

Helping Learners Recognize, Diagnose, and Unravel Incompetence Traps to Achieve Synergistic Exploration–Exploitation in Classroom

Journal of Management Education
2015, Vol. 39(6) 684–712
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sagepub.com/journalsPermissions.nav
DOI: 10.1177/1052562914566682
jme.sagepub.com



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Abstract

Sensemaking theory suggests that sensemaking may collapse when perception fails to detect weak signals of changes in the environment, cognition fails to appropriately categorize the new data coming from perception, and action fails to test the applicability of new concepts and schemas. Mindfulness–mindlessness theory warns us that routine practices based on low levels of exploration and exploitation may hinder performance. Finally, the theory of learning failure distinguishes between the traps of failure or overexploration and the traps of success or overexploitation. Combining and advancing these insights, we offer a typology of incompetence traps: (a) underexploration–underexploitation or mindlessness, (b) overexploration–underexploitation, and (c) overexploitation–underexploration. We examine their manifestations in perception, cognition, and action. Based on our analysis of how incompetence traps may hamper learning in management education, we give examples of how instructors may help students achieve synergistic exploration–exploitation via informed vision (combining depth

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and multiple perspectives); perceptive thinking (combining theoretical, constraint-savvy knowledge and practical, context-savvy knowledge); and mindful action (developing and refining new and existing capabilities).

Keywords

sensemaking, incompetence traps, mindfulness, mindlessness, overexploration, overexploitation, informed vision, perceptive thinking, mindful action

In today's world, organizations operate in multilayered, ambiguous, and equivocal environments requiring substantial cognitive complexity to cope (Houghton, Stewart, & Barr, 2009; Stewart, Houghton, & Rogers, 2012). Such complexity has been called dynamic since organizations need to cope simultaneously with different types of novelty as they continually encounter new situations and form new identities while learning to apply new tools (Colville, Pye, & Carter, 2013). In addition, research has shown that organizational environments may be driven by conflicting institutional logics, the phenomenon defined as "institutional complexity" (Greenwood, Raynard, Kodeih, Micelotta, & Lounsbury, 2011; Smets & Jarzabkowski, 2013). Not surprisingly, navigating these distinct yet overlapping complexity types—cognitive, dynamic, and institutional—could create enormous challenges for sensemaking, that is, extracting cues, making plausible sense retrospectively, and enacting order into the ongoing circumstances (Weick, 1995; Weick, Sutcliffe, & Obstfeld, 1999, 2005). As we consider how we might effectively teach students to cope with such a complicated world, examining sensemaking as it relates to management education offers an important framing, particularly as we examine sensemaking failures.

Sensemaking theory (Weick, 1979, 1995, 2011; Weick & Sutcliffe, 2006, 2007; Weick et al., 1999, 2005) explains the reasons for ineffective sensemaking by faulty perception (e.g., low sensitivity or inability to detect and capture weak signals of nascent change); faulty cognition (e.g., inability to interpret and categorize new sensory information both timely and effectively into new concepts or schemas); and ineffective action (e.g., failure to enact new knowledge and verify new concepts' appropriateness and applicability). Hence, the efficacy of sensemaking could be increased by making perception more alert, and apt at utilizing multiple and diverse perspectives in combination to capture the ongoing changes in the environment; making cognition more aware of new and altered perceptions and capable of interpreting and categorizing them at a deeper level and in a timely fashion; and making action more mindful—testing new cognitions through new and continually refined capabilities to provide feedback to perception.

The problem of enhancing the efficacy of sensemaking, in the situation of constantly increasing environmental complexity, is especially relevant for education, in general, and management education, in particular. This is because management education seeks to prepare competent and energetic business specialists and leaders who combine excellent knowledge of advanced theories and methods with highly developed intuition and the ability to act decisively and appropriately at the same time. These days, scholars call for increasing the relevance of academic research (Bartunek & Rynes, 2014; Hughes, Bence, Grisoni, O'regan, & Wornham, 2011; Rynes, Bartunek, & Daft, 2001; Van de Ven & Johnson, 2006). Even though theory knowledge and practice knowledge represent different knowledge types (Van de Ven & Johnson, 2006), the dialectical tensions between practitioner orientation and scholar orientation could and should be combined creatively to enhance the rigor and relevance of management research (Bartunek & Rynes, 2014).

Similarly, in the area of management education, as we argue in this article, it is possible to combine rigor, relevance, and practice orientation—helping students develop a capability for mindful, adaptive, and effective action. Following March (1991), the art of exploration (teaching students to discover new perspectives, analyze situational contexts, and develop new capabilities) should be fused with the art of exploitation (teaching students to apply new and familiar perspectives, discover constraints, apply fitting methods and capabilities, and act vigorously).

We propose in this article that since expertise presupposes integration of exploration and exploitation (Chi, 2006; Ericsson, 2006; March, 1991), incompetence traps, or traps that are activated when expertise is lacking may arise as a result of (a) underexploitation (ineffective utilization of familiar perspectives, ideas, and methods); (b) underexploration (insufficient search for new, alternative, and emerging perspectives, ideas, and methods); and/or (c) underexploration combined with underexploitation. Hence, we define the three incompetence traps of (i) underexploration–underexploitation or mindlessness, (ii) overexploitation–underexploitation, and (iii) overexploration–underexploitation. From this perspective, learning failure may occur not only because either exploration or exploitation is excessive but also because its counterpart is underutilized and/or the two fail to achieve synergies (Levinthal & Rerup, 2006). Responding to Weick's (1995, 2010) and Langer's (2014) criticism of simplification as leading to mindlessness, we focus on examining how incompetence traps may thwart learning activities in the process of management education, and seek to pinpoint complicating strategies that could help students attain synergistic exploration–exploitation.

Challenges do exist: In their classical study, Levinthal and March (1993) contrasted the two “myopias of learning”: (a) the traps of failure that arise when exploration supplants exploitation and (b) the traps of success that arise

when exploitation supplants exploration. The concept of success traps, also known as “competency traps,” has been thoroughly examined in the literature (Levitt & March, 1988; Liu, 2006; Siggelkow & Levinthal, 2005). In contrast, the concept of failure traps has been understudied. And yet these two concepts are symmetrical: overemphasis on exploration may lead to paying the costs (due to excessive experimentation) without gaining the benefits; overemphasis on exploitation may lead to trapping oneself in “suboptimal stable equilibria” (March, 1991, p. 71). Moreover, exploration (learning new skills and competencies) and exploitation (learning to refine the existing skills and competencies and apply them appropriately and effectively) represent interdependent and mutually reinforcing (Levinthal & Rerup, 2006) activities.

