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Sharing and cultivating tacit knowledge in an online learning environment

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Abstract Research on knowledge cultivation often focuses on explicit forms of knowledge. However, knowledge can also take a tacit form—a form that is often difficult or impossible to tease out, even when it is considered critical in an educational context. A review of the literature revealed that few studies have examined tacit knowledge issues in online learning environments. The purpose of this study was to develop a greater understanding of the conditions and processes that help promote the sharing or cultivation of tacit knowledge in a formal online course setting. Using naturalistic inquiry as the methodology of this study, an online graduate business course offered at a private, non-profit United States-based university was purposively selected as the research site. The study found that the online course encouraged processes and created conditions consistent with Nonaka's model of knowledge creation and the concept of *ba* (or shared context)—encouraging students to share, and to construct knowledge through socialization, externalization, combination, and internalization. The results suggest that purposefully developing a *ba*-like environment may be a useful approach to facilitating online learning, creating a strong potential to support learning processes necessary for students to cultivate tacit knowledge.

Keywords Tacit knowledge · Knowledge construction · Learning environment · Socialization · Externalization · Combination · Internalization

The capacity of online learning environments to help students share and cultivate tacit knowledge is a significant issue that few studies have addressed. Polanyi (1967) explained that tacit knowledge is what we know but find hard to articulate. During these relatively early years of online learning, most courses have focused on explicit knowledge (Granger

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and Bowman 2003), and perhaps rightfully so. However, in doing so the tacit component can easily get lost in the mix.

In an increasingly networked world, explicit knowledge is easily shared, but knowledge introduced in a higher education setting cannot assume an entirely explicit characteristic, for if it does, higher education may very well suffer the ill fate described by Noble (2001) in *Digital Diploma Mills: The Automation of Higher Education*. Fundamentally, the very nature of tacit knowledge defies precise definition, and therefore generalization, and ultimately automation. For example, in the Nobel Prize-winning paper *The Use of Knowledge in Society*, Hayek (1945) argued that the power of markets originates from the independent and locally minded decision-making entrepreneurs' ability to mobilize the tacit knowledge of all participants within a marketplace. Highly centralized planning bureaus, he argued, are unable to gather precise tacit knowledge of abundance, scarcity, preferences, tastes, and the likes. By the same token, although text book publishers or e-learning course producers can process formal or explicit knowledge effectively just like Hayek's centralized planning bureaus, they are unable to help learners cultivate the kinds of tacit knowledge needed to thrive in the world we live in today. Knowledge, regardless of domain areas, involves a significant tacit characteristic (Bereiter and Scardamalia 1993; Reber 1989). Managers of businesses in the complex global economy today rely heavily on tacit insight, vision, and intuition (Bennett 1998; Brockmann and Anthony 2002; Mintzberg 2004). Educators, too, rely on similar tacit understandings to thrive in their classrooms (Jarvis 2002; Simpson et al. 2005). Even scholars and scientists who rely heavily on explicit knowledge, depend on a unique kind of tacit knowledge to excel at what they do (Sternberg and Horvath 1999; Tschannen-Moran and Nestor-Baker 2004).

Ultimately, the more widely available explicit knowledge becomes, the greater the importance of tacit knowledge. Tacit knowledge forms a critical foundation for meaning making and developing understanding that helps learners differentiate the relevant from the irrelevant during an era of information explosion when more information has been produced in the last 30 years than in the previous 5,000 years combined (Lyman and Varian 2004; Wurman 1989). To put it in another way: Something that is "explicit" means that it is simply stated in words or illustrations. However, words or illustration always have to be interpreted, and interpreting always relies on a tacit understanding that has not been or cannot be stated (Stahl 2003).

This led to the broad research questions: Can learners share and cultivate tacit knowledge in an online learning environment? And if so, how?

Tacit knowledge

Polanyi argued that tacit knowing is more fundamental than explicit knowing, stating that "we know more than we can tell and we can tell nothing without relying on our awareness of things we may not be able to tell." (Polanyi 1958, p. x). For instance, Polanyi (1967) pointed out, one can know a person's face and recognize it among thousands of people, but yet not be able to tell how the recognition was made. Polanyi then highlighted a commonly known police procedure that involves a witness to a crime referring to a face book (that contains pictures of various facial features including chin shape, nose type, face shape, etc.) to help form a reasonably good depiction of the alleged criminal. This, according to Polanyi, may suggest that we can communicate quite successfully (even in relation to content that is as complicated and diverse as physiognomy) if we are given adequate means for expressing ourselves.

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However, Polanyi added that even if one is able to match facial features to that in the face book, much remains tacit, including the inability to tell how one can recall abstract fragments and make matches of similar facial features. Polanyi, and other thinkers including Wittgenstein (1953), suggested a variety of reasons why tacit knowledge cannot be fully explicit or formalized for the purpose of knowledge sharing or knowledge management. One underlying reason can be summed up quite simply: It is much too vast. Tacit knowing involves a background knowledge that includes physical skills and social know-how that result from immense histories of life experiences. Much of these skills and know-how are generally transparent to us even when in use. It is through tacit knowing that certain acts are made possible; the examples include playing in a jazz band, negotiating a business deal, managing an organization, adapting to a new culture, or teaching a room-full of seven-year-olds.

Polanyi (1967) and Buckingham Shum (1998) argued that tacit knowledge cannot be captured in order to be transferred to somebody else or so that it can be converted to explicit knowledge for future consumption. Tsoukas (2003) also argued that tacit knowledge cannot be "captured," "translated," or "converted," but it can be displayed or manifested in what we do. This knowledge, Tsoukas argued, comes about when our actions or communications are recursively emphasized. This can occur through a series of social interaction, personal reflection and insight, and through different forms of experiential learning.

Others have argued that while it is difficult to capture or convert tacit knowledge, it is not impossible (Goguen 1997; Nonaka et al. 2000; Teece 1998). Nonaka and his colleagues (Nonaka and Nishiguchi 2001; Nonaka and Takeuchi 1995) went one step further, arguing that knowledge can be converted or captured in several ways: from tacit knowledge to tacit knowledge (through socialization); from tacit knowledge to explicit knowledge (through externalization); from explicit knowledge to explicit knowledge (through combination); and from explicit knowledge to tacit knowledge (through internalization). According to Nonaka and Konno (1998), these knowledge conversions must take place in a *ba*, a Japanese character that basically means shared context. A *ba* is essentially a place with some unifying form where knowledge can be stimulated, shared, created and utilized, punctuated by the necessary energy, quality, and medium to perform the individual knowledge conversions in ongoing and interacting spirals of socialization, externalization, combination, and internalization (Nonaka and Konno 1998; Takeuchi and Nonaka 2004). This place can be physical, like an office or a classroom. It can be virtual, like an online meeting place or through video conferencing. It can be mental, through shared experiences, values, and ideals. Or it can be through a relationship of people sharing common goals and aspirations.

This concept is related to the work of Lave and Wenger (1991), who argued that knowledge, particularly practical knowledge, is situated. Knowledge exists in a social as well as a physical environment, and is difficult, if not impossible to be separated from its context (Bereiter 2002; Arvaja 2007). In other words, it can be argued that much of tacit knowledge resides in the context in which it exists—sometimes exclusively so. Making this form of knowledge visible to others is difficult as it is, and perhaps even more difficult in online settings as the interpersonal face-to-face context can be limited (Kanfer et al. 2000).

Methodology

The intent of this study is to develop a greater understanding of the conditions and processes that help promote the sharing or cultivation of tacit knowledge in e-learning environments. In this section, the researchers' basic assumptions about researching tacit

knowledge are discussed, followed by the research design and trustworthiness methods used in this study.

Coming to terms with studying tacit knowledge

From the outset, the inquirer intentionally chose not to prescribe to any theoretical definition of tacit knowledge. Instead, the inquirer chose to work on this study based on Polanyi's (1967) rather general definition of tacit knowledge as a form of knowing that is difficult or impossible to express in words. As much as possible, the inquirer refrained from thinking of forms of knowledge in the Cartesian sense, as either explicit or tacit. Instead, he went into the study assuming that explicit and tacit knowledge are almost always so well blended together that realistically there is often no real way to separate them. For example, if a person read every substantive work that has ever been written about Malaysian culture, does it mean that she will be able to function as comfortably as the inquirer does in a Malaysian home (the first author is Malaysian)? Probably not. There is a significant tacit component to culture, as certainly as there is an explicit component. The extent to which the inquirer can make his Malaysian culture explicit to another person, versus the extent to which some of his understanding of Malaysian culture remains tacit is not always clear. It is not easy to discern where one ends and the other begins, and therefore impossible although tempting to separate one from the other so that tacit knowledge can be studied in isolation. Many have shied away from studying tacit knowledge for this reason alone, but the authors believe that just because tacit cannot be easily parsed out from the explicit, it does not mean that it is not worthy of scientific study. In fact, it may make it even more worthy of study.

