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# CHANGING HEALTHCARE BY CHANGING THE EDUCATION OF ITS LEADERS: AN INNOVATION COMPETENCE MODEL

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## ABSTRACT

Current approaches to management development in healthcare do not provide students with the requisite skills to drive innovation within their organizations. We draw a distinction between traditional managerial competencies and innovation competencies, and it is argued that the latter help define the domain of innovation education. Employing a multistage Delphi methodology, evidence is provided of a core set of 19 innovation competencies. We also provide evidence for a more experiential and immersion-based approach to innovation education.

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## INTRODUCTION

Despite increasing financial, human resource and infrastructural investments, and despite exponentially advancing technologies in healthcare, the sector continues to be plagued with inefficiencies and complex problems including erratic quality, unequal access, and relatively high costs (Davis et al., 2014; Diamantis & Kotler, 2012). Addressing this growing potential performance gap will require novel approaches to the reconceptualization of health and healthcare delivery (Pillay, 2014). Creating disproportionate value relative to these investments and advances is at the core of the innovation agenda in healthcare (Porter & Teisberg, 2006), just as it has been in the business sector (Rauch et al., 2009). Although health CEOs wanted managers who were creative, innovative, and entrepreneurial, graduate training programs did not equip students to meet the challenges for innovation of 21st century healthcare (Herzlinger et al., 2014; Omachonu & Einspruch, 2010). This may perhaps be attributable to the fact that current pervasive health leadership and management competency models such as that of the Health Leadership Alliance (HLA) (Stefl, 2008) do not include creativity, innovation, and entrepreneurial thinking as key competencies, while models such as those of the National Center for Health Leadership (NCHL) (Calhoun et al., 2008) include “Innovative Thinking” as a single competency within the Transformation domain. It is our contention that a distinct set of knowledge, skills, behaviors, and attitudes are critical for innovative thinking and entrepreneurial action within healthcare, and that they must be developed in concert with the more general managerial competencies included in the HLA and NCHL models which are vital for the day-to-day operations of any healthcare organization.

The essence of innovative and entrepreneurial behavior in healthcare is the introduction of a new concept, idea, service, process, or product aimed at improving treatment, diagnosis, education, outreach, prevention, and research, and with the long-term goals of improving quality, access, safety, outcomes, efficiency, and costs, regardless of resources controlled (Omachonu & Einspruch, 2010). Given the significant advances in innovation and entrepreneurship as academic disciplines and our enhanced understanding of these activities as processes (Varkey et al., 2008 ; Morris, Kuratko, & Schindehite, 2001), and given the increase in university programs offering healthcare innovation as degrees, tracks or concentrations courses (Valerio, Parton and Robb, 2014), the main purpose of this research was to bridge the disconnect between what the market needs and wants, and what training programs offer, by developing a specific competency model for innovation education and training in healthcare.

The purpose is not to replace existing administration competency models, but merely to complement and augment them so that they better meet the needs of modern-day health managers.

While considerable effort has been devoted to understanding psycho-social traits of successful innovators and entrepreneurs, as well as organizational attributes associated with highly innovative organizations (Baron, 2008; Gartner, 1989), the particular competencies that support and enable them remain elusive. This is further compounded by a failure among scholars to distinguish managerial skills from specific innovation-related skills. Both educational programs and the academic literature in health administration have tended to emphasize the need for the former, and while these are important for the day-to-day operations of healthcare organizations (Calhoun et al., 2008; Stefl, 2008), they do not address the unique requirements of an innovation agenda. It is our contention that an innovation-driven approach requires a distinct set of competencies that has to be co-developed with the general managerial competencies that are currently emphasized. This approach will enable graduates to bring immediate value within the domain of existing operations as well as explore new opportunities to drive value creation within their organizational contexts.