Scholars have recently pointed out that typological theorizing in business disciplines has been underutilized in the past 20 years (Delbridge & Fiss, 2013; Fiss, 2011; Snow & Ketchen, 2014). Typological theorizing represents construction of ideal types that are comprehensive, mutually exclusive, based on clearly articulated conceptual foundation, and can be validly and reliably measured (Doty & Glick, 1994; Snow & Ketchen, 2014). Following this approach, we build our typology of incompetence traps on the foundation of sensemaking theory (Weick & Sutcliffe, 2007), theory of mindlessness–mindfulness (Langer, 1997; Langer & Moldoveanu, 2000a, 2000b), and theory of learning failure (Levinthal & March, 1993; Levinthal & Rerup, 2006; March, 1991); specify the criteria for identifying incompetence traps in perception, conception, and action; and provide an explanation of how a typology of such traps could guide our analysis of typical learning errors made by students in the process of management education.

This article is organized as follows. In the first section, we examine how sensemaking theory and theory of mindfulness explain the reasons for sensemaking failure due to flawed perception, conception, and action. In the second section, we examine the theory of learning failure, introduce the concept of incompetence traps, and develop a typology of such incompetence traps. In the third section, we introduce the concept of complicating strategies and explain how such strategies may allow unraveling incompetence traps to achieve synergistic exploration–exploitation. In the discussion section, we examine our typology’s main contributions and limitations and point out directions for future research.

Sensemaking Theory: When Sensemaking Collapses?

Sensemaking represents a constellation of various cognitive activities, for example, understanding, explaining, attributing, extrapolating, and predicting

(Starbuck & Milliken, 1988). These activities have been described as reacting to and seeking to explain some new stimuli coming from the environment while applying certain cognitive frameworks or schemata (Starbuck & Milliken, 1988). Sensemaking operates both at the level of perception (seeing) and conception, or cognition (thinking) that need to be continually interconnected and interrelated through action, or enactment of new and emerging perceptions and cognitions (Weick, 2010). Kant's (1789/2003) famous dictum from the *Critique of Pure Reason*, "Thoughts without content are void; intuitions without conceptions, blind" (p. 47), underlies sensemaking theory's notions of alertness that suggests the need to exercise constant efforts to discern any signs of unusual and unexpected changes in the environment and awareness, that is, continual efforts to generate new categorizations of the information captured via alertness (Baron & Misovich, 1999; Weick, 2010; Weick & Sutcliffe, 2007).

In his path-breaking book, Weick (1995) defined sensemaking as a process that is (a) grounded in identity construction, (b) retrospective, (c) enactive of sensible environments, (d) social, (e) ongoing, (f) focused on and by extracted cues, and (g) driven by plausibility rather than accuracy (Maitlis, Vogus, & Lawrence, 2013). Sensemaking collapses (Weick, 1993) when people fail to focus on extracting cues (perception failure), to generate plausible concepts (conception failure), and to continually verify the veracity/applicability of perception and conception (action failure). Sensemaking may fail if it is not grounded in identity construction since live experience needs to be interwoven with continual reconceptualization of one's own identity. Additionally, sensemaking collapse may occur when it stops being retrospective so that past experience is not fittingly conceptualized. It also may collapse if it is not ongoing so that learners are no longer alert to live experience. Finally, sensemaking could stumble when it does not lead to enactment or active creation of new realities that would, in turn, change our perceptions (Maitlis et al., 2013; Weick, 2010; Weick & Sutcliffe, 2006, 2007).

Overall, one can argue that sensemaking may fail because of inadequate perception (e.g., inability to notice and bracket vital cues), inadequate cognition (e.g., inability to continually modify conceptualizations to capture the ongoing circumstances), and inappropriate action (inability to interrelate perception and cognition via enactment; Weick, 1988, 1993, 1996). In order to advance the theory of flawed sensemaking due to faulty perception, conception, and action, we propose to examine the theory of cognitive traps arising as a result of overweighing either exploration or exploitation (Levinthal & March, 1993; Levinthal & Rerup, 2006; March, 1991; Posen & Levinthal, 2012), and the theory of mindfulness–mindlessness (Ie, Haller, Langer, & Courvoisier, 2012; Langer, 1997, 2014). This could help us shed more light on

the reasons and manifestations of sensemaking failure, the learning errors in the area of management education, particularly.

Learning Failure, Mindfulness–Mindlessness, and Incompetence Traps

According to the theory of learning failure, there are two symmetrical traps that may create myopias of learning: traps of failure and traps of success (Levinthal & March, 1993). Traps of failure arise because of excessive exploration whereas traps of success arise because of excessive exploitation (Levinthal & March, 1993). Learning may be undermined not merely because of overexploration or overexploitation but also underexploration or underexploitation.

Since competence-based expertise presupposes effective integration of exploration and exploitation (Chi, 2006; Ericsson, 2006), we define incompetence traps as learning barriers that arise when exploration suppresses exploitation, when both exploration and exploitation are suppressed, or when exploration and exploitation are not integrated synergistically. The theory of mindlessness–mindfulness suggests that following routines (i.e., overweighing exploitation) could undermine learning via exploration (Langer, 1997; Langer & Moldoveanu, 2000a, 2000b). In turn, sensemaking theory asserts that ineffective exploration—the inability to “notice and bracket” new and important information coming from perception and ineffective exploitation could undermine sensemaking success (Weick et al., 2005).

Integrating explanations and categorizations from the theory of learning failure, the theory of mindfulness–mindlessness, and sensemaking theory, we propose that the first incompetence trap of underexploration–underexploitation or mindlessness occurs when learners miss the signals and cues coming from the environment. With mindlessness, learners fail to develop relevant perceptions, refine conceptualizations, and enact. The resultant sensemaking collapse can frequently be observed in the classroom when students feel that they cannot comprehend a new subject introduced by the instructor and grasp the content of the discussion. They fail to explore (acquire new knowledge) and exploit (apply and refine new and familiar knowledge).