For the purpose of this study, the content or domain of focus was not Malaysian culture, but crafting and execution of business strategy. In this domain, one cannot use "explicit knowledge" exclusively to achieve top-level crafting and execution of business strategy (Mintzberg 2004; Takeuchi and Nonaka 2004). There is a critical tacit ingredient that characterizes deep or expert knowing that guides the decision making of a strategic manager (Bennett 1998; Brockmann and Anthony 2002; Brockmann and Simmonds 1997; Mintzberg 2004).

How does one go about researching something tacit? Lincoln and Guba (1985, p.198) argue that the sole research instrument that can uncover tacit knowledge is the human instrument. The unique characteristics that qualify humans as formidable research instruments in this regard—including responsiveness, adaptability, holistic emphasis, knowledge base expansion capabilities, and processual immediacy (Lincoln and Guba 1985, pp.192–195)—are essential characteristics for studying a phenomenon as complex and intangible as tacit knowledge. For example, tacit knowledge will be detected in this study through triangulation of multiple "human instruments," taking into account the judgment of the inquirer, course instructor, and the students. The inquirer's previous experiences in management and consulting in both small-medium enterprises and multinational organizations provided the basis for detecting possible emergence of tacit knowledge. These detections and the precise scenario in which it occurred were discussed and confirmed with the course instructor, and then critically verified through interviews with the students. Note that this detection process—particularly involving the inquirer and the instructor—is very similar to Eisner's (1994) idea of educational connoisseurship as a form of evaluation. Finally, also note that the second author often served in the role of sounding board, as a touch stone during the analysis as well as helped in the site selection process. He has been a business professor for over 25 years with much experience teaching and assisting business professionals and taught at a different university than where the course was offered.

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Research design

Using naturalistic inquiry to gain a holistic perspective (Lincoln and Guba 1985) and the constant-comparison method for data analysis (Glaser and Strauss 1967), the researchers observed and examined course activities and interactions, and interviewed the instructor and a subset of students to develop a rich description of the course (Tee 2005).

The research setting—and indirectly the individuals within the setting—was selected to maximize the possibility of being able to inquire into tacit knowledge and the processes related to its cultivation or manifestation in intangible knowing. The subject area itself—strategic management—has a rich tacit dimension (Mintzberg 2004). This particular course was also designed in a way that includes different kinds of activities—from basic elements such as readings to discussions, to more complex elements such as distributed collaborative work in response to a simulation game. This diversity provided different opportunities for study within the same context.

The data used in this study was collected through a variety of techniques including observations, interviews, documents and record analysis, and unobtrusive measures such as the posting trends in the bulletin board discussion automatically captured by the online system. The variety of data sources allowed for triangulation of the information collected (Lincoln and Guba 1985; Patton 1990). As mentioned earlier, this was particularly critical to detect tacit knowledge as the judgment of inquirer, course instructor, and the students were triangulated. Student judgments were based on observation of interaction during collaborative activities, document analysis of assignments, and interviews with students.

Data analysis occurred throughout the research process, from beginning of data collection through the construction of the final case study report (Lincoln and Guba 1985). Data were analyzed using the constant comparison analysis technique (Glaser and Strauss 1967). Through a process of unitizing and categorizing of field data, the eventual data codes—essentially "tags" descriptive of broad unifying themes—iteratively emerged. When this eventually stabilized, much of the tagged data corresponded closely to Nonaka's SECI framework. For example, talking and sharing of experiences and feelings became social interaction. The less formal of such exchanges came to be coded as socialization. The more formal were coded as externalization. As these exchanges became more cleanly synthesized and systemized, the term combination seemed to be an appropriate code. The final key codes are described in Table 1.

Trustworthiness

In this study, credibility was addressed with six techniques—triangulation, prolonged engagement, persistent observation, peer debriefing, referential adequacy, and member checks—as recommended by Lincoln and Guba (1985) and Skrtic (1985). Member checks were carried out at different levels of the inquiry process. First, they took place during interviews when the inquirer intermittently reviewed his field notes and checked with the participants for correction or further clarification. Second, as findings emerged from information that was gathered through observations, interviews, and document analyses, the inquirer attempted to verify its credibility in subsequent interviews by asking participants to comment on its accuracy or relevance. Finally, each participant was provided a copy of the draft case-study report and was asked to review it for credibility under the grand member check process.

To aid the possibility of transferability, "thick description"—characterized by detailed descriptions of the cultural, social, and physical environment of the context, so that readers

t1.1 **Table 1** Key codes and definitions

t1.2	*Socialization:* Informal sharing of feelings, emotions, experiences, and mental models involving the entire capacity of communication. Example: "I am done ragging on X. Let the three of us just try to get thru this, agreed?" or "... we knew these were classmates that were facing the problem in real life and could get a better view from the source."
t1.3	*Externalization:* Attempting to make the tacit explicit through reflective dialogue and writing. Example: "From my experience, I think corporate culture is ..."
t1.4	*Combination:* Synthesizing of multiple knowledge-bases to form new explicit knowing that can be readily expressed to others. Example: "I would say that it is a combination of work experience and a discussion I had in a previous class..."
t1.5	*Internalization:* Transformation of knowledge from explicit to tacit through activities such as doing or experiencing. Example: "There were several weeks we didn't really get that (stated strategy)—to get an understanding of what to do to make that happen (in the simulation game)... In the later weeks, we were able to pin down our differentiation strategy as we planned...."

can make judgments for themselves as to the applicability of the study—was used as the primary reporting technique (Lincoln and Guba 1985; Skrtic 1985).

As for confirmability and dependability, relevant documents were archived in such a way that it can facilitate an audit of the reported processes. For instance, each "piece" of data cited in the following report that supported the different interpretations and conclusions can be traced to its original source in the original data set.

Results and discussion

While the case-report method is the preferred method of reporting naturalistic data to provide the reader with a vicarious experience of the research participant's world (Lincoln and Guba 1985), due to space limitations the reporting here will be limited to a brief background about the online course and two vignettes to highlight the most salient findings, followed by corresponding discussions.

The context

The course BUS 905 *Strategic Management* is a course offered at a U.S.-based private, non-profit institution. It is a capstone course taken in the final 12 credit hours of a 43-credit-hour Master of Business Administration program. Prior to taking this course, most of the students would have completed a number of classes to fulfill the "entrant competencies" to be in this capstone course, including management, management of information systems, economics, marketing, and finance.

While available in online or face-to-face format, this particular section of BUS 905 was a 10-week online course facilitated by a professor who used a blend of asynchronous and synchronous technologies, including a course management system, email, bulletin boards, live online presentations, and online chat rooms. The course syllabus stated that students who successfully master the material contained in the course will achieve a well-developed understanding of single and multi-business enterprises, and a thorough understanding of the entrepreneurial and strategic thinking that drives these enterprises in dynamic competitive regional, national, and global economies.

Essentially, the course had three main components that ran concurrently throughout the 10 weeks. The first was readings students were expected to do on their own—consisting of

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a text book and selected news articles, and additional readings selected by students themselves. The second was threaded discussions based on topics related to the selected readings. The final component was a team-based activity that revolved around a computer-based simulation game known commercially as the Business Strategy Game, or in short, BSG (Thompson and Stappenbeck 2002).

All in all, 50% of the course grade was based on this simulation activity. Twenty percent was based on overall participation and threaded discussions. The remaining 30% was based on the mid-term and final exams.

The participants There were 11 students enrolled in the course, ranging in ages between early 20s to late 30s. Ten of these students worked full-time while enrolled in the course. Their work experiences were in different industries—including hotel management, financial services, insurance services, energy, and information technology consulting services—and in companies of varying sizes, from small privately owned companies to large multinationals. Three of the 11 students were international students. One was a resident in the United States, one in Jamaica, and another in Panama. Three students were completing the course partially or entirely outside the United States, one from Jamaica, another from various destinations in South America, and another partially from South Korea. Because many of the students had numerous other commitments—family, a full-time job, and other job-related activities such as travel and attending conferences—time was at a premium. This certainly created considerable tension for many of the students, but most seemed to take it in stride and made the best of the situation.

Threaded discussion activity

Throughout the 10-week course, four threaded discussions were planned. The most interesting discussions took place when students were asked to elaborate on concepts introduced in the text by relating them to their own experience and what they were facing in the simulation game. The students talked about the value of this during interviews.

