

Blended Learning at the Boundary: Designing a New Internship

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Abstract

This paper explores how blended learning can enhance learning at the boundary between academia and industry, and make possible the design of a new kind of internship. Boundary theory proposes that socio-cultural discontinuities between different environments create opportunities for learning. Blended learning pedagogy makes it possible to make the boundary between the classroom and the work place more salient and continuous. We present principles for designing internships that leverage blended learning to exploit boundaries, and describe an internship program based on these principles. Finally, we reflect on what we have learned through two years experience offering the program to students and employers.

Introduction

The idea that work can provide a suitable context for learning is deeply rooted in experiential learning theory. Among others, Dewey (1986) and Kolb and Kolb (2005) have systematically explored a philosophy of experience and the impact of experience on lasting, meaningful learning. One of the best-known manifestations of experiential learning, the traditional college-student internship, has a number of widely acknowledged benefits. It typically leads to improved employability and a higher salary after graduation (Callanan & Benzing, 2004; Gault, Leach, & Duey, 2010; Gault, Redington, & Schlager, 2000), higher career satisfaction and faster promotion rates (D'Abate, 2010), and improvement in domain specific knowledge (O'Connor MDa, Mahvi MD, Foley MD FACSa, Lund MD, & McDonald PhDa, 2010; Ogrinc et al., 2007; Pedro, 1984). Internships also build important non-cognitive skills such as time management, self-discipline, communication, information literacy, listening skills, and collaboration skills (Falconer & Pettigrew, 2002; Moser & Elbert, 2007; Zuccheromaglio & Alby, 2009).

Despite these benefits, this paper questions whether the traditional internship fully leverages the educational technologies and the evolving modern workplace that are available today. Two issues stand out: first, abundant open educational resources generate rich opportunities for individualized, contextualized, blended learning that was not previously available. Second, many of today's workplaces operate globally and on a scale that was previously unimaginable. These extended enterprises often cross traditional organizational boundaries to include customers, suppliers, and contractors. This flexing of typical chains of interaction result in boundaries that are fluid and constantly changing, and which require continual recalibration on the part of the employees (including interns) who must span them. The increasing need for adaptability in the work place may be straining the traditional internship model, which relies on clear-cut hierarchies and predetermined responsibilities. Indeed, as information technology disrupts the higher education ecosystem and extends today's workplaces, the work-based learning literature hints that the traditional internship model may no longer be the best interface between these two environments.

For example, Eraut (2004) calls for a new type of internship—one that is carefully designed to refine the oversimplified concept of “knowledge transfer” with an integration of knowledge that embraces both workplace and academy. In “Transfer of knowledge between education and the workplace,” Eraut agrees learning in new situations happens through “knowledge transfer,” or “the learning process involved when a person learns to use previously acquired knowledge/skills/competence/expertise in a new situation” (2004, p. 58). However, he adds two new dimensions to that process: learners must not only recognize what previously acquired knowledge and skills are needed, they must also have the ability to *transform* them and *integrate* them in order to successfully navigate the new situation (Eraut, 2004). Based on this process, he concludes learning in both education settings and workplace settings is essential because the learner acquires different types of knowledge in each. Bridging these two types of knowledge and bringing them together “requires both time and support,” which our blended learning internship model provides (Eraut, 2004, p. 72).

Akkerman and Bakker (2011) describe the difference between “transfer” and “boundary” models in a related critique of the traditional internship model. Boundary theory proposes that there are socio-cultural discontinuities between different environments which, when crossed (or spanned, or blurred), require individuals to reformulate their thinking (Akkerman & Bakker, 2011), creating opportunities for learning to occur. Hence, instead of considering the boundary between academia and industry that Eraut identified as posing a knowledge transfer problem, we approach it as a unique opportunity for enriched, situated learning. We propose that beneficial boundary effects can be substantially enhanced during an internship by leveraging a blended learning model and the technological tools that support it.

Student interns are typically required to cross the boundary between work and school, but too often such crossings are infrequent, brief, and unsupervised. The skills required to succeed in the two environments often remain compartmentalized as a student shifts from ‘work mode’ to ‘school mode.’ A blended learning pedagogy can address these shortcomings and can make the boundary between the classroom and the work place more salient to students. Over time, the conceptualization of blended learning has evolved from a framework for integrating online lesson delivery into traditional classrooms, to a more nuanced view that mixes different learning environments to create an integrated, individualized educational experience (R. Garrison & Kanuka, 2004a). From this perspective, an internship provides the perfect opportunity for blended learning to occur; during an internship, students are presented with numerous opportunities to learn in various settings, with support from the academy. Yet surprisingly, there has been little work exploring blended learning within an internship context.

Therefore, this paper addresses a specific question: How should we use blended pedagogy to design an internship that fully exploits the learning potential of boundaries? Eraut (2004) points out that

in order to maximize the learning potential of any boundary, there is a critical need for careful design, facilitation, and reflection. Thus we will explore specific principles for designing and executing an internship program that uses blended learning techniques to facilitate reflection across the boundary between the workplace and the academy. In the following section, we present a review of relevant previous research that has guided this work. Next, we describe an *immersive-boundary internship model* and the blended learning design principles derived from the model. We then present a case study of an actual internship program that was designed and executed based on these principles. We conclude by describing how we evaluated this program, and finally, reflect on what we have learned to date from offering it.

Background

Two streams of literature have influenced our thinking about optimizing the learning opportunities provided by the academy-workplace boundary: (1) boundary theory and learning, and (2) blended learning.

Learning Opportunities Created by Boundaries

While the benefits of work-based learning have been identified, there has been less attention paid to the mechanisms by which these positive outcomes are realized. There is a broad educational assumption (little explored) that knowledge transfer takes place automatically as students move from the formal educational environment to the work setting (Eraut, 2004). The pedagogical strategies in many work-based learning (WBL) programs are consistent with learning theories that assume this kind of knowledge transfer. Transfer is promoted by emphasizing similarities between school and work environments, and such similarities are often expressed in the form of abstract principles. In this way, educators hope to bridge the many differences between university and workplace through abstract models that can be widely applied to many different contexts (Eraut, 2004).