A competency refers to the knowledge, skills, attitudes, values, and behaviors that people need to successfully perform a particular activity or task (Brophy & Kiely, 2002; Rankin, 2004). Importantly, competencies directly correlate with job performance and can be learned, developed with training, and measured against standards (Bergevoet, Mulder, & Van Woerkum, 2005; Bryant & Poustie, 2001). Structuration theory provides a useful framework to understand competency development and describes the reciprocal interactions between individuals and their environments. (Giddens, 1984). Past behaviors and interactions with their environments facilitate learning about the types of behaviors that lead to desirable outcomes, thereby establishing values, norms, and rules which are essentially the scripts defining how to behave within specific contexts (Barley & Tolbert, 1997). Individuals acquire a broad cache of scripts from behaving in different situations, each of which is available to guide them through a situation with which they are familiar (Feldman & Pentland, 2003; Lord & Kernan, 1987). Through their own distinctive behaviors and interactions, they determine whether these scripts should be replicated or revised for future circumstances. As scripts are confirmed, they can serve as the foundation for the development of competencies, a development which generally occurs over time (Nelson & Winter, 1982). Signification scripts influence how individuals search for environmental change, legitimation scripts

influence how individuals interpret and evaluate this change, and domination scripts influence how individuals respond to this change (Giddens, 1984).

Specific innovation-oriented scripts remain unspecified and understudied. The emergence and rapid growth of health innovation programs suggest that this may represent a unique discipline encompassing a unique body of scripts that can be imparted upon students taking these courses. Identifying, defining and measuring these scripts or competencies therefore has valuable implications for both the advancement of health innovation education and improving innovation practice. As a result, they can have significant implications for what is taught in health innovation courses and training programs, how it is taught, and how learning outcomes are assessed.

### STUDY DATA & METHODS

We employed a multiround Delphi technique to identify key innovation competencies associated with the successful conceptualization and implementation of a new idea in a healthcare context. The Delphi technique is a formalized method of soliciting ideas and subsequently consensus among individuals considered to be experts in the field of interest (Preble, 1983; Chan et al., 2001). A particular benefit of this method is its ability to garner multiple expert opinions without face-to-face interaction among the experts (Wilson, Averis, & Walsh, 2003). This interaction is facilitated after an initial survey is distributed to each individual in a chosen panel(s) of experts in which ideas are generated. In our case, we ask the participants to list innovation competencies. Based on the results, a group of raters collate all of the ideas. In subsequent rounds panelists then get the chance to see and respond to the ideas of other members of the panel.

The study involved three distinct samples: a panel composed of 27 distinguished health entrepreneurs (drawn from the Harvard Business School database), 45 leading healthcare administration business and entrepreneurship/innovation educators (members of the Global Educators Network for Innovation Education); and 11 senior government representatives. The purpose of the study was explained as determining success factors in conceptualizing and implementing innovations in healthcare and all participants agreed to participate through multiple rounds.

In round one, members of each panel were sent an initial survey asking whether they believe there are specific competencies associated with innovation success, and if they were learnable. The key question involved having participants generate a complete list of innovation competencies they believed were vital in conceptualizing and implementing innovations. Respondents were asked to focus on innovation as opposed to managerial competencies,

where a managerial competency is one that is more generic, applying to all managers or managerial contexts. A total of 305 items were generated. While the compilation included many duplicate items, other responses were subject to interpretation. Accordingly, we collated the responses and asked four raters (i.e., business school professors) to break down the list into a common set of competencies. Each rater produced a revised list of competencies that ranged from 17 to 30 items. We used items on which at least three of the four raters agreed. This resulted in a set of 23 competencies.

Round two involved designing a second survey around the twenty three competency items from the first round. It was explained that the revised set was the result of the combined input from the two panels. Respondents on each panel were then asked to rate the relative importance of each competency for the successful conceptualization and implementation of innovations on a five-point Likert scale (1=an unimportant competency; 3=neutral; 5=an important competency). They were also asked to indicate the extent to which each of the competencies was more an entrepreneurial or general management competency (where 1= more a managerial competency; 5= more an entrepreneurial competency).

The data from round two was analyzed to determine those items that received a mean importance rating of 3.0 or better and that were rated as being more an innovation-related than a general management competency. Based on the results, a new list of 20 competencies was produced. This revised list was then sent to the members of the three panels,

We then repeated the steps from the second round using the revised list, asking respondents to again assess the importance and innovation/managerial nature of each competency. Using the same selection criteria, a set of 19 competencies was produced from this third round (Table 1). Finally, these 19 competencies were again sent to the panelists, asking if these were indeed the key innovation competencies or if there were any they would remove. There was a consensus around this final set.