Carly (in her 30s, a mother of three, and a consultant at a small accounting firm), for example, said that the online discussions created an environment that encouraged her to think about the concepts that she was reading about (internalization), write about them (externalization), and then get other people's feedback on them (synthesis, externalization, and internalization). As this cycle repeated itself, new layers of understanding were continually added.

Due to the intangible nature of these processes, particularly internalization, it was difficult to identify the specific point or area at which a distinctly new level of understanding was achieved. For example, when students were asked if they could have learned what they learned from the bulletin board discussions by reading a book, or responding to a case study, or even listening to a lecture, all but one answered "No." However, they struggled to explain why the learning associated with the online discussion was simply not replaceable by reading a book, responding to a case study, or listening to a lecture.

"It's different because with a case study or a book you're getting one person's perspective... but with the bulletin board, you have several students, in our case I think it was about 11 students that you saw how they were thinking and they put a different spin on the situation," said *Cid* (30s, single, senior manager at a branch site of a hospitality multinational company).

Even *Dean* (30s, married, diverse professional background working in the security industry), the only one who said that he could have learned it from other more explicit

means, talked about distinctive characteristics of an online discussion. "Through the discussion boards, I was able to hear from all different kinds of business backgrounds and expertise. I was able to see different professional points of view on different business topics, and this enabled me to see the world of business from many different aspects."

It seemed that when the topic of the discussions had a subjective nature, having an opportunity to read varying thought processes and ideas became a distinct learning experience. Consider what *Dory* (mid-20s, married, unemployed with previous experience in marketing) said:

> ... it does have somebody's opinion with it usually. [For example] if he is an employee there, that is a different perspective than maybe a case study would have. That is [a] different aspect—by getting someone's opinion about what they think the company should change or not. And he's probably one of the front line employees and so that's an important opinion to listen to.

A first-person description of the goings-on in a real business situation seemed to be of significant value. The richness of an example from somebody who is there on the scene (in the form of an opinion or an observation), giving an unedited or a less sanitized account, provides something unique in helping business students better understand the often unpredictable world of business. *Vanita* (30s, mid-level manager at a multinational company) explained it this way: "When you read the book it does not make much sense because you [don't quite relate] with the writer. In the bulletin board we knew these were classmates that were facing the problem in the real life and could get a better view from the source."

It is difficult to specifically identify or objectify the learning that took place in the bulletin board discussions, but the value is hard to ignore if seen as a whole. Consider the following vignette.

Vignette 1: Tacit knowledge about corporate culture This scenario took place in the final discussion during weeks 8 and 9 of the course. It revolved around an article about Krispy Kreme. Two notable events took place during this particular series of posts, involving a discussion about corporate culture. The first event began on June 1, with a 626-word post by Bo. The following is an extract from the opening paragraph:

> Corporate culture reflects so much in a business that is both seen and unseen, both tangible and intangible, and both required as much as it is desired if the organization is to follow the path of it's intentional strategy to corporate success. In many ways, corporate culture embodies the very essence, if even at the fundamental level, the behavior, motivation, and achievement-oriented means of how to act towards obtaining organizational goals. This can be exhibited both at the highest level of management, as well as when the frontline [meets] with the customers.

Bo continued with an explication of the importance of a corporate culture and how it can affect the overall performance of a company, relating it to his own experience at Proactive, his current workplace. He then used this to set up his response with regard to the Krispy Kreme case, particularly on the issue of whether the ailing donut company should stay the course or change.

> As for Krispy Kreme, and in review of their situation, it is my opinion that Krispy Kreme keep true to their culture now more than ever, but at the same time, incorporate the appropriate strategic changes in order to keep up with the competition. I believe that Krispy Kreme must stick to the 'bread & butter' of their business and do what has brought them success in the past, yet they must also realize

> the signs of the time and adapt and improvise accordingly. From a business perspective, Krispy Kreme has established much in it's past and they must "stick to their guns" through these tough times... Krispy Kreme can alter their culture slightly in order to better associate with the customers who have been lost due to the 'latest fad diets' (but) they should not stray too far from that which they do best.

The response from the instructor—posted a day after Bo's reply—was enthusiastic. "I don't know if your description of corporate culture is all your own words, but it's an EXCELLENT description! It's one of the best I've seen, in fact," Dr. Garcia wrote. He then used this opportunity to engage in direct instruction, emphasizing key points that Bo had made.

> Your discussion of the role of culture at Proactive is also very good. Clearly there's a match between culture and strategy at Proactive, and this is critically important if organizational goals and objectives are to be achieved.

> Your suggestions for KK [short for Krispy Kreme] are also on target...stick with what they do best while adjusting to current market demands.

Bo responded with equal enthusiasm the next day.

> Believe it or not, that description of corporate culture was purely mine! I'm glad you liked it. That is my best description of how I've seen culture from *my own past experiences, workplaces, and professional perspectives*. That is also how I've been shown and taught what culture is from an employee's point of view, and from working with several different major companies in my career thus far. [Emphasis in italics added]

This response from Bo indicated that he had—over a period of time—internalized what it means to have a sound "corporate culture" through his professional experience with various companies. Given the opportunity to relate his personal insight to the discussion questions that were based on concepts introduced in the textbook, Bo was able to synthesize and then, externalize his personal understanding into words.

As this was happening, other students had joined the thread. On June 2, Cid posted a message reinforcing Bo's original response by citing her own experience with her own company (which happens to have one of the most recognizable international brand names and distinct corporate culture in the hospitality business).

> Corporate culture is reflected in EVERYTHING that the company does and does not do. I like to say that the corporate culture is the character or personality of the company. Yes, the corporate culture DICTATES how every employee should conduct business. Like your company, mine has a CLEARLY defined CULTURE, this sets the tone for each employee's behavior. There is a 2-day Orientation program that is conducted for EVERY new recruit; this exposes them to every member of the executive and middle management team and more importantly to the ORGANIZATIONAL CULTURE. We make it very clear from the onset that they either support and build the culture or join our competitor. Quite frankly, if they are not supportive of the culture we are happy to see them join the competition. [Emphases in caps are original]

Another notable event began at about this point as Cid extended her response with a cautionary message, which highlights the subjective nature of the topic being discussed.

> Changing one's strategy does not mean that one must change the culture. A change in Krispy Kreme's strategy, that is, to provide more health conscious options, does not translate to a change in corporate culture. In some cases the strategy and/or the culture

> may change partially, completely or none at all. I agree with you that sometimes tough times for a business is an opportunity to excel, HOWEVER, let us not be too much of a dinosaur that we refuse to change even when change is the only thing that will bring us success. Recommending that a business "stick" to the old model when the customers are demanding a new model is very risky, especially in light of great competition.

Cid's post above is followed by Anne, who expressed both surprise and inclination toward Bo's recommendation for Krispy Kreme to stay the course.

> You have put an interesting "twist" on your recommendation [for] KK by suggesting that they try to get through the difficult times and "stick to the bread & butter of their business and do what has brought them success in the past." I liked your analysis because when I first read the article, the first thing I thought was that they should go "low carb" to match with the current societal trends that have been going on in recent times. It is apparent that there are times when businesses will experience difficult times due to either the competitive nature of the industry, regulations, the presence of substitute products, etc., but you have come up with a very interesting recommendation for them to remain true to their recipes and not waver due to the latest fads.

This led to *Beth* (in her mid-20s, married, and a human resource development personnel for a service-oriented multinational company) posting a dissenting opinion on June 5, with a cautionary warning similar to the one expressed earlier by Cid.

> I would have to disagree with you. As you can see, KK has lost millions due to not offering healthier options. Many franchises such as McDonald's and Burger King have to offer healthier choices, because America is moving in that direction. I think that times of eating fatty foods is not coming back because as a society we are seeing how poor eating habits is hurting not only adults but children. I think that in order for KK to remain true to its values of being a quality and family-oriented company, then they should start to provide healthier choices that will encourage better eating habits.

Anne responded 2 days later, essentially leaving the responsibility of responding to issues raised in Beth's post to Bo. Unfortunately, the thread ended here as time for discussion ran out. Later, looking back, Anne said that Bo's original post was one of the most memorable ones in the course. In a follow-up interview, she said that she was quite surprised by Bo's perspective:

> His seemed very different. So, I said okay, I'll respond to this one because in my thought processes, I thought they should change strategy because I think society as a whole is going low carb so I think they should go with the trend and so forth and so on. And I think a lot of other students posted that way. But when I read his, he was like, this is their recipe, they should really stick to it. This is what their bread and butter is, and I thought it was really interesting that he thought so strongly that they should not deviate from that but just, ride the wave and stick through the tough times. So that was a very different strategy than I would have thought of.

