EFFECTIVENESS OF STRATEGIES TO ENHANCE INTERACTION IN COURSES
EMPLOYING DIFFERENT BLEND CATEGORIES

by

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Abstract

Given the value of participant interaction to enhance learning, and the growth of blended (face-to-face and online) delivery, the purpose of this study was to examine the way instructor-designers approach interactions in blended learning environments, and the effectiveness of these approaches in terms of student satisfaction and expectations. Using a three-part blend framework, which classifies the design of blended courses as either (a) transforming instruction, (b) enhancing existing pedagogy by increasing productivity, or (c) increasing overall convenience and access for students and instructors, a case study method was employed, with one case representing each of the three blend categories, with cases selected from respondents to a survey of over 500 post-secondary instructors experienced in the design and implementation of blended learning courses. Data with respect to each of the blend categories was collected from interviews conducted with each of the three case instructors. In addition, students from the three case classes were surveyed regarding their expectations for interactions in general and their satisfaction with the efforts of their instructor in particular. Logic modeling, a process employed in program evaluation, was used to organize and validate the data from the three case studies. The study found that, especially with online discussions, instructor-designer blend preference influences strategies for interaction, development, and implementation of activities, and acts as a benchmark for evaluation and iterative change. The enhancing case placed the most emphasis on discussions to enhance learning outcomes, while the enabling case eschewed discussions as inconvenient. Discussions in the transforming case occurred mainly in the face-to-face sessions. The study further found that students
appeared equally satisfied with all three blend categories suggesting that students may adapt to the blend preference of the instructor. As part of the analysis, findings were compared to contemporary instructional design models; of note was the finding that none of the three cases involved on-going consultation with instructional designers. Given these findings, future research should assess the impact of instructor-designer blend preference in interaction studies employing grouped data and exploratory surveys focusing on the current role of instructional designers in blended learning.
Dedication

This work is dedicated to my father, Thomas Gaetano Pensabene. He lived the American dream.
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All would be literally lost were it not for the successful disk recovery efforts of Rajendra Shrestha, who reminded me that blessed are the pessimists, for they have made backups.

Jim Johnson and Bob Baker, faculty members, deserve a nod. It was their heated debate over the “correct” way to handle discussion in blended formats that was the genesis of this adventure.

Dr. Elaine Strachota created the Student Satisfaction Survey and graciously gave permission for me to adapt it for this study.

I will be forever grateful to the three instructor-designers who volunteered their time and considerable expertise for the case studies.

Finally, I owe a special debt of gratitude to my soul mate, Kathy Boeve, who hung in there during the entire wild ride of emotions and assured me, albeit lovingly, that quitting would not be an option.
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CHAPTER 1. INTRODUCTION

Introduction to the Study

Interaction has been studied in a variety of distance education formats first with computer-based training (CBT) and later web-based online instruction (Bannan-Ritland, 2002; Brown, 2008; Chou, 2003; Durrington, Berryhill, & Swafford, 2006; Schwartzman & Tuttle, 2002; Sims, 2003). Recent studies have begun to examine interaction in blended, or hybrid, learning situations. Blended learning combines online with a face-to-face component. Such formats are predicted to increase in popularity, especially at the community college level (Garrison & Kanuka, 2004; Waddoups & Howell, 2002; Zenger & Uehlein, 2001).

The proliferation of distance education methodologies brought into review questions concerning the interaction within such learning environments, including the basic definition of terms, qualitative and quantitative differences between delivery systems, if any, and vital issues around what kinds of interactions best support learning outcomes. Moore’s (1989) seminal editorial provided an initial framework for the study of interactions by proposing three dyadic combinations, namely, learner-learner, learner-instructor, and learner-content.

These dyadic interactions have been viewed within traditional, linear design models as one component of instructional strategies (Dick, 1997; Smith & Ragan, 2005). Gap analysis between what learners needed to know and what they did know led to
strategies and activities to meet learning objectives often with pre-determined sequences. Interactions within linear design models represent one of many instructional strategies. Evolving technologies and pedagogies suggested the need for new models (Sims, 2003).

Sims and Jones (2003) highlighted the need for more relevant Instructional Design (ID) models as more constructivist, learner-centered educational philosophies grew in popularity and acceptance. Their Three-Phase Development Model (3PD) originally spoke to the changing, even merging, roles of instructors, designers, and subject matter experts (SMEs). More recent iterations have evolved to include emergence theory as a basis for the framework (Irlbeck, Kays, Jones, & Sims, 2006). With online learning, Sims (2006) argues that the roles of instructors, designers, and learners are becoming merged as top-down, linear design models no longer fit the bottom-up synergy hoped to be created by divergent, constructivist strategies. Blended learning with its mix of face-to-face and online facilitates further role merging and more divergent design models.

The impetuses to move to blended learning situations have been driven by efficiencies, on the one hand, and core desires to transform instruction on the other. Space and other administrative efficiencies are often a driving force to introduce blended learning formats (Waddoups & Howell, 2002) since class times can be reduced. Bonk and Graham (2006) document over 40 models of blended learning at the institutional level combining efficiency and effectiveness. For example, the Cisco Networking Academy uses a centralized online component with hands-on lab activities; the former enhances efficiency and the latter learning effectiveness (Dennis et al., 2006). The
The COHERE group of Canadian Universities view blended as having transformative potential to change the way instructors design courses by increasing amount and quality of interactions. Instructor-designers within this decentralized model develop activities to minimize lecture time while maximizing interactions (Owston, Garrison, & Cook, 2006).

The Pew Foundation’s Learning and Technology Program (Twigg, 2003) has funded 30 projects involving technology with the intent to enhance efficiency (e.g., lower costs) but to enhance learning outcomes as well. The Pew Learning and Technology Program highlights an important theme in the blended learning literature, namely, transformative potential. As with the COHERE schools, Pew’s focus is on the opportunity to decrease the amount of lecture as a delivery model and to move toward more learner-centered, interactions. Thus blended learning environments and the concomitant development of emerging models provide the potential for changing instructional philosophies, methods, strategies, and activities. Wingard’s (2004) survey of seven institutions found that while the majority of instructors first engaged in blended learning for practical reasons such as efficiency, the perception of the overall learning experience was also enhanced. More than half of the instructors reported increases in interaction and many felt improved effectiveness in terms of enhanced organization, active learning, and collaboration among students. Researchers observed that instructor-designers were not always immediately conscious of these changes. Early survey results were not as indicative of change as follow up interviews.

Garrison and Kanuka (2004) purport that blended learning can have a transformative impact on instruction and learning when so designed. Blended designs
have the capability to enhance social presence, cognitive presence, and teaching presence (Garrison & Anderson, 2003). Schwartzman and Tuttle (2002) describe the important opportunity instructor-designers have to increase interaction and enhance engagement with blended learning. However, they further cite the difficulties and challenges some face in making such a shift. “The central challenge for educators will be to (a) maximize engagement with students especially when interpersonal contact is limited or absent, and (b) induce students to participate in these interactive components” (2002, p. 181).

Instructors designing blended courses can opt to use the online component simply for static content delivery missing the opportunity for interactions.

Given the growth of blended learning and the rationale for alternative design approaches, the blended learning approach provides opportunities for emerging models of interaction as instructor-designers experiment with their own courses. For instance, Leh (2002) modified her approach over several terms by actively engaging her students in online discussions. She measured effectiveness by quality and frequency of discussion posting as well as student satisfaction. She concluded that effective instructors modify their design over multiple iterations and that students develop more self-discipline and learner control, a basic foundation of all ID models. Christensen (2003) describes her success at implementing two semester-long projects designed by the students employing constructivist conditions. One condition, “encourage ownership of learning” (p. 239) was met by having students choose their own projects and develop their own models. She, too, reported that there were greater opportunities for interaction by both the instructor and the students over time.
Waddoups and Howell’s (2002) blended taxonomy describes three potential pedagogical approaches that could be employed as frameworks for blended development: (a) transmission of information, (b) interactivity and connectivity, and (c) interactive distance education. Transmission of information is simply content delivery. With interactivity and connectivity the instructor is still viewed as a content expert but with more intentional feedback opportunities. Waddoups and Howells believe interactive distance education has the potential to change the focus from instruction to learning through the creation of rich learning environments (i.e., transform). The intent of the last approach is for students to take more responsibility for their own learning. The approach to interactions by instructor-designers could vary with each framework.

More recently, Graham and Robison (2007) proposed a taxonomy for blended learning. Their three categories of blends are transforming, enhancing, and enabling. Transforming blends are large in scope with improved pedagogy as a key purpose and their nature is to move towards active learning. They identify transformative blends as “facilitating an improvement in pedagogy to a more active learning pedagogy” (2007, p. 90). Enhancing blends may propose to improve learning but largely aim to increase productivity of learners and/or instructors. Enabling blends’ main purpose is to increase access and convenience (Table 1).
Table 1: Blend Preference Categories (Graham & Robison, 2007)

<table>
<thead>
<tr>
<th>Blend Category</th>
<th>Key Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transforming</td>
<td>Large in scope</td>
</tr>
<tr>
<td></td>
<td>Improved pedagogy</td>
</tr>
<tr>
<td></td>
<td>Disruptive technology</td>
</tr>
<tr>
<td></td>
<td>Active learning</td>
</tr>
<tr>
<td>Enhancing</td>
<td>Increased productivity of learners and/or instructors</td>
</tr>
<tr>
<td>Enabling</td>
<td>Improved access and/or convenience</td>
</tr>
</tbody>
</table>

This blended taxonomy provides an opportunity to investigate systematically interactions within blended learning by focusing on the educational perspective of the instructor-designers. How does each blend category impact the implementation of interactions? How do students perceive the effectiveness of these interaction efforts?

Interactions in blended learning environments, then, can transform the instruction if the instructor-designer chooses to employ the possibilities for new learner-centered interaction strategies. Alternatively, the instructor-designer can opt to enhance convenience or productivity. Research viewed through the perspective of blend categories informs how instructor-designers approach interactions and how effective these strategies are.

Blended courses can be categorized based in large part on the choices of the individual instructor-designer. These choices are based on both experience and preference. These choices or approaches, in turn, can be represented by one of the three blend categories. How does each approach handle interactions? How effective are these
approaches with the students involved? How do students perceive the efforts of the instructor to enhance interaction? These are the issues addressed by the current study.

**Background of the Study**

This research had as its broad foundation the studies that have examined interactions in online environments employing the dyadic framework originally proposed by Moore (1983). Emerging instructional design models facilitate application of findings from in-depth study of interactions employing different instructor-designer implementations. Research in instructional transformation opens up the possibility that interactions employing new learning arenas such as blended learning can enhance instruction. Specifically, this research was based on the work of Graham and Robinson (2007) who propose that blended learning can be categorized as transformational, enhancing, or enabling.

The literature review chapter covers several studies that have examined interactions from the dyadic framework of learner-learner, learner-instructor, and learner-content (Bannan-Ritland, 2002; Elicker, O'Malley, & Williams, 2008; Gerber, Scott, Clements, & Sarama, 2005; Hirumi, 2002; McFarlin, 2008; Wagner, 1997). A review of these studies makes it clear that this framework has both helped communicate findings informing what works with interactions.
Role of Models of Instructional Design

Intentional design for interactions suggests implications for models of instructional design. The ever-increasing availability of technologies for educators, preference for more constructivist-oriented approaches, the complexities surrounding topics such as interaction, and new choices inherent in the blended learning arena have led some to suggest new and evolving models for instructional design. Sims and Jones’ (2003) Three-Phase Development (3PD) Model, emergent theory (Irlbeck, et al., 2006), and the Six-Phase Feedback Model (Hummel, 2006) all acknowledge the changing role of instructor-designers in response to evolving complexity. The complexity of the new learning playing field, as it were, combined with the adaptive response of instructors as designers suggests the possibility of multiple answers to the question of how best to approach interactions.

The Potential for Transformation

The current dynamic state that exists within the blended learning arena includes aforementioned complexities related to interaction and emerging technologies as well as the changing role of the instructor especially regarding design. Owston, Garrison and Cook (2006) refer to the “transformative potential” of blended designs. There is a potential for change, indeed, but not inevitability. Thus, Sims and Hedberg (2008) posit encounter theory as one strategy for instructor-designers to transform their thinking versus simply translating existing face-to-face metaphors. One could theorize, though, that not all instructors will embrace the opportunity for change.
The Blend Framework

Graham and Robinson (2007) studied the impact of the introduction of blended learning at Brigham Young University. They were interested in how blended learning changed instructional practices. They found that in some cases instructional practices were changed. For example, one audiology instructor reported that learning was greatly facilitated by adding an online simulation versus relying solely on limited lab time on the actual equipment. Other instructors, though, were more focused on the benefits from enhanced convenience for students or improved productivity. Investigation of student perceptions and expectations was not a focus of their work.

The current research, then, built on the existing body of knowledge regarding interactions. This research investigated interactions through a different framework, blend categories, in order to help inform instructor-designers and emerging instructional designs. Finally, the role of student expectations and perceptions was examined as one indicator of effectiveness.

Statement of the Problem

Based on the analysis of the literature for the current study, the importance of interaction as engagement is established. Research has focused on the dyadic interactions first suggested by Moore (Hirumi, 2002; Moore, 1989; Rothmund, 2008; Swan, 2004; Wagner, 1997) and results have helped informed instructional designers (Durrington et al., 2006; Hirumi, 2002; Wagner, 1997). For example, Strachota (2003) analyzed dyadic
combinations of interactions in all online courses at a technical school. Among her findings was that there was no significant difference in learner-instructor interaction as to satisfaction with discussion boards. Her study examined interactions in one dyadic combination, learner-instructor, across a wide sample of courses and students. Looking at this one dimension resulted in no significant difference. Viewing interactions from a different perspective could reveal a different dynamic. The current study posited that interactions could vary when viewed through the portal of blend category preference. For example, the purpose and importance of discussion within discussion boards could vary considerably based on the blend category and the educational philosophy of the instructor-designer. Studies that view interactive strategies across blends are not designed nor intended to find what works within each blend category. The variety of approaches to interaction considering the salient category of blend allows for the probability of difference in implementation by instructor-designers whose primary emphasis is productivity versus whose emphasis is convenience versus whose emphasis is enhanced pedagogy.

Examining interactions in some depth in each blend category should help instructor-designers better understand the nature of interaction. The current results should help inform instructional designers as to what works given the preferred blend categories of the instructors involved. Overlaying the dyadic interaction framework with these blend categories should help interpretation of future research studying interactions within blended formats. For example studies seeking significant differences in treatment
of dyadic interactions across groups of instructor-designers should consider blend category preference as influencing both main and interactive effects.

Therefore the problem investigated in this study was how instructor-designers in differing blend categories approach interaction and what is the satisfaction and perception of the students with these approaches. Researching this problem in the context of actual courses permitted examination both of how interactions are implemented, how they are perceived by students and how they vary across blend categories. Comparison of these findings to a contemporary instructional design model (i.e., PD4L, (Sims, 2009)) provided grounding in current theory.