We define the second incompetence trap as overexploitation–underexploration. Learners may overuse exploitation when they apply fixed categories divorced from exploration or continual search for the unexpected (Weick & Sutcliffe, 2006, 2007). Learners keep using old, stale ideas, and routines not adjusted to the ever-changing circumstances. As people focus on the familiar and what they already know, they fall into success or competency traps (Levinthal & March 1993; Liu, 2006). In the area of education, the

overexploitation trap arises when students apply a certain method mechanically to any problem they are asked to examine in the classroom. This comes as a surprise to students who believe that they will always be rewarded for their strong efforts.

The third incompetence trap can be described as overexploration–underexploitation. It is possible for learners to overexplore and underexploit as they keep searching endlessly for the correct perspective while failing to choose the best one out of those that they have already identified (Rudolph, Morrison, & Carroll, 2007, 2009). Students can fall into the overexploration–underexploitation trap when they develop an ability to discern various perspectives but not the ability to select the most fitting one and the ability to verify its applicability through action. Table 1 lists the three incompetence traps and provides a summary of their particular manifestations in perception, conception, and action discussed in the following sections of the article. It also shows that, similar to other areas of human endeavor, the goal of education is to help students achieve synergistic exploration–exploitation through perception, conception, and action.

Incompetence Traps of Perception

The incompetence traps of perception arise when learners fail to achieve depth (or strength) of vision, focus too narrowly, or adopt a static perspective and cannot change/adjust it appropriately. As a result, learners may not be able to detect and extract cues from the ongoing circumstances and/or fail to adopt a perspective, angle, or frame that would allow noticing and bracketing important symptoms of change or novelty that could affect meaning and interpretation of the ongoing circumstances (Weick & Sutcliffe, 2006, 2007; Weick et al., 1999, 2005). Thus, workers in Bhopal did not see the obvious signs of trouble as they regarded the widely available cues as unimportant and negligible (Weick, 1988, 2010).

Figure 1 represents the incompetence traps of perception, with their relationship to competent perception or informed vision. We discuss this model below.

First Incompetence Trap of Perception: Hazy Vision

Hazy vision occurs when low depth is combined with poor focus or inability to take a perspective. Thus, students may fail to develop a complicated understanding of their discipline (Cunha, Cunha, & Cabral-Cardoso, 2004; Gallos, 1989, 1992; Weathersby, Bartunek, & Gordon, 1982) and feel overwhelmed, unable to detect cues in the material that appears to them as undifferentiated mass of information.

Table 1. Three Incompetence Traps and Synergistic Exploration–Exploitation.

Types of exploration–exploitation interface	Manifestations		
	Perception	Conception	Action
First incompetence trap Underexploration–underexploitation or mindlessness (exploration and exploitation is suppressed)	Hazy vision Underexploring alternative pertinent perspectives (static or narrow perspective taking) and underexploiting new and familiar perspectives (low depth of vision)	Loose thinking Underexploring the inherent problems and situational constraints (poor problem detection) and underexploiting relevant methods (poor problem solving)	Stale action Underexploring (failing to develop new capabilities) and underexploiting (failing to refine both new and familiar capabilities)
Second incompetence trap Overexploitation–underexploration (exploitation at the expense of exploration)	Tunnel vision Overexploiting the familiar perspectives creating the impression of depth while failing to explore the existence of other potentially relevant and even superior perspectives	Biased thinking Overexploiting practice knowledge, such as familiar approaches/ methods while underexploring by failing to use theory knowledge to understand the constraints of the situation	Disingenuous action Overexploiting by applying too vigorously familiar capabilities and underexploring in the sense of failing to develop and apply new capabilities
Third incompetence trap Overexploration–underexploitation (exploration at the expense of exploitation)	Wandering vision Overexploring by way of continual shifting of perspectives and underexploiting as a result of failing to identify the best fitting angle and apply it accordingly	Oblivious thinking Overexploring by trying to apply a great number of abstract theories and underexploiting by failing to ground them in specific context	Anemic action Overexploring, that is, overanalyzing while failing to develop new capabilities and underexploiting in the sense of failing to apply new and old capabilities vigorously
Synergistic exploration–exploitation	Informed vision Combining multiple, broad, and dynamic perspectives with depth of vision	Perceptive thinking Combining theory knowledge and practice knowledge, grounding the abstract in the context, and revealing the constraints	Mindful action Combining new capabilities development with the refinement of new and old capabilities

In an example of students' hazy vision, a group project for a movie theater failed to create improved service value when the team failed to notice the emerging problems in the movie industry due to online streaming and mail-order DVDs. A lack of depth of vision was exacerbated by a lack of focus on what needed to be accomplished to create a new, profitable service. Hazy vision was due to failure to synergize exploration and exploitation.

FOCUS DEPTH	NARROW / STATIC FOCUS	BROAD / DYNAMIC FOCUS
	HAZY VISION	WANDERING VISION
LOW		
HIGH	TUNNEL VISION	INFORMED VISION

Figure 1. Incompetence traps of perception.

Second Incompetence Trap of Perception: Tunnel Vision

Tunnel vision (Posavac, Kardes, & Joško Brakus, 2010), also known as focalism (Häubl, Dellaert, & Donkers, 2010), focal bias (Stanovich, 2011), or the fixation error (Rudolph et al., 2007, 2009), represents adoption of a narrow and/or static angle and adhering to it while failing to explore alternative perspectives. Tunnel vision occurs when depth of vision is combined with a narrow and/or static focus, preventing one from applying multiple angles and considering options. Tunnel vision may also lead to escalation of commitment as students become convinced that their approach (often the only one they are familiar with or have learned to apply previously) is inherently superior to others.

In one example of tunnel vision, students had been charged with helping a local cantina launch a marketing campaign to create greater awareness regarding its offerings in an area subject to strict city regulations. While the student team correctly identified all the possible marketing channels the cantina could utilize, they fixated on their initial determination that the cantina's main problem was in reaching the target customer. In reality, the restaurant's problems were significantly more complex and solving them required exploring a number of alternative perspectives. Tunnel vision undermined students' ability to effectively synergize exploration and exploitation.