Säljö (2003) has suggested that the concept of transfer of knowledge has endured in educational theory because it is a metaphor that generalizes easily across many disciplines. He argues that the concept of transfer is a detour that does little to contribute to the understanding of learning (Säljö, 2003). To address these limitations we turn to a learning theory that moves beyond the notion of knowledge transfer across boundaries, and instead focuses on the learning potential created by the boundaries themselves.

Scholars have observed that boundaries carry learning potential, and that boundary crossing and boundary spanning are activities that are conducive to the construction of new knowledge. This idea has been derived from a rapidly growing literature on knowledge sharing across boundaries in organizational and community contexts (Carlile, 2002; Levina & Vaast, 2005; Orlikowski, 2002; Østerlund, 1997; Østerlund & Carlile, 2005; Star & Griesemer, 1989; Wenger, 1998). Some of this research has attended to the ways in which individual learning involves boundaries. Specifically, the theory of situated learning in communities of practice (Wenger, 1998) introduced the notion of legitimate peripheral participation where a novice learns by crossing several boundaries, first from outside the community to the periphery, and then successive crossings approaching the core. Akkerman and Bakker define a boundary as a "sociocultural difference leading to discontinuity in action or interaction" (2011, p. 133). Such discontinuities create fertile ground for learning because existing knowledge and familiar response patterns may prove ineffective in the new context. Boundaries also connote commonality "in the sense that within discontinuity two or more sites are relevant to one another in a particular way" (Akkerman & Bakker, 2011, p. 133). The simultaneous coexistence of difference and similarity allows for the creation of useful artifacts that carry meaning in two sites on either side of a boundary and can be shared between them – boundary objects – and, as we will see below, these play a pivotal role in learning.

Researchers have begun to explore how industry-academia discontinuities can be leveraged to facilitate professional growth. Harreveld and Singh (2009) identified the importance of contextualization of learning when spanning the boundary between work and school. Smeby and Vågan (2008) focused on differences between the classroom education of nurses and physicians and the knowledge required on the job, and explored the idea that these gaps promoted constructive learning opportunities. But as Eraut (2004) notes, the intentional facilitation of boundary spanning between school and work has largely been absent, and for that reason, the full learning potential of boundary-spanning remains unrealized. A blended learning pedagogy can provide the ideal foundation for designing internships that maximize the learning potential of the academic-industry boundary.

Blended Learning

Graham *et al.* (2014) have pointed out that while interest in blended learning is high, efforts are just beginning to apply and integrate models and theories to the blended learning domain (Drysdale *et al.*, 2013; Graham, 2013; Halverson *et al.*, 2012). Early waves of blended learning research explored best practices for designing web-based interactions (Bersin, 2004; Stacey & Gerbic, 2009; Tsai, Shen, & Tsai, 2011), incorporating web learning management systems into traditional curricula (Keengwe & Kang, 2011; Tamim, Bernard, Borokhovski, Abrami, & Schmid, 2011), and discovering the role that technology-based learning plays in facilitating different modes of cognition (R. Garrison & Kanuka, 2004b; Mayer & Moreno, 2003; Tamim *et al.*, 2011). Research often focused on the time and place in which content delivery and interaction occurred, and this approach still has utility in a number of settings (e.g. Staker and Horn (2012) in their classification of K-12 blended learning models). Blended learning frameworks were often plotted on a two by two grid and anchored by the dimensions of *time* and *place*, describing interaction modes as either same time or different time, and either same place or different place. (See Figure 1.) But such a focus on delivery mode could sometimes run the risk of being instructor-centered or content-centered, rather than student-centered.

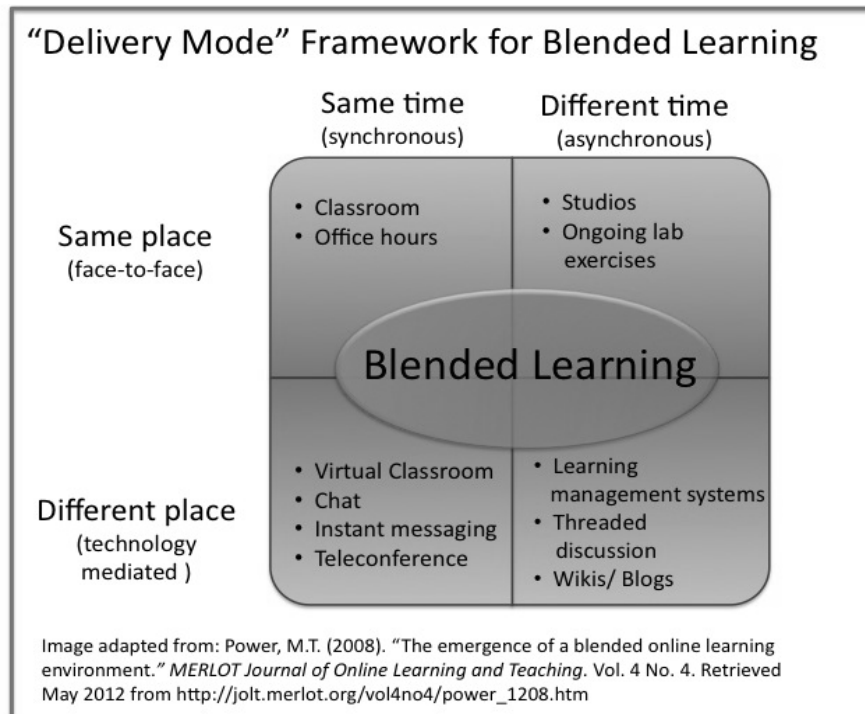


Figure 1. A “Delivery Mode” Framework for Blended Learning

More recently, researchers have been less interested in how to use technology to manage delivery modes, and more interested in how a blended learning experience works from a student's perspective—a student-centered model of blended learning. In a *student-centered blended learning framework*, designers create opportunities for a self-directed student to construct an individualized learning environment that draws on a rich array of learning resources and assets. The *delivery mode* framework provides a foundation for exploring the possibilities afforded by new technologies, but the newer conceptualization enriches that model by viewing the student experience as a multi-modal opportunity for learning. This conceptualization of a blend is more holistic, focusing on the variety of experience available to the learner afforded by multiple channels of interaction. This shift was championed by authors like R. Garrison and Kanuka (2004a), and Oliver and Trigwell (2005), who argued that the definition of blended learning must be rooted in the experience of the student, rather than the content and technology design decisions made by the teacher. Picciano's (2009) multimodal, "Blending with Purpose" model recognizes that learners represent different personality types and learning styles, and thus advises instructional designers to use multiple approaches that meet the needs of a wide spectrum of students. The shift also leverages the social landscape resulting from the so-called Web 2.0 technologies (D. Randy Garrison & Vaughan, 2007), and expands even further the possibilities for rich interactions in web-based learning environments (R. Garrison & Kanuka, 2004a).