**The Purpose of This Study**

Graham and Robison (2007) proposed that blends within blended learning can take three forms, namely, transformative, enhancing and engaging. Transformative blends employ facilities provided by technology, affording instructor-designers the opportunity to change, or to transform, their method of teaching. An instructor-designer, thus, might change from objectivist/instructivist philosophy to a constructivist philosophy emphasizing engagement of the learners’ mental models and shifting toward learner control. However, other instructor-designers may see blended as an opportunity to enhance productivity (i.e., enhancing) or convenience (i.e., enabling). Graham and Robison (2007) studied exemplar cases of each type of blend from instructors teaching blended at Brigham Young University. From their work, it was plausible that instructor-designers from each exemplar case might approach interactions differently.
Interaction and engagement have been studied (Hirumi, 2002; Sims, 2003; Wagner, 1997) often employing Moore’s (1989) original dyadic taxonomy (i.e., student-student, student-content, and student-instructor) with the addition of student-technology added by Hillman (1994). Student satisfaction with online and blended learning has been used as one indicator of effectiveness (Bailey, 2002; Gunawardena & Zittle, 1997; Noyes, 2008; Restauri, 2006; Rothmund, 2008; Swan, 2001; Wickersham & McGee, 2008). Student perceptions and expectations have also been studied (McIsaac, Blocher, Mahes, & Vrasidas, 1999; Ortiz-Rodríguez, Telg, Irani, Roberts, & Rhoades, 2005; Sargeant, Curran, Allen, Jarvis-Selinger, & Ho, 2006; Sims, 2003; Swan, 2001; Wickersham & McGee, 2008; Wyatt, 2003). There is research value, then, in studying both sides of the interaction equation, namely, the instructor-designers and the students who experience their classes.

What is the intent of instructor-designers regarding interaction? What are they trying to do? What, then, is the reaction of the students to these efforts at enhancing interaction? And what are the perceptions and expectations of students regarding these interactions? The purpose of this study was, therefore, to examine those factors that affect the quality of interaction strategies across transformative, engaging and enabling learning blends. PD4L, a contemporary instructional design model, was employed to connect the findings to relevant theory.

Rationale
Blended learning formats are increasing in popularity especially at community colleges (Garrison & Anderson, 2003). Although often described as ‘the best of both worlds’ (Owston et al., 2006), in reality combining online with face-to-face provides both challenges and opportunities. Blended learning formats represent a potentially rich experimental format for researchers studying interaction and its implementation.

The 3PD model (Sims & Jones, 2003) speaks in part to the blending of roles between instructors and designers. Blended learning formats, arguably, facilitate such blending of roles as they combine two separate design histories. Instructional designers have traditionally played key roles in the development of online. Face-to-face or classroom learning has typically been the domain of the single instructor typically acting in isolation. Among their many decisions, instructor-designers in blended learning formats are faced with decisions regarding how to accomplish learning objectives employing a variety of activities that are either face-to-face or online or both.

Further, blended formats provide the opportunity for transformative change. Such change could be as significant as a shift in instructional philosophy from traditional instructivist/objectivist strategies with emphasis on delivery of content to completely learner-centered approaches more aligned with constructivist beliefs. It is equally reasonable to assume that blended formats simply facilitate enhanced convenience and productivity of existing instructional philosophies. In any event, the universe of instructor-designers in blended formats represents a potentially rich field for investigation regarding how such instructor-designers approach interaction and how effective are these approaches from the perspective of the students.
Anderson’s (2002) equivalency theory purports that effective learning occurs when there is sufficient interaction in at least one of the dyadic domains: learner-content, learner-instructor, learner-learner. Instructor-designers representing the differing blend preferences likely view the importance of each in different ways with divergent emphasis. Thus, one espousing transformative blends and learner-centered, active engagement would likely place emphasis on learner-learner interaction in vehicles such as discussion boards. Engaging and enabling blend instructor-designers, though, might simply make a discussion board available for student use. How students react and respond to these two different approaches could be quite different.

**Research Questions**

1. How are experienced instructor-designers utilizing interactions across blend categories?

2. How effective are these efforts at implementing interactions?
   a. What are the student expectations and perceptions of interactions?
   b. How satisfied are the students with the interactions?

3. What is the relationship between instructor-designer approaches to interaction in blended learning and student satisfaction and perceptions?

**Significance of the Study**

From a research perspective, it was expected that thematically rich cases would shed light on how instructor-designers across a variety of transformation blends design
for interactions and how effective these strategies are. The results from this study could lead to development of models upon which practicing instructor-designers could draw as they, in turn, create their own approaches to the issue of interactions.

**Nature of the Study**

This study builds on the body of research on interactions by overlaying the framework of blend categories. Within this framework, instructor-designers make decisions based on whether their underlying purpose is instructional transformation, convenience, or productivity. The literature review will show that much is known about interaction through the portal of interaction dyads (i.e., learner-learner, learner-instructor, learner-content). Discovering how instructor-designers approach interaction from the perspective of blend categories and how effective these approaches are is the nature of this study.

The nature of the Research Questions suggested a largely qualitative exploration. We want to know how instructor-designers employing a variety of transformative blends approach interactions. Too, we want to know how their students respond to these efforts.

**Assumptions**

It was assumed

1. that instructor-designers vary their approach to interactions based on their blend preferences.
2. that experienced instructor-designers who sought out and achieved peer reviewer status represent a population who are actively engaged in their own development of emergent models for interaction.

3. that students given assurances of anonymity would be truthful in their responses.

Limitations of the Study

This study, as in most qualitative studies was limited by the selection of cases, the openness and articulation of the respondents and the skills of the researcher.

1. Case selection was critical. Cases needed to represent the three blend categories. Students from classes developed in each case needed to be available and willing to respond to a survey. Cases needed to represent a variety of models and responses to same.

2. It was reasonable to suspect that instructors may not be conscious of their role as designers and would require assistance in delineating and in expressing their model including their approach to and strategies employed with interactions. Ferreting out themes and developing a representation was the responsibility of the researcher. The interview protocol (Appendix A) was developed to guide the researcher toward ascertaining instructor-designer considerations as efficiently as possible.
3. The results are as good as the researcher who, in effect, is the primary research tool (Creswell & Plano-Clark, 2007) for this study. The researcher has extensive experience in instructional design, development of online and blended course formats, he is a certified peer reviewer for a national online standards program, and program evaluation. The researcher was the primary investigator for a validation study by the National Weather Service involving a comprehensive approach including extensive interviews.

Definition of Terms

*Blend preference.* This term is used in this study to describe which of the three *blend categories* proposed by Graham and Robison (2007) most closely represents the underlying philosophy of the instructor-designer. *Blend categories* are not mutually exclusive. Thus, an instructor might evidence attitudes across all three *blend categories*. However, *blend preference* is the one category that seems to best represent the philosophy of the instructor-designer.

*Blended or combined learning.* *Blended learning,* for purposes of this research, refers to the combination, in any number of ways, of online and face-to-face components. As such, *blended* provides both new opportunities and new challenges to enhance effective interactions. The challenges might be how to engage and where, for example. The opportunities include the potential to transform instruction, enhance productivity, and/or to enable convenience for instructors and students (Graham and Robison, 2007).
Dyadic interactions. As used in this study, the term refers to the original pairings proposed by Moore (1989) and any other pairings for interaction. Thus, learner-learner and learner-content would be examples of dyadic interactions.

Instructor-designer. The compound term instructor-designer is employed in this study to represent the dual nature of the instructor who is both developing and implementing instruction within blended environments. The instructor aspect is largely implementation. However, even during the course of implementation, design considerations are never far removed.

Interaction. The terms interactivity and interaction appear at times to be used interchangeably. A review of a sampling of relevant articles shows reference to ‘interactivity’ (Aldrich, Rogers, & Scaife, 1998; Larson, 2002; Macdonald, 2001; Poon, 2003; Sims, 1997; Wagner, 1997)‘interaction’ (Anderson, 2002; Hillman et al., 1994; Veena Mahesh & Marina Stock McIsaac, 1999). For purposes of this research, working definitions will be proposed. Interactivity emphasizes the mechanisms that can support or facilitate interaction. Interaction refers more directly to the interplay of the various agents. Thus, Moore’s (1989) editorial suggests learner-learner, learner-content, and learner-instructor and Hillman et al. (1994) add learner-interface. Additional categories and aspects such as student-management feedback (Northup, 2001), instructor-peers, and instructor-support staff (Mortera, 1999) and learner-pedagogical strategy (Hedberg & Sims, 2001) have richened the dialog. One might suggest that the two terms of interactivity and interaction are distinguished by their research roots. Sims (1997), for example, is interested in design issues related to effectiveness of learning with a variety
of interactive media (e.g., CD-ROMs, WBT). He takes issue with the simplistic notion that any button-pushing or mouse-clicking would by itself facilitate effective interactions. Instead they could and sometimes do detract from both efficiency and effectiveness of interaction. Some authors employ the term interaction to represent the various learning processes that occur irrespective of technology. Hirumi’s framework for interaction (2002) is a good case in point. While the framework certainly buttresses effective design interactivity components, it applies equally well in face-to-face settings where there are no literal buttons to push.

**Summary**

This study explored via three case studies how instructor-designers in the different blend categories proposed by Graham and Robison (2007) approach strategies for interaction. The literature review that follows establishes the context for the current work highlighting key research.
CHAPTER 2. LITERATURE REVIEW

The problem investigated in this study is the factors that identify effective interaction strategies across transformative, engaging and enabling learning blends as proposed by Graham and Robinson (2007). This literature review will establish the case that much has been learned about interactions by studying them through a variety of frameworks especially the dyadic framework described by Moore (1989). The review concludes with the proposition that at this time there is a gap in the literature in investigating interactions from the perspective of these various blend categories. Such analysis will contribute to how instructor-designers approach interactions in blended learning situations.

This chapter first reviews the relevant research which frames the problem. The basic framework for the study of interactions is established focusing on the pivotal role in the research literature of interaction pairings. Strategies to enhance interaction and frameworks to study them are reviewed. Factors that might impact the implementation of interactions are examined especially related to interaction pairings. Finally, models of instructional design are reviewed to the extent they help inform the discussion of designing for interaction. In whole, this chapter supports the position of the researcher that blended learning environments present unique learning laboratories for the study of interactions. Further, in order to best understand the effectiveness of interactions, the
focus takes into account the educational and philosophical foundation of the individual instruction-designers. These differences are evident across blend categories (Graham & Robison, 2007).

Moore’s (1989) seminal editorial lay the groundwork for a serious academic discussion of the critical role of interactivity in distance education. Interaction of learners with content has been considered to be a pillar of learning since Dewey (1997/1938). The proliferation of distance education methodologies brought into review questions concerning interactivity including basic definition of terms, qualitative and quantitative differences between delivery systems, if any, and vital issues around what kinds of interactions best support learning outcomes.

Blended (or hybrid) learning combines both face-to-face and online components. Blended offerings have been increasing at post-secondary institutions in the United States in general and at community colleges in particular (Young, 2002). Often billed as the best of both worlds (Owston et al., 2006) blended formats provide enhanced flexibility for instructors who may make use of both face-to-face and online activities, tools and resources. With increased flexibility comes a concomitant challenge in terms of how best to employ both learning environments. Questions facing faculty developers considering interactivity include all the issues from the past and add a new element of choice regarding how, when, and where to enhance interactions in both the face-to-face and online components.

The scholarly literature provides strategies, models and theoretical constructs that could help inform design decisions regarding effective implementation of interactions.
This literature review lays the groundwork to understand what is known about effective interaction.

**Overview of Concepts**

Moore (1989) framed the discussion around interaction, setting parameters for research while providing the nascent structure of a framework for effective standards. This structure, according to Moore, helps address basic but pivotal questions such as, “What level of interaction is essential for effective learning? What is good interaction? How can we achieve it?” (Moore, 1989, p. 70). Learner-content interaction is the junction where learning occurs, however that nexus is envisioned (Dewey, 1938). Whether the engagement comes from an instructor delivering content (in any of a number of formats) or from learners grappling with a realistic problem (as in problem-based learning) learner-content is present.

Anderson (2002) proposes that any effective interaction domain results in effective interaction and learning overall. His equivalency theory holds that as long as one of the dyads is effective then effective learning will occur. Thus, conditions for effective learning would be met as long as any interaction is effective.

Learner-instructor interaction involves the multiple roles played by the instructor to facilitate learner-content interaction. These roles vary significantly depending on instructional philosophy. Thus, objective instructivists might focus on the effectiveness of their presentation delivery. They would be concerned with the transmittal portals, as it were, from them to the students. Feedback and two-way communication would appear to
be key elements. That is, are students receiving the message correctly and, if not what corrections need to occur?

Instructors employing constructivist principles play a key role in developing fruitful experiences, clarifying the students’ existing mental models and providing sufficient scaffolding and support to result in effective learner-content interactions. These interactions would appear to be more facilitative than directive. Thus, students are guided in a discovery process and false assumptions are corrected early. So while the activities of the instructivist and the constructivist might look quite different, the end goal, to facilitate effective learner-content interaction, is the same for both.

The Role of Interaction

An important design consideration is the role of interaction in blended learning situations. Moore’s (1989) initial taxonomy of learner-learner, learner-instructor, and learner-content was augmented by Hillman, Willis and Gunawardena (1994) to include learner-interface. Several researchers have added depth and breadth to the taxonomies developing theoretical frameworks for interactions. These frameworks often take into account the instructors educational and philosophical preferences (Bannan-Ritland, 2002; Chou, 2003; Hirumi, 2002; Sims, 1997, 2003; Wagner, 1997). Others appear to draw more directly from clinical experience and proffer strategies of best practice (Durrington et al., 2006; Larson, 2002; Macdonald, 2001; Veena Mahesh & Marina Stock McIsaac, 1999). Many have added to the richness of the discussion by focusing on factors influencing interaction (Gunawardena & Zittle, 1997; McIsaac et al., 1999; Roblyer &
Ekhaml, 2000; Rovai & Jordan, 2004; Vrasidas & McIsaac, 1999). Other studies might be best categorized as focused on issues related to instructor-designer individualization; that is, what is the role of the faculty in design for interaction (Hedberg & Sims, 2001; Northrup, 2001; Rhode, 2008). Finally, many studies focus on specific interaction pairings such as learner-learner, learner-instructor, and/or learner-content (Elicker et al., 2008; Gerber et al., 2005; McFarlin, 2008).

Role of Motivation

As Moore notes, the role of internal student motivation can compensate for less than effective learner-instructor interaction. Poon’s work with mega-classes of over 500 students (2003) also found that learners’ motivation had strong, positive impact on outcomes. That is, students who appeared to be motivated performed better. Accepting learner motivation as an a priori given, though, should be problematic for designers. One needs to be careful not to get cause and effect relationships backwards. Any recommended standards and strategies to increase interaction, it could be suggested, should work to enhance motivation for all learners by increasing and enhancing productive interactions. The implication is, once again, learner-content interaction is key.

Moore saw learner-learner interaction as a challenging opportunity with developing distance education systems. Face-to-face certainly has a rich history with effective use of learner-learner interaction. Consider, for example, collaborative learning, small group discussion and dyadic feedback. All can and likely should be part of an active learning process (Tinto, 2000). If used properly, though, distance education
technologies can facilitate the intensity, frequency, and quality of learner-learner interactions. Following along with the instructivist-constructivist dichotomy, instructivists might add learner-learner interaction as a powerful teaching technique. Constructivists would embrace learner-learner as a key component.