Third Incompetence Trap of Perception: Wandering Vision

Wandering vision is reminiscent of the "unfocused mind" (Brown, 2005). It arises when learners view a situation from an excessively broad and/or continually shifting viewpoint while failing to choose the most appropriate angle.

In this sense, tunnel vision (choice of a single, fixed, and static perspective) and wandering vision (inability to choose among multiple competing alternatives to adopt the most fitting outlook) are opposites. Similarly, learners with wandering vision get caught in hectic yet futile exploration activities. Subsequent poor results and grades can be frustrating to students convinced that they should always be rewarded for their hard work. Wandering vision fails to use the sensory data to inform cognition so that it could, in turn, inform and guide perception (Weick & Sutcliffe, 2006, 2007; Weick et al., 1999, 2005).

A recent student project team offered an instance of wandering vision. The team's goal was to provide insights about why a local cosmetics and massage therapy school had a high employee turnover rate. Management assumed that the faculty's young age and lower compensation than elsewhere could explain why so many quit; the student team, despite its persistence, could not determine the root cause of the problem. Instead, its members kept guessing at reasons for high turnover without creating a reasoned point from which to explore the problem. As it kept going back and forth in its ongoing investigation of the problem and its causes, the student team overlooked a more fitting vantage point—high turnover was possibly due to lacking opportunities for professional growth. Thus, continual change of perspective and low depth of vision lured the student team into the incompetence trap of wandering vision.

Synergistic Exploration–Exploitation: Developing Informed Vision

Students should be taught how to combine vision depth with the ability to discern and integrate multiple perspectives. Students should seek to attain an informed vision that would allow seeing the situation from multiple perspectives (exploration), yet deeply, while being able to zero in on key, most advantageous viewpoints (exploitation). Informed vision is critical for effective sensemaking as it facilitates detection of weak signals of change and emerging problems, helps avoid simplification and develop sensitivity to operations and resilience to adversity (Weick & Sutcliffe, 2006, 2007; Weick et al., 1999, 2005).

Incompetence Traps of Conception

In addition to defective perception, sensemaking could fail due to defective conception (Weick et al., 1999, 2005). The rigor-relevance debate in the management literature (Bartunek & Rynes, 2014; Hughes et al., 2011; Rynes et al., 2001; Van de Ven & Johnson, 2006) has brought attention to the existence of two different knowledge types: theory knowledge and practice knowledge

THEORY KNOWLEDGE PRACTICE KNOWLEDGE	POOR	ROBUST
	POOR	ROBUST
POOR	LOOSE THINKING	OBLIVIOUS THINKING
ROBUST	BIASED THINKING	PERCEPTIVE THINKING

Figure 2. Incompetence traps of conception.

(Van de Ven & Johnson, 2006). While the two knowledge types are conflicting, they need to be used synergistically (Bartunek & Rynes, 2014).

Incompetence traps of conception could arise due to overexploration of theory knowledge, or rigor, and underexploration of practice knowledge, or relevance. In addition, incompetence traps of conception could occur as a result of overexploitation of practice knowledge, or relevance, and underexploration of theory knowledge, or rigor. Finally, incompetence traps of conception could be activated when both theory knowledge and practice knowledge are suppressed or not integrated synergistically. Importantly, overexploitation of practice knowledge often leads to underutilizing theory knowledge, and hence, overlooking the boundaries and constraints of the situation. Failure to understand context, the here and now, often causes sensemaking collapse (Weick & Sutcliffe, 2006, 2007). Thus, incompetence traps arise when conception turns dogmatic exhibiting insensitivity to operations and neglecting expertise (Weick, 2010). Only synergizing exploration, in the form of abstract but deeply penetrating theory knowledge, and exploitation, in the form of concrete and relevant practice knowledge, allows overcoming the three incompetence traps arising due to overlooking constraints and/or contexts. Figure 2 represents the incompetence traps of conception, with their relationship to competent conception or perceptive thinking. We discuss this model below.

First Incompetence Trap of Conception: Loose Thinking

Loose thinking can occur when theory knowledge (exploration) and practice knowledge (exploitation) are both poor. When both theory knowledge and

practice knowledge are absent, detecting and solving problems is difficult. For example, students who do not have a good understanding of theories and methods taught in the classroom and also lack practical experience, often miss the clear signs that the firm analyzed in class (in a business case) is in distress, claiming that it is doing just fine. Loose thinkers view the world as largely uncomplicated and unproblematic and, hence, are not searching for ways to find and resolve even rather obvious problems. Furthermore, when others help the trapped learner detect a problem, he or she may not be able to solve it because of failing to grasp the constraints of the situation.

For example, a student team working with a car rental company recommended a quick fix to the problem of varying customer fees but failed to identify the problem's root cause. Their theory knowledge or exploration was suppressed leading to low comprehension. As a result of not completely comprehending the constraints and contexts, the students recommended the company to install a new system to increase consistency in charging authorization fees across all locations without specifying how to factor in whether the client was a new or repeat customer and what training program for the employees used to operating the old system would need to be provided.

Second Incompetence Trap of Conception: Biased Thinking

Defective thinking also may emerge when robust practice knowledge (exploitation) is undermined by poor theory knowledge (exploration) leading to biased thinking. This incompetence trap of conception is activated when students cling to familiar methods that have worked in the past regarding them in a naive fashion as universally applicable. As a result, biased thinking tends to recycle interminably the methods that used to be appropriate but no longer are. Such overexploitation of the familiar is known as the traps of success (Levinthal & March, 1993). In addition, underexploring theory knowledge leads to overlooking important constraints leading to failure. Counterintuitively, excessive emphasis on practice knowledge is impractical.

In one example of biased thinking, a student team chose to analyze a small sports bar restaurant that had been experiencing excessive seating wait times. The student team limited their examination to a common survey technique they had often used in class without exploring more applicable data gathering methods. Thus, the information they gathered did not facilitate understanding of why the wait times in the restaurant were so long. Instead, the student team needed to use a process flowchart combined with the walk-through-audit to uncover the true reasons for service failure.