The student-centered model recognizes that there is potential value in all available learning assets, even informal and serendipitous interactions. From this perspective, the 'blend' is more complex than just *online* or *in person*. The rich variety of mediated experiences provided by today's open educational resources, combined with the face-to-face interactions, both formal and informal, provide a range of opportunities to reinforce theoretical knowledge *and* practical application, as well as evaluation, facilitation and support (Rossett & Frazee, 2006). As R. Garrison and Kanuka (2004a) argued, the best use of blended learning effectively integrates all student experiences to achieve instructional goals, rather than supplementing old models of instruction with new technologies.

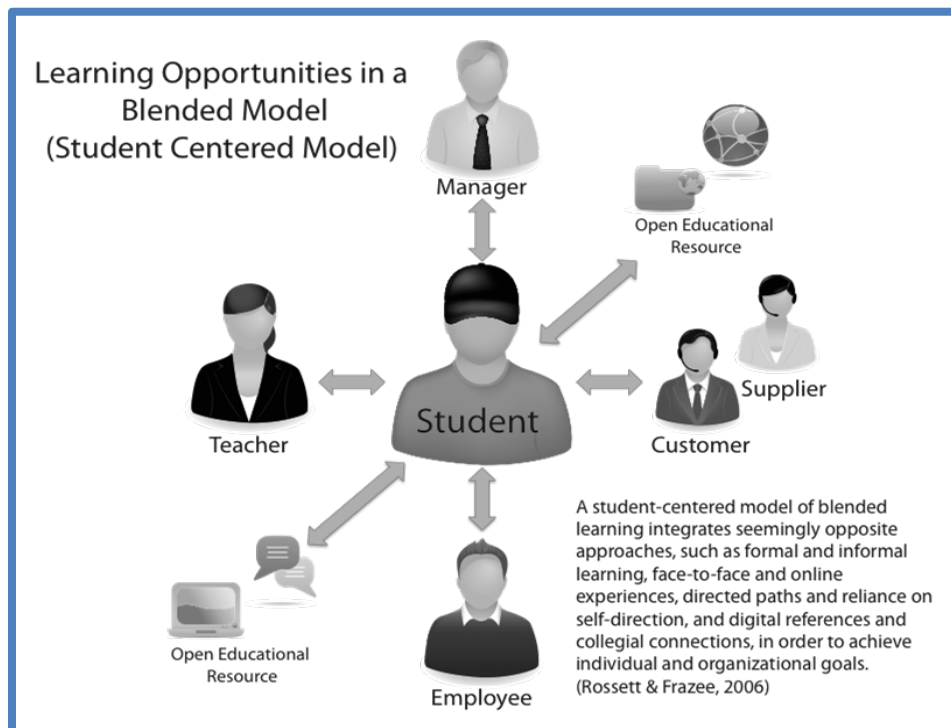


Figure 2. A Student Centered Model of Blended Learning in the Workplace

Figure 2 (previous page) illustrates the student-centered model of blended learning in an internship context. Here, the learner is a student intern. In addition to the traditional learning opportunities and resources provided by a teacher, there are a rich array of opportunities that arise from boundary-spanning interactions between the student-employee and managers, co-workers, customers and suppliers. In addition, an appropriately mentored, self-directed employee-learner has access to a wide variety of open educational resources that can be used to support learning on the job. Such a learner-centered model of blended learning “integrates seemingly opposite approaches, such as formal and informal learning, face-to-face and online experiences, directed paths and reliance on self-direction, and digital references and collegial connections, in order to achieve individual and organizational goals” (Rossett & Frazee, 2006, p. 2)

Graham et.al (2014) suggest that core attributes of blended learning models are not always clearly articulated. In the *immersive boundary* internship model described below, the core attributes are *boundaries; boundary interventions;* and *the respective roles of faculty and corporate managers*. These core attributes are part of what Graham et al., in an adaptation of Gibbons and Rogers (2009), call the pedagogical layer of the design model. In the discussion that follows, we focus more on the pedagogical layer of our model than on the physical layer. That is, we focus more on the strategy involved in exploiting boundaries than on the specific delivery systems used to accomplish the strategy.

Creating Blended Learning Opportunities at the Boundary

The intersection of boundary theory and blended learning makes possible a previously unavailable pedagogy for internships. Rather than relying on the transfer paradigm of traditional internships, it is possible to leverage the opportunities afforded by blended learning to create an *immersive boundary* between the workplace and the classroom (Figure 3).