Table 1

Innovation competencies and mean scores (1=an unimportant competency, 5=an important competency, 3= neutral)

Competency	Overall Mean (SD)	Academia	Business	Other
		(n=45)	(n=27)	(n=11)
Opportunity recognition	4.73 (.45)	4.78	4.65	4.88
Conveying a compelling vision/ Seeing the future	4.49 (.61)	4.62	4.22	4.33
Maintain focus/Adapt	4.40 (.60)	4.40	4.43	4.44
Resilience	4.39 (.67)	4.46	4.52	4.11
Interdisciplinary teamwork and collaboration	4.36 (.70)	4.34	4.47	4.22
Opportunity assessment	4.35 (.70)	4.28	4.47	4.55
Building and using networks	4.19 (.67)	4.22	4.09	4.00
Self-efficacy/Confidence	4.16 (.64)	4.20	4.13	4.00
Tenacity and perseverance	4.34 (1.0)	4.24	4.71	4.50
Understanding of healthcare systems	4.30 (.86)	4.33	4.41	4.00
Ability to leverage resources/ Bootstrapping	4.14 (.79)	4.18	4.04	3.09
Risk management/Mitigation	3.86 (.69)	3.84	4.00	3.67
Creativity problem solving/ Imaginitiveness	4.11 (.81)	4.12	4.26	3.89
Guerrilla skills/Unconventional approaches	3.77 (.76)	3.76	4.26	3.89
Design thinking	4.01 (.98)	3.76	3.88	3.78
Change management	3.93 (1.06)	4.08	4.00	4.13
Cross-disciplinary knowledge	4.06 (.83)	3.96	3.86	3.89
Information management	3.86 (.89)	4.08	4.09	3.56
Behavioral economics	3.75 (.79)	3.71	3.83	3.67

Competencies one through seven in Table 1 were rated as being most important and also exhibited high concurrence, whereas behavioral economics, information management, and change management items were rated as relatively less important and exhibited low concurrence. This was perhaps due

to the more managerial and generic nature of these competencies. Analysis of Variance showed no significant differences in the ratings between academics, industry representatives, and others (Table 2).

Table 2

Analysis of variance, Competencies

Competency	Df	Sum Sq.	Mean Sq.	F Value	Pr(>F)
Opportunity recognition	2	0.436	0.218	1.172	0.315
Conveying a compelling vision/Seeing the future	2	2.758	1.379	3.934	0.024
Maintain focus/Adapt	2	0.017	0.009	0.024	0.976
Resilience	2	1.17	0.584	1.387	0.256
Interdisciplinary teamwork and collaboration	2	0.49	0.2461	0.527	0.592
Opportunity assessment	2	0.980	0.492	1.077	0.345
Building and using networks	2	0.56	0.278	0.597	0.553
Self-efficacy/Confidence	2	0.33	0.1652	0.426	0.654
Tenacity and perserverance	2	2.860	1.432	1.316	0.275
Understanding of healthcare systems	2	1.09	0.547	0.808	0.449
Ability to leverage resources/ Bootstrapping	2	0.81	0.4038	0.667	0.516
Risk management/Mitigation	2	1.115	0.558	1.467	0.237
Creativity problem solving/ Imaginitiveness	2	0.920	0.459	0.68	0.509
Guerilla skills/Unconventional approaches	2	0.22	0.1088	0.192	0.826
Design thinking	2	0.72	0.3575	0.452	0.638
Change management	2	0.04	0.0197	0.018	0.982
Cross-disciplinary knowledge	2	2.23	1.1144	1.681	0.193
Information management	2	3.17	1.5844	2.67	0.075
Behavioral economics	2	0.27	0.1322	0.208	0.812

## COMPETENCIES DEFINED

*Opportunity recognition* pertains to one's ability to scan and search for new information, connect the dots between incidents that appear to be unrelated with limited cues, and recognize patterns or ideas that suggest potential opportunities in the myriad cues or signals that they receive (Baron, 2006).