Third Incompetence Trap of Conception: Oblivious Thinking

Conversely, when theory knowledge (exploration) is robust but practice knowledge (exploitation) is poor, the trap of oblivious thinking may be activated. A student may have an excellent command of theory and methods but fail to understand the unique context of the situation leading to overgeneralization. The learner could be able to grasp the problem correctly, in the abstract, but miss the specifics, that is, overexplore theory knowledge but underexploit practice knowledge. Consequently, oblivious thinking produces inadequate solutions (Chi, 2006).

As an illustration, students exhibited oblivious thinking in trying to resolve an airline's problem. Student teams were able to correctly identify some problem areas, such as issues with the reservation system causing customer complaints and higher prices than those offered by competitors. Although students identified valid issues facing the company and other legacy airlines compared with discount providers, tackling them was beyond the scope of case analysis. Students failed to comprehend the context of process improvement and pinpoint the specific problems to be resolved. Thus, overexploration of theory knowledge and underexploitation of practice knowledge failed to generate useful and applicable solutions.

Synergistic Exploration–Exploitation: Developing Perceptive Thinking

Instructors should seek to help students develop perceptive thinking combining robust theory knowledge and robust practice knowledge. Perceptive thinking is continually merging knowledge by acquaintance through active exploration with knowledge by description through active exploitation (Baron & Misovich, 1999). While exploration is experience-driven, exploitation is schema-driven (Maitlis & Sonenshein, 2010; Weick, 2010). Exploration and exploitation, however, need to be continually realigned and enrich one another to make cognition effective.

Incompetence Traps of Action

To be successful, perception and cognition need to be connected via action whose role is to test the veracity of new conceptualizations generated by cognition and enact new realities feeding, in turn, into perception (Rudolph et al., 2007, 2009; Weick, 2010; Weick et al., 1999).

Similar to perception and conception, action, however, can be thwarted by specific incompetence traps. Ultimately, action produces new capabilities

CAPABILITIES REFINEMENT CAPABILITIES DEVELOPMENT	WEAK	STRONG
WEAK	STALE ACTION	ANEMIC ACTION
STRONG	DISINGENUOUS ACTION	SMART ACTION

Figure 3. Incompetence traps of action.

and applies/refines familiar capabilities. It is related to changing one's identity in the process of sensemaking (Weick, 1995). However, both individual and collective learners may not be successful at forming new capabilities, that is, exploration (reinventing oneself) as well as exploitation (applying and refining new and familiar capabilities). Figure 3 represents the incompetence traps of action, with their relationship to competent action or mindful action. We discuss this model below.

First Incompetence Trap of Action: Stale Action

When learners experience difficulties at generating new capabilities, or reinventing themselves through the process of exploration, while also failing to exercise/refine familiar capabilities, the result is—stale action. Effective sensemaking requires continual improvement both in the sense of acquiring new skills and refining new and existing skills. When both activities of exploration and exploitation are suppressed, action can only be repetitive and suboptimal. This may happen, for instance, when student teams recycle their ideas from working on previous projects instead of approaching their new project with an open mind, creatively and enthusiastically. Another student example is when they take shortcuts by forming the same team in every class, seeking to utilize their knowledge of each other, ability to work as a group, and apply previously learnt approaches. This common practice may result in stale action that forgoes true search for meaning.

When charged with helping a plant evaluate the feasibility of buying additional production capacity, students exhibited familiarity with the use of

breakeven point and broader methodological analysis learnt from their introductory accounting class. Unfortunately, many of them applied this analysis mechanically without paying attention to the differences between fixed and variable costs that they had previously learned. Instead of developing new capabilities and refining new and familiar capabilities, such as analyzing unequal fixed costs and unequal contribution margin, they used a simple breakeven formula, rendering their analysis inappropriate and defective.

Second Incompetence Trap of Action: Disingenuous Action

This incompetence trap arises when action is fully dedicated to refinement of existing capabilities (exploitation) whereas new capabilities acquisition (and subsequent refinement) is abandoned. Learners who are excessively pragmatic may want to save the effort and focus on doing something they already know well, thinking perhaps that this will secure repeating prior success. In a way, this thinking is justified since new capabilities acquisition is very costly and such new capabilities may not be effective until they have been sufficiently refined. However, merely seeking to improve and refine what one already knows and can do well may also be counterproductive.

In the classroom, new content and new approaches are continually introduced. In this sense, students err in thinking that they could continue perfecting their existing capabilities without acquiring new ones. Seeking to fall back on familiar capabilities can only result in disingenuous action that puts in considerable effort to reapply previously acquired capabilities only to find out that acquisition and refinement of new capabilities was required instead.

A student team helping a popular restaurant provides an example of disingenuous action. The task was to find a more effective way to communicate with customers waiting to be seated than the current pager system. The students decided to research thoroughly alternative pager systems instead of exploring what could make customers happier while waiting for a table. Thus, the students overexploited their familiar capability (conducting comparative analysis of the merits and shortcomings of different technologies) instead of exploring customer needs and working out new creative solutions to reduce customer wait time at the restaurant.

Third Incompetence Trap of Action: Anemic Action

Overexploration combined with underexploitation may hamper action as a result of pouring all resources into learning new capabilities without taking the time to refine both new and familiar capabilities. In anemic action, learners may seek to develop newer and newer capabilities without letting the new

capabilities advance to the extent that their implementation becomes rewarding. Second, learners may stop trying to refine their familiar capabilities while focusing solely on developing new capabilities. Finally, learners may fail to align the new and existing capabilities.

Thus, students often try so hard to learn some new capabilities that their previously acquired skills may decline significantly. From this perspective, it is important to remind students that their previous accomplishments can never be taken for granted. Exploration and exploitation must be synergistic. Importantly, the new and existing capabilities need to be refined and realigned continually.

A student team assigned to help an insurance company exhibited anemic action when they did not take the time to combine prior knowledge of systems improvement with new understanding of the specific customer complaint. As the students dedicated all their efforts to learning the insurer's system, they did not try to combine it with previously learned capabilities and failed to align the new and previously learned capabilities. As a result, their action (analysis of the situation described in the case and subsequent recommendations) was patently anemic and failed to address the insurer's problems.

Synergistic Exploration–Exploitation: Developing Mindful Action

In our view, mindful action will include the ability to develop and refine new capabilities while continuing to refine existing capabilities and align and adjust new and existing capabilities. Mindful action will be able to avoid stale, disingenuous, and anemic action and help learners achieve synergistic integration of exploration and exploitation in a particular area or endeavor.