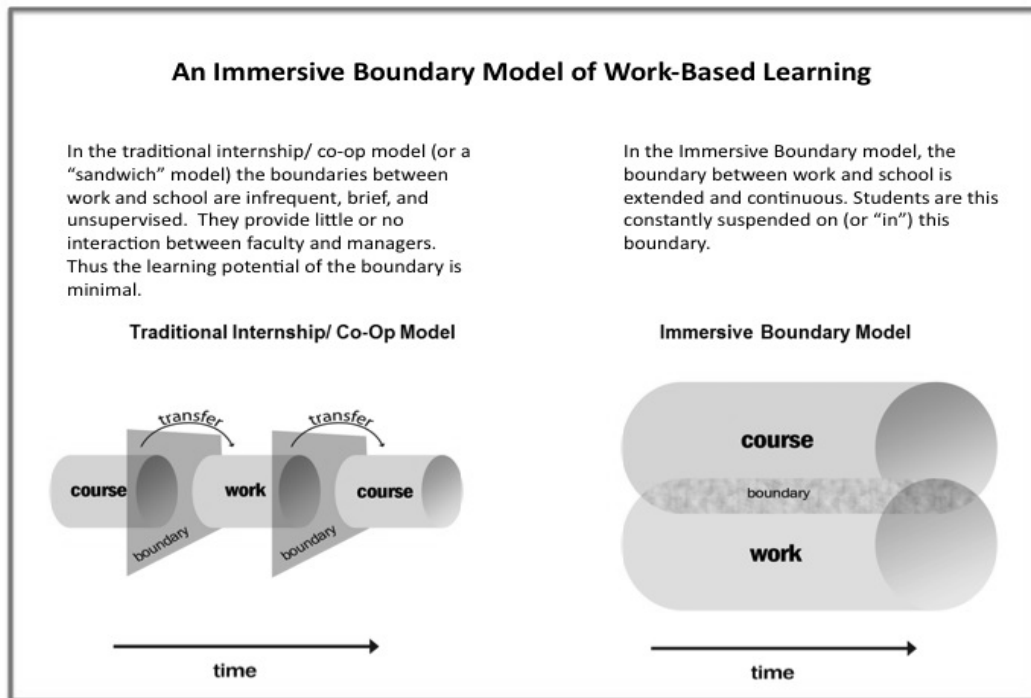


Figure 3. An Immersive Boundary Work-Based Learning Model

We have designed and implemented an internship program based on this principle, the Boundary Learning Internship (BLI) program at a mid-sized private university in the northeastern United States. The program allows students to take courses while simultaneously working full-time in a large global enterprise. The internship experience is comprised of a carefully selected internship position and a set of related courses that are delivered through blended learning pedagogy. The program's blended learning approach uses a range of techniques including interaction with instructors, fellow students, managers and senior organizational mentors. These interactions occur asynchronously online and synchronously in workplaces, face-to-face residencies, teleconferences, and through telepresence meetings. Course instructors are aware of and involved in the students' work, and they incorporate student experiences at work into the subject matter of their academic courses. The courses are specifically structured to integrate academic content with the real-world challenges the students face in their internship. This approach is illustrated in Figure 3 which demonstrates graphically how blended learning strategies make the boundary-spanning experience continuous during internships, allowing students to be immersed in the boundary.

We have used this program over the past two years (2011 and 2012) as a concrete test case to experiment with the immersive boundary approach. The rest of this section describes the program, and presents design principles based on immersive boundary and blended learning concepts suggested in the literature review.

The Program

The BLI Program is open to students from any university, and enables a broad range of internship companies to hire BLI students. Over the past several years, students have participated from eight schools, including large public and private universities as well as several small colleges. Companies that provided internship positions included large, global corporations in the financial services, technology, and consulting sectors.

Students applied to the program in the Fall semester of their junior year. The program was open to students from any major, but most students were from information technology programs (e.g. computer science, information systems, information management, etc.). After a rigorous selection process, successful candidates were awarded an eight-month, full-time position within one of the companies. The length of the internship provides a rich opportunity for learning, since students can work on longer term, more complex projects. Participating companies find the extended time allows students to become more productive and integrated into the company than they would be in a summer internship.

Students began the program with a synchronous intensive residency class designed to prepare them for the months ahead at work. During the residency, students who would be working in the same organization were placed into project teams. Almost all teams had members who would not be co-located with other team members in their fulltime assignments. This configuration would require them to work virtually on academic team projects throughout their internships. The face-to-face residency allowed such teams an opportunity to bond before beginning their distributed work assignments.

After the residency, students dispersed to their employing organizations, where they continued taking asynchronous online courses and worked with team members on their major course project. Each student was assigned a senior industry mentor who collaborated with the workplace manager and faculty team to provide guidance to the student. The course concluded with an Innovation Project, developing an IT-enabled innovation proposal and a project plan to implement the proposal, which was presented to and evaluated by senior managers and mentors in the host organization. The BLI Program included three required courses plus 3-6 internship credits for a total of 12-15 semester credits, a full course load.

Three Design Principles and Their Application

Building on the concepts identified above, we identified three principles for a pedagogy that would maximize the learning potential of boundaries in internships. In this section we present each design concept, and describe its implementation in the BLI Program.

Make the boundary between work and school continuously salient. Suspend students in the boundary between school and work for the duration of their internship experience. In order for this to happen, the student must participate in work and school simultaneously. Blended learning strategies make it possible for students to take courses while they are working. Such courses should be relevant to the work assignment and be integrated with it.

In the BLI Program, students are accountable for their workplace deliverables and their course requirements simultaneously. Thus, they never abandon their school or work frame of mind, but must employ (and often combine) both to deliver the work they are responsible for. This creates a fertile ground for learning because immersion in the boundary renders existing knowledge and familiar response patterns ineffectual in the new, hybrid environment.

Introduce purposefully designed boundary interventions. Beyond suspending students in the boundary between school and work, there should be designed interventions requiring students to span boundaries. In other words, there should be a specific assignment to push students into boundary spanning situations. This idea is expressed as the final Innovation Project for the BLI Program, which is a technology innovation proposal for the employing organization. The project design and requirements are made clear to managers, mentors, and senior executives as well as to the students. After several months of simultaneous intern work and academic courses within a blended learning environment, the student teams present their proposal to senior organizational leaders, and the project is evaluated by course instructors, senior leaders, and their managers at work.

The project thus serves as an artifact that carries meaning and value in both corporate and academic organizational contexts. The Innovation Project clearly leverages the distinct boundary between work and school, but it also capitalizes on other boundaries within the work organization that carry learning potential. The boundaries between mid-level and senior management, between functional areas of business, and between managers and technical workers are all examples of boundaries that naturally occur within a firm. Taking advantage of these boundaries requires deliberate program decisions that will make these boundaries salient and useful in course work.