In considering Bo's recommendation, Anne was forced to reflect on her own assumptions in an attempt to make sense of the situation in the context of what might eventually transpire.

> I never really thought they should stay the course. I thought they should change. So, when I saw that I thought "Hm, this is really different... a different thought process"

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> and I started to think if this would really work and if they realize that this is the way the world is going, and [if] they don't change and they're going to stick to it, would it really work in the long run.

Unfortunately, the assignment deadline ended this thread before it could achieve deeper levels of discussions. Still, Anne was satisfied with what she had learned from this particular thread. When she asked if this kind of thread happened regularly, Anne replied, "You know, this was one of the first ones ... A lot of times we ended up saying very similar things. I think this is one of the first posts that really struck me as wow! That's a different strategy altogether. That was probably the most different post I've seen."

When students were asked to draw from their experience (externalization), and were encouraged to relate it to the concepts introduced by the professor or the textbook (internalization, synthesis), they were able to cultivate and express a type of knowledge that is difficult to attain just from reading a book. This seemed particularly true when students were given a rich, real-life example to frame the discussion.

Consider what Dory said.

> I think it helps bring home the concepts when I'm really forced to think of my own business experience and put them into the bulletin board. [It was] also [helpful] to read an article and apply it to different areas. So, in the future [you know] what you're looking at...and now [you know how to] use the concepts.

Implicitly, then, Dory was saying that listening to lectures or reading the textbook alone did not "bring home the concepts" the way the discussions did, especially when they required students to draw from their experience and to apply the concepts they were learning to a real business problem.

Summary of the threaded discussion experience The examples highlighted in the above vignette indicate that students had engaged in socialization, externalization, combination, and internalization. In other words, they have taken the explicit and tacit, and cultivated new knowledge from it. All but one of the students interviewed said that they could not have learned what they learned from the bulletin board discussions just from an explicit source, such as reading a book, working through a case study, or even listening to a lecture. Some suggested that the discussion mode encouraged a greater diversity of opinions and perspective that are usually not present in explicit sources. Others found value in reading their classmates' firsthand accounts of what other companies are doing. Still others found the feedback from their peers and the professor to be most helpful. Most notably, several students found that previously inert textbook concepts made more sense as fellow students related them to their work experiences and attempted to apply them in realistic business situations.

The team-based simulation game

The Business Strategy Game, or in short, BSG (Thompson and Stappenbeck 2002) is a computer-based simulation game that pits one company with other companies in the global athletic footwear industry. In this course, each team, which consisted of two to four students, functioned as a senior management team of a company, competing against other companies run by other groups of students from this and other sections of the same course. These responsibilities were "handed" to them in the company's 10th year of operation. The

simulated operations of the company were intended to parallel those of real-world athletic footwear companies competing in a complex international business environment. Companies compete in a global market arena, selling and potentially sourcing or manufacturing branded and private-label athletic footwear in four major geographic regions—Europe-Africa, North America, Asia-Pacific, and Latin America.

Each team must make a myriad of decisions concerning plant operations, distribution and warehouse operations, work force compensation, online sales at the company's website, sales and marketing, and finance. The challenge was to develop and execute a competitive strategy that results in a respected brand image, contends for global market leadership, and produces good financial performance as measured by earnings per share, return on investment, stock price appreciation, and credit rating.

Also as part of the simulation assignment, each group was expected to develop a strategic plan to help in the decision-making process, submit a management audit as a review of how one's team performed as a company and how well it conformed to the strategic plan, and submit a mid-term and end-of-term peer review of each member of one's team.

When students were asked if they could have learned what they learned from participating in the simulation game by reading a book or responding to a case study, or even listening to a lecture, everyone overwhelmingly said "no." The response to this question was much more emphatic compared to that of the threaded discussion.

"I don't think a case study or a book or anything [in] a lecture could compare to [the simulation game experience]," Dory said.

Much of the simulated learning experience occurred in a blending of activities involving synthesis, externalization, and internalization. Consider Bo's observations.

> The BSG has taught me that there are many sides to *consider* before *making* important decisions, and the *text reading* is somewhat reinforcing some *previously learned material*. In essence, this class is *putting everything together* nicely and in a manner that urges us to *utilize a culmination* of our skills. [Emphases in italics added]

The coming together of "text" and "previously learned material" suggest a synthesis of explicit forms of knowledge, and the action "to consider" or to reflect is associated with internalization, while "making decisions" is an act of externalization based on the "culmination" or "putting together" or synthesis of explicit and tacit knowing.

The simulated reality created a condition of overwhelming amounts of data that changed with every decision, influenced by varying ideas and arguments offered by a variety of personalities working under time constraints. Ultimately, the students had to deal with the consequences of whatever transpired. Consider Cid's observations.

> [It] gave you the real thing. You were in an industry. You were one of the players. You were one of the companies that made up this industry. As a result, it was a real situation where you're at work and you have to make decisions on behalf of your company. A case study doesn't necessarily provide that because the case, when you do a case study, all you need to do is to support your arguments, why you would make that decision. It might not necessarily be the correct decision and you're not able to see the effect of your decision in the industry or in the company. With the BSG, you saw the effect of your decisions and how they impacted your organization and you know, what your position is in the industry was as a result of the decision.

The experience of actually doing or acting on one's knowledge—in this case, assessing a business situation and then making a series of strategic decisions—required a level of detail that never quite emerges in its entirety until it has to be done. Dory, for example, said that

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playing the simulation game forced her to apply what she knew. The textbook and previous learning from other courses gave her team the explicit dimension needed to develop a strategic plan, but according to Dory, her understanding only came together when they had to implement what they had stated in their plan.

> I've never done anything like that before where you actually *apply your knowledge* and try to stick to a plan. So, it definitely gave me a better understanding of, "Okay, this is what I said in the plan when it comes to *making decisions* about how the company is going to price things and your [credit] ratings, and what you're going to spend your money on and stuff. It *makes you think* and *makes you go back* to, "Okay, what is my plan," instead of just shooting in the dark. [Emphases in italics added]

In order to perform an action or "apply one's knowledge," clearly required a thought process involving internalization and reflection ("it makes you think") and synthesis of increasingly meaningful explicit statements ("makes you go back to..."). This knowledge cultivating process adds new layers of understanding, which are eventually externalized as part of a decision set. Carly faced similar challenges and responded in much the same way. Consider her team's struggle with the details of pricing their shoes.

> Even just thinking about pricing. This has been the big perplexing [problem] here. How [do] you price something, and [consider] all the different things that go into it, all the different ways to look at it? What are your competitors going to do? What is your overall strategy? That has been interesting to me on how businesses formulate their strategy, and then, you have this opportunity to try to stick to it, and morph within it."

Carly is essentially describing an active cycle of questioning, reflection, and synthesis that would eventually culminate in a decision.

Referring to a book by Henry Mintzberg, entitled *Managers Not MBAs: A Hard Look at the Soft Practice of Managing and Management Development*, Dr. Garcia had talked about the challenge of teaching the "soft" but essential practices inherent in a management course such as BUS 905. For example, how does one teach the dynamics of an analytical or decision-making process required to run an organization with numerous interacting but separate functional parts in an increasingly complex global marketplace? Yet these are knowledge and skills essential to business students, because the successful strategic manager in a corporate environment is often defined by his or her ability to analyze and diagnose a complicated situation with no clear right or wrong answers, and to make a decisive decision that maximizes the possibility of success. The triangulation of data sources suggests that much of the development of this "soft" or tacit knowledge emerged during simulation game activities.

The students—by being put in a context-laden simulated condition—began to cultivate tacit knowledge. In their end-of-semester management audit report, Dean and Dory reported:

> The BSG helped us learn about all the dynamics that go into making a decision. It is easy to say that you want the highest quality, customer service, and the lowest costs but sometimes resources do not permit for all [these] to be accomplished at the same time. The BSG helped [us] to see the impact of decision making as well as the changes that competition brings to the situation. It helps to see how a plan can be put into action and gives you the ability to see the results and consequences over time.

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Similarly, Beth discovered that it was not easy to translate a stated strategy into action. In other words, the students knew what they wanted to strive for explicitly (e.g., low-cost provider strategic plan) but, like Dean and Dory, Beth's team quickly found out that execution of a stated strategy was a little more complicated.