Disentangling Incompetence Traps: The Role of Complicating Strategies

In the following sections, we will outline strategies that instructors could apply to help students unravel incompetence traps and develop informed vision, perceptive thinking, and mindful action to facilitate their sensemaking. We describe these strategies as *complicating* since they help learners avoid simplification leading to mindlessness and develop new competencies conducive to greater cognitive powers and cognitive flexibility (Ie et al., 2012). Table 2 summarizes our analyses and recommended instructor strategies for combating the incompetence traps.

Table 2. Complicating Strategies.

Complicating strategies	Explanation	Illustration
Perspective taking Helps overcome underexploration–underexploitation in perception: <i>Hazy vision</i>	Teaching students how to recognize and adopt a perspective and analyze its implications; allows developing alertness to weak signals of changing circumstances and events	<i>Movie theater:</i> Students did not show depth of vision regarding the situation in the industry besieged by the new media and did not develop an apt perspective on how to create a new, profitable service.
Dynamic focusing Helps overcome overexploitation–underexploration in perception: <i>Tunnel vision</i>	Teaching students how to aptly shift perspectives to advance understanding; helps develop awareness of multiple frames and meanings	<i>Cantina:</i> Students suffered from tunnel vision about how to improve the restaurant's profits by increasing its visibility even though the actual problems were more complex so that their understanding required applying multiple lens and types of analysis.
Perspective selection Helps overcome overexploration–underexploitation in perception: <i>Wandering vision</i>	Teaching students how to make their search (exploration) effective by selecting one or several perspectives most relevant for understanding of the observed situation or problem	<i>Cosmetics college:</i> Students kept shifting their perspective on the cause of high turnover among employees failing to see that the college's inattention to professional growth were the root cause of the problem.
Constraint discovery Helps overcome underexploration–underexploitation in conception: <i>Loose thinking</i>	Teaching students to recognize the constraints of the situation and factoring them in to better understand the nature of the problem	<i>Car rental agency:</i> Students did not take into account how a new system's adoption needed to be adjusted in view of constraints, such as repeat versus new customers and the need for retraining the company's employees.
Method discovery Helps overcome underexploration–overexploitation in conception: <i>Biased thinking</i>	Teaching students to recognize the limits of a certain method's applicability and the task of finding an optimal method or methods for resolving a particular problem; teaching to correlate problem finding and problem solving and relate them to optimal method search	<i>Local restaurant:</i> Students have focused on applying a particular method for measuring customer satisfaction but have not considered that the problems of the business could be due to flawed operational processes so that other methods would be more fitting for problem solving.
Context discovery Helps overcome overexploration–underexploitation in conception: <i>Oblivious thinking</i>	Teaching students recognize how the same problem could change due to various contextual factors involved and the necessity of identifying and factoring in contextual factors in looking for solutions	<i>Airline:</i> Students did not examine the contextual factors at play related to legacy airlines' burdens due to their previously taken obligations. As a result, the proposed solutions largely missed the mark.
Transforming Helps overcome underexploration–underexploitation in action: <i>Stale action</i>	Teaching new capabilities while continuing to refine both new and existing familiar capabilities	<i>Capacity planning:</i> In using breakeven analysis, students did not take into account unequal costs and contribution margins for different levels of plant capacities.

(continued)

Table 2. (continued)

Complicating strategies	Explanation	Illustration
Innovating Helps overcome underexploration–overexploitation in action: <i>Disingenuous action</i>	Teaching new capabilities, warning that merely refining existing capabilities will not suffice	<i>Chain restaurant:</i> Students focused on analyzing what technologically improved pager system could be adopted, whereas they should have looked for creative alternatives to reduce the wait time.
Invigorating Helps overcome overexploration–underexploitation in action: <i>Anemic action</i>	Teaching how to make new capabilities fully functional so that they would reveal their advantages compared with the existing capabilities	<i>Insurance company:</i> Students analyzing the case were familiar with multiple service quality improvement frameworks; however, when they learnt about a newer service quality gap framework, they were unable to align the newer framework with what they already knew.

Combating Hazy Vision: Perspective Taking

The first trap of hazy vision arises as a result of low depth of vision and narrow or static perspective. Learning to take a perspective represents a stage of human development as children gradually learn this skill (Piaget, 1932; Piaget & Inhelder, 1968). Even adult learners, though, may systematically fail to take a perspective and, consequently, develop a simplified rather than complicated understanding of the subject (Bartunek, Gordon, & Weathersby, 1983; Weathersby et al., 1982). Perspective taking is often defined as taking the perspective of the other or empathizing with the other (Parker, Atkins, & Axtell, 2008; Parker & Axtell, 2001). Yet it also can be approached as a critical skill-making perception effective that needs to be mastered (Piaget, 1932; Piaget & Inhelder, 1968).

Students should be trained to identify various perspectives underlying a particular business situation. Thus, one of the authors teaches a business case focused on methods of improving customer loyalty and retention in a small credit union bank. Interviews with employees reported in the case produced a list of factors that could potentially affect customer loyalty, such as product or service pricing, staffing deficiencies, relationship building, providing a differentiated, value-added service, and so forth. Using a perspective-taking strategy, the instructor typically asks students to analyze the case from the standpoint of economic feasibility. Although this is only the first step, followed by applying other pertinent perspectives, the simple act of evaluating the text from a certain standpoint could facilitate students' sensemaking. Learning how to take a perspective or focus on a particular trend in the data

could help students overcome hazy vision and the frustrating feeling of lacking the ability to comprehend the studied material (Rudolph et al., 2007, 2009).

Combating Tunnel Vision: Dynamic Focusing

Students tend to exhibit tunnel vision in approaching a problem from a single perspective. To disentangle this incompetence trap, students should attain greater cognitive flexibility or learn how to draw distinctions among the observed phenomena, overcome prior cognitive commitments, and become aware of the existence of alternative perspectives that could be fruitfully combined and integrated (Langer, 1989, 1992; Langer & Moldoveanu, 2000a, 2000b). Unlike intelligent flexibility that assumes a linear, one-to-one relationship between problem and solution, “mindful flexibility” examines a problem from a variety of overlapping perspectives (Le et al., 2012). Hence, dynamic focusing, that is, the ability to change focus and compare the cognitive implications of adopting various angles could help students better understand the subject.