Involve teachers in students' work; involve managers in students' courses. Teachers and workplace supervisors often have different frames of reference when assessing performance, and they often complement each other in terms of knowledge that the other might not use on a regular basis. Involving teachers in the students' workplace and managers in the students' courses can make the industry-academia boundary more salient. For example, a student might be a member of a project team that has just handed over an important deliverable, subsequently evaluated by a supervisor. A teacher might assess the same work from a theoretical perspective, or ask students to reflect on the experience in relationship to their course work. There is value in both perspectives, and by engaging in discussion with the student, the salience of the boundary is maximized.

Because BLI Program teachers are aware of and involved with their students' activities at work, they can provide targeted opportunities for reflection, discussion and comparison of those activities. Likewise, a manager's assessment of a course assignment may often be different from a teacher's, so we have made an effort to ensure managers are involved in several aspects of students' course work. First,

managers and instructors collaborate closely to create course material that is relevant to issues in the work place. Second, managers and company leaders are an integral part of the evaluation of the final Innovation Project.

Evaluating the Program

In this section we reflect on what we learned about the application of these principles as we offered the BLI Program in 2011 and 2012. As described above, we used this program over the past two years as a case study to explore the immersive boundary approach. The case study is an accepted method for studying complex contemporary phenomena. Yin (2002) suggests that the case study is appropriate for a study that asks a “how” question about a contemporary set of events, occurring in their natural setting, where principles of experimental control are not desirable. In this study, we explored how three design principles derived from the literature would perform in a natural internship setting.

To evaluate the program, we applied a multi-method approach appropriate to the case study, one that used quantitative surveys, open ended surveys, and interviews. We first created an instrument to assess perceptions of program learning outcomes by three sets of stakeholders. At the end of the 2011 and 2012 BLI Program we surveyed students, managers, and senior mentors from the program’s largest employer on their perceptions of each student’s progress on the program’s eight primary learning outcomes. Respondents were asked to evaluate (on a five point Likert-type scale) a student’s level of skill on each learning outcome at the beginning of the program, and at the end of the program. They were also asked open-ended questions about which aspects of the program were most valuable, and which needed improvement. Thirty-five students were surveyed. Twenty-seven of their managers and sixteen of their senior mentors responded. Table 1 shows substantial perceived improvement in all eight learning outcomes as independently perceived by students, managers, and mentors. While all three groups perceived substantial and statistically significant improvements from the start of the program, not surprisingly, students thought they had improved more than did managers, and the senior mentors were more critical than managers. While student self-reports of learning can be biased, we regard the independent assessments of managers and senior mentors as better evidence of student progress.

Table 1 Perceived Student Improvement on Learning Outcomes During BLI

Learning Outcomes		1	2	3	4	5	6	7	8
	Students Before	2.6	2.5	2.2	1.8	2.1	2.1	1.9	2.1
	Students After	4.1	4.1	4	3.5	3.7	4	3.8	4.1
Student Scores	Difference	1.4*	1.6*	1.7*	1.7*	1.7*	1.8*	1.9*	1.9*
	Managers Before	2.3	2.5	2	1.7	1.8	1.8	1.7	2
	Managers After	3.5	3.7	3.2	3	3	3.4	3.1	3.6
Managers Scores	Difference	1.2*	1.1*	1.2*	1.3*	1.2*	1.6*	1.5*	1.6*
	Senior Mentors Before	1.9	1.8	1.4	1.5	1.5	1.6	1.3	1.8
	Senior Mentors After	3	3	2.6	2.6	2.8	2.9	2.6	2.9
Senior Mentor Scores	Difference	1.1*	1.2**	1.2***	1.1**	1.3**	1.3**	1.3**	1.2**

Legend

Statistical Sig

* *p* < .0001

** *p* < .001

*** *p* < .01

Learning Outcome 1

Ability to present effective, well organized material

Learning Outcome 2

Ability to communicate & collaborate

Learning Outcome 3

Understand how scale impacts the team

Learning Outcome 4

Understand enterprise architectures

Learning Outcome 5

Understand how scale impacts the solution

Learning Outcome 6

Understand how to achieve IT-enabled innovation

Learning Outcome 7

Understand how to propose a large innovative IT project

Learning Outcome 8

Understand corporate culture & organizational context

Faculty and staff who participated in the program met after each year's BLI Program to review survey results and reflect on program successes and areas for improvement. Below we present reflections on the three design principles described above.

- 1. Make the boundary between work and school continuously salient.** We found that continual immersion in the industry-academic boundary had a number of positive effects. Student impressions of the BLI Program were overwhelmingly positive, and open-ended comments from the 2011 and 2012 surveys show that they valued the experience. As can be seen from a typical selection of student comments, they recognize and appreciate the integration of school and workplace:

I love the idea of taking classes during an extended internship. I can't imagine many internships being better than this one.

I have learned more here than I ever will in the classroom.

It has been one of the most amazing experiences of my life to date. Our ability to network and learn is far better than being trapped in a college classroom.

We found that spanning boundaries put students into difficult situations that are impossible to simulate in the classroom. Immersion in the two worlds means the students need to understand both, communicate in both, and integrate both into a coherent framework. Spanning boundaries accelerates the student maturation process forcing students to synthesize what they are learning with how to apply that knowledge (with faculty and mentor support).

Our industry partners observed an unexpected benefit: students not only created a bridge between academia and industry work, they also made existing organizational boundaries more salient. Several mentors commented that they often do not have the time to make connections across the business units (within the company), but the students make the time (as part of their course assignments). So interns span business-unit boundaries and have identified best practices that can be shared across the firm. In another example, students in the BLI Program acted as a conceptual and relational bridge between faculty and managers/mentors. Several quotes from industry managers and mentors illustrate these ideas:

Great opportunity for both the business and the intern – we get innovative ideas and the intern has the opportunity to learn about technology and the business we support.

The interns bring a fresh look at the way business is done, a new perspective.

What we learned: The continuous immersion in school and work was not without challenges. Some students struggled to find the right balance between courses and internship work demands. When job pressures mounted, students sometimes found it difficult to focus on school work. Some reflected that this pressure was the stimulus for improving time management skills:

I had a large work load. It helped me learn how to balance many different projects going on at once.

Others found it stressful and overwhelming. In the design of future BLI Programs, we have created a more complementary rhythm between courses and work by offering students the opportunity to work part-time when course demands are heaviest.