Hillman (1994) adds a fourth type of interaction, learner-interface. It would be difficult, if not impossible, to develop a framework for effective interaction employing any technology without stating this fourth component either implicitly or explicitly. Although on the surface learner-interface appears to involve more closely what has been defined here as interactivity, it does have important implications for interaction, per se. In the worst case, for example, the interface could be a problematic obstacle for the learner. An extensive WBT with poor way-finding would thwart even the most motivated student. This challenge would negate the opportunities for learner-learner, learner-content and possibly even learner-instructor interaction (e.g., attrition). On the other hand, a well-designed interface would appreciate the range of learners’ mental models (Sims, 2003), would be clear to the point of intuitive in its organization and structure, and would, therefore, facilitate learner-learner, learner-content and even learner-instructor interaction.

**Strategies to Enhance Interaction**

As discussed above, the Moore (1989) editorial and the Hillman et al. (1994) addition set the initial structure in place to grow a rather rich field of research. This section intends to highlight strategies from this literature. Much of this work focuses on
distance education aspects in general (e.g., online, WBT). Since blended learning combines online components and face-to-face, it offers additional degrees of freedom and design opportunities. That is, instructors have the latitude to employ effective strategies to enhance interaction both online and face-to-face. The choice might be in part based on strategies but more likely strongly influenced by the preferences and style of the instructor.

The literature in this area is mixed. Some primary research addresses the topic of interaction directly. The majority, while tying in to academic references, draw more on clinical experience. Development and implementation of strategies are variables worthy of investigation across transformational blends. Durrington, Berryhill and Swafford (2006) delineate seven distinct strategies which can be placed within the four categories of interaction. These strategies by category are summarized in Table 2.

<table>
<thead>
<tr>
<th>Categories of Interaction</th>
<th>Strategies</th>
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<tbody>
<tr>
<td>Learner-Learner</td>
<td>Expectations for quantity of discussions</td>
</tr>
<tr>
<td></td>
<td>Expectations for quality of discussion</td>
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<tr>
<td></td>
<td>Student moderated discussion</td>
</tr>
<tr>
<td></td>
<td>Problem-based learning</td>
</tr>
<tr>
<td>Learner-Content</td>
<td>Expectations for quantity of discussions</td>
</tr>
<tr>
<td></td>
<td>Expectations for quality of discussion</td>
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<tr>
<td></td>
<td>Student moderated discussion</td>
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<tr>
<td></td>
<td>Problem-based learning</td>
</tr>
<tr>
<td>Learner-Instructor</td>
<td>Timeliness of instructor response</td>
</tr>
<tr>
<td></td>
<td>Instructor presence or tone</td>
</tr>
<tr>
<td>Learner-Interface</td>
<td>Provide a detailed syllabus</td>
</tr>
</tbody>
</table>

Larson (2002) studied both the quantity and quality of learner-learner interactions in an online marketing course. He proposed that larger group size would increase
interaction. He found that group size did not appear to impact either quantity or quality of interaction. Groups were divided into light and heavy coaching in addition to varying sizes; there was not a “no-coaching” control. One could hypothesize from Larson’s work that even light coaching has a fairly powerful effect. Certainly others (Bannan-Ritland, 2002) have reported that student-led discussions appear to be very effective.

Sims’ (2003) qualitative analysis of student expectations for interaction found engagement to be a strong theme. Further, students expect to be in control of their learning. Sims concludes that learners with different past experiences might have varying expectations suggesting flexibility within an educational experience supports engagement and learner control. The obvious and perhaps critical follow along study would be to gauge faculty expectations about interactions in general and their understanding of student expectations in particular. Any potential gap discovered in that process would support the need for underlying standards for interaction.

Enhancing interaction can be viewed as increasing quantity and/or quality. Quantity is fairly objective and readily measured by frequency counts. Quality more likely relates to the values and philosophy of the instructor and its assessment might be more elusive (Venna Mahesh & Marina Stock McIsaac, 1999). Rubrics have been shown to be effective for both assessing and structuring interactions, for example, in discussions. A review of 50 separate rubrics for discussions (Penny & Murphy, 2009) found that almost half of the rubrics focus on learner-cognitive interactions and with student-student and student-instructor interactions included in about 17% of all rubrics. Support for quality interactions can be devised in such a way as to move learners toward higher level,
critical thinking (Macdonald, 2001). Increasing the quantity and quality of interaction develops a sort of learning synergy and, as such, should be considered with any set of standards.

Frameworks Used to Study Interactions

Several authors have proposed frameworks or components of frameworks designed to enhance interaction (Bannan-Ritland, 2002; Chou, 2003; Hirumi, 2002; Sims, 1997, 2003; Wagner, 1997). Much of the focus is on interaction at a distance. They could be adapted for blended environments which are composed of both distant and face-to-face components. A synthesis of the various frameworks helps determine effective strategies (Sims & Jones, 2003) for interaction in blended courses. Properly applied, frameworks serve the purpose to expand designers’ thinking into the depths and breadth of interactive opportunities.

An effective framework ultimately stimulates thinking, generating potential strategies. Chou (2003) expands on the four interaction dyads (Hillman et al., 1994; Moore, 1989) adding nine interactivity dimensions (a) choice, (b) non-sequential access of choice, (c) responsiveness to learner, (d) monitoring information use, (e) personal-choice helper, (f) adaptability, (g) playfulness, (h) facilitation of interpersonal communication, and (i) ease of adding information. He proposes that these dimensions fit best within the four types of interaction. Thus, learner-interface includes choice, non-sequential access of choice, responsiveness to users, and monitoring information use.
Each of these pairings leads to creation of interactive functions. Frameworks of this type help bridge the gap from theory to practice and could guide standards development.

An effective framework leading to implementation strategies includes meta-cognition. That is, as the learner interacts with content, what reflective processes are engaged that result in said learner self-initiating more and more effective interactions? One meta-analysis of some 132 relevant articles found that learner-content interaction is least investigated (Bannan-Ritland, 2002). While the interaction of learner with his or her own thought processes arguably might not constitute a fifth dyad, a successful framework should lead to strategies that elicit meta-cognitive processes. At least one writer posits that it is (Hirumi, 2002).

**Unique Role of Instructor in Blended Formats**

While the instructor may not have had a hand in the design and development of the online components, instructors in blended learning situations do need to make on-going design decisions. For example, discussions (i.e., student-student and student-instructor) can take place face-to-face, online or both at the instructor’s prerogative. Ideally instructors employ the resources of instructional designers. In any event, the role of designer and instructor are becoming themselves blended (Sims & Jones, 2003). Hirumi’s (2002) framework provides some guidance.

Hirumi addresses the issues of learner motivation and instructor-designer educational perspectives in his three-level framework. Level I, or learner-self interaction, directs focus toward enhancing learner’s meta-cognitive skills. A key skill, he argues, is
self-regulation, a variant of motivation. Effective self-regulation should ameliorate potential design challenges at other levels. These meta-cognitive skills can and should be developed. Self-regulation is most likely enhanced not by training (and not via a sequenced ADDIE approach) but by the scaffolding structures making up the learning environment. Following this line of thinking, resolving learner-interface issues could facilitate learner-self interaction by minimizing frustration. Initial orientation to technology with timely follow along support, too, would help. Even such a simple intervention as a well-designed syllabus anchoring expectations in time leads to an environment for learner-self to develop.

Level II includes all learner-human and non-human interactions including the four traditional interface types and adding learner-other and learner-environment. This level could be viewed as a subroutine of sorts pulling in other frameworks that share the interface types at this nexus. Learner-other, in the Hirumi framework, includes supporting services. Learner-environment includes out-of-the-box lab and field based experiences. Overall, Level II begins to guide us to a host of rich strategies to enhance interaction within blended learning.

It is at Level III, learner-instructor, that the flexibility and individuality of the blended instructor/designer is acknowledged. Instructional strategies are purposefully tied to the theoretical preferences of the instructors. Hirumi includes examples from Gagne’s Events of Instruction (Gagne, Briggs, & Wager, 1992) through Problem-Based Learning covering the complete gamut of research and theory. Intentionally tying
instructional strategies to individual educational theory preferences would appear, intuitively, to raise the likelihood of success.

Wagner’s (1997) work views interaction in some detail. Wagner covers 13 separate types, including (a) interaction to increase participation, (b) increase engagement, (c) develop communication, (d) receive feedback, (e) enhance elaboration and retention, (f) support learner/control and self-regulation, (g) increase motivation, (h) enhance negotiation for understanding, (i) team building, (j) discovery, (k) exploration, (l) understanding, and (m) closure. The overlap with categories and types presented above should be clear.

**Factors Influencing Interaction**

The lens through which one views interaction affects the focus of the results. Interactions have been viewed from a variety of perspectives including social presence, learning communities, learner control, and the various relationships have been delineated by at least one rubric. Each viewpoint will be reviewed.

One early literature review effectively defined interaction as anything that enhances learning (Zirkin & Sumler, 1995). As noted, many studies view interaction through some variant of the dyadic pairings originally suggested by Moore (1989). The choice of filter impacts results. Social presence, learner control, learning communities and more empirical methods are such filters suggesting interaction factors.
Social Presence

Gunawardena and Zittle (1997) examined the impact of interaction from the perspective of social presence. Social presence was defined as degree of interpersonal contact and immediacy. Students who felt they were treated as genuine individuals were more likely to report overall satisfaction (accounting for some 60% of the variance in the step-wise regression). Survey questions focused on quality of interactions primarily between students.

Learner Control

Vrasida and McIsaac (1999) identified learner control, social presence, structure, feedback and dialog as factors influencing interaction in online courses. The focus of their study was a blended class with an equal number of discussions online as face-to-face. Structure, they found, could increase or decrease interaction. If students viewed the online discussions as superfluous, then interaction decreased dramatically. Class size was considered a determining factor as the authors hypothesize that there is a minimal critical mass for effective online discussion. Finally, students with more prior online experience tended to interact more in the discussion and chat rooms. Most significant, perhaps, is the report by students that feedback for discussions was considerably more immediate face-to-face than online which contributed to more interaction when the class met on campus. Not addressed is the role played by the instructor in both the face-to-face and online settings.
McIsaac et al. state, “Interaction may be the single most important activity in a well-designed distance education experience” (1999, p. 122). The authors believe that instructors teaching online perceive that interaction is better than in face-to-face. Their qualitative analysis of six doctoral level blended courses found that instructors teach differently, modify the course structure, consider both what to and how to communicate and spend more time than in traditional classes. Students, they observed, were goal-oriented with their interactions and anticipated frequent and immediate feedback else they reported feeling isolated.

**Rubric for Interaction**

Addressing the issue of framing the question of effective interaction, Roblyer and Wiencke (2003) developed a rubric combining theory and research. They examine five elements including social/rapport-building, instructional design, interactivity of technology resource, evidence of learner engagement and evidence of instructor engagement. Each is ranked on a 4-point scale. The authors hold that online instructors while seemingly faced with more challenges to enhance interaction also have more tools available to do same. That is assuming such tools are used effectively. The authors propose their operational definition of effectiveness via the rubric (Roblyer & Ekhami, 2000).
Learning Communities

Several studies connect enhanced interaction with establishment of effective learning communities. The more effective and frequent student-student interactions are, the more likely students would report a sense of community and vice versa (Northrup, 2001). The distinction may be in where the design emphasis is first placed. One proposed strategy involves designing a course, or its major components around project-based learning. Murphy, Mahoney and Havell (2000) studied three graduate classes both online and blended. Students worked collaboratively to develop a chapter for a telecommunications course. Employing content analysis, the authors found that instructional scaffolding in the form of learning contracts helped establish a viable learning community which, in turn, enhanced interactions. Of particular salience to the proposed research is a finding that instructors needed to align their teaching paradigms to place more responsibility for learning in general and for interactions in particular on the students. This paradigm shift was, in effect, written into the learning contracts.

Rovai and Jordan (2004) found in their study of graduate education classes that blended classes can develop a greater sense of community and belonging. However, the design of blended provides a necessary but not sufficient condition for change. They believe instructors tend to teach as they have in the past, but blended establishes the opportunity to change learning formats to higher levels of engagement. They conclude that the experience and willingness of the instructor are critical and even pivotal factors.

Liao (2006) reported a significant singular impact of interaction on learning by applying flow theory. Flow refers to the hypothetical state when external factors
combine to facilitate intrinsic motivation in learners. When flow is achieved, learners take responsibility for their learning and discovery becomes self-motivating. Factor analysis of some 271 students in Taiwan suggested that interactivity had the greatest single effect in establishing conditions to create flow in distance education. Simply put, effective interaction resulted in perpetual learning.

Hannon et al. (2002) applied student feedback from online courses to two instructional models, Gagne’ and Laurillard. The authors compare and contrast the events of instructions of both theorists. Gagne’s Nine Events of Instruction, they believe, rely in large part on alignment between learning activities and assessment. Laurillard’s Conversational Framework, on the other hand, they view as more focused on changing the very nature of student thinking or deep learning. Reviewing the end of course evaluations of students in online public health courses, the authors note that students tended to want more frequent and more intentional interaction with the instructor especially in the form of regular feedback and involvement in discussions. They note that instructors in the study varied significantly in their approach to interaction. However, they conclude students expect on-going engagement.

**Importance of Instructor’s Approach**

The individual instructor and his/her approach would be a significant variable in any research involving student-instructor interaction. Often, especially in quantitative analyses, that information is not available. Jansen and Lewis (1996) view interaction as “perhaps the single most important factor to be monitored” (p. 8). They propose three
distinct approaches individual instructors may take to interaction. At the one extreme, some instructors may simply allow interaction as an add-on, optional activity. Others may encourage interaction by reinforcing same. The third category requires interaction either via scoring and monitoring or the nature of the activity (e.g., collaborative problem-solving).

Chang (2003) studied facilitation requests by online students. Students could post requests for assistance in any of three online areas. Facilitation needs varied by student background with experienced students making virtually all of the requests. Of the five categories of requests, none were related to course content per se but were focused on course maintenance including grading and assignment clarification.

One correlational study (Harris & Grandgenett, 1996) found that teachers who perceived themselves social constructivists (i.e., as opposed to logical positivists, objectivists or instructivists) also saw themselves as favoring more student-centered approaches and being more innovative. One could hypothesize that these teachers, too, might place more value and emphasis on interaction both between themselves and students and between students.

**Instructor Individualization**

Continuing with the focus of the current study that there is research value in investigating interactions across blend categories, it is implicit that instructor-designers will have a variety of approaches based on their backgrounds and educational philosophy. Northrup (2001) contends that effective interaction must be purposely designed by the
instructor. Her five interaction attributes include content, collaboration, conversation, intrapersonal interaction (or meta-cognition) and performance support. Northrup further believes, “When given a choice, instructors many times will select [and design] instructional methods and techniques that are consistent with their theoretical and philosophical views” (p. 32). The choice of interaction methods would necessarily vary based on whether instructor-centered or student-centered approaches were adopted. In any event, though, building in interaction involving both content and social is critical.