*Conveying a compelling vision/seeing the future* reflects an individual's proclivity for effective communication where he or she can translate his or her vision into condensed, clear, and intriguing messages to important stakeholders (Chen, Yao, & Kotha 2009).

*Ability to maintain focus yet adapt* speaks to the entrepreneurial experience. This can include considerable ambiguity and uncertainty, significant obstacles, ongoing emergence of new opportunities, and continuous change in circumstances (Morris et al., 2012). The entrepreneur must continuously adapt, change, modify, and switch while maintaining a self-regulated focus in the midst of volatile conditions (Haynie & Shepherd, 2009)

*Resilience* captures the cognitive tendency of an individual to cope with stressful, adverse, and devastating situations, to be able to recover from failures, and to constructively sustain his or her efforts to pursue goals. In reality, successful entrepreneurs are not easily beaten by distress or rejections. Instead, they are able to remain or resume a calm state of mind, to tactically frame and analyze problems, dig into the root cause of failures, and to search for ways to get back on track again (Sinclair & Wallston, 2004).

*Interdisciplinary teamwork and collaboration* refers to the ability of individuals to form partnerships with a team of professionally diverse individuals in a participatory, collaborative, and coordinated approach to share decision-making around issues as the means to achieving improved health outcomes (Orchard & Curran, 2003).

*Assessing the feasibility of an opportunity* emphasizes the need for innovators to make evaluations or judgments on whether emerging information or changes would lead to viable opportunities with profit potential (McMullen & Shepherd, 2006).

*Self-Efficacy/Confidence* relates to an entrepreneur's self-confidence and self-assurance about his or her ability to take on challenges, to perform certain set of tasks as needed or expected, and to control processes, contingencies, or consequences in the entrepreneurial pursuit (Bandura, 1997; Baron & Markman, 2005; Tierney & Farmer, 2002).

*Building and using networks* concerns one's ability to establish, maintain, and structure his or her contact network(s) in ways that foster relationships, enhance access to opportunities and/or resources, and potentially lead to realization of his or her objectives (Aldrich, 1999).

*Tenacity/Perseverance* refers to the extent to which entrepreneurs are committed to seeing their vision through, to endure the long journey to carry out venture creation, to work fervently despite challenges or adversity, to maintain interests, and persist with efforts in achieving goals (Duckworth & Quinn 2009; Hmieleski & Corbett, 2006).

*Understanding of healthcare systems* entails having a firm grasp of the various components of the health system and an understanding of the major issues faced by the stakeholders.

*Resource leveraging/Bootstrapping* describes the need to overcome resource constraints by leveraging resources from others. It also reflects a tendency for innovators to demonstrate an inclination towards effectual rather than causal reasoning in bringing together unique resource combinations (Greene & Brown, 1997; Honig, 2001; Politis, Winborg, & Dahlstrand, 2011).

*Creative problem solving/Imaginativeness* is characterized by Schumpeter (1942), who posited that creative destruction plays a key role in the innovation process. Innovators who start something are engaged in a process of creative imagination in which opportunities are exploited by continuously combining resources in new ways (Kirzner, 1973; Chiles, Bluedorn, & Gupta, 2007).

*Design thinking* is a human-centered, prototype-driven process for innovation that can be applied to product, service, and business design. It is the process of questioning, observing, and experimenting, so that you can become better equipped to capture valuable information and develop new business ideas. It requires experimentation in order to understand how things work, to test new business ideas or different approaches, and to look for valuable insights that may emerge in the process (Brown, 2008).

*Guerrilla skills* is a label adapted from a warfare context, describing approaches that center on clever ways to take advantage of one's surroundings, do more with less, to rely upon unconventional tactics, and to utilize resources not recognized by others in accomplishing tasks within entrepreneurial firms (Schindehutte, Morris & Pitt, 2008).

*Risk management/mitigation* involves the systematic monitoring, assessing, hedging, transferring, and/or exploiting multifaceted risks encountered as an innovation initiative unfolds. Risk-averse attitudes discourage individuals from innovative activities (Cramera et al., 2002), while successful entrepreneurs are willing to first recognize and bear the uncertainty or risk needed to take entrepreneurial actions, and are able to manage risk rather than simply trying to avoid risk (McMullen & Shepherd, 2006).