> I guess it is easier to put things down on paper than to actually do them in a business. Our initial plan was to be a low-cost provider. However, it has been very difficult for our team to *translate the strategy to "actions."* Actually, we had to change our strategic plan to reflect more appropriate goals. We initially wanted to be a low-cost provider and still provide high quality products. However, we found that this was almost impossible to achieve and decided to reduce the quality in order to provide a lower cost product. [Emphases in italics added]

The experience of trying to "translate the strategy to actions" helped Beth develop the tacit understanding that had eluded her through much of the MBA program. Beth explained that the experience of playing the simulation game helped her understand that every decision affects the business as a whole. "Before this class it was hard for me to picture that. Now I can see that even decreasing staff or spending money on advertising affects the other areas of the business," she said.

Developing the intangible ability to see the strategic "big picture" cannot be taught directly, just as one cannot be didactically instructed to be a team player. In their management audit report, Team II summarized:

> I think we all really *got our first taste* of the broader side of running a big business, globally-expanded, and industry competitive company. It seems we all learned that there is indeed much more to business than just branches of separated functions working towards common strategic and tactical goals. I believe we all began to see the *true intricacies of how intertwined these branches of business really are*, and how interdependent they are on one another. I think we really gained a *deeper knowledge in understanding* production costs, manufacturing costs, the costs and benefits of marketing, supply chain economics, and value along all relative issues pertinent to the customer. I believe we all got a true sense of the macro side of executive business *decision-making* versus the micro side of management. In seeing the importance of both when analyzing data for a business, I think we were able to see the meaning and purpose that this type of analysis provides when using the data to forecast future numbers and expectations. I think we were also able to finally realize that when the *power of decision-making is shared amongst an equal wheel or command chain*, then communication is paramount in productively moving forward with growth, profitability, and in overall corporate as well as group success. [Emphases in italics added]

Put simply, the simulation and team activities provided a complex, multi-dimensional situation that forced the students to use all that they knew (synthesis), reflect and act upon what they knew (internalization), and commit to a decision (externalization). In the following segment, a specific BSG-related vignette is presented to highlight the process of knowledge cultivation in context:

Vignette 2: An emerging tacit dimension The date is May 22, approaching the end of Week 7 of the 10-week course. Team I just received the results from the simulation game. After sustaining a top five finish in the first 3 years of leading their company—Year 11, 12 and

13—the results from Year 14 brought bad news. As usual, Anne, Allie, and Vanita meet in the online chat room.

8:52:51 PM> Anne: Did we get year 14 results back?

8:53:29 PM> Allie: Yes and they were horrible...

"Results are very disappointing," Vanita says after 3 min of silence, presumably after looking over the data. At the end of Year 14, the company is in tenth position for that year as well as the overall standing, in an industry with 13 companies.

As they delve into the data, they begin to realize the depth of their problem. "Yikes, I think we're in serious trouble," Anne says.

A short while later, as Allie begins to realize that there was more at stake to the game, she says glumly, "I have to pass this class too...and I am upset."

9:03:16 PM> Allie: There is no way with the few changes I made we could have dropped that much.

9:03:31 PM> Anne: Maybe we should bring this to professor's attention that something might have gone wrong.

What exactly went wrong is not quite clear.

9:05:01 PM> Allie: Unless there was a downward spiral effect of overall choices we have made that just accumulated in year 14—but that still doesn't make sense to me.

9:05:01 PM> Vanita: That is exactly what I reviewed Allie and the issue is that all other teams did a better strategy in Y14 and got better results.

9:05:24 PM> Vanita: The better the other teams do the less chance we have to be more profitable.

They try to parse through all the data at hand, and speculate on what could have gone wrong. Could the submission process have tainted the data because of a technical glitch? Maybe there was a misunderstanding that caused this to happen. Maybe the person responsible for submitting the data made some mistakes.

The conversation begins to focus in on a team member who is not present and who had been absent from team meetings several times. After almost 4 min of what seemed to be characteristic silence, Vanita writes: "I think we all have to share the responsibilities."

Allie quickly responds, "That is right, and we can't go back and capture the integrity of the information."

In the midst of venting their frustration and attempting to speculate on the roots of their company's problem, the team begins to come together.

9:12:59 PM> Vanita: A good starting point is to have some ground rules to work with.

9:13:22 PM> Anne: Ok, I am up for that Vanita.

9:13:30 PM> Allie: Me too.

9:14:09 PM> Vanita: Not only to agree on the strategy but also more responsibility of all team members with the meetings.

The discussion skirts around the absent member again, but little was being accomplished. The team realizes—again—that at this point they need to move beyond

the immediate personnel issues. Allie makes a commitment: "I am done ragging on [the absent team member]."

9:17:42 PM> Anne: Let the three of us just try to get thru this, agreed?

9:18:02 PM> Allie: I 100 % agree.

9:18:05 PM> Vanita: Agree.

9:18:29 PM> Vanita: Shall we start by reviewing the strategy? That should give us ideas about the way forward.

"Okay, so with that in mind, how do we proceed to get through the next 3 weeks?" Anne asks soon after. Vanita responds by taking charge.

9:19:42 PM> Vanita: First [we] would [need] to have a single focal point [for] sending the information.

9:19:58 PM> Vanita: If all agree, I could do that.

9:21:00 PM> Vanita: We still have three more pending decisions and, if we implement an aggressive strategy, we could improve a lot.

9:23:43 PM> Anne: Okay, I am fine with that.

Allie agrees, too. A key decision is made, and Vanita becomes the point-person for submitting all the information for each of their business decisions. The norming phase is beginning to take shape within the team, as they begin establishing a new level of cohesiveness and commitment in search of new ways to work together and set expectations for appropriate behavior. They stop finger pointing and forge on.

With a few basic but critical ground rules and a greater sense of ownership in place, the team attempts to figure out where they are, and how they should proceed. After several minutes of deliberations as they process the pages of data, a key discovery emerges.

9:26:38 PM> Vanita: I found something....

9:27:26 PM> Vanita: We did not sell in Y14 any pair in NA [North America].

9:27:58 PM> Vanita: That is what lowered our results.

However, more trouble is on the way, as they begin to experience technical and operational problems related to the technical aspects of the game. Despite the distraction, they begin to attack the problems caused by not selling any shoes in North America in Year 14.

Attempting to put some focus on the problem, Anne asks, "What is the most positive use of the extra cash? Increase mfg [manufacturing] for year 14?" Within a few minutes, they begin to formulate their response to the question.

9:33:11 PM> Vanita: I would say increase manufacturing and lower prices with a strong advertising budget and retailer support.

9:33:48 PM> Allie: I agree.

9:33:49 PM> Vanita: Regarding manufacturing, increased budget in styling and features and quality.

9:35:21 PM> Vanita: We would still be aligned with our strategy which is based on differentiation focusing on image and product quality.

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9:36:05 PM> Allie: Vanita, you have a good ability to analyze—this is a good strategy.

9:36:49 PM> Vanita: Allie, not sure if [it] is good but at least we can try and see results.

9:36:55 PM> Anne: Agreed

They begin to see the silver lining in the disastrous Year 14 performance, as Vanita notes, "No other company will have that amount of money available to spend." It is not clear if she really means this or if she is joking, but soon after, in a brief and rare moment of pep rally-type exchanges, they begin to band together:

9:37:33 PM> Vanita: Let's do it together.

9:37:38 PM> Allie: You are absolutely correct!!!

With their newfound unity, they trudge on, occasionally finding small victories on the way. "Just to cheer us up, I was reviewing our original strategy and at least we have met the financial goals. Need to improve on the marketing strategy though," Vanita says midway through a stream of discussion.

"Lets cycle for a minute and play 'what if' with NA [North America]," Allie suggests soon after, which then leads to detailed decisions like this one.

10:09:48 PM> Vanita: We should lower the price to 31. I just noticed that only 5 companies sold shoes to PL [Private Label] market. WOW!

10:10:13 PM> Vanita: That is a price sensitive market! Only the companies with lower prices sold in Y14.

10:10:32 PM> Allie: Done

10:11:03 PM> Vanita: To make sure we do not end up with PL [Private Label] inventory, we should also turn on the inventory liquidation option.

The discussions continued, and more decisions are made even in the midst of continued technical complications. The team continues undeterred, even as the meeting approached 2 h. The next hour and 20 min prove momentous for their advancement as a company, and by implication, their learning process. Anne later reflected:

We ended up with a lot of cash. So we had to make some very, very [hard decisions] as we fell almost to the bottom as far as the scoring went. So, we were really panicking. We had to make some strong decisions. What are we going to do? So, we spent hours and hours and hours going through 'what if' scenarios and that's when we had to pull together and really come up with a way that we could spend the money but spend it wisely. That was a very big thing that happen to us.