Hedberg and Sims (2001) underscore the importance of the varying views on the role of the learner depending on the instructor’s implementation (i.e., instructivist v. constructivist) style. The interaction with the designer’s style provides an opportunity to enhance design processes. There is a potential for three-way interaction between the designer, the instructor and the learner. If the encounters are managed properly the results can be synergistic. Otherwise, underlying philosophy may tend to win out with instructivist tools used in constructivist ways. The interactions within blended environments become more critical as the instructor’s design role is likely enhanced (over completely online formats).

Rhode (2008) studied the forms interaction took with students in one of his self-paced courses. He was interested in which forms of interaction adult learners value and engage in the most and what impact these interactions have. The course included a variety of educational social software (i.e., Web 2.0 collaborative) that allowed the researcher to study both formal and informal interaction. The study concluded that learners felt the value of different forms of interaction varied with individual needs.
Informal interactions, though, were ranked as important as formal interactions in the students’ assessment of their online experience.

The Rhode Interaction Matrix (RIM) was developed as an organizing device integrating and synthesizing the research literature on interaction and results from the current study. It’s core elements include content, learner, instructor, network and the collective. The collective and the network Rhode views as catalysts facilitating and enhancing interactions. The network involves the dynamic, ever-changing connections. The collective is the organic synergy generated by the contributions of the many to the whole.

Rhode developed a graphical representation of a series of embedded equilateral triangles with informal and formal interaction making up two of the sides. Formal interactions include learner-learner, instructor-content, content-content, instructor-learner, and learner-content. Informal interactions are interactions occurring outside the formal learning space and, similarly, include learner-learner, instructor-content, content-content, instructor-learner and learner-content. Added to the informal mix are learner-network and learner-collective.

**Interaction Pairings**

Many studies have investigated interactions through dyadic pairings (e.g., learner-learner, learner-instructor and learner-content). It is important to review these findings as a basis for what is known and to set the stage for the current research.
Several empirically based studies focus on specific interaction pairings such as learner-learner or instructor-learner. Virtually without exception they acknowledge some larger, overarching framework such as proposed by Moore (1989) and enhanced by Hillman et al. (1994). Research on specific interaction pairings furthers our depth of understanding. Such specificity helps bridge the gap between research and practice.

Elicker, O’Malley and Williams (2008) focused on learner-instructor interaction. They studied some 250 students in multiple sections of a psychology course that employed optional, web-enhanced materials. Half the sections had a standalone web site and the other sections employed a Learning Management System (LMS). According to the authors, the two options were identical in content where the LMS sections included internal e-mail and self-contained discussion boards. Controlling for co-variates such as attendance and past web experience, found that students in the LMS sections accessed the supplemental site more, had more positive learning outcomes and were more satisfied with the overall learning experience. Disaggregating the data, though, they discovered that while e-mail to the instructor was used more frequently, the optional discussion boards were not used by a majority of students. Therefore, they conclude that a powerful instructor-learner interaction was a play. They hypothesize that ease of use enabled more interaction between instructor and learner. Learner-learner interaction, on the other hand, which primarily would occur in the discussion area, was not a powerful, discriminating factor.

Gerber, Scott, Clements and Sarama (2005) studied the impact of instructor engagement on student discussions (i.e., instructor-learner). They examined posts from
25 students across 4 modules for referenced and reasoned responses. Responses are said to be referenced when the student includes a reference. Reasoned responses are somewhat more subjective and “put forth a thoughtful or reflective statement or argument” (p. 30). Ranking of reasoned responses is tied to rubrics. Instructors purposefully varied their participation in discussions by changing their stance and the level of the topic. Topic level is tied to Bloom’s taxonomy with lower level topics based on content and concepts and upper level topics requiring analysis and synthesis. Stances can be either challenging or not. A reflective response would not be challenging where a directive for further exposition of thought would be.

The results were somewhat mixed. Lower order postings generally were more reasoned. Challenging stances resulted in more reasoned responses but only with lower order postings. The researchers recommended further research and caution against employing only lower order topics. From their analysis they conclude that the instructors’ challenges may have been too abstract for the higher order topics and that more supportive scaffolding would be required.

An alternative hypothesis might involve the expectation of the students versus the instructor-researchers. For example, if students come to a course with a background in instructivist, directed methods then they might be expecting to simply respond with the “right” answer. If, as is the case with the course studied, the instructor expectation is based on a constructivist philosophy in which students would create their own knowledge, then there would be a potential expectations gap. Thus, student when
challenged could more readily handle lower order questions. Effective scaffolding would require a conceptual bridge clarifying instructor expectations.

McFarlin (2008) highlighted learner-content interaction. He studied over 600 students in a blended undergraduate exercise physiology course. They report the course was developed as a result of feedback from students in face-to-face courses requesting better use of technology to enable content review. The blended course appears particularly well-designed with thoughtful consideration to go beyond simply placing assets “up on the Web.” Thus, PowerPoint lectures from face-to-face were storyboarding, scripts written and audio tracks developed. They estimate that 20 hours was spent per lecture for this task.

Students in the blended sections outperformed students in face-to-face sections by a factor of one grade level. There are potential issues with the research design including that students were not randomly assigned to sections and scoring between sections were not consistent. The authors conclude from an analysis of student feedback that the significant factor at play was the extended engagement and interaction of students with course content. Given that engagement and interaction was the initial expressed need, such a conclusion appears warranted. However, one could argue that without the intentional instructional design of the blended modules that interaction would not have been as significant.
Models for Instructional Design

Traditional linear models of instructional design (ID) (Dick, 1997; Smith & Ragan, 2005) were instrumental and effective in the development of much media for distance education including instructional videos (e.g., Telecourses), laser disks (and later CD-ROMS) and early development of online courses (Simonson, Smaldino, Albright, & Zvacek, 2006).

Sims and Jones (2003) highlighted the need for better ID models as more constructivist, learner-centered educational philosophies grew in popularity and acceptance. Their Three-Phase Development Model (3PD) originally spoke to the changing, even merging, roles of instructors, designers and subject matter experts (SMEs). More recent iterations have evolved to include emergent theory as a basis for the framework (Irlbeck et al., 2006). With online learning, the roles of instructors, designers and learners are all becoming merged as top-down, linear design models no longer fit the bottom-up synergy hoped to be created by divergent, constructivist strategies (Sims, 2006).

Convergence of roles is likely even more pronounced in blended learning situations. Instructors often work directly or indirectly with instructional designers for online formats. However, with face-to-face classes, instructors typically work in relative isolation relying on their own training, experience and knowledge of curricula.

Further, blended provides a potentially richer forum to apply new models such as 3PD as, it could be hypothesized, instructor-designers have more flexibility to develop initial prototypes (as it were), test them, and revise them. “It is therefore critical that we
examine current technology, theory, and practice to better understand online distance education and why learners, as well as teachers, need to accept and adopt new and/or alternative strategies in order to interact effectively with peers and the content.” (Sims, 2006, p. 136). With blended learning, that need is even more salient.

So how does the instructor-designer facilitate effective interactions in blended learning? According to emergence principles, relatively random and varied learning behaviors would interact with selected instructor-designer strategies (Irlbeck, et al., 2006). Each iteration of the course would evolve, or emerge, as a result of intentional reflection. Such reflection could be as simple as determining when to employ online v. face-to-face for any particular interaction.

At the extreme, one could conclude that there are as many emerging models as there are instructor-designers. As each undertakes an intentional ground-up process decisions would be made involving such broadly ranging factors as educational philosophy and recent results. Within these many models, one could further envision models of models or prototypical models that could help inform others.

Hummel (2006) describes a fairly detailed six phase feedback model (6P/FB). His six phases include function definition, determination of course of action, consideration of aspect varieties, application of principles and guidelines, form and organization decisions, and final questioning. Expert analysis of this comprehensive approach, though, found the model to be too complicated in its current form. However, he does underscore the importance of the multiple approaches instructor-designers could take to interaction. Indeed, intentional engagement does not occur in isolation but must
be planned. As such 6P/FB provides a stimulus to consider expanding both the depth and breadth of planning for interaction.

Encounter Theory (Sims, 1999; Sims & Hedberg, 2008) provides a framework to support implementation of what would be seen as constructivist principles in online and blended environments. It represents a bridge, of sorts, from classroom based metaphors. As Sims and Hedberg (2008) propose, “Quite frequently we find that the implementation of online learning programmes is predicated on existing mode of face-to-face classroom interactions” (p. 26). One could argue that the pull to maintain such traditional models would be all the stronger in blended learning situations as the instructor continues to affirm pre-existing paradigms from the face-to-face classroom. Online components (e.g., discussion, drop boxes, chat, etc.) should not dictate the structure of the class, but the mechanics rather should enable a series of developing encounters. Interactive encounters, for example, start with Welcoming which establishes both learner-instructor and learner-learner connections. Directing encounters can be used to encourage students through structure to expand their own learning paradigms and to play a more active, engaging, contributive role. Strategic encounters can expand the learner role to initiate their own learning imperatives and, quite literally, take the course in new and unplanned directions. Ethical framing encounters provide a structure to keep the learning track. Ideally, the encounters move to personal narratives. At that stage a true dynamic learning community is at work and effectiveness of all interactions is maximized.

The application of both encounter theory and emergent theory (Irlbeck, et al., 2006; Sims & Hedberg, 2008) could be extended to encapsulate a second level of
encounters. Consider the instructor-designer in blended learning who is intentional in the application and analysis of the series of encounters within a course. Through each cycle, the individual encounters are reviewed and adjustments made. The collective changes to all these encounters, in turn, impact the developing model the individual instructor-designer has regarding blended learning situations.

The most contemporary evolution of the Sims work is the Proactive Design for Learning model (PD4L). Sims (2009) proposes PD4L as a model for effective online teaching and learning environments. He presents six informing factors representing a compilation of ongoing instructional design theory: (a) theory-based, (b) innovative, (c) team-based, (d) emergent, (e) interactive, and (f) personalized. The six informing factors central to the PD4L model define the degree to which the design for effective online instructions is theory-based, innovative and relevant, team-based, emergent, interactive, and personalized.

The problem this study investigates is the factors that identify effective interaction strategies across transformative, enhancing and enabling learning blends. These factors are impacted by the models employed by the instructor-designer and, as such, are important to the investigation.

Summary

This literature review established the importance of determining a focus or framework for the investigation of interactions. Much has been learned about interactions from the early work clarifying interaction versus interactivity. Emerging ID

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models are accommodating interactions within blended learning in new ways. Still, a gap exists if we do not study with focused intent the underlying objective of individual instructor-designers’ implementations coming from a variety of perspectives. What is the effect on interactions if the terminal objective is instructional transformation versus productivity versus convenience? The blend categories model (Graham & Robison, 2007) highlights potential differences in design and implementation of interactions by instructor-designers and set the stage for investigation of perception of said interactions by the student affected. Blended learning environments propose a particularly rich laboratory environment for such investigation.
CHAPTER 3. METHODOLOGY

The problem investigated in this study was how instructor-designers in differing blend categories (Graham & Robison, 2007) approach interaction and what is the satisfaction and perception of the students with these approaches. Interaction is important for learning; but how do instructor-designers implement interactions based on the category of blend employed and how do students perceive these efforts? In short, how are instructor-designers approaching interactions and how effective are these approaches? The answer to these questions was the subject of the current investigation and should help instructor-designers enhance engagement via interaction.

The specific Research Questions for the current study were

1. How are experienced instructor-designers utilizing interactions for engagement across blend categories?

2. How effective is the implementation of these interactions across transformational blends in terms of
   a. Student expectations and perceptions of interactions
   b. Student satisfaction with interactions

3. What is the relationship between instructor-designer approaches to interaction in blended learning and student satisfaction and perceptions?
Research Design

This study examined representative cases from three different blend preference categories (i.e., transforming, enhancing, enabling). The specific focus was on how interactions are handled by the instructor-designers compared to the expectations and perceptions of the students taking the courses. Surveys were used to determine expectations and perceptions of students.

Data Generation Process

Chronologically, the research design was in three phases (a) case study selection, (b) case study of instructor-designer, and (c) exploratory study of impacted students. Each phase will be explained as to its purpose and method.

Phase 1: Case Study Selection

Selection of exemplar cases for each of the blend categories was pivotal to the success of the study. While studying novice approaches to interactions in blended learning would have its own significant potential for contribution, the focus of the current study was with more experienced instructor-designers. The value of this approach originates from the 3PD model (Sims, 2003), which describes multiple iterations toward effective design and later work that added emergence theory as an overlay:

The model is therefore one which enables emergent instructional design within the modus operandi of the organizational context, staggering the creation of online materials over a number of delivery cycles and collaborating with the academic and learners and other team members, where feasible, during actual course delivery. (Irlbeck, 2005, p. 179)
Instructor-designers who have experienced multiple iterations of design and development cycles and who have made concomitant adjustments would provide a richer potential pool for investigation. For purposes of the current investigation, only instructor-designers who have taught in blended learning situations at least three times were included.

The potential pool came from peer reviewers certified by a national association and from public community colleges. The peer reviewers are instructor-designers trained and experienced in the application of a set of standards based upon research and best practices. To be certified these peer reviewers must have taught online. Instructors in schools implementing the national standards programs and members other community colleges who were recommended by instructional designers were contacted via e-mail and invited to participate in an online survey. Current fellow graduate students and professional instructional designers provided additional contact information in what resulted in a snowball process. The online survey consisted of two sections: the first helped determine which blend preference category grouping best describes the instructor’s orientation. Proponents of transformational blends highlight the ability of blended learning to change instruction. Enhancing and enabling instructor-designers favor productivity and convenience respectively. Respondents were asked to rank the benefits of blended learning design based on this list: (a) provides the opportunity to change instruction, (b) enables increased productivity, (c) or establishes more convenience for students and instructor. Respondents provided an example for each. The second part assessed the quantity and quality of interactions attempted (e.g., student-
student, student-instructor, student-content) and associated strategies. Respondents were asked to describe specific strategies they designed for interactions and what outcomes were expected.

Questions on the online survey covered demographics including years of teaching experience, number of courses taught in a blended format, and relative amount of face-to-face versus online in their blended class. Two open-ended questions were used to help ascertain the degree to which Shea (2007) calls grounded models: “Describe your approach to enhancing interactions in blended learning situations?” and “How do you decide what activities to employ in face-to-face v. online settings?”

Case Selection

Cases for study were selected from survey participants. One case was selected as representative of each of Graham and Robison’s (2007) blend categories namely transforming, enhancing and enabling blends. To reiterate, transforming blends are large in scope with improved pedagogy as a key purpose. Their intent is to change or even to disrupt existing instructional methods. Enhancing blends may propose to improve learning but largely aim to increase productivity of the learner and/or instructor. Enabling blends’ main purpose is to increase access and convenience. Cases were selected based on three criteria (a) clarity of blend category preference, (b) focus and emphasis on online elements, and (c) availability.

Phase 2: Case Study (Instructor-Designers)

Case studies group into single- and multiple-case designs (Yin, 2003). According to Yin, single case studies typically involve testing a well-developed theory, capturing
unique or typical cases, reviewing new phenomenon, or studying a subject longitudinally over time. One of the Research Questions asks about the transformational impact of blended learning situations on instructor-designers. Cases were selected that would be representative of the three blend categories (Graham & Robison, 2007) (i.e., transformative, emerging, enabling). Therefore, a multiple case study was suggested.