- 2. Introduce purposefully designed boundary interventions.** The final Innovation Project not only required students to work across the academic-industry boundary, but also created opportunities to encounter unexpected boundaries. The project was a naturally occurring nexus of boundaries, spanning multiple business units, hierarchical levels, geographical locations, and disciplinary cohorts. For example, one student worked on a co-located team responsible for launching an internal application for an organization's accounting function. This required the student to interact with managers in corporate, accounting, and IT functions to coordinate the project, communicate with project managers, engineers, and end-users to design, build, and implement the project at locations across the country. BLI Program positions are designed specifically to allow these complex relationships to arise when students are at work. Typical manager-mentor comments were:

The integration of the intern working, learning and contributing to a functional area, while also working separately with other interns allowed them to look for innovative solutions to better the technology of the firm.

Having the interns work across LOBs and sites for the team project is a terrific experience, as many of the jobs that they will be placed in if they stay with the company will require the same kind of coordination.

The senior mentor role also provided a structured opportunity for students to cross hierarchical boundaries in a way unavailable to most interns (and most regular employees for that matter). Students wrote:

Another positive aspect was the contact with all of these execs....I was able to see how they act, what their work practices are, and learn how they got to where they are.

The exposure to mentors and senior leadership is 100% the greatest thing about BLI.

What we learned: We recognized a need to find additional ways to make the many diverse, naturally occurring organizational boundaries even more salient to students. We believe that there is much untapped learning potential that can be released in guided student reflection on the boundary structures of large global enterprises. For the future, we have redesigned faculty mentorship interactions to provide even more opportunities for guided reflection on organizational boundary structures.

- 3. Involve teachers in students' work; involve managers in students' courses.** As we have discussed above, there is often conflict at the boundary—and this conflict provides a rich opportunity for learning. One example is the simultaneous evaluation of student performance by faculty and managers. Often the expectations and priorities of these interest groups differ, and when both are simultaneously involved in assessment, the student is placed in an uncomfortable, but highly formative, position of creating a deliverable that will fulfill the expectations of both. In order to navigate through the conflicting advice, students are required to integrate foundational academic learning with the “real world” insight from managers and mentors. By leaving the students to wrestle with this boundary issue, students have the opportunity to develop non-cognitive skills such as navigating the system, conflict resolution, prioritizing, and negotiating. Students recognized the value of faculty mentoring in the work world:

The program has provided an excellent way to transition into the corporate world with support from academics and faculty for students.

The program provided an almost perfect combination of school work and “work work.” The ability to work alongside company personnel and be treated as one of their own, while still being able to take classes is just amazing.

And senior mentors’ input and assessment of projects was also highly valued by students:

[X] was the best senior mentor in the program. Without her my project would not have been half as good as it was. She put us in touch with contacts, reviewed our deck, and always made time to go over any problems I was having.

What we learned: In the future, we will create even more opportunities for faculty, managers and mentors to collaborate in the evaluation of student work.

Discussion and Conclusion

In this paper, we have proposed a new kind of internship that fully exploits the learning potential of boundaries by immersing students continuously “within” the boundary between industry and academia. We have presented three principles for designing an immersive boundary internship program, and the theoretical rationale that led to the development of those principles. A two-year case study describes our experience in applying the principles, and we have reflected on what we learned from their application. An internship that fully exploits the learning potential afforded by spanning boundaries is only possible through the affordances of blended learning. Blended learning makes it feasible for students to work in globally distributed organizations and take courses at the same time, to encounter a variety of boundary-oriented interventions, and to involve both faculty and managers in work and school simultaneously.

But how, specifically, should we think of blended learning in this context? We observed above that the conceptualization of blended learning has evolved from a focus on lesson delivery mode into a broader view of student opportunities to learn. Championed by authors like Oliver and Trigwell (2005) and Rossett and Frazee (2006), the student-centered approach is rooted in the experience of the student rather than the content and technology design decisions made by the teacher. The blend of learning assets thus becomes more complex than simply “online” or “in person”—the individualized interplay between learning assets and each student becomes primary. Each interaction creates different opportunities for different types of learning to occur and will naturally fit some students better than others. A blended-learning pedagogy for internships must strive to effectively integrate all student experiences rather than supplement old models of instruction with new technologies (R. Garrison & Kanuka, 2004a). The new internship thus calls for teachers to abandon a “cover-the-material,” content-delivery instructional approach in favor of *opportunistic instruction*.

Opportunistic Instruction. Opportunistic instruction requires teachers to embrace a much broader array of potential learning resources. In addition to content directly selected by the instructor, an appropriately mentored, self-directed employee-learner has access to a wide variety of open educational resources (OER). These might include the company’s online, self-paced training modules, technology vendor educational resources, MOOCs, and rapidly proliferating free learning resources such as YouTube Edu, Kahn Academy, Treehouse, Lynda, CodeAcademy and iTunes U. In student-centered blended learning, instructors will be sensitized to help interns undertake “just-in-time” learning projects occasioned by the immediate job context. In addition, students should be encouraged to take advantage of the human resources available to them in the internship experience to create personal learning networks. Goodman called them “learning webs” of colleagues, supervisors, mentors, customers and suppliers (Goodman, 1960; Kamenetz, 2010). Opportunistic instruction will integrate seemingly opposite

approaches—didactic and experiential learning, formal and informal learning, planned and serendipitous learning (Rossett & Frazee, 2006).

We learned that the *immersive boundary* model creates rich opportunities for serendipitous and informal learning. As students become part of the organization's ecosystem, they experience its informal happenings. By employing a full blend of instructional technologies, instructors can quickly help students take advantage of such opportunities. Because students were regularly sharing their experience through both synchronous media (conference calls, telepresence meetings, face-to-face residencies) and asynchronous media (discussion boards, email, blogs), opportunities to discuss and reflect on the serendipitous were plentiful. However, to fully leverage these opportunities, instructors need an opportunistic mindset, one that emphasizes reflection on action (Schön, 1983) rather than delivery of content. We recognize that we must learn more about how instructors can best be sensitized to take advantage of the serendipitous. For future versions of the BLI Program, we have restructured the student-faculty relationship to allow faculty members to work more deeply with fewer students.