*Cross disciplinary knowledge* refers to an understanding of the connections, interrelations, and interactions between different fields of knowledge (Mosseri, 2006).

*Change management* is the ability to understand and manage driving forces, visions, and processes that fuel large-scale transformation (Kottler, 2011). Information management is the collection and management of information from one or more sources and the distribution of that information to one or more audiences.

*Behavioral economics* refers to an understanding of psychological, social, cognitive, and emotional factors on the economic decisions of individuals and institutions, and the consequences for market prices, returns, and resource allocation (Lin, 2012). It is the understanding that drives decision making.

In addition respondents were asked to rate the relevance (1=least relevant; 5=most relevant) of 10 pedagogical approaches for the development of these 19 competencies (Table 3).

Table 3

Ratings of pedagogical approaches (1=least relevant, 5= most relevant)

Pedagogical approach	Overall Mean (SD)	Academia (n=45)	Business (n=27)	Other (n=11)
Case studies of failures	4.49 (.50)	4.44	4.59	4.56
Project-based learning	4.37 (.71)	4.50	4.09	4.11
Field-based learning	4.32 (.65)	4.39	4.05	4.11
Case studies of successes	4.21 (.59)	4.18	4.36	4.56
Continuing education	3.97 (.70)	3.94	4.05	4.00
Mentoring by industry professionals	3.90 (.79)	3.85	3.57	3.78
Team-based learning	3.70 (.87)	3.78	3.55	3.67
Global experience	3.70 (.75)	3.67	3.59	3.67
Traditional lecturers	2.87 (.92)	2.94	2.50	2.56

Case studies of failures, case studies of successes, field-based experiences, and project-based work were rated as most relevant. They exhibited high concurrence amongst respondents, whereas traditional lectures were rated as being least relevant. Analysis of Variance showed no significant differences in the ratings between academics, industry representatives, and others (Table 4).

Table 4

Analysis of variance, Pedagogy

Pedagogy	Df	Sum Sq.	Mean Sq.	F value	Pr(>F)
Traditional lectures	2	1.21	0.606	0.717	0.491
Case studies of successes	2	1.332	0.666	1.945	0.15
Case studies of failures	2	0.387	0.193	0.759	0.472
Project-based learning	2	3.11	1.557	3.264	0.043
Mentoring by industry professionals	2	2.11	1.053	1.673	0.194
Field-based experience	2	2.01	1.006	2.313	0.106
Global experience	2	0.11	0.532	0.089	0.915
Interactive learning	2	0.64	0.322	0.400	0.672
Team-based contests	2	0.85	0.427	0.620	0.596
Continuing education	2	0.18	0.088	0.173	0.842

## DISCUSSION

As innovation becomes a central part of the education of future leaders in healthcare and as health innovation programs become more prevalent in universities throughout the world, the 19 specific health innovation competencies identified in this study can help to define content and reduce the variance of health innovation programs going forward. In addition, our findings underscore the need for a stronger emphasis on experiential learning.

It is noteworthy that this set of competencies, while more detailed and comprehensive, is consistent with the areas emphasized across previous seminal work on entrepreneurial competencies (Morris et al., 2013). The range of competencies that emerged from our Delphi approach highlights the complex nature of healthcare innovation. Competencies range from attitudinal competencies such as resilience, self-efficacy, and tenacity to social competencies such as networking and collaboration/teamwork. They also include behavioral competencies such as opportunity recognition, opportunity assessment,