Cases were selected from among post-secondary instructors who responded to an online survey. The goal in selection was to find cases that were most representative of the blend category preferences as described by Graham and Robison. As part of the data collection process, blend preference was validated by highlighting prevalent themes from interviews and surveys and by confirmation by the informant.

A case study protocol was developed for the three cases (Appendix A). A case study protocol is a series of questions directed to the researcher to help structure the focus of the interviews. Initially, one hour interviews were conducted by phone. Interviews were recorded and transcribed. Additionally, specific strategies to impact interactions were determined from each case. Tailored questions specific to each case were used for the student phase of the research. A follow up interview to clarify and to validate findings was conducted in each case.

**Phase 3: Student Expectations and Satisfaction**

Students from classes associated with the instructor-designer case studies were invited via e-mail to participate in an online survey. The survey was in three sections. The first two sections were the same for all students. The first section utilized the Student Satisfaction Survey (Strachota, 2006). This tool measures the interaction factors
of interest namely, learner-content, learner-instructor, learner-learner, learner-technology and a general satisfaction category. The Student Satisfaction Survey appears reliable and valid. Strachota reports a Cronbach alpha reliability coefficient of about .90. Alphas of .70 and above are considered reliable (Creswell, 2005). Additionally, the device was reviewed by experts to establish that the test measures what it purports to measure.

The second part asked two questions based on Sims (2003). Designed to elicit response regarding expectations of interaction in blended classes in general the questions are

1. What do you see as the major benefits of interactivity to the learning process?
2. What do you see as the major characteristics of interactivity? (Sims, 2003, p. 90)

The third part was individualized for each case. Questions for this part were specific to the activities for interaction built in to the design and the reaction of students to same. The purpose was to compare the intent of the instructor-designers with the result.

**Data Analysis Procedures**

All interviews with instructor-designers were recorded using a digital recording device and transcribed. Case study analysis is in large part a search for common themes (Creswell, 2005; Lewins & Silver, 2007). Toward that end, ATLAS.ti, a Computer Assisted Qualitative Data Analysis Software (CASQDAS) was employed to help
organize the data and to assist in the development and organization of themes. Inductive analysis over multiple iterations of theme analyses yielded cross case comparisons. As part of the inductive analysis, logic modeling, a process adapted from the field of program evaluation, was employed.

The Kellogg Foundation (2004) states that logic modeling links resources, activities, outcomes, outputs, and impacts via a series of if-then formulations. Logic modeling was an effective organizing device for the data from the case studies. Designed to facilitate program change, the logic model is also an effective vehicle to describe the decision-making processes employed by informants. Logic models are comprised of two dimensions: key activities and logic of activities (or performance spectrum) (Reed & Jordon, 2007). Typical representations are akin to simple flowcharts detailing activities and their logical connections.

Although designed for program evaluation, logic modeling provided an excellent mechanism to capture the models used by instructor-designers in blended learning situations. “The logic model provides the hypothesis of how the program is supposed to work to achieve intended results” (McLaughlin & Jordan, 1999, p. 71). Inserting the words “interactions are” for “program,” one can draw out the emerging models of the instructor-designers. “The logic model can be a useful tool for identifying processes and components that lead to desired outcomes” (Torghele et al., 2007, p. 478).

Logic models tend to be most effective where the program outcomes are not clearly defined or where there are not easily quantifiable deliverables. Recently Dede (2008) has applied logic models to questions of sustainability of innovation. Thus, if a
project were to infuse an innovation into a new setting, evaluators would develop logic models to elucidate the process and the results. Logic model representations are sometimes narratives but typically are graphical or tabular representations showing the interplay of factors that connect outcome, intervening variables, contributing factors, and strategies. The categories vary depending on the application. The overarching purpose of the tool is “to determine what activities are both necessary and sufficient to achieve outcomes” (Compassion Capital Fund, 2011).

The logic models developed for this study show the corresponding relationships between philosophy, strategies and activities (Shea, 2007). Data from the initial instructor surveys, the instructor-designer interviews, and the student survey was constantly reviewed to the degree it informed the relationship between philosophy, strategies and activities. Initial logic development tables were established. The results were shared with the instructor-designers in follow up interviews to validate that these tables did, indeed, represent their design processes. Changes were made as needed based on the instructor-designer feedback.

In summary, while typically used for program evaluation, logic models also provide a clear way to capture and to communicate the emerging models of individuals. Further, they provide a framework to draw out what considerations individual instructor-designers employ, what they consider important, and why.
Ethical Considerations

This study was approved by the University’s Institutional Review Board (IRB). Every consideration was given to protect the identities of participants. For example, their institutional affiliation is never mentioned and they are referred to by aliases throughout this document. All participation was strictly voluntary. Electronic surveys were submitted via secured socket layer (SSL) and no identifying information was required. Data was backed up every night to a secured, commercial storage facility. No individuals from the college where the researcher was employed were involved in this research.

The next chapter presents the results from the current study highlighting the findings from each of the three cases. The logic development model for each case is described. Processes employed in the data collection phase are explained.
CHAPTER 4. DATA COLLECTION AND ANALYSIS

The primary purpose of this study was to examine the way instructor-designers approach interactions in blended learning environments, employing the blend framework developed by Graham and Robison (2007). The blend framework purports that instructors infuse technology with a main purpose of transforming instruction, increasing productivity, or increasing convenience for students and instructors. These three approaches are labeled transforming, enhancing, and enabling, respectively.

This study examined how interactions are employed in each blend category. The study further examined how effective these approaches to interactions are from the perspective of the students in terms of satisfaction and expectations. The rationale for the current study was that studying interactions through the portal of the blend framework would help inform instructor-designers who want to make effective use of interactions for their individual purposes.

The Research Questions addressed by this study are

1. How are experienced instructor-designers utilizing interactions across blend categories?

2. How effective are these efforts at implementing interactions?
   a. What are the student expectations and perceptions of interactions?
   b. How satisfied are the students with the interactions?
3. What is the relationship between instructor-designer approaches to interaction in blended learning and student satisfaction and perceptions?

A multiple case study method was used. One case was examined for each of the three blend categories. Cases were selected from instructors from post-secondary institutions who taught in blended learning situations at least three times. Each instructor also created their own online and blended courses on at least one occasion. Instructors chose one recently taught class section as their case. Initial interviews followed a protocol (Appendix A). Follow up interviews were conducted as needed for clarification and validation. All interviews were transcribed and analyzed for themes. Students from each case completed an online survey designed to gauge their perceptions and expectations of interaction in general and with strategies used by the instructor in particular.

Chapter organization begins with an in-depth description of the participants. Analysis of the data is presented for each of the Research Questions in order. Data determining blend category placement are highlighted. Finally, comparisons and contrasts regarding interaction strategies are presented across the three blend categories.

Participants

Case Selection

Invitations to participate in the study were sent to over 500 registered peer reviewers associate with a national standards organization. Additional invitations were sent as a result of referrals from instructional designers and graduate students of
instructional design. Eighty-five individuals attempted the instructor survey (Appendix B). Of those 85, 62 completed the survey and, of those, 44 volunteered to participate in the case studies. All but one of the 44 had taught blended three or more times with 33 teaching in a blended format five or more times. Three judges with experience and/or education in instructional design ranked the surveys according to a scoring rubric (Appendix C). All three were colleagues of the researcher. The scoring rubric was an informal tool and was developed based on the descriptions of blend categories developed by Graham and Robison (2007). Inter-rater reliability of the instrument was examined using SPSS scale procedures which resulted in Cronbach Alpha values below .70 (generally in the area of .50). The inter-rater reliability of the instrument was thus not supported with this data set (Creswell, 2005). As such the results were not considered reliable by themselves for blend category determination. Follow up interviews with the three judges suggested that more training in the use of the rubric as well as confirmation of clarity of blend category definitions may have been helpful. Therefore, the rubric results by themselves were not considered to be of sufficient reliability to determine blend category.

Instead all the data was reviewed in its totality. First, the judges’ ratings were used to find situations in which two or three judges agreed on one category. Then the raw survey data was reviewed for respondents who ranked one category over the others as “very important.” Finally, open-ended comments were analyzed for phrasing suggesting loading on one category over the others. Preselection focused on cases that
would most inform the Research Questions. That is, cases which appeared to represent the category and were potentially thematically rich in content were selected.

In summary, considerations for selection were (a) clarity of blend category preference, (b) focus and emphasis on online elements and (c) availability. First, all responses and ratings were reviewed for cases which most strongly appeared to represent each of the blend categories. For example, good candidates for the enabling category were those who rated convenience, as very important while rating other categories lower and who presented examples on the survey using strategies to enhance convenience. Recall, the Graham and Robison (2007) definition of the enabling category emphasizes convenience over other factors. Next, selection of online versus on-campus (face-to-face) venues by the instructor for strategy implementation was considered. Thus, instructors who placed key activities online were preferred over one who relied more on the face-to-face meetings. This decision was driven by the focus of the current study which was on design and development of online components. A final critical determination for selection was availability of both the instructor and his or her students.

Initial e-mail invitations explaining the study and requesting participation were sent to 12 candidates who rated highest using this three-level classification. These 12 appeared to best meet the preferred requirements. Telephone conversations were conducted with instructors who responded positively to the researcher’s e-mailed invitations. Three cases were selected from instructors who employed a variety of strategies online and whose schools gave approval. Cases were selected after review of all the available information as the ones that were most representative of the three blend
categories and who were willing to participate. Description of the participants in the three cases follows.

**Case 1: Transforming Blend**

Dr. D is starting his 20th year as a biology instructor in a large community college in the Northeast. A self-described, “classic Ph.D.” he is on his second career having spent over 20 years as a researcher. He is quick to add, though, that he taught one way or another throughout his entire professional life. He was one of the early adopters for online at his school and a protagonist for blended formats. The class selected for the case analysis was his Human Anatomy and Physiology II course taught in the spring of 2010. The course was originally designed to support students in Health Information Management (HIMS) courses, but recently dental hygiene and physical education have embraced the course. Students in Allied Health are required to take two separate courses in both Anatomy and in Physiology. Dr. D describes this course as “not nearly as intense” as the higher level while covering the same systems but with less depth of content. As Dr. D reported, “I’ll make them learn 60 terms for bones instead of 112.”

**Case 1: Validation**

Transforming blends are large in scope with improved pedagogy as a key purpose and their nature is to move towards active learning. In effect they represent disruptive technologies. Overall, judges ranked surveys as best fitting “transforming blend” as less than 20% of the cases. The judges did not agree on scoring for this case with only one judge ranking the primary blend category as transforming. Recall, though, that the because of issues with the reliability of the device, the judges scoring could not be the
sole determinant of blend category. Dr. D ranked “Changing Instruction” as Very Important while ranking every other category as Somewhat Important. Further, he described his approach simply as, “I have students do virtual labs at home.” In the preliminary phone call for case consideration, Dr. D said that his ultimate goal is to have biology lab courses that are completely online. He saw blended formats as a way to approximate that goal while navigating a host of political issues among the faculty who believe there is no replacement for face-to-face labs. He disagrees with that presupposition. A senior member of the faculty, he used his committee memberships to set the stage for his ultimate goal to implement virtual labs in lieu of traditional, face-to-face labs. Class times that had been traditionally labeled “labs,” for example, he simply renamed in his syllabus as “meeting times.” His reported intentional strategy was to use virtual labs (which he described to the curriculum committee as “lab-type activities”) demonstrated a commitment to a significantly different pedagogical approach supporting “transforming” as Dr. D’s primary blend category.

Case 2: Enhancing Blend

Ms. M is an instructor in the Organizational Leadership program at a Midwest University. She has been an adjunct up until this fall when she accepted a full-time teaching position. Ms. M had an unusual adjunct assignment, however, as she was a key protagonist and developer for a program for degree completers.

Although the Organizational Leadership program is offered fully online, faculty felt a blended format would be preferred for this degree completer cohort. Their decision was based in part on their presupposition that these particular students would not be
comfortable with fully online technology and, as importantly, their belief that a sense of cohort would be developed more fully if there were face-to-face opportunities. In addition, the program was accelerated with students completing two courses in half a semester. The change to a blended schedule allowed students to complete a full load in one semester while not overloading them with multiple simultaneous courses. Ms. M felt that this change was critical in order not to “overburden” these students who had full-time jobs and were not used to rigorous academic pursuit. Further, program developers believed these non-traditional degree-completers would not be technologically ready in terms of skills, experience, or confidence level for completely online offerings.

The course selected for the case study, Personnel Management, is an initial course in the major area preparing students for advanced courses in human resources. Two sections were included. Both were accelerated formats. One section, though, met every other week while the other met every week but for less face-to-face time.

Case 2: Validation

Enhancing blends largely aim to increase productivity of the learner and/or instructor and may propose to improve learning. The judges had difficulty determining the optimal blend category for this case with voting split across blend categories. For example, Ms. M ranked every aspect of blended learning formats as Very Important. However, M’s open-ended responses highlighted multiple aspects of increasing productivity including multiple opportunities for quizzes with auto-scoring and posting resources for students to use. Most significant, though, was her statement regarding her rationale as to why she requires online discussions during the week. Ms. M said,
“Asynchronous discussion (discussion board) is used heavily to enhance/extend class discussions. Students can kick start discussions there that we extend in class. Sometimes use of a video and online discussion is begun online and extended in class.” Finally, in our pre-interview conversation, Ms. M mentioned that she had “been handed” a course that had requirements that precluded participation and, over time, she made changes which greatly enhanced overall productivity.

Case 3: Enabling Blend

Dr. J is an instructor in a business management program in the same community college as Dr. D. She has been teaching business management for over 32 years. She is an early adopter of online technology, teaching her first online course in 1998. The class for the case studied was Business Management: Theory and Practice, taught in the spring semester of 2010. This is an upper level capstone course for business majors who intend to transfer to a 4-year college. Although officially the course is designated as web-enhanced by the College, Dr. J teaches it as a blended course. Dr. J spoke to the added flexibility she has in web-enhanced classes as she can cancel a face-to-face session at any time if there is no need to meet; blended classes at her college, however, must meet on a set schedule. Further, all required aspects of her web-enhanced course are online including tests (which are open book), assignments (they are placed in a drop box), and lecture materials. Her actions fit the definition of a blended course although it is not officially listed as such.

Business management students have an option to take an alternative course, Management: Organizational Behavior, from a different instructor. This alternative
course is more clinically-based while Dr. J’s course is steeped in theory. This distinction appeared important to her as she stressed, “I'm more interested in the research and the current writings and keeping up with the academics in the field. She [the other instructor] tends to be more into alternative learning styles-- pop culture using ... and, by the way, there isn't a big age difference between us....” Dr. J clearly values the theoretical underpinnings of this course, Management: Theory and Practice, over the other.

Dr. J has taught this course in all formats including face-to-face, blended, online and, in this case, web-enhanced. She believes all three formats are equally effective.

**Case 3: Validation**

The main purpose of enabling blends is to increase access and convenience. On the initial instructor survey, Dr. J rated the question, “Blended learning can provide more convenience for students and for you the instructor: How important is this function to you?” as *Very Important*. She added, “Online submission of all quizzes and assignments means students can submit as many times as they wish until the deadline and work at their own pace. The grade book takes their best grade and manages the calculations and tracks all student activity, essentially archiving it all for me. Everything is in one place. No papers to handle.” The convenience question was the only one that Dr. J rated as *Very Important*. Further, all three judges ranked enabling as their first choice on Dr. J’s instructor survey.
Data Presentation

Research Question 1: How are experienced instructor-designers utilizing interactions across transformational blends?