Self-Directed Learning (SDL). At the heart of this blended approach to internships is the expectation that student learning be increasingly self-directed and autonomous. Immersion in the industry-academia boundary creates unique opportunities and demands for developing self-directed learning skills. Students placed in a work environment are immediately expected to perform and contribute. Work projects often include tasks that are ambiguous and far-separated from a student's prior experience. Thus they must adapt quickly, and this adaptation requires development of self-directed learning skills.

Self-directed learning has been defined as “a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes” (Knowles, 1975, p. 18). SDL is closely intertwined with the concept of “learning-to-learn” (D. R. Garrison, 1992), and has been considered “the single most important outcome of formal education” (Grow, 1991, p. 135). Despite the high desirability of SDL skills, developing self-determined, self-directed learners in the formal university setting has remained challenging and elusive. Some argue that “fully self-directed learning is not possible in an institutional setting” (Grow, 1991, p. 135). We recognize the need to better learn how instructors can encourage and reward self-directed learning skills during internships. Students must be presented with the expectation that they will candidly assess the state of their current knowledge and develop a plan to learn what they need to know to succeed. Because blended learning technologies allow them to be in school as well as at work, it is possible to help them find resources to carry out effective, mentored self-directed learning.

Broader impact. The *immersive boundary* internship model, while extremely useful for the study of information technology, can be adapted for other professional fields of study, ranging from engineering to marketing. Hence a future area of exploration might be to adapt our model to other fields. Central to such progress will be the ongoing work to formally assess the immersive-boundary model. We have begun a project that will provide a longitudinal assessment of the BLI Program. It will include assessment of learning outcomes at the end of each cycle as described above, and also longitudinal assessment of students as they progress throughout their subsequent school and professional careers. The longitudinal assessment will measure how the outcomes from participation persist and evolve over time. Results of these assessments will provide empirical input to the ongoing process of updating and designing future versions of the programs. We have developed instruments designed to evaluate program learning outcomes, and to monitor graduates' career progress.

We believe work-based learning should be a central component in the disruptive re-imagining of higher education that is currently taking place. In order for workplace experiences to make an essential

contribution, however, there is a need for a new kind of internship. This new internship will be highly situated, individualized, and context dependent. It will fully exploit the boundary between industry and academia. It will simultaneously demand and nurture high levels of self-direction in students, and it will be enriched by a diverse set of open learning assets that self directed students will exploit. Student-centered blended learning makes this new internship possible.

References

- Akkerman, Sanne F., & Bakker, Arthur. (2011). Boundary Crossing and Boundary Objects. *Review of Educational Research, 81*(2), 132-169. doi: 10.3102/0034654311404435
- Bersin, Josh. (2004). *The Blended Learning Book: Best Practices, Proven Methodologies, and Lessons Learned*: John Wiley & Sons.
- Callanan, Gerard, & Benzing, Cynthia. (2004). Assessing the role of internships in the career-oriented employment of graduating college students. *Education + Training, 46*(2), 82-89. doi: 10.1108/00400910410525261
- Carlile, Paul R. (2002). A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development. *Organization Science, 13*(4), 442-455.
- D'Abate, Caroline. (2010). Developmental Interactions for Business Students: Do They Make a Difference? *Journal of Leadership & Organizational Studies, 17*(2), 143-155.
- Dewey, John. (1986). Experience and Education. *The Educational Forum, 50*(3), 241-252. doi: 10.1080/00131728609335764
- Drysdale, J. S., Graham, C. R., Spring, K. A., & Halverson, L. (2013). An analysis of research trends in dissertations and theses studying blended learning. *The Internet and Higher Education, 17*, 90-100. doi:10.1016/j.iheduc.2012.11.003
- Eraut, Michael. (2004). Transfer of knowledge between education and workplace settings. In H. Rainbird, A. Fuller & A. Munro (Eds.), *Workplace Learning in Context* (pp. 53-73): Psychology Press.
- Falconer, S., & Pettigrew, M. (2002). Developing Added Value Skills Within an Academic Program Through Work Based Learning. *Educational Innovation in Economics and Business V*, 3-15.
- Garrison, D. R. (1992). Critical Thinking and Self-Directed Learning in Adult Education: An Analysis of Responsibility and Control Issues. *Adult Education Quarterly, 42*(3), 136-148.
- Garrison, D. Randy, & Vaughan, Norman D. (2007). *The Future Blended Learning in Higher Education* (pp. 143-155): Jossey-Bass.
- Garrison, Randy, & Kanuka, Heather. (2004a). Blended learning: Incovering its transformative potential in higher education. *Internet and Higher Education, 7*, 95-105.
- Gault, Jack, Leach, Evan, & Duey, Marc. (2010). Effects of business internships on job marketability: the employers' perspective. *Education + Training, 52*(1), 76-88. doi: 10.1108/00400911011017690
- Gault, Jack, Redington, John, & Schlager, Tammy. (2000). Undergraduate business internships and career success: Are they related? *Journal of Marketing Education, 22*(1), 45-53.