As an example, in a case included in a service operations course taught by one of the authors, a business customer who was having a problem was treated rudely by a nonempathetic front-desk clerk. In their case presentation, the student team blamed the front-desk employee for not taking care of the customer and recommended to dismiss him immediately. To help the students assess the situation from multiple perspectives, the instructor asked them to recall their encounters with a difficult customer. In light of their own experience, it was easier for students to take the perspective of the front-desk clerk leading to suggestions that the hotel manager should have better trained his employees to deal with frequently occurring service disruptions.

Combating Wandering Vision: Perspective Selection

Wandering vision or “vagabonding” (Rudolph et al., 2007, 2009) is tunnel vision’s counterpart. It refers to learners’ inability to choose the correct angle as a result of continually switching perspectives in an almost kaleidoscopic fashion. The goal, however, is not merely to be able to identify plausible explanations but be able to choose the ones that are most relevant. Undertaking particular actions, such as mental experiment, could help students ascertain which of numerous perspectives could be most fitting for practical purposes and which may be deemed less significant and even irrelevant. Therefore, instructors should advise students to engage in perspective selection, that is, to compare perspectives in terms of their relevance and practical implications and help them choose the most pertinent perspective or perspectives.

Combating Loose Thinking: Constraint Discovery

Loose thinking arises when learners overlook the situational constraints, and therefore, fail to understand the problem deeply. Like hazy vision, loose thinking is an example of mindlessness. It is a lose-lose (as opposed to win-win) combination of underexploitation and underexploration. Both hazy vision and loose thinking are not focused on avoiding failure and oversimplification that are regarded as the benchmarks of effective sensemaking (Weick & Sutcliffe, 2007). These incompetence traps ignore failure and oversimplify the situation making it virtually incomprehensible. The strategy of constraint discovery could help students realize that any potential solution has to be geared toward particular constraints. The instructor should keep asking students how their recommendations may change depending on various types of constraints involved and help them identify particular constraint types.

For example, undergraduate students often assume that any customer walking into the door should be provided with the best possible service at all times. It comes as a surprise to students that some organizations choose not to provide service to difficult-to-please customers because of the monetary constraints (the revenue from the customer service should exceed the cost of service provided). Such examples of real-life situations could show to students that all business decisions are subject to constraints/trade-offs. Students need to learn how to look for constraints underlying a particular situation and take them into account when searching for solutions.

Combating Oblivious Thinking: Context Discovery

In the process of education, there is a tendency to focus on developing abstract learning models that could be applied to a variety of contexts (Dunning, Heath, & Suls, 2004). An increasing emphasis on the abstract in the classroom may decrease novices' interest in learning as students are more stimulated by personalized narratives that target them emotionally and are easier to remember afterward (Cordova & Lepper, 1996). Even so, students may experience difficulties understanding the context of the situation and applying exceedingly abstract models to a concrete situation. This may lead to oblivious thinking disregarding the role of contextual factors.

To help students combat their proclivity for oblivious thinking, instructors should apply a context discovery strategy. For that, they need first to identify a variety of relevant contextual variables, such as organizational culture, decision makers' assumptions, the perception of the choice dilemma as an opportunity or threat, decision speed, and demand expectations, and so forth. Then, the instructor could ask students how the situation would change if the

contextual variables were different, that is, how abstract theories would need to be adjusted in view of the contextual knowledge?

Combating Biased Thinking: Method Discovery

Similar to tunnel vision, biased thinking arises when exploitation surpasses and replaces exploration. In conception, practice knowledge may dominate theory knowledge, hindering analysis of the situation, and identification of its inherent constraints. Biased thinking typically applies the same method or approach without conducting an analysis of the problem and its constraints. Hence, students may fail to grasp the problem and fail to solve it as a result of utilizing inappropriate methods. Instructors, however, may apply method discovery strategy in order to teach students first to grasp the problem and its constraints by utilizing theory knowledge and then identify a variety of methods potentially applicable to the problem at hand and subsequently determine what method or methods could be more fitting, relevant, and rewarding.

As an illustration, in an operations course taught by one of the authors, students learn seven different tools helping them solve various process-related problems. One of the cases included in the course describes the situation faced by Sonora County Sheriff and provides various statistics with regard to burglaries, theft, assault, and other types of crime in the area. The instructor then teaches students to identify the particular constraints of the situation and asks them to choose the tool that would be most helpful for improving the outcome of the process. Heated discussions on the relevance of a particular tool and validity of its use for resolving the problem discussed in the case help students understand the importance of choosing an optimal approach.

Combating Stale Action: Transforming

Stale action results from failure to develop new capabilities and refine existing and new capabilities. Typically, learners who fail to develop new capabilities and continually refine new and familiar capabilities do not realize that their existing capabilities are both inadequate and insufficient. Such learners may actually feel that they do not need to change anything since, in their opinion, things are perfect exactly the way they are. Those practicing stale action, therefore, typically exhibit conceit and self-deception as well as unwillingness to change, and possibly, aggressive rejection of change. Hence, overcoming stale action needs effecting attitudinal change and a broad-based transformation. Dealing with a learner complacent about his or her stale action, the instructor needs to use a transforming strategy, which includes

demonstration of the inadequacy of stale action and motivating the learner to develop new capabilities and refine new and existing capabilities.

Using a transforming strategy requires a lot of patience since complacent learners often suffer relapses going back to their complacent attitudes after having achieved only very modest improvements. Thus, one of the authors has repeatedly used a transforming strategy with PhD students who were failing to develop research and writing skills indispensable for conducting high-level scholarship. Pointing out to students who may use instructor's assistance only up to a certain point and who will need to transform themselves could help complacent learners advance.

Combating Disingenuous Action: Innovating

The main problem with disingenuous action is that strong effort and motivation are wasted on inappropriate goals. Such unsuitable goals may include unethical pursuits. For instance, students may use a lot of effort to avoid hard work required to complete the assignment. Learners may try to refine their existing capabilities and avoid forming new capabilities, thinking, perhaps, that this could be too challenging, that they may not be up to the task or that the existing capabilities could be sufficient if they are adjusted and fine-tuned. Learners could cling to this attitude as demonstrated by the well-documented biases, such as escalation of commitment (Staw, 1975, 1991), sunk cost fallacy, and status quo bias (Samuelson & Zeckhauser, 1988).