The first Research Question sought to determine how experienced instructor-designers utilize interactions across blend categories. Telephone interviews were conducted with each of the instructor-designers following the interview protocol (Appendix A). All interviews were transcribed verbatim. ATLAS.ti6 ® software was used to assist with coding.

Inductive analysis was employed building on the line of questioning from the interviews and the initial coding. Initial coding occurred during transcription. In vivo coding employing verbatim wording was applied. Additional codes were attached that tied directly to the Research Questions such as “strategy” and “blend category.” Codes from instructional design theory and practice including “advance organizer,” “development,” and “implementation” were added. Multiple iterations across the three cases added additional richness. Word pictures were produced to review intensity of word use. There appeared to be little variance across cases.

Establishing logic models for each case was not an algorithmic process as each case appeared to present different drivers. Initial logic model development tables were built (Appendixes D, E, and F) as representations for the instructor-designer of their underlying design process. The results were shared in follow up interviews which were also transcribed and coded. The primary purpose of the follow up interviews was validation of the logic model development tables. These tables were modified as needed.
based on the input and feedback from the instructor-designers. Evidence from each of
the three cases is detailed and an analysis of similarities and differences is presented.

**Case 1: Transforming Blend**

Dr. D’s overarching strategic objective is to transform how anatomy and
physiology labs are taught. These labs have been taught for many years as on campus,
face-to-face activities. Virtual, online components, when used at all, were simply
supplemental. Dr. D indicated he intentionally chose to implement virtual labs as the
primary lab strategy. He used a commercial lab simulator which comes with every lab
manual. He began implementation of the lab simulator in his on campus (face-to-face
only) classes by writing standalone instruction sheets. He had students pilot the virtual
labs and would make changes to the instructions until students were able to perform the
labs with no further assistance.

He would analyze the learning objectives for each course and use virtual labs
where he determined they would best succeed. His analysis for his strategy development
was quite clear. Students in hands-on labs first have to master the use of the equipment;
such mastery involves mainly psychomotor tasks. However, the terminal course
objectives call for higher order conceptual thinking skills. Therefore, Dr. D surmised,
students in the virtual labs would spend less time learning non-critical tasks (e.g., running
the equipment) and more time interacting with the concepts and, ultimately,
demonstrating discovery experiences. As Dr. D explained:

You can get past learning to use the equipment and focus on the results [sounds
pleased]. Focus on, you know, what's really going on. You know, rather than
dissecting a frog muscle, and hanging it up in the saline solution ... and it works
most of the time, but not all of the time... hmm, you get a PICTURE of a frog
muscle... you get a picture of the equipment and you have to push the same buttons. You have to flush the same solution. But you can do it in less time... There's no learning curve in terms of how to run the equipment, really, and you can focus on how the muscle's going to behave under certain conditions. In effect, he used the online technology to produce more concentrated learning experiences. Such decisions were underlying themes during the interviews. He did not choose, however, to place all labs online as of his spring class. He tended to use physiology labs virtually while continuing to place anatomy labs during the face-to-face time. Physiology, to Dr. D, is largely conceptual while anatomy involves simple identification and labeling. Anatomy tasks are best carried out in three dimensions. Pictures online are currently two-dimensional requiring a second layer of interpretation. His strategic decision is the same in both cases; choose what results in the most concentrated learning experience with the most frequent and enhanced learner-content interactions.

Once the decision was made to design the weekly lab as virtual or in vivo, the rest of the class was structured around that choice. Dr. D prefers to use what he calls a “stable structure” so that it is predictable for students. Every module follows the same design template. Students cover one module each week. His blended online course is basically his online course. He employs the same components every week including: Module-at-a Glance, Study Ideas, Mini-Lecture, Assignment, Helpful Ideas, Materials, and Ask-A-Question. Module-at-a-Glance is the goals and learning objectives for the week. Dr. D says he started doing this when he first began developing for online under the guidance of an instructional designer. Study Ideas targets specific review questions— with implications for tests. Mini-Lectures are the materials from his on campus classes
tailed for online. He has quizzes each week designed so that Dr. D knows the students “opened the book.” All these activities lead to and surround the main activity for the week which is the lab assignment.

Dr. D employs significant structure to ensure the success of the lab assignments. For virtual labs, Dr. D reports he, “gave detailed instructions to use the software and that sort of thing and I also threw a discussion board to talk with each other over issues of using the software.” Then the lab assignments were “very structured” employing a series of questions designed to help student interact with and manipulate the data. Finally, during his face-to-face time each week Dr. D holds “directed discussions.” These are highly interactive times where he posits probing questions designed to stimulate deeper thinking. He reports these times are especially engaging since, by then, the students have worked with the concepts multiple times.

Dr. D describes his experiment in blended instructional design as going “incredibly well.” However, he is quick to point out that this was an exceptional class of students. His design of blended courses appears to lead to a deeper, more sophisticated thinking. He attributes this effect to what he calls “mind control.” The online activities during the week require students to continue to think about the labs until they can deduce a solution. As Dr. D summarized:

[Typically] you come to a lecture 2 hours a week. You’re there. You have to think about it for those 2 hours on those 2 days, but you may not do any active learning. If you take those same 2 hours, 2 different times a week and read in response to a question or look at the objectives and say, “Well, I’m going to focus on this objective today,” then you’re (the student) taking control and you’re doing active learning. And I really think that’s what makes the difference.
Case 2: Enhancing Blend

Ms. M redesigned a course developed by another instructor. The activities in the former course, she felt, were too abstract and too far removed from the primary objectives to provide sufficient opportunity for effective learning interactions. Her reported overarching objective is to increase the overall production of interactions especially by students with content and students with students.

As the instructor-designer for this course, Ms. M appeared focused on learner characteristics. She indicated that she designs strategies to meet students where they are. Throughout the interview she would spontaneously mention how learner characteristics drove design. Thus, in describing the strategic decision to “go blended” Ms. M said:

The motivation for the hybrid [blended] delivery was to support adult learners that didn’t feel that online was the way to go for them because we also offer our degree online… totally online.. so online wasn’t the way to go for them.. They needed face to face interaction and they preferred face to face learning. This first course presented some early design challenges based on learner characteristics. Ms. M described the original format of the course (which was handed off to her with little preparation time) as built around a series of critical, written, theoretical analyses. Students the first term had tremendous difficulty producing these assignments because they required too many skills the students had not mastered (e.g., research skills) and did not connect to their current mental models. Ms. M described the course at that time as requiring too much student-content interaction via reading. Extensive theoretical reading, Ms. M determined, was not effective at helping these students meet learning objectives.
For the next iteration of the course, Ms. M replaced the critical writing analyses with case studies. These case studies were designed to align with experiences students had such as employee performance evaluations. Ms. M very deliberately structured the case studies to provide sufficient scaffolding to increase interactions both with the content and between students. She is quite intentional about maintaining workable instructional clusters to avoid cognitive overload.

Students would work in small groups and each would take turns writing the summary report. Therefore, only one student from each group would be writing each week but all students would be more engaged and, ultimately, more productive. In a further effort to increase productivity, Ms. M requires participation each week in online discussions. Her zeal for online discussion leads to a unique approach. Ms. M does not participate in the discussion boards. Instead, she e-mails every student individually every week providing what amounts to meta-cognitive coaching tips. Ms. M recounted several examples:

Excellent job... A pleasure to read and or something... A nice job in both explaining and supporting your conclusions or, you know, that's a great statement but you need to take that a little deeper ... you don't want to just agree with people, but WHY do you agree? and what evidence have you seen of this working ... share that to help us take the conversation to another level. M’s specific strategy is to prevent students from simply attending classes but, instead, to engage the materials and each other throughout the week. That strategy leads to richer discussions both in and out of class and more overall productivity.

Decisions for which activities were placed in online versus face-to-face formats were unique to this case since they were based on the class schedules. Content would be “covered” following the course schedule. For one section that met every week there...
would be online and face-to-face components. For the section that met on alternate weeks, though, content would be online and face-to-face one week, but then be fully online the next week. Ms. M reports both formats worked equally well for her.

Ms. M does not simply make her online course available to her blended sections. Instead, she culls the material down to what she feels the students need. For her completely online classes she employs PowerPoint with notes. For her blended classes, though, she views the PowerPoint as simply review and reinforcement for the in class lectures and, so, does not include notes. One very much gets a sense that M’s emphasis is on providing sufficient structure to increase productivity via engagement.

M’s strategy with testing helps illuminate her underlying philosophy. She tests only because tests are required. However, she allows multiple attempts and all tests are online and are open book. Ms. M sees even multiple choice tests as opportunities to develop critical thinking. Ms. M expanded in some detail, saying,

I feel like, at least in my discipline, we’re teaching leadership … and things that related to leadership and leadership in organizations. But they need to know how to look up that answer if they don’t have it. They need to recognize that they don’t always have all the answers. That, to me is the sign of a good leader and to be able to find that information and then to recognize which information has value and which needs further research.

For the final project, Ms. M uses the face-to-face as an opportunity for students to present to the class. She encourages them to engage the class in some way and not to simply, as she put it, “Do death by PowerPoint.”

Case 3: Enabling Blend

Dr. J says she employs strategies that work equally well in online or face-to-face formats. To Dr. J, effective online strategies increase convenience for both students and
instructors. Her overarching strategy per her reporting is to find activities that work in face-to-face environments and transfer them to the online arena.

Dr. J converted what is listed as a web-enhanced course to a blended format specifically to emphasize online capabilities. An early adopter of online technology, her course is built around a series of cases which students analyze while working in groups. She has several cases which have worked for her over the years. Many of these cases employ videos as a stimulus. In the face-to-face classes she would have the students view the videos and then apply a specific management principle. Her emphasis is on analysis. With her online class, she simply transferred the videos to the online environment. She described her test for effective transference as, “and I do this [activity] online and I do it in the classroom and it works just fine in both ways.” All cases have a series of questions about applying the case and students appear to do equally well regardless of format.

The theme of convenience of transfer of existing activities recurred throughout our interviews. Class caps, per their negotiated agreement, are set at 40 for on campus, blended, and online underscoring the need for efficient processes. Perhaps most telling is her description of an activity that did transfer to online versus one that did not. She described in clear detail a case on interactional justice which she originally obtained from someone she respects at a management institute who is, “Wonderful at writing stuff like this.” The materials, she added, are structured in such a way as to force students to apply the underlying principles. Application of underlying principles appeared to be a litmus test for all activities.
This case, too, appears very representative of Dr. J’s approach to blended design. As she said, she “likes symmetry.” First, students have a required online quiz each week. This quiz is due the night before the class meets on the topic. It is designed to make sure students have completed the reading or, at least focused on the key points. Toward that end she allows multiple iterations. There is a mini-lecture online that overviews the theoretical concept—in this case, interactional justice. Then the videos are presented in class (although, as she indicates, it does not matter). Students are placed into groups and work through the exercise online during the week. She does allow some time as needed during face-to-face time to discuss progress on the cases. These are typically 10 minute slots.

In contrast, she deemed her Land on the Moon case project as less workable outside of a face-to-face environment. This “ancient exercise” is one Dr. J has used effectively for years. The case study is designed to apply decision making formulas such as majority rule versus consensus building. The group is stuck on one part of the moon and the task is to join up with others on the other side. They need to achieve a solution by way of consensus. Dr. J states, “Now THAT’s totally a classroom exercise and I can’t really do that one online because the whole thing is how do you teach… how do you analyze your group’s progress?” She added that her goal is to have the students “engaged with the material.” As she thought through her no-go decision, she had something of a breakthrough moment saying, “Oh, boy! I mean you could, now that I think about it. You could do it in a discussion board I guess.”
However, Dr. J basically eschews the use of online discussion boards. She has them available but they are largely designed for infrequent student-instructor interactions. The one exception in the case course is a requirement for students to post their completed and instructor-approved papers. Students are to make a “substantial suggestions” for improvement to the work of others. Aside from this highly structured activity, Dr. J does not require nor score online discussions.

As she explains, to employ discussion boards effectively requires a rubric and using discussion boards is “difficult for the students.” Students need to check back frequently and make value-added contributions. They “go nuts” because, as Dr. J adds, “then they're all wading through, you know, 25 things to see what they CAN'T say before they can come up with something they can say.” Upon further thought she suggested they could be done in small groups online. But, the implication is that the scoring issue would still exist. Online discussions, to J, simply are not efficient if done correctly. If they are not efficient, then they are not effective.

Her decision, in effect not to use Land on the Moon via online is that to get to the level of interaction she would like, too many additional steps would be involved. Such a strategy would be an inefficient method to achieve effective interactions and not an efficient route to attaining learner outcomes.

Often during the interviews, Dr. J would link convenience to learner characteristics and learner needs. During the course overview she volunteered:

The students are generally adults and by that I mean they are usually people who have left school. They are non-traditional age students. By that I mean they are not usually 19 to 22 years, or 18 to 22 years old. I do get some. There are probably a few in there that might be. But generally speaking, these are students
who are going to have families, they are more mature… they are working… frequently have quite a bit in the way of work hours as well. Throughout our conversations it was clear that convenience/efficiency and effectiveness are not mutually exclusive to J. In fact, the two, when applied strategically, complement each other.

**Data Analysis**

**Research Question 1**

The first Research Question addresses the similarities and differences between instructor-designers across blend categories regarding their approach to interactions. In all three cases, blend preference category impacted considerations for design of interactions. This impact exists early in the design process of the blended courses and remains a thread throughout. It is a gauge by which changes are made across multiple iterations. The transforming blend example is perhaps the most obvious. Here, the overarching goal is to demonstrate that lab objectives can be achieved online. Dr. D designs strategies which by their very nature transform instruction. First, the online components become the primary lab activities. Secondly, the emphasis shifts to more learner responsibility through discovery learning. To the extent that virtual labs were deemed as effective as their face-to-face counterparts, Dr. D will keep them as instructional units.

Ms. M noted that students were underperforming with the activities in the class she “inherited.” Seeking to increase production, she refocused the content from theory to clinical to better match what she saw as the learners’ mental models. To enhance the
quality of interactions of students with content, Ms. M minimizes activities that veer from the core objectives. Thus, rather than learn to read and write organizational theory, she has students focus on clinical experience. She believes discussions represent significant opportunities for student-student learning and extends considerable personal effort to insure these strategies are productive. Strategies that enhance production of interactions and that enhance learning are used again in future courses.

Case studies represent a significant portion of the learning activities in Dr. J’s course. She transfers case studies that were effective in face-to-face situations to online. Case studies that would not be convenient for students to accomplish as readily online are not used. Ultimately convenience is the measure by which strategies are implemented and maintained.

Irrespective of blend preference, all three place equal emphasis on students attaining learner outcomes. Decisions to maintain or to re-design a strategy are based on both learner outcomes and what might be described as underlying blend preference assumptions. Dr. D develops strategies that transform education and which, he believes, will enhance learner outcomes. Ms. M enhances learner outcomes by monitoring student production. Dr. J expects academic rigor from her capstone students while seeking convenience.