resource leveraging, and design thinking. Although factor analysis of the 19 items loaded onto just one factor, the behavioral items clearly fall into the three categories proffered by structuration theory: signification, legitimation, and domination (Giddens, 1984). Signification scripts like creativity and imagination, opportunity recognition, understanding of healthcare systems, cross-disciplinary knowledge, information management, vision-based competencies, and behavioral economics are key tasks associated with environmental scanning. These competencies may be developed by encouraging students to read trade journals, stay abreast of industry trends, have industry mentors, and conduct interviews with established innovators to understand how they recognized their own opportunities. Similarly, opportunity-assessment and risk-mitigation competencies are legitimation scripts, in which students might be tasked with conducting feasibility analyses and risk assessments. Finally, domination scripts support the development of resource leveraging, design thinking, guerilla skills, building and using networks, teamwork and collaboration, and change-management skills which enable innovators to respond in tangible ways to the opportunities. These may be enhanced by getting students to develop business models or plans, buy using elevator pitches, or constructing mock innovation-related tasks or simulations. All of these competencies provide the students with the skills to recognize opportunities, conceptualize solutions, and successfully execute them.

When it comes to innovation, healthcare presents a number of unique challenges. Does the proposed innovation address a real problem that meets market needs? Is there adequate access to required resources? Does it meet legal requirements? Does it suit the varied needs and interests of key stakeholder groups? It is therefore no surprise that respondents identified tenacity, resilience, and self-efficacy as significant attitudinal skills important to successfully innovate in healthcare. These can be taught by creating deliverables that are extremely difficult for students to perform. Resultant failures or difficulties provide opportunities to teach students how to respond to these stumbling blocks, how to analyze what caused them, and ultimately about the need to persist and endure in order to achieve lofty goals.

It is also noteworthy that despite participants being explicitly instructed to identify innovation as opposed to generic management competencies, there was some overlap with the HLA and NCHL models. Understanding of healthcare systems, cross-disciplinary knowledge, information management, vision-based competencies, risk management, change management, teamwork, and collaboration are also common to the HLA and NCHL models, suggesting that innovation entails a management and leadership component as well. The unique innovation competencies that should complement existing

health management competencies include the attitudinal competencies such as resilience, self-efficacy, and tenacity, as well as creativity and imagination, opportunity recognition, opportunity assessment, resource leveraging, design thinking, guerilla skills, and building and using networks.

A key assertion underlying our research is that competencies are developed (rather than conferred) over time, and that education and training can play an important role in this process. It is our hope that innovation education and training will help create a cohort of innovators and transformative healthcare managers who embody these key innovation competencies, as is evidenced by the positive correlation between entrepreneurial outcomes and entrepreneurship education (Dickson, Solomon, & Weaver, 2008; Hamidi, Wennberg, & Berglund, 2008; Wilson, Kickul, & Marlino, 2007). The competency model presented in this paper provides educators with the framework to support innovation education and measure teaching effectiveness. Courses can be designed to develop students' specific competencies, with courses incorporating a case-based approach as well as significant experiential components. The latter will provide an opportunity for health leaders to collaborate with academics in course development and delivery, thereby bringing practical experience to classroom and providing students with opportunities to solve real-world problems in their organizations. The lack of practitioner involvement in the co-creation and co-delivery of health management programs has long been a major criticism levelled by health CEOs (Herzlinger et al., 2014).

## CONCLUSION

Given the desire of health CEOs to have managers who are able to innovate and manage change within their organizational contexts, and their assertion that current approaches to management development do not provide these skills sets (Herzlinger et al., 2014), the competency model presented in this paper is timely. We provide a foundation for educators to construct educational programs that more accurately help students develop attitudinal, social, and behavioral competencies to support their innovation activities, as well as measure the effectiveness of their education programs.

The findings also affirm our assertion that innovating healthcare calls for a specific domain of competencies that are distinctly different to those of general managers. Unlike managers who are assigned specific roles and responsibilities and work within existing paradigms, innovators face uncertainty, varied and complex problems, and significant risks in terms of reputations and resources in their efforts to identify and successfully exploit opportunities.

These competencies are best developed by immersing students in context and providing significant experiential exposure during the programs. We hope that this competency and pedagogical model will inform the development and delivery of effective innovation education programs.