As they pulled together, midnight was already approaching. Soon after, a series of critical decisions are made, as can be seen in the following exchange:

11:19:27 PM> Vanita: Lets visit the branded sales screen again to summarize.

11:20:05 PM> Allie: Okay.

11:20:41 PM> Vanita: NA [North America] price 55, advertising 8000, rebate 1, retail outlets 7000, company owned stores 1, retail support per outlet 3000, delivery time 0.

11:20:55 PM> Vanita: Liquidation option on

11:21:25 PM> Anne: I had 1 week. I will change to 0.

11:21:40 PM> Anne: Correct.

11:21:58 PM> Allie: Got it.

...

11:26:43 PM> Allie: Did we have liquid option on or off for Asia?

11:26:54 PM> Vanita: Not for Asia, Allie.

11:27:12 PM> Allie: Good.

11:27:37 PM> Vanita: For the moment I think that Asia being a low cost manufacturing and storage area we do not need to have that option on. Also because we need a buffer in case sales inventory increase.

"We will liquidate inventory because storage costs are higher in NA [North America] than in Asia," Vanita explains to her fellow teammate. Such observations suggest that new layers of understanding are occurring, as Anne noted later as she reflected on this situation:

> We decided to liquidate our inventory at one point. And I [asked the] question: "Why do you think we should do that?" [And Vanita explained that] it would reduce our storage costs and the amount for manufacturing and so forth and so on. So I know from that that these are the reasons why. And I think interacting with those teammates was really good because you learn. It's just like if we were both running the firm, or if all of us were running the firm and we would sit down and one person would say lets do this. And we would, you know, have to question that. So I think I learned why they wanted to do certain things at certain times. I think the ones who participated, we all brought different elements to the table.

This interactive learning facilitated by the simulation game was particularly significant because few avenues are available to practice making complex, multi-million-dollar strategic decisions. As Anne noted later: "The whole BSG thing is different from what I do in my job. I'm not making such important decisions... at times we're raising the prices or selling off inventory or we're not manufacturing in one whole country. I mean these are key strategic decisions. I don't think I'm at a point [in my job] where I make such decisions that [can] make or break the company."

However, this newfound know-how may be useful in the future, according to Anne: "When I get to that level I can reflect back to BSG perhaps, and think about those types of decisions."

This freshly cultivated knowledge often resulted from learning to apply concepts that Anne already knew, at least at the theoretical level, as she later explained. "We had to come up with the strategy at the beginning of the course. But it was really a struggle coming up with 'how do we really hone in on this differentiation strategy...' We chose the differentiation strategy and we struggled with that for a while."

Even though the textbook explained what a differentiation strategy was and how it can be implemented, the actual execution or application of the concepts proved to be difficult. Despite reading the section on "differentiation strategy" several times, Anne did not quite

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develop the understanding to be able to confidently manipulate different variables to bolster the company's position until much later in the simulation game.

> There were several weeks we didn't really get that—to get an *understanding of what to do to make that happen*. I think the actual work made it more real. Even though it was difficult, I think actually doing it was really a different concept and made it much more real than a case study or a lecture or anything. [emphases in italics added]

As the game developed, they began synthesizing what they knew, using the textbook as the primary source in attempts to make decisions consistent with the company's stated strategy. Through detailed team discussions, individuals within the team began to internalize new layers of understanding that enabled them to make better decisions as a team. This cycle of synthesis, internalization, and externalization was repeated with every annual decision they made. Toward the end of the simulation game exercise, it was clear that their understanding had reached a higher level, as described in the team's management audit report:

> In the later weeks we were able to pin down our differentiation strategy as we planned and [thereby] gained additional advantage in a tough and competitive industry. We based the company on high quality products with strong customer service, which enhanced our brand image and gave us market leadership in Latin America.

Not all aspects of the experience were positive, but the learning was valuable. Consider, for example, what Vanita said later as she reflected on the simulation game activities.

> BSG was a challenging exercise not only from the strategy standpoint but also because in my team there were serious communication problems that finally got sorted out, and then... the strategy improved! It is better it happened to me in a game so that I know what to do in real life: Be a leader, get everybody together and review what benefits each of us will get from the strategy (get their commitment) because as humans we are always looking to what is in it for me; once people understand that following the rules and the same strategy will help them, everything will fall in its place.

Vanita said that one of the most valuable learning experiences was learning new ways to improve her virtual management practice through more effective communication and negotiation skills. In addition, she learned more about the many dimensions of strategic management.

"This was like a real life experience," Vanita said. "Different companies with different strategies trying to make money. Different market and customer behaviors that helped me understand how all the functional pieces fit together. Prices and costs are not the only competitive variables and in the books I could not have learn that the way I did in the BSG (by applying new variables like advertising, quality and image)."

Summary of the simulation experience The simulation game provided a shared context in which students could engage in problem-solving and decision-making activities, in the midst of a realistic and often subjective business environment with multiple interacting and dynamic variables. In negotiating the many hurdles of the game, the students cultivated new layers of understanding, much of it tacit in nature, through activities involving synthesis, externalization and internalization.

As a result, a greater sense of self-efficacy seemed to emerge. Reflecting other students' sentiments, Carly said that this class, anchored by the experience involving the simulation game, prepared her to be a more effective strategic manager. In this regard, Carly said, "Not only does a person have a good opportunity and ability to see how decisions are related [in the simulation game], you have the opportunity to work with people you may or may not get along [with]. By far, I think this has been the most useful part of this course and one of the most useful things I have done in all of my classes."

Dory summed up many of the students' feedback when she said that the simulation game allowed her to put into practice *all* that she had learned.

Fusion of learning experiences

The online BUS 905 course consisted of numerous activities—including reading of the textbook, examinations, live online discussions, asynchronous bulletin board discussions, and a simulation game reflecting the real business world—but what stood out were the bulletin board discussions and the simulation game activities. Both of these activities encouraged the students to engage in processes that involved socialization, externalization, combination, and internalization. However, this was most pronounced in the simulation game activities where the fusion of these processes highlighted some of the key learning experiences of the students. The significant outcome of the fusion of these processes was the cultivation of knowledge that many of the students felt could not have been derived from simply reading a book, listening to a lecture, or working through a case study. In other words, they developed a critical knowledge base that had considerable tacit qualities.

Conclusion and implications

A focused naturalistic exploration—culminating in the case highlights and vignettes reported above—revealed a number of saliencies that advance understanding of how tacit knowledge can be implicitly but deliberately taught in an online classroom. These saliencies will be discussed here from two perspectives. The first involves processes, and the second pertains to the conditions of the learning environment relative to the design of a course. Then, the major findings are summarized followed by a brief discussion of lessons learned for practical applications.

Inducing processes for cultivating tacit knowledge

It is clear from the vignettes reported above that tacit knowledge was being used and cultivated. The instructor of the course, on a number of occasions, noted that clearly some of the students knew and could do more than they were able to express. In addition, virtually all interviews with participants and the group reflections in the management audits revealed that they had cultivated significant personal tacit understanding. For example, almost all the participants explained that the experience from the class—particularly from engaging in bulletin board discussions and playing the simulation game—helped them understand and better respond to the complex interdependence of each functional unit within a business organization. Many mentioned that they knew this in theory—as they should because many were just a course or two away from graduation—but did not really "get it" until their learning experience in the course. In addition, they are now willing to apply, or in one case, already applying their learning at work.

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The course instructor—by designing a course that consisted of numerous assignments that included reading of the textbook, synchronous and asynchronous online discussions, and a simulated strategic management game—seemed to have designed activities that induced four key processes: socialization, externalization, combination, and internalization. This is consistent with Nonaka's SECI model of knowledge creation.

The following discussion expands upon how these individual processes came into play in the online course, using the holistic context of the integrated SECI model as an explanatory frame of reference.

Socialization The key to this process is some form of shared experience, without which it is extremely difficult to identify with another individual's thinking process. The mere transfer of information, unless for the purpose of memorizing explicit knowledge, will often make little sense if it is devoid of emotions or contexts. Furthermore, emotions and contexts are better understood with shared experiences.

The students were given a context for socialization where feelings, emotions, experiences, and mental models emerged primarily through the bulletin board discussions and the simulation game activities that required collaboration. The bulletin boards discussions—particularly the ones with rich contexts such as the discussions involving the simulation game, the student's personal experiences, and the Krispy Kreme scenario—were effective in promoting socialization. Team-oriented discussions with the simulation game as a backdrop also provided the students opportunities to share divergent world views, opinions and experiences, develop trust, and make decisions based on a growing common understanding.