All three case instructor-designers shared similarities. All had some background in instructional design and had worked with instructional designers to develop online courses. All seemed strategically aligned with learner characteristics as all three brought up the topic spontaneously and referenced back to it often. All built their courses around
pivotal case studies or laboratory experiences. Finally, all were passionate about online and, given the choice, would infuse online components often to achieve effective interaction.

Blend preference does appear to impact approach to interactions. The key differences are summarized in Table 3. This cross case comparison was developed from analysis of the transcripts and validated by follow up interviews. Dr. D and Dr. J come from a more theoretical background while M’s preference is clinical experience. Only one intentionally modified their online course for use in blended situations. The others used the same course they have for online. Perhaps the most salient differences, though, are around the use of online discussion boards. Dr. D seemed disappointed that students were not using the online points. Student surveys confirmed the discussion boards were not effective. His students preferred to lose points versus post during the week. Ms. M, on the other hand, felt the boards were critical and spent extensive efforts to have students use them to interact. Students in her class appeared to respond in kind especially regarding student-student interactions. Dr. J simply does not require discussion boards as they are inefficient to deploy effectively.

Table 3: Cross Case Comparison

<table>
<thead>
<tr>
<th></th>
<th>Preferred blend</th>
<th>Theoretical perspective</th>
<th>Adapts online course</th>
<th>Discussion boards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1 [D]</td>
<td>Transforming</td>
<td>Theoretical</td>
<td>No</td>
<td>Ineffective</td>
</tr>
<tr>
<td>Case 2 [M]</td>
<td>Enhancing</td>
<td>Clinical</td>
<td>Yes</td>
<td>Critical</td>
</tr>
<tr>
<td>Case 3 [J]</td>
<td>Enabling</td>
<td>Theoretical</td>
<td>No</td>
<td>Inefficient</td>
</tr>
</tbody>
</table>
Summary Findings: Research Question 1

Experienced instructors in blended learning build into their course designs strategies for effective interaction. These interactions are designed ultimately to enhance learning outcomes. This outcome is true irrespective of blend preference category. However, blend preference category does appear to have a salient effect on the design for interaction. This impact is seen in initial design phases, in evaluative, iterative processes, and ultimately in determination of effectiveness.

Research Question 2

How effective are these interaction strategies? What are students’ expectations and perceptions and how satisfied are they with these strategies? As with the first Research Question, data are presented first case by case and then comparisons are drawn.

Case 1: transforming blend. Dr. D was interested in knowing how effective his approach to the labs was with his students. Additionally, he noticed that very few students used the required online discussion boards and wanted some insights. Two questions were embedded into the survey to shed light on these questions.

Eight students from the class attempted the survey. This was the highest response rate of the 3 cases. The majority of students shared the expectations of the instructor for the purpose of the virtual labs and all but one was satisfied with the interactions. Comments from students included:

I liked those labs because it cut down the time and allowed us to see the results of labs that we would not be able to complete in the lab time we had. Very nice supplement to just reading the textbook on my own or just reading the PowerPoint lectures. It was effective to have another form of learning. [R7.13]
The virtual labs were important. In addition to the discussions in class, the labs allowed us to see first-hand the cause and effect. [R7.7]
Yes, the virtual labs were important in learning the concepts … It did force you to read all the material and use any online materials available. [R7.6]
Clearly most students who responded both understand the designed intent of the interactions. The design intent includes both learning objectives (e.g., develop causal relationships) and process requirements (e.g. “forcing” student-content engagement during the week).

For the second question, students were asked why there was little participation in the online discussion during the week despite the fact that points were deducted if one did not post. It appears students did not see the purpose for this activity especially since Dr. D conducted “directed discussions” every week during the face-to-face time. Student comments included:

Activities [discussions] were not sufficiently engaging. [R10.11]
Many students would rather have their questions answered by the instructor face to face. It's more personal and you feel like you can really engage in a conversation. I rarely participated in the online discussions. [R7.7]
Even though Dr. D encouraged online communication it didn't happen that often unless required by him. We had one assignment where we did have to collaborate with fellow students and unless you had a proactive group most students found it frustrating because no one was sure who should start and even how to start. I was fortunate to be a part of a group who was very proactive and we finished our assignment on time and rec'd a very good grade. I think if Dr. D had appointed one person as the lead it might have helped the other groups. [R7.6]
It is noteworthy that when asked about the effectiveness of the discussion boards, two students reported that there were no discussion boards. The underlying issue appears to be that there was no strategic purpose to the discussion boards. In our interviews, Dr. D mentions online discussions almost as an afterthought saying, “[I] also threw a discussion board to talk with each other.” The lack of strategic intent was not lost on the students who opted not to participate even though it meant a reduction in points.

**Case 2: enhancing blend.** Ms. M was very interested in knowing if her
extensive attempts at scaffolding for discussion was working. Despite several reminder
e-mails, only 5 students attempted the survey and just 2 answered the embedded question.
However, both affirmed that the instructor-student interaction efforts were effective. As
summarized by one:

[M’s system was] very effective. There have been a few classes that I have taken
that didn't use discussion boards and it always made you second guess
assignments or class schedule and sometimes even grades! [R7.16]
On the Student Satisfaction Survey (Strachota, 2003), as Ms. M surmised,
students reported they either didn’t enjoy working with computers or did not find
working with computers easy. However, students also indicated that working with
computers (i.e., the online component), made them more productive, made learning more
interesting, made learning easier, and was a good aid to learning. This finding suggests
M’s many efforts at instructor-student interactions to make effective use of technology
despite students’ predilection to eschew technology were effective.

**Case 3: enabling blend.** Student input was extremely limited for this case.
Unfortunately, this was a small capstone class and most students graduated at the end of
the course. The only authorized contact method was via student e-mail which is not
forwarded. However, one student did complete the entire survey and those responses do
help inform.

The tailored question for this case was, “In this course, all required assignments
were online using ANGEL. As you think about your interactions in class with other
students, the assignments (or content) and the instructor, in what ways, if any, did that
format facilitate your learning?” To which the student responded:
Being a student that has been out of the classroom for many years, I found the online/classroom mix perfect. I liked being able to go to class and ask questions and get involved in classroom discussion and also having an opportunity to schedule time on the computer for quizzes and other learning tools. I feel at times too burnt out in the classroom to completely stay focused the entire time and also the setting for learning should be mixed between home and classroom, it forces you to get engaged with the subject material at home. [R10.6] Dr. J’s strategy of requiring all assignments and quizzes to be completed online is meeting her strategic intent and blend philosophy in at least this one exemplar. The course structure provides convenience for the student but also “forces” engagement throughout the week. Discussions which she holds solely in the face-to-face environment are considerably more informed as preparatory work (i.e., learner-content) is accomplished online before class sessions.

**Summary findings: research question 2.** Student survey responses indicate that in each case the underlying blend preference of the instructor influenced students’ perceptions of the interactions. For the most part, responses to interaction strategies resonate with the underlying intent of the course designer. All but one student in Dr. D’s course reported the transformative experiment to employ virtual labs as effective. They appear to appreciate Dr. D’s intent which was to enhance learning by utilizing technology in innovative ways. At the same time, the discussion boards, which by themselves were not transformative and which Dr. D did not appear to place much stock, were basically ignored by the students. In fact, two did not recall that online discussions existed.

M’s emphasis on increasing productivity via extensive scaffolding and support for participation, including weekly individualized attention, was also viewed by students as beneficial and helpful. Her students rated their technology experience the lowest of the three cases, but all agreed by the end of the course that computers made them more
productive. Dr. J, recall, required online components in her course. It is telling that the one student reported that these required components provided added flexibility and convenience which allowed additional focus on his/her learning.

Irrespective of blend, students appeared satisfied with the specific efforts at interaction and these strategies were seen as effective. In every case, the design was influenced by the blend preference. In every case, though, the strategic design for interactions was based on enhanced learning outcomes. And, by reports, these learning outcomes were attained. Table 4 summarizes these findings.

Table 4: Student Report of Effectiveness

<table>
<thead>
<tr>
<th>Case 1 Transforming</th>
<th>Driving Rationale</th>
<th>Strategy</th>
<th>Student reports of effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Significant, disruptive change in instruction</td>
<td>Virtual labs in lieu of face-to-face</td>
<td>Enhanced learning by creating more engagement with content</td>
</tr>
<tr>
<td>Case 2 Enhancing</td>
<td>Increase productivity</td>
<td>Engaging discussions</td>
<td>Enhanced learning by shaping on-going student-student discourse</td>
</tr>
<tr>
<td>Case 3 Enabling</td>
<td>Provide convenience for busy students</td>
<td>All required activities online and available 24/7</td>
<td>Enhanced learning by making things easier so learning could be the focus.</td>
</tr>
</tbody>
</table>

Research Question 3

The final Research Question involves analysis across blend categories, namely, What is the relationship between instructor-designer approaches to interaction in blended learning and student satisfaction and perceptions?

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Dr. D’s emphasis was on virtual labs with the expectation that students would spend more concentrated time in student-content interactions leading to higher order discovery learning. Ms. M carefully structured online activities to insure active and engaging online discussions during the week. In addition to these student-student interactions, she built relationships by frequent individualized instructor-student interactions. Dr. J placed all required activity in the online component and employed group case studies necessitating student-student interaction.

The student survey included two open-ended questions adapted from Sims (2003). Students were asked what they see as the major benefits and characteristics of interactivity. A recurring theme was interactivity in the online environment places more responsibility for and control of learning on the learner. The majority of students reported that both are effective and enhanced their learning. One student reported:

What I liked about this class was that I took more of a role and responsibility in my own learning by reading the text and PowerPoint lecture. Therefore, in class time was used to talk about major points that the professor wanted to make rather than being lectured at for a couple hours, and we could do labs to supplement what we were learning about in the text and demonstrate major concepts. The major characteristics of interactivity as related to this hybrid [blended] course to me include autonomously being prepared to participate in class activities by taking initiative to learn the material your own way, and then contributing to class/lab time by asking questions on what you don't understand by your own learning and enhancing what you did learn on your own by participating in the experiments or helping classmates. [R7.13]

The Student Satisfaction Survey (Strachota, 2003) measures satisfaction with all interaction dyads (e.g., learner-content, learner-instructor, learner-learner and learner-technology) in addition to satisfaction with the blended format in general. Results across cases on the Strachota were universally high. Students either agreed or strongly agreed that interactions are both satisfying and effective between 87% (learner-technology) and
100% (learner-instructor) of the time. However, overall satisfaction with blended formats was not as high. With questions asking students to compare blended formats with face-to-face 78% said they felt blended was as effective and would take another class in a blended format.

**Summary findings: research question 3**

There were no obvious differences in the report of students across blend categories. Students in all three cases report apparent satisfaction with instructor-designer efforts at enhancing interaction. Further, students in all cases seemed to reflect accurately the design and intent of activities in the courses engaging interaction.

**Summary Findings**

Activities and strategies for interaction in blended learning situations were examined for transforming, enhancing and enabling blends. Case selection included a survey of instructor-designers practiced in blended and online learning. Interviews with instructors from each case were conducted. Students from each case were surveyed regarding interactions in general and interaction strategies specific to their case.

Blend philosophy appears to have a significant influence on every stage of the instructor-designers’ development process. Design and implementation of online discussion boards appears to show the most differences in approach to interactions. Dr. J opts not to require online discussions as they are inconvenient to both students and instructors. Her design encourages more student-content interaction. Ms. M places considerable effort into structuring the online discussions in order to enhance overall productivity and learning outcomes. Her design drives more student-student interactions.
Dr. D concentrates his strategic efforts on virtual cases to transform instruction. The virtual labs, a pivotal component of the transformation, place emphasis on student-content. The required discussion boards appear to serve no purpose and are, in effect, ignored.

Blend philosophy impacts implementation of activities and how strategies are developed. Again, Dr. D’s choice of virtual labs (an activity) with careful development of standalone instructions to insure their success (a strategy) derives from his overarching interest in transforming how science labs are perceived.

Blend philosophy, too, influences which activities are conducted online versus face-to-face. Dr. D appears most adventurous placing science labs, historically conducted face-to-face, online. Ms. M carefully structures online time between classes to insure productivity. Dr. J places activities online that are most convenient for students.

All three instructor-designers are passionate about online learning. Unlike roughly half of the instructors in initial survey, all three showed a bias or predilection to develop strategies with the online portion v. simply moving activities back to the face to face class time. All three evidenced a depth and breadth of design for interaction in the online components. Students, in turn, appear to perceive these interactive activities as important and, by report, the strategies for interaction are effective. On the other hand, activities that do not enhance productive interactions such as Dr. D’s discussion boards are not effective.
Chapter 5 provides interpretation of these findings drawing, conclusions from the case studies. Recommendations for instructor-designers and for future research are suggested.
CHAPTER 5. RESULTS, CONCLUSIONS, AND RECOMMENDATIONS

The literature investigating the interactions in online learning environments is rich. Moore’s (1989) editorial framed much of the discussion around dyadic combinations of student, content, and instructor. Hillman, Willis, and Gunawardena (1994) added a fourth component, technology. Others investigated strategies for effective implementation of interactions (Durrington et al., 2006; Larson, 2002; Sims, 2003). Anderson’s (2002; 2003) equivalency theory proposed that the key issue for learning is the quality of interactions, irrespective of dyadic combinations.

Blended learning combines online and face-to-face elements. Models in current practice include a wide variety of combinations ranging from reduced class time per week to flexible scheduling of on campus, face-to-face meetings only as needed. Presently, the Next Generation Learning Project (Bill and Melinda Gates Foundation, 2010) has announced a request for proposals to study effective ways to employ blended learning to enhance learning outcomes in “disruptive ways.” At least one author (Young, 2002) has predicted that 80-90% of all college offerings will be in blended formats.

Graham and Robison (2007) proposed a framework for blended learning in part to validate the range of possibilities for implementation. Their three-part framework suggests instructors design blended classes to either transform instruction in new ways, to enhance existing pedagogy by increasing productivity, or to increase overall convenience for students and instructors.
The purpose of this study was to apply the Graham and Robison framework to the study of interactions. How are instructors who are designing blended courses utilizing interactions? How does their blend preference impact their approach to design and implementation of these interactive activities? Then, from the students’ viewpoint, how effective are these efforts and what are the students’ expectations and perceptions? Finally, what is the relationship between the instructor-designer approach and students’ perception?

This chapter provides interpretation of results from the current study including how these findings add to the current literature. Three cases representing each of the blend categories from the Graham and Robison framework were investigated. Data analysis in chapter 4 included instructor interviews and surveys of instructors and students. From that analysis, an initial framework based on logic modeling (McLaughlin & Jordan, 1999) is presented. This framework looks at the relationships between blend philosophies, strategies for interaction, design and implementation of online activities, and desired face-to-face outcomes. Potential for application of this framework to future research is discussed. Results from this study are compared to current pertinent literature. Finally, significance of this current work to the field of instructional design is posited.

Proposed Framework

Perhaps the most salient finding of the current study is the apparent impact blend preference had on design and implementation of strategies for implementation of
interactions. The instructor for the transformative case specifically chose activities (i.e., the virtual lab) that, when effectively implemented, could change the way laboratory instruction is viewed. The enhancing case remained focused on enhancing productivity from early design considerations to evaluative processes for iterative improvement. The enabling case never veered far from a focus on convenience.