## REFERENCES

- Aldrich, H. (1999). *Organizations evolving*. Thousand Oaks, CA: Sage Publications.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Baron, R. A., & Markman, G. (2005). Toward a process view of entrepreneurship: The changing impact of individual level variables across phases of new venture development. In M. A. Rahim, R. T. Golembiewski, & K. D. Mackenzie (Eds.), *Current topics in management: Vol. 9* (pp. 45-64). New Brunswick, NJ: Transaction.
- Baron, R. A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs "connect the dots" to identify new business opportunities. *Academy of Management Perspectives, 20*(1), 104-119.
- Baron, R. A. (2008). The role of affect in the entrepreneurial process. *Academy Management Review, 33*(2), 328-340.
- Bergevoet, R. M., & Van Woerkum, C. (2006). Improving the entrepreneurial competencies of Dutch dairy farmers through the use of study groups. *Journal of Agricultural education and extension, 12*(1), 25-39.
- Brophy, M., & Kiely, T. (2002). Competencies: A new sector. *Journal of European Industrial Training, 26*(234), 165-176.
- Brown, T. (2008). Design thinking. *Harvard Business Review, 33*(33), 84-92.
- Bryant, J., & Poustie, K. (2001). Competencies needed by public library staff. Retrieved from [http://uflibjobcompetencies.pbworks.com/f/Pub\\_Lib\\_comp.pdf](http://uflibjobcompetencies.pbworks.com/f/Pub_Lib_comp.pdf)
- Calhoun, J., Dollett, L., Sinioris, M. E., Waino, J., Butler, P. W., Griffith, J. R., & Warden, G. L. (2008). Development of an interprofessional competency model for healthcare leadership. *Journal of Healthcare Management, 53*(6), 375-391.

- Chan, A. P. C., Yung, E. H. K., Lam, P. T. I., Tam, C. M., & Cheung, S. O. (2001). Application of Delphi method selection of procurement systems for construction projects. *Construction Management and Economics*, 19(7), 699-718.
- Chen, X. P., Yao, X., & Kotha, S. (2009). Entrepreneur passion and preparedness in business plan presentations: A persuasion analysis of venture capitalists' funding decisions. *Academy of Management Journal*, 52(1), 199-214.
- Chiles, T. H., Bluedorn, A. C., & Gupta, V. K. (2007). Beyond creative destruction and entrepreneurial discovery: A radical Austrian approach to entrepreneurship. *Organization Studies*, 28(4), 467-493.
- Cramera, J. S., Hartogb, J., Jonkerb, N., & Van Praag, C. M. (2002). Low risk aversion encourages the choice for entrepreneurship: An empirical test of truism. *Journal of Economic Behavior & Organization*, 48(1), 29-36.
- Davis, K., Stremikis, K., Schoen, C., & Squires, D. (2014). *Mirror, mirror on the wall, 2014 update: How the U.S. healthcare system compares internationally* (June). Washington, DC: The Commonwealth Fund.
- Dickson, P. H., Solomon, G. T., & Weaver, K. M. (2008). Entrepreneurial selection and success: Does education matter? *Journal of Small Business and Enterprise Development*, 15(2), 239-258.
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the Short Grit Scale (Grit-S). *Journal of Personality Assessment*, 91(2), 166-174.
- Gartner, W. B. (1989). "Who is an entrepreneur?" is the wrong question. *Entrepreneurship Theory and Practice*, 13(4), 47-68.
- Giddens, A. (1984). *The constitution of society*. Berkeley, CA: University of California Press.
- Greene, P., & Brown, T. (1997). Resource needs and the dynamic capitalism typology. *Journal of Business Venturing*, 12(3), 161-173.
- Hamidi, D. Y., Wennberg, K., & Berglund, H. (2008). Creativity in entrepreneurship education. *Journal of small business and enterprise development*, 15(2), 304-320.