Commenting on the value of these discussions, which were characterized by informality and diverse opinions and experiences, students reported that they could not have learned from more formal sources what they learned from the bulletin board discussions because the discussions were richer contextually as they were unedited, firsthand accounts of fellow students' experiences.

Externalization The externalization mode of knowledge creation was typically seen in the process of elaborating on a concept or explaining an idea. The bulletin board discussions that encouraged students to relate and share their own experiences with concepts introduced in the textbook, and to describe how they might apply those concepts in the simulation game, were quite effective in promoting externalization.

This process was characterized by greater formality and precision compared to socialization, often revolving around questions regarding practicality or feasibility. For example, one of the students said that it required a measure of discipline to relate her experiences to concepts that were being discussed, but felt that it was a worthy exercise because it forced her to think things through with greater detail so that she could confidently share it with others. Other students talked about the deepening of their own understanding, either as a result of somebody else's explanation or by having to relate their own experiences in the context of a more formalized business environment.

Combination As a result of synthesis, knowledge is often reconfigured—through sorting, adding, combining, and categorizing—to form a new basis of knowledge. When the students built on each other's externalization of explicit knowledge in the bulletin board discussions, the cumulative discussion resulted in new knowledge combined from multiple sources of information. Likewise, when the student teams met to formulate and execute an overall strategic plan for their respective companies in the simulation game, they were

essentially externalizing, responding to, and combining sets of financial data, business concepts, and competitive information with their own understanding.

This process was characterized by a greater need for organization of knowledge, so that it could be transferred with clarity and fidelity. For example, in preparing their strategic plan, each team of students dedicated a significant amount of time to collecting and sharing explicit knowledge, proposed ideas in different media, and finally consolidated everything into a rational and coherent document.

Internalization Nowhere was internalization more apparent than when students were continuously and fully engaged in the simulation game, particularly in situations where each team had to deal with a common problem, analyze the situation, discuss possible solutions, and eventually act on an agreed upon decision and be ready to respond to what transpired. Internalization is generally a personal process, but it also happens in a group context, such as when a group of people who have stayed together for a period of time internalizing a unique culture that is only apparent to the individuals of the group (the beginnings of this can be seen in the second vignette when the group begins to develop norms). As noted earlier, the students reported that they did not really "get it" until sometime in the course, often after a particular "ah-ha"-type moments. As a result, they are now willing to apply or are already applying their learning at work.

Internalization would not be possible without the other key processes—socialization, externalization, and combination—and vice versa, usually involving an ongoing culmination and refinement of one's knowledge through a series of reflection and action. In other words, none of these processes is individually sufficient and all must be present to feed off each other (Takeuchi and Nonaka 2004).

SECI in context It is when all four processes interact with one another—both in a personal and collaborative context, involving both tacit and explicit knowledge—that the "spiral" of knowledge creation becomes hyperactive. The greater the interaction, the more active the spiral, thus enhancing the opportunities for new knowledge creation—both of the tacit and explicit kind.

First, the socialization mode usually begins with a "field" of interaction that facilitates the sharing of individuals' experiences and mental models (Takeuchi and Nonaka 2004). In the online course, several fields of interaction were in place. Students began by introducing themselves on the bulletin board. They also made their email addresses available on the roster, and several posted a mug shot of themselves. These helped create a sense of a social presence (Gunawardena and Zittle 1997; Rovai 2002), which continued to develop during bulletin board discussions and group-oriented activities. As noted, these provided many opportunities for students to share divergent ways of thinking and their personal experiences in the process of problem solving (Muukkonen and Lakkala 2009), and to develop a way of communicating with and understanding each other. For example, by the time one of the teams was faced with a dire situation whereby their company in the simulation game was at risk of failing (see the second vignette) they had already developed a sense of each other's strengths and weaknesses. When one of the team members began to take on a leadership role, the other members were quick to show their support. Clearly, a certain level of respect had been earned over a number of interaction activities, which is consistent with the socialization process. The foundation for externalization had been established, making conditions ideal for meaningful dialogue and collective reflection to take place (Takeuchi and Nonaka 2004).

As a result, a highly productive discussion ensued, with each proposed solution for each problem guided by the mental model of the newly emerged leader. Through an intense

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process of externalization, the leader's experience—much of it tacit—began to emerge explicitly and implicitly. Her fellow group members not only trusted her to guide, but also supported her by providing information and other input critical to the decision-making process, essentially setting up the combination mode.

Each member drew on their own knowledge from different sources—including required readings and notes from other courses, their professional experience, and from "interacting with" and "manipulating" the simulation game—to cultivate new knowledge. This ongoing process not only helped the students make decisions, but also highlighted their learning experience. The leader of the team said the overall experience helped improve her communication and negotiation skills, particularly in managing from virtual sites (which is part of her actual job description). As a team and as individuals, they learned by experiencing the tacit-laden craft of developing and executing a strategic plan (Bennett 1998; Brockmann and Anthony 2002; Mintzberg 2004) in a contextually rich business simulation exercise. In doing so, they were able to embody explicit knowledge into tacit knowledge.

When knowledge is internalized in an individual's tacit knowledge base, the individual begins to gain insight that can be characterized as developing a deep understanding that enables a person to see a once explicit and perhaps inert concept "come to life." For example, many of the students were not sure how to execute their broad competitive strategy of choice (e.g., differentiation, low-cost, or focus/niche). Indeed, the textbook (and certainly books and lectures from other business courses) had laid out what it meant to, for instance, embark on a differentiation strategy. Yet, when it came to acting on this essentially explicit knowledge, many of the students were quite dumbfounded. As the game developed, they began to synthesize what they knew as they attempted to make decisions consistent with their stated strategy. Through team discussions, individuals within the team began to internalize new layers of understanding that enabled them and their colleagues to make better decisions as a team.

This cycle of socialization, externalization, combination, and internalization was repeated with every annual decision they made, and toward the end of the experience one of the teams announced that they were finally able to "pin down" their strategy of choice. Others mentioned that previously theoretical concepts "had come to life" or "were being brought home" as they began embodying what was once explicit knowledge.

As the embodiment of explicit knowledge took place, new tacit knowledge was cultivated at the individual level, setting the stage for a new spiral of knowledge creation. With each spiral, the depth of knowledge—at the individual, group, and/or class level—became deeper.

Creating conditions for cultivating tacit knowledge

The course instructor in this research seemed to have inadvertently created an elementary *ba*, or a shared context for knowledge sharing, creation, and utilization (Nonaka and Konno 1998). According to Takeuchi and Nonaka (2004, p. 102), a *ba* "provides the energy, quality, and places to perform the individual knowledge conversions and to move along the knowledge spiral" that consists of four key processes—socialization, externalization, combination, and internalization.

As an elementary *ba*, it provided, encouraged, and required the use of virtual spaces to facilitate knowledge sharing, creation, and utilization by promoting interactions between members of the class based on contextually rich situations such as the scenario-based bulletin board discussions and the simulation game. The course also had enough

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concentration of critical knowledge-promoting agents in place to promote the knowledge creation spiral, especially during the simulation game that required decisions to be made on a weekly basis. Because tacit knowledge is intangible, without boundaries and dynamic, and because it cannot be managed like an object, knowledge sharing, creation, and utilization require a critical mass of knowledge resources in a certain space and at a certain time (Nonaka et al. 2001).

For example, in this elementary *ba,* the students were asked to read and learn from the textbook, essentially a well synthesized and organized knowledge resource that had been derived from years of the SECI spiral by strategic management experts. The bulletin board discussion that required students to relate concepts in the textbook in their own words to their experiences and the simulation game, gave them an opportunity to socialize and externalize their knowledge bases. The input and feedback from the instructor and fellow students further energized this activity.

The simulation game activities—involving the individual students and their teams—provided ample opportunities for activating the SECI spiral. The game provided market feedback, and the students responded with analyses and decisions that were based on individual reflections and group discussions (and their strategic plan). Each time the game provided feedback (weekly), this cycle would be repeated, complemented by the ongoing bulletin board discussions, reading assignments, instructor's feedback, students' past and present work experiences, and external knowledge sources such as books, websites, or lecture notes from other classes.

In other words, a critical mass of knowledge resources came together within a given space and time during the online course, and the result of this aggregated effect is a *ba*. Without an enabling *ba*, the knowledge acquired is decontextualized and tends to be inert and of little practical utility, because knowledge, thinking, and the context for learning are inextricably linked (Bereiter 2002; Brown and Duguid 2000; Lave and Wenger 1991; Whitehead 1929).