- Gibbons, A. S., & Rogers, P. C. (2009). The architecture of instructional theory. In C. M. Reigeluth & A. Carr-Chellman (Eds.), *Instructional-Design Theories and Models*, (Vol. III, p. 305-326). Mahwah, NJ: Lawrence Erlbaum Associates.
- Goodman, Paul. (1960). *Growing up absurd; problems of youth in the organized system*. New York,: Random House.
- Graham, C. R., Henrie, C. R., & Gibbons, A. S. (2014). Developing models and theory for blended learning research. In A. G. Picciano, C. D. Dziuban, & C. R. Graham (Eds.), *Blended learning: Research perspectives, volume 2* (pp. 13-33). New York, NY: Routledge.
- Graham, C. R. (2013). Emerging practice and research in blended learning. In M. G. Moore (Ed.), *Handbook of Distance Education* (3rd ed. pp. 333-350). New York, NY: Routledge.
- Grow, Gerald O. (1991). Teaching Learners to Be Self-Directed. *Adult Education Quarterly*, 41(3), 125-149.
- Halverson, L. R., Graham, C. R., Spring, K. J., & Drysdale, J. S. (2012). An analysis of high impact scholarship and publication trends in blended learning. *Distance Education*, 33(3), 381-413. doi:10.1080/01587919.2012.723166
- Harreveld, R. E., & Singh, Michael. (2009). Contextualising learning at the education-training-work interface. *Education + Training*, 51(2), 92-107.
- Kamenetz, Anya. (2010). *DIY U : edupunks, edupreneurs, and the coming transformation of higher education*. White River Junction, Vt.: Chelsea Green Pub.
- Keengwe, Jared, & Kang, Jung-Jin. (2011). A review of empirical research on blended learning in teacher education programs. *Education and Information Technologies*, 1-15. doi: 10.1007/s10639-011-9182-8
- Knowles, Malcolm S. (1975). *Self-Directed Learning*. Chicago: Association Press Follett Publishing Company.
- Kolb, Alice Y., & Kolb, D. A. (2005). Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education. *Academy of Management Learning & Education*, 4(2), 193-121.
- Levina, Natalia, & Vaast, Emmanuelle. (2005). The Emergence of Boundary Spanning Competence in Practice: Implications for Implementation and Use of Information Systems. *MIS Quarterly*, 29(2), 335-363.
- Mayer, Richard E., & Moreno, Roxana. (2003). Nine Ways to Reduce Cognitive Load in Multimedia Learning. *Educational Psychologist*, 38(1), 43-52. doi: 10.1207/s15326985ep3801_6
- Moser, Steve, & Elbert, Dennis. (2007). Expanding Field Experience and Internship Partnerships: Foundations, City Government, and Corporate Options. *Journal of Business and Training Education*, 16, 55-60.
- O'Connor MDa, Erin S., Mahvi MD, FACSb, David M., Foley MD FACSa, Eugene F, Lund MD, FACSa, Dennis, & McDonald PhDa, Robert. (2010). Developing a practice-based learning and improvement curriculum for an academic general surgery residency *Journal of the American College of Surgeons*, 210(4), 411-417.

- Ogrinc, Greg , West, Alan, Eliassen, M. Scottie, Liuw, Stephen, Schiffman, Jennifer, & Cochran, Nan (2007). Integrating practice-based learning and improvement into medical student learning: Evaluating complex curricular innovations *Teaching and Learning in Medicine*, 19(3), 221-229.
- Oliver, Martin, & Trigwell, Keith. (2005). Can "Blended Learning" Be Redeemed? *E-Learning*, 2(1), 17-26.
- Orlikowski, Wanda J. (2002). Knowing in Practice: Enacting a Collective Capability in Distributed Organizing. *Organization Science*, 13(3), Knowledge, Knowing, and Organizations (May - Jun., 2002)(3), pp. 249-273.
- Østerlund, Carsten. (1997). Sales Apprentices on the Move: A multi-contextual perspective on Situated Learning. *Journal of Nordic Educational Research*, 17(3), 169-178.
- Østerlund, Carsten, & Carlile, Paul. (2005). Relations in Practice: Sorting Through Practice Theories on Knowledge Sharing in Complex Organizations. *The Information Society*, 21(2), 91-107. doi: 10.1080/01972240590925294
- Pedro, Joan Daniels. (1984). Induction into the workplace: The impact of internships. *Journal of Vocational Behavior*, 25(1), 80-95.
- Picciano, A. G. (2009). Blending with purpose: The multimodal model. *Journal of Asynchronous Learning Networks*, 13(1), 7-18.
- Power, Michael. (2008). The emergence of a blended online learning environment. *MERLOT Journal of Online Learning and Teaching*, 4(4), 503-514.
- Rossett, Allison, & Frazee, Rebecca Vaughan. (2006). Blended Learning Opportunities. *AMA Special Report*. www.amanet.org
- Säljö, Roger. (2003). Epilogue: From transfer to boundary-crossing. In T. Tuomi-Gröhn (Ed.), *Between school and work: new perspectives on transfer and boundary-crossing*. Oxford: Emerald Group Publishing.
- Schön, Donald A. (1983). *The reflective practitioner: how professionals think in action*. New York: Basic Books.
- Smeby, Jens-Christian, & Vågan, André. (2008). Recontextualising professional knowledge—newly qualified nurses and physicians 1. *Journal of Education and work*, 21(2), 159-173. doi: 10.1080/13639080802018014
- Education for the 21st Century—Impact of ICT and Digital Resources. In D. Kumar & J. Turner (Eds.), (Vol. 210, pp. 225-234): Springer Boston.
- Stacey, Elizabeth, & Gerbic, Philippa. (2009). *Effective Blended Learning Practices: Evidence-Based Perspectives in ICT*. Hershey, PA: IGI Global.
- Staker, H., & Horn, M. B. (2012). *Classifying K-12 blended learning*. Innosight Institute, Inc. Retrieved from <http://www.innosightinstitute.org/innosight/wpcontent/uploads/2012/05/Classifying-K-12-blended-learning2.pdf>
- Star, Susan Leigh, & Griesemer, James R. (1989). Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19(3), 387-420.

- Tamim, Rana M., Bernard, Robert M., Borokhovski, Eugene, Abrami, Philip C., & Schmid, Richard F. (2011). What Forty Years of Research Says About the Impact of Technology on Learning. *Review of Educational Research*, 81(1), 4-28. doi: 10.3102/0034654310393361
- Tsai, Chia-Wen, Shen, Pei-Di, & Tsai, Meng-Chuan. (2011). Developing an appropriate design of blended learning with web-enabled self-regulated learning to enhance students' learning and thoughts regarding online learning. *Behaviour & Information Technology*, 30(2), 261-271. doi: 10.1080/0144929x.2010.514359
- Wenger, Etienne. (1998). *Communities of practice : learning, meaning, and identity*. Cambridge, U.K. ; New York, N.Y.: Cambridge University Press.
- Yin, R. K. (2002). *Case study research: Design and methods* (3rd ed. Vol. 5). Thousand Oaks, CA: Sage Publications.
- Zucchermaglio, Cristina, & Alby, Francesca. (2009). Learning to Work or Working to Learn? A university-work transition case study. *Learning Inquiry*, 3, 79-95.