- Haynie, J. M., & Shepherd, D. A. (2009). A measure of adaptive cognition for entrepreneurship research. *Entrepreneurship Theory and Practice*, 33(3), 695-714.
- Herzlinger, R., Ramaswamy, V. R., & Schulman, K. A. (2014). Bridging health care's innovation-education gap. *Harvard Business Review*, November(2014).
- Hmieleski, K. M., & Corbett, A. C. (2006). Proclivity for improvisation as a predictor of entrepreneurial intentions. *Journal of Small Business Management*, 41(1), 45-63.
- Honig, B. (2001). Learning strategies and resources for entrepreneurs and intrapreneurs. *Entrepreneurship Theory and Practice*, 26(1), 21-35.
- Kirzner, I. M. (1973). *Competition and entrepreneurship*. Chicago, IL: University of Chicago Press.
- Kotter, J. (2011, July 12). Change management vs. change leadership: What's the difference? *Forbes*. Retrieved from <http://www.forbes.com/sites/johnkotter/2011/07/12/change-management-vs-change-leadership-whats-the-difference/#cc8c1fd18ec8>
- Lin, T. C. W. (2012). A behavioral framework for securities risk. 34 *Seattle University Law Review*, 325(2012). Retrieved from [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2040946](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2040946)
- McMullen, J., & Shepherd, D. (2006). Entrepreneurial action and the role of uncertainty in the theory of the entrepreneur. *Academy of management review*, 31(1), 132-152.
- Morris, M. H., Webb, J., Fu, J., & Singhal, S. (2013). A competency-based perspective on entrepreneurship education: Conceptual and empirical insights. *Journal of Small Business Management*, 51(3), 352.
- Morris, M., Schindehutte, M., Kuratko, D. F., & Spivack, A. (2012). Framing the entrepreneurial experience. *Entrepreneurship Theory and Practice*, 36(1), 11-40.
- Mosseri, A. (2006). *Cross-disciplinary theories for cross-disciplinary teaching*. CDTL Brief, 9(5).

- Omachonu, V. K., & Einspruch, N. G. (2010). Innovation in healthcare delivery systems: A conceptual framework. *The Innovation Journal: The Public Sector Innovation Journal*, 15(1), Article 2.
- Orchard, C. A., & Curran, V. (2003). Creating a culture for interdisciplinary collaborative professional practice. *Medical Education Online*, 10(11).
- Pillay, R. (2014). Creativity, innovation and entrepreneurship: A new prescription for health care. *Innovation and Entrepreneurship in Health*, 2014(1), 1-3.
- Politis, D., Winborg, J., & Dahlstrand, A. (2011). Exploring the resource logic of student entrepreneurs. *International Small Business Journal*, 30(6), 659-683.
- Preble, J. F. (1983). Public sector use of the Delphi technique. [\*Technological Forecasting and Social Change\*, 23\(1\), 75-88.](#)
- Rankin, N. (2004). The new prescription for performance: The eleventh competency benchmarking survey. *Competency & Emotional Intelligence Benchmarking*, 2004/05.
- Rauch, A., Wiklund, J., Lumpkin, G. T., & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. [\*Entrepreneurship Theory and Practice\*, 33, 761-787.](#)
- Schindehutte, M., Morris, M. H., & Pitt, L. F. (2008). *Rethinking marketing: The entrepreneurial imperative*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Schumpeter, J. A. (1942). *Capitalism, socialism, and democracy*. New York, NY: Harper.
- Sinclair, V. G., & Wallston, A. K. (2004). The development and psychometric evaluation of the brief resilient coping scale. *Assessment*, 11(1), 94-101.
- Stefl, M. E. (2008). Common competencies for all healthcare managers: The healthcare leadership alliance model. [\*Journal of Healthcare Management\*, 53\(6\), 360-373.](#)

- Tierney, P., & Farmer, S. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, *45*(6), 1137-1148.
- Valerio, A., Parton, B., & Robb, A. (2014). *Entrepreneurship education and training programs around the world: Dimensions for success*. Retrieved from <http://elibrary.worldbank.org/doi/book/10.1596/978-1-4648-0202-7>
- Varkey, P., Horne, A., & Bennet, K. E. (2008). Innovation in health care: A primer. *American Journal of Medical Quality*, *23*(5), 382-388.
- Wilson, A., Averis, A., & Walsh, K. (2003). The influences on and experience of becoming nurse entrepreneurs: A Delphi study. *International Journal of Nursing Practices*, *9*(4), 236-245.
- Wilson, F., Kickul, J., & Marlino, D. (2007). Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: Implications for entrepreneurship education. *Entrepreneurship Theory and Practice*, *31*(4), 387-406.