Innovating strategy could help learners overcome the trap of disingenuous action. Instructors need to be alert to opportunities to orient learners toward creation of new capabilities, critically examining student work that relies on mindless application of old methods. An innovating strategy is critical for connecting perception and cognition and securing learning success. The new, increasingly complicated environment makes it imperative for learners to continually develop new capabilities.

Combating Anemic Action: Invigorating

When learners can develop new capabilities, but fail to refine new and familiar capabilities to achieve success, their action can be characterized as anemic. The strategy of invigorating recognizes student energy as a key learning component. Incompetence traps of action, unlike incompetence traps of perception and cognition, are largely motivational. Hence, instructors need to provide feedback to students regarding not only their direction ("you are on the right path") but also the level of energy and effort needed. Anemic action is not sufficiently inspired and does not put in enough effort, thus invigorating is needed to help learners succeed. Instructors need to urge students to

refine their capabilities, old and new, so that their efforts to enhance the efficacy of perception and cognition are effective and successful.

Conclusions

In this article, we propose a new typology of exploration–exploitation that identifies four possible types of interface between these two fundamental activities. True expertise seeks to make exploration and exploitation not only complementary but also mutually enriching and synergistic (Chi, 2006; Ericsson, 2006; Goleman, 2013; Levinthal & Rerup, 2006). Hence, we posit that achieving synergistic exploration–exploitation represents the goal of management education. The rest of the interfaces are suboptimal and may subvert sensemaking.

The main contribution of this article lies, therefore, in combining and advancing the perspectives of sensemaking theory (Maitlis & Sonenshein, 2010; Maitlis et al., 2013; Weick, 1995, 2010), mindfulness–mindlessness theory (Langer, 1989; Langer & Moldoveanu, 2000a, 2000b; Ie et al., 2012), and theory of learning failure (Levinthal & March, 1993; Levinthal & Rerup, 2006; March, 1991). This conceptual synthesis allowed us to show that barriers to learning, or incompetence traps, arise not only because of excessive exploration or exploitation (Levinthal & March, 1993) but also because of a combination of underexploration and underexploitation (mindlessness; Langer, 2014), or poorly aligned and coordinated exploration and exploitation leading to failure to synergize the interface of exploration and exploration.

We believe that as educators, we need to be honest and acknowledge the fact that suboptimal interface of exploration and exploitation may commonly undermine sensemaking in the classroom. We believe our contribution for classroom practice lies not only in the sensemaking traps we have modeled but in the pedagogical techniques for overcoming them that we have offered.

We have argued in this article that applying a number of complicating strategies could assist instructors in helping learners diagnose and unravel such incompetence traps. However, it is possible that our story is yet more complex; it may be possible for incompetence traps to intersect so that, for instance, wandering vision may be combined with biased thinking and stale action. We assume that this is possible, but considering such cases would introduce a new level of complexity requiring more scrutiny.

Scholars have recently called for developing typological theorizing in the management literature (Delbridge & Fiss, 2013; Fiss, 2011; Snow & Ketchen, 2014). Answering this call, we sought to identify the clear-cut types of incompetence traps at the levels of perception, cognition, and action and pinpoint

the types of complicating strategies that could help learners overcome such barriers to learning in order to increase the efficacy of sensemaking in the classroom.

In the classroom, it is important to help students diagnose their learning problems and apply appropriate strategies to further their learning advancement. Combining sensemaking theory with theory of mindlessness–mindfulness and theory of learning failure shows that incompetence traps have different manifestations at the levels of perception, cognition, and action. This finding is important for helping students choose an appropriate complicating strategy. For example, some students may be sufficiently perceptive and cognitively savvy but need encouragement to put in more effort needed for refining their recently acquired new capabilities. Other students can be very motivated but stumble at the level of perception lacking for instance the depth of vision. Still other may be driven and perceptive but fail to categorize properly or ground their well-developed abstract thinking into the context. Given these possible types of deficiencies, the instructor may need to act as a diagnostician helping students detect, identify, and unravel their incompetence traps through an appropriate combination of complicating strategies and devices.

Limitations and Future Directions

As with any effort at conceptualizing, this one has a number of limitations. The new concepts and typologies introduced here need to be tested empirically. Such empirical verification could potentially show that some of the proposed traps may be more pernicious than others under specific circumstances. For instance, hazy vision could create significant problems at the initial stages of problem exploration. Furthermore, particular personality types could be more susceptible to falling into certain incompetence traps. For example, narcissistic individuals might be more likely to suffer from tunnel vision, whereas individuals with low self-confidence who question their abilities could be more likely to suffer from wandering vision/anemic action. Individuals prone to rash, bold initiatives may suffer from loose thinking as they “plunge in” (Russo & Shoemaker, 1989) without considering the inherent constraints of the situation. Conversely, individuals with a proclivity for abstract thinking may fail to contextualize and adjust their methods.

Furthermore, typologies may suffer from certain shortcomings. They could disregard that the constructs used may not be equally important (some could be more important than others) whereas construction of a typology could limit further exploration of the causal mechanisms at work (leading into the overexploitation trap). Typologies may also simplify the complexity

of the existing realities and so doing could be deceptive and misleading (Doty & Glick, 1994; Fiss, 2011; Scott, 1981). Specifically, different combinations of exploration and exploitation could still represent mindfulness in a particular domain or area of activity. However, whenever exploration, exploitation, or both become suppressed, it could lead to the creation of perilous incompetence traps.

Hopefully, future studies will lead to identifying increasingly concrete, hands-on strategies for teaching students how to recognize, diagnose, and unravel specific incompetence traps that undermine the strong effort they put into their studies. We believe that empirically grounded, culture-specific studies of incompetence traps could help improve the quality of management education. Furthermore, it may be possible to discover the incompetence traps specific to particular disciplines and areas of study and so doing enables educators to help students achieve greater competency, creativity, reliability, and superior levels of performance as they enter our high flux, complicated world as the next generation of leaders.

Authors' Note

Both authors have contributed equally to the paper.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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