Nonaka et al. (2001) also propose a specific type of *ba* for each of the key processes in the SECI model. The originating *ba*—for example, the more open-ended discussions occurring in the bulletin board discussions—promotes socialization when feelings, emotions, experiences, and mental models are shared. The dialoguing *ba*—as seen in the team chat discussions related to the simulation game—promotes externalization when common terms and concepts are negotiated and become more concrete. The systemizing *ba*—for example, the time and space where teams synthesized and documented their strategic plan and end-of-semester management audit—promotes combination when new systemic, multi-source explicit knowledge is created through focused collaboration. The exercising *ba*—as represented in the simulation game—facilitates internalization when knowledge is acted upon and embodied through continuous adjustment and refinement.

Energizing the Ba Merely building a *ba* is not enough to activate the knowledge-creating spiral. The *ba* needs to be "energized" to give motion and quality to the knowledge-creating process, driven by both implicit and/or explicit purpose, direction, interest, and mission (without which the energy in the *ba* cannot be directed effectively). According to Nonaka et al. (2001), a *ba* can be energized by providing enabling conditions of autonomy; fluctuation and creative chaos; redundancy; requisite variety; and love, care, trust, and commitment.

Students of the online course, either on their own or in self-organizing teams, were given the freedom to act with relative *autonomy* so that they could motivate themselves to experiment and discover new knowledge.

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Largely through the activities related to the simulation game, there was significant *fluctuation and creative chaos* that helped stimulate the knowledge creation process. For example, a sense of crisis was evoked in a team trying to recover from a potentially debilitating company performance in the simulation. There was also significant room for ambiguity that forced some of the students to work and think beyond their conventional capacity as members of a classroom, and as a result there were some positive breakdowns of set routines learned from more structured educational experiences.

Due to the nature of the simulation game, a lot of information (e.g., financial, operational, marketing, and competitive data) was made available to the students that went beyond what they were accustomed to. This kind of *information redundancy* forced the students to learn to deal with information overload, and to begin to understand how to discriminate the most critical information from the generally important information. When the members of the team collaborated, it helped promote the sharing of tacit knowledge and the exchanging of ideas.

The final two conditions—requisite variety and love, care, trust, and commitment—seemed to be somewhat harder to detect and limited at the research site. According to the principle of *requisite variety*, internal diversity must match the variety and complexity of its external environment (Nonaka et al. 2001). In a way, this was ingrained in the experience, as many students noted, with respect to the ability of the game to simulate the interdependencies of functional units, the complexity of decision making and the dynamics of a global competitive market with numerous competing organizations. What was missing both in the course, in general, and the game, in particular, was the prompt and convenient access to a wide range of information so they could respond to questions, issues, confusions, and challenges that were emerging in real time like they do in the real world. The largely asynchronous environment hindered such promptness and convenience, and as a result many of the emerging learning questions and issues were never quite addressed (e.g., the premature endings in the bulletin board discussions and the technical problems that prevented some of the teams from viewing synchronized data from the simulation game).

Knowledge—particularly tacit knowledge—is best shared and cultivated in a climate of love, care, trust, and commitment (resulting in a safe learning environment). To foster such a climate, both students and instructor have to be inspired and committed to their goal, and in a sense, must be able to function at a certain level of selflessness and altruism. For example, in cases where a member of a team failed to fulfill his or her responsibilities, it can compromise the team's performance and certainly a climate of trust. It can also be demoralizing when fellow students choose to do the bare minimum, while others are striving hard to contribute to the knowledge-creation process. In a classroom context, there exists some tension between fostering this climate and giving students autonomy. The instructor can intervene to help individuals and teams balance these tensions and develop good team habits and an appropriate work ethic by providing mentoring and engaging with students on a regular basis. In an online environment, this seems much more difficult. In fact, such interventions were not observed in this study. However, a safe environment that allowed for risk-taking was created in the course. Love and care were just difficult to detect.

Limitations and future research

While this study provides important guidance toward a more holistic framework for the integration of learning activities that is based on both tacit and explicit knowledge, it must be noted that this study is just one preliminary investigation. To be able to extrapolate

further, similar studies need to be done in different types of classes involving different demographics. For example, can blended or face-to-face classrooms accelerate the knowledge cultivation processes? Or, what can be done in subject areas where it is more difficult for students to relate the content to their real-world experiences?

Another limitation is the loss of data. Some communications—particularly private phone conversations and emails—were not available to the inquirer. In addition, the plan to ask the participants to keep a journal was dropped due to time constraints on the part of the participants. Furthermore, one participant refused to be interviewed and another chose not to be involved with the study at all. Full involvement may have yielded a broader perspective or a deeper insight into different issues. This lack of full involvement probably was, in part, due to challenges of developing rapport between the participants and the inquirer. Despite the inquirer's effort to drop an occasional email or to be "there" at the synchronous and asynchronous discussions, this virtual "presence" was less effective than desired.

In hindsight, the design of the course also limited the study. Shared experience takes time to develop, and at several occasions when the discussions were becoming more intense, it was time to move on. The threaded bulletin board discussions were closed at a predetermined time, no matter where the discussion stood. A more flexible discussion

t2.1 **Table 2** Design considerations to create activities and conditions to facilitate socialization, externalization, combination, and internalization

t2.2	Process	Activities and conditions
t2.3	Socialization	Design open-ended activities such as open discussions, inquiries, or explorations.
t2.4		Create a space to facilitate sharing of feelings, emotions, experiences, and mental models. The overall ethos tends to be less formal and the stakes lower, allowing room for the development of trusts and rapport.
t2.5		*Example:* Sharing of background information, open-ended threaded discussions, and socialization while playing a simulation game
t2.6	Externalization	Design "externalizing" activities such as writing exercises, model or prototype development, dialogue and group reflection.
t2.7		Create a space to facilitate negotiation and development of common terms, concepts, and meanings. The overall ethos is more formal than socialization (but not to the level of combination), with the stakes increasing (i.e., more concerned with do-ability).
t2.8		*Example:* Threaded discussions where students can share how their life experiences relate theory and practice; and, exploration and evaluation of ideas and approaches while playing the simulation game or discussing a current problem in the news.
t2.9	Combination	Design authentic or simulated complex situations that challenges learners to synthesize multiple knowledge-bases
t2.10		Create a space to facilitate the organization and application of varied knowledge-bases more deliberately and systematically. The overall ethos is most formal and the stakes highest, as the culmination of knowledge is prepared for application or a more public consumption.
t2.11		*Example:* A simulation game and/or a real-world problem without a clear right or wrong answer to challenge learners to synthesize multiple knowledge bases.
t2.12	Internalization	Design activities that requires action and reflection
t2.13		Create a space to facilitate action and reflection. The overall ethos varies, as the primary focus is on attaining individual or group insights or deep understandings.
t2.14		*Example:* A simulation game or a real-world problem that requires action and reflection (e.g. learning audits, summary of logs, focused group discussions on key learning experiences).

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format and longer simulation activity could have resulted in more incidents and opportunities for learning.

Summary

The students experienced an online course with a design that seemed to incorporate the main elements of Nonaka's model, and as a result gained deep insights and understandings (from embodying of explicit knowledge into tacit knowledge) and also learned to develop ways to externalize and organize their knowledge bases. Table 2 contains a summary of key course design considerations for incorporating Nonaka's model of knowledge creation and *ba*. These considerations are derived from this study, both its setting and the subsequent learning that emerged.

It is important to note that socialization in an online environment continues to be a challenge even with high-fidelity communication media such as video conferencing. As important as the socialization mode is, it is suggested that online courses of this nature should have a face-to-face component—often referred to as a blended or a hybrid course. If the face-to-face component is planned for the early part of a course, it can be used to promote initial rapport and understanding so that students can go on to more focused and formal knowledge—creation activities.

Activities to encourage externalization and combination seem to take place quite efficiently and effectively online, especially if students learn how to use the most ideal communication technologies for different circumstances and the instructor structures activities and creates conditions to encourage this. Finally, since internalization is mostly a personal process, it can also happen in an online course of this nature, but is perhaps best done with some form of mentorship or guidance, either virtually or otherwise.

In summary, tacit knowledge and meaningful explicit knowledge are best cultivated and manifested in a shared context that enables knowledge sharing, construction and utilization through socialization, externalization, combination, and internalization. The overall *ba* can be energized by providing enabling conditions of autonomy, fluctuation, and creative chaos, redundancy, requisite variety, and trust and commitment.

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Q1. The citation 'Bennett III 1998' (original) has been changed to 'Bennett 1998'. Please check if appropriate.
Q2. Please check if the section headings are assigned to appropriate levels.