothesis. In other words, an individual's predisposition to be innovative did not moderate the impact of the training. Although this runs counter to our hypothesis, it is an important finding with respect to understanding the SEEC training intervention. Those with a lesser predisposition for innovation derived the same benefit from the training as those with a greater predisposition. The findings do not indicate that all were at the same level after the training intervention, but rather that the predisposition to be innovative did not significantly alter the ability to learn to be more creative in generating business opportunities.

Three of our hypotheses were not supported. First, there was no relationship between the preintervention KAI (innovativeness) score and the number of opportunities generated. We propose three reasons why this might have occurred. First, individuals who are inherently more creative may be less concerned about task environment. Second, individuals who are more innovative may be less likely to want to share all of their creative ideas. One student commented on the study "no way am I giving my great ideas to anyone involved in entrepreneurship." In that case, the results from the study may actually be understated. Finally, either the measure of preintervention innovation or our criterion measure of the number of opportunities may be flawed. If either the predictor or criterion variable is not valid, legitimate relationships may be masked. The final two hypotheses that were not supported dealt with the interaction between the preintervention KAI and training and its impact on number of ideas generated and the innovativeness of those ideas. The most obvious explanation for this finding is that the preintervention KAI score is not an indicator of trainability. As pointed out above, this is not a serious blow to our model. Rather it provides stronger support for the efficacy of the training.

Of course there is a substantial distance between a student's ability to generate ideas for business opportunities, and the ability to turn ideas into wealth-creating businesses. From a logical perspective, individuals who come up with innovative ideas should have a higher probability of turning those ideas into a differentiated competitive advantage than individuals who do not generate innovative business ideas.

It is also important to note that the ability to generate innovative business ideas is viewed as a necessary but not sufficient condition for entrepreneurs who develop wealth-creating businesses with sustainable competitive advantages based on the innovativeness of their products or processes. Man, Lau, and Chan (2002) point out that in addition to competencies related to recognizing and developing market opportunities, other competencies include relationship and alliance building, conceptual competencies, organizing competencies, strategic competencies, and commitment competencies. Thus, the SEEC training is conceptualized to be only a piece of the competence-building process for aspiring entrepreneurs. This research simply shows that students can be trained to generate ideas for innovative opportunities. The SEEC method, as mentioned earlier, is not to be viewed as the only method of opportunity identification. It does not teach systematic search skills, and is thus best fitted to the passive search perspective.

There are two obvious avenues for future research. We have provided evidence of a link between training and the ability to generate innovative business ideas within the entrepreneurial classroom. However, we have not dealt with the link between the innovativeness of the idea and eventual wealth creation. An initial study should replicate the current study with a group of nascent entrepreneurs to determine if entrepreneurs can be trained to identify more opportunities and opportunities of a more innovative nature, and if so, to determine if these more innovative ideas lead to wealth creation. Of equal importance is a clearer identification of other competencies required for successfully developing wealth-creating businesses. After such competencies are clearly identified it will be necessary to develop and test specific training interventions to help develop them. This is a formidable task and will require substantial development and validation.

Despite the fact that our competency-based approach for designing training interventions is in an early stage, the results of this research have practical application for those involved in teaching entrepreneurship as well as those interested in

acquiring entrepreneurial skills. The application of the SEEC training intervention is linked to measurable improvements in students' abilities to generate business ideas. This is an obvious first step for those passively seeking opportunities by relying on environmental cues to inform the process.

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