In order to draw inferences to potentially generalize these findings, a framework based on logic modeling was developed. Logic modeling is a method generally employed for project evaluation, but can help visualize abstract relationships. The logic model for this study is derived from Shea (2007) who discusses the importance in blended formats of the relationship between philosophy, strategies, and activities. Here the logic model components become blend philosophy, strategy (or strategic purpose), online activities, and anticipated face-to-face outcomes. The logic model visualizing the design processes using this structure is presented for each of the three cases.

The proposed logic model follows a linear, chronological sequence. The model begins, as does the design process, with the instructor’s blend philosophy. That philosophy informs a specific strategy that leads to design and development of online components. Finally, there is some expectation that online interactions will have an impact on face-to-face learning opportunities.

One critical underlying assumption of this model is that the designing instructor has the latitude to choose which activities are presented online versus face-to-face. Recall, blended models combine online and face-to-face elements. A significant design decision for an instructor teaching in a blended format involves how best to take
advantage of the time available in on campus meetings versus time and effort spent online. How they approach that decision elucidates their design process. Discussions, for example, could be facilitated using online discussion boards or such boards could be eschewed and discussions placed in the face-to-face sessions. In all three cases studied, instructor-designers based decisions on their held beliefs regarding how best to enhance interaction. Their common goal was increased engagement.

Table 5 summarizes the nature of the relationships in the decision-making process for the three cases studied. The summary is a compilation of the logic blend development tables synthesized by the researcher. Blend philosophy clearly informs strategy. In each case the online activities are designed with one common purpose—to increase the concentration and frequency of interactions. In the case of transforming and enhancing the desired outcome is to enhance learning outcomes during face-to-face time. In the enabling case, with its emphasis on online promoting convenience, learning outcomes can be completely achieved without additional face-to-face activities.

<table>
<thead>
<tr>
<th>Table 5: Logic Model by Blend Category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mix Philosophy</strong></td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
</tr>
<tr>
<td>Applying online in unique ways</td>
</tr>
</tbody>
</table>
### Table 5: Logic Model by Blend Category (continued)

<table>
<thead>
<tr>
<th>Desired Face-to-Face Outcome</th>
<th>Transforming</th>
<th>Enhancing</th>
<th>Enabling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students make better use and synthesize material more fully in directed instruction (instructor-student)</td>
<td>Students better prepared to synthesize case studies in class (instructor-student and student-student)</td>
<td>Students may meet learning outcomes and class time becomes optional or for enrichment activities</td>
<td></td>
</tr>
</tbody>
</table>

### Application to Research Literature

This section seeks to present the current study in terms of validating pertinent research literature. Toward that end, it is important to note the special characteristics of the instructor-designers from the three cases. Recall surveys were sent only to currently registered peer reviewers from a national standards organization and others upon recommendation of instructional designer or graduate students of instructional design. This sample represents a population of online and blended experts who have considerable experience both designing online and blended courses, working with instructional design models (especially for online), and implementing design into practice. This section, then, matches expert practices with research-based conclusions from the literature.

Larson’s (2002) examination of the quality of learner-learner interactions indicated that even moderate coaching can have a significant positive impact. The findings of this study support that conclusion. Ms. M provided significant scaffolding and students engaged actively in online discussions. Dr. D provided no support except
completion points and students were dissatisfied with the online discussions and most avoided making any contributions.

Macdonald (2001) described intentional design for quality interactions leading to higher order thinking skills. Irrespective of blend preference, the drive to achieve synthesis and analysis was paramount in all three cases studied. There exists a clear connection between purposefully designing interactions and upper level thinking skills.

Several studies speak to the importance of models aligning with or adapting for the individual preferences of the instructor-designer. Hirumi’s (2002) three-level framework, with its focus on meta-cognition, is firmly based on connecting instructional strategies with instructors’ underlying theoretical preferences. Where Hirumi was referencing instructional theory such as behaviorism v. constructivism, blend preference can now be added. Northrup (2001) held that effective interactions must be strategically designed. Further, she posits instructor-designers will implement strategies consistent with their theoretical and philosophical views. The current study bears out Northrup’s theory adding blend philosophy as a key factor.

As reported, blend preference did not affect level of quality of interactions in the design and implementation of the three cases. Roblyer and Ekhami’s (2000) Rubric for Assessing Interactive Qualities provides some validation of this reported result. Their rubric assesses four elements of interaction, namely, social rapport-building, instructional design for learning, levels of interactivity of technology, and impact of interactive qualities. Social rapport at above average levels per the rubric requires the instructor to design activities specifically to increase social rapport. Instructional design at above
average levels requires students to work together in groups and to report out. All three cases irrespective of blend preference category would rate as above average on social rapport building and instructional design. The third category regarding range of technologies does not apply to the cases studied. This study did not collect data to be able to access the fourth category, impact. While blend preference clearly impacts the quality or flavor of design for interactions, effectiveness of interaction can be achieved irrespective of blend category.

**Implications for Instructional Design**

The focus of this study was on instructor-designers. That is, those instructors who, themselves, are involved in design processes. The instructor-designers in each of the three cases studied worked at some time with instructional designers. Instructional designers apply instructional design models.

Consider that one nexus between research and theory is the development and application of models. Design and development research is “a practical form of research that attempts to test theory and validate practice” (Tracey, 2009, p. 553). There is value both in applying current research findings to developing models as well as overlaying models on top of research findings. The former potentially validates or transforms the model. The latter provides conceptual understanding of underlying processes. Both potentially advance the field of study.

As noted in chapter 2, a recent instructional design model is Proactive Design for Learning (PD4L) developed by Sims (2009). The following section compares the finding
from the current study to PD4L in order to draw contemporary implications for instructional design.

**Comparison to PD4L Model**

Sims (2009) proposed Proactive Design for Learning (PD4L) as a model for effective online teaching and learning environments. He presents six informing factors representing a compilation of ongoing instructional design theory: (a) theory-based, (b) innovative, (c) team-based, (d) emergent, (e) interactive, and (f) personalized. The six informing factors central to the PD4L model define the degree to which the design for effective online instructions is theory-based, innovative and relevant, team-based, emergent, interactive, and personalized.

Case selection was among instructors who had experience in blended learning situations (i.e., having taught in that format three or more times) as well as a significant background in online design and implementation. Ultimately, cases were selected to the degree they helped inform the Research Questions which are all based in blend preference. The three cases do represent part of the current community of practice in design for blended learning. There should be value, then, in comparing these case studies to the benchmarks described by PD4L. Alignment and gap analysis between the cases and the PD4L model could help inform opportunities for positive change.

All three current cases were grounded in the instructor-designers’ blend preference in addition to their educational theories. The requirements for innovation and relevance appear to be met as proactive evaluation was influenced by blend preference, and clear metaphors were used (i.e., case studies and labs). No innovative assessment
was demonstrated in any of the cases, per se. Element delivery, however, was critically examined in determining what activities would occur online versus face-to-face.

There was some opportunity for personalization in all three cases. None of the cases were team-based. None appeared to employ any bottom-up, emergent methods. Design for interactions, though, was consistently present. Personalization was present only at the level of the class. That is, designs were modified based on learning characteristics. By PD4L definitions, then, that factor was not demonstrated.

Table 6 represents a scorecard, as it were, comparing the findings from the current study to the six PD4L informing factors.

Table 6: Findings Compared to PD4L

<table>
<thead>
<tr>
<th>PD4L factor</th>
<th>Current Findings</th>
<th>Performance Against Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory based</td>
<td>Focused on blend preference theory</td>
<td>Yes Consistent evidence of blend preference</td>
</tr>
<tr>
<td>Innovative and Relevant</td>
<td>Clear strategic intent</td>
<td>Yes for 4 of 5 components</td>
</tr>
<tr>
<td></td>
<td>Minimal content delivery</td>
<td>Assessments were fairly traditional</td>
</tr>
<tr>
<td></td>
<td>Clear interface</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assessment not particularly innovative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Excellent consideration of delivery elements</td>
<td></td>
</tr>
</tbody>
</table>
Table 6: Findings Compared to PD4L (continued)

<table>
<thead>
<tr>
<th>PD4L factor</th>
<th>Current Findings</th>
<th>Performance Against Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team-based</td>
<td>All worked in isolation</td>
<td>No</td>
</tr>
<tr>
<td>Emergent</td>
<td>Structured labs and cases that facilitated discovery learning</td>
<td>No</td>
</tr>
<tr>
<td>Interactive</td>
<td>Learners frequently engaged in higher order cognitive activity</td>
<td>Yes Decisions for online versus face-to-face activities were consistently based on enhancing quality of interactions.</td>
</tr>
<tr>
<td>Personalized</td>
<td>“Personalized” at course section level based on aggregate learner characteristics of that class</td>
<td>No</td>
</tr>
</tbody>
</table>

Since a primary filter for case selection in the current study was clarity of blend preference category, one should avoid assuming the three cases represent a random sample of general practice. However, all cases represent instructors who are particularly expert in both design and implementation of online and blended learning formats. Many of the informing factors for effective online teaching environments are either present or highly demonstrated. However, some significant gaps in practice exist. These gaps, without exception, would be narrowed or eliminated if, in addition to blend preference, constructivist philosophy was a clear part of the theory basis. None of the three cases studied appeared to demonstrate strong foundations in constructivism. The transforming blend was perhaps the most representative with its built-in discovery processes during the virtual labs. The basic course design structure, though, including other learning activities
and assessment suggest a more top-down, instructivist philosophy. Therefore, the gaps between the current research results and the PD4L model most likely are because of these underlying philosophical differences.

None of the three cases evidenced an on-going relationship with an instructional designer. One cannot extrapolate from this limited sample about the evolving nature of the instructor-designer and instructional designer relationship, of course. However, the instructional designers might consider employing intentional strategies to continue involvement with instructors of blended courses especially as these instructor-designers transition from fully online design, development and implementation. Only through an on-going relationship would the opportunity exist to impact designs to more fully align with the PD4L informing factors. This study suggests further implications for the evolving field of instructional design.

**Changing Role of Instructional Designers**

Courses presented in blended formats present interesting challenges and opportunities for instructional designers. Consider the current study where all three instructors had worked closely with either an instructional designer or an instructional design team when they developed these courses initially for online. None of the instructors, though, consulted an instructional designer when the courses were re-purposed, as it were, to a blended format. They developed their blended designs on their own using their own evolving design models. All continued to be influenced by the original designers and one even stated so directly. It is as if they did not feel the need for any additional assistance and, in fact, they may not. These three cases likely are
representative of what several authors have reported vis-à-vis the changing, merging, and even emerging roles of instructors and instructional designers (Irlbeck et al., 2006; Sims, 2006; Sims & Jones, 2003; Sims & Stork, 2007). For purposes of this study, for example, the term instructor-designer was chosen. This compound word loosely captures the combined roles of the instructor designing for blended learning. None of the aforementioned researchers, though, proffer that instructional designers should be disengaged from on-going iterative design processes. Instead, an on-going synergistic relationship between instructors and instructional designers is needed for the field to continue to advance.

An informative survey question would have been to have asked the 500+ instructors surveyed if they continued to seek the assistance of instructional designers and why or why not. For those that do not seek on-going technical assistance or consultation, it would be good to know how much fidelity of implementation existed from the initial instructional design training and consultation. Finally, diversion from original training, one might hypothesize, could be desirable. To the degree that each instructor-designer develops their own mental model for interaction, then one would expect as many models as there are instructor-designers. On the other hand, simply placing distance between the instructional designer and the instructor would not by itself bring benefit. Consider the case of Dr. J. One wonders if, with additional instructional design support, she might seek to develop alternative activities meeting the same learning objectives versus choosing existing activities that work in online formats.
Power’s (2008) posits via his congruency principle that course design is both most effective and most efficient when planning, teaching and evaluation align with the instructor’s philosophy. He further states that course design is accelerated when the instructional designer aligns with the instructor’s continuity of thought. The current study suggests that instructional designers working with instructors developing blended formats have what could be described as empathy for blended philosophy. Attaining and demonstrating this empathy might not come easily when there is a considerable difference in underlying, intrinsic values. Thus, a designer who embraces transformative blends might not accept and support an instructor whose primary blend preference value was convenience. Both the instructional designer and the instructor-designer share a common footing towards advancing learner outcomes.

**Future Research**

Qualitative studies often provide the basis for theory development (Creswell, 2005). Theories can be validated by further study. The current study found very persistent influence of blend preference across all aspects of design and development processes. Blend preference, too, was a key consideration of the iterative evaluation process. Students in all cases reported understanding the underlying intent designed into the interactions by the instructor-designer and, almost without exception, reported they felt the design was effective. The current study suggests that blend preference does not impede learning outcomes. That is, if there is a mismatch between students’ expectations and the instructor-designers’ plan for interactions, that disconnect is not obvious from
these cases. This finding is consistent with the work of Hye-Jung and Rha (2009). They randomly assigned students to courses that were either highly structured with little interaction or highly interactive but loosely structured. Students in the structured group reported that structure was very important. Students in the interaction group reported interaction to be more important. These findings lead to the very plausible hypothesis that, at least in instructivist, linear designs, students tend to adapt to the design elements.

These hypotheses generate more questions and they underscore the need for further study. The researcher for this study purposely selected three cases where the instructor-designers appeared well versed and experienced in design and implementation of online learning. All three were committed to and, in fact, passionate about the potential for online components in blended learning situations. It is less clear what studying instructor-designers who were equally passionate about the face-to-face components would yield. On the initial survey of over 500 expert online instructors, almost half gave examples of the opportunities they saw moving back into the classroom, as it were. These instructors were not included for case consideration in this study. How instructors who stress the face-to-face components over online utilize interactions across blend categories certainly could not be deduced from the current study.

Despite the finding that students both understood the intent of strategies for interactions and seemed satisfied with them, we do not know what the outcome would be in less structured, more constructivist-based learning situations. That is, what might be the impact of a learning environment where students were able to take on more responsibility for the learning versus being acted upon by activities designed by the
instructor? In that case, blend philosophy of the instructor-designer might have no effect at all.

Future research is advised to buttress or to refute the findings of the current study that, in the current field of blended practice at least, the role of instructional designer is changing. It appears that experienced instructor-designers of blended courses are working less with instructional designers than they did when developing online courses. It is critical both for developing ID models and for the furtherance of the field that on-going, collaborative experiences become the norm.

Finally, a modification to the Graham and Robison framework is suggested. Their framework loads enhancing with increased productivity and enabling with increased convenience. That may be parsing a too thin distinction. Also, the enhancing category, as currently defined, appears to fit the majority of all instructor-designers. Very few experienced instructors seek convenience as a prime motivator. Instead, enhancing’s core might be efforts to bolster the impact of the instructor-designers existing pedagogy while enabling’s core theme would be increased efficiencies. Such a triage would likely result in more even distribution of instructor-designers across categories.

One should not take from this study that the blend preferences are mutually exclusive with any one instructor-designer. All three cases had elements of all three blends. What matters, it appears, is the preponderance of the blend elements. Certain conclusions can be drawn.
Conclusion

This study looked at interactions in blended learning environments from the perspective of the Graham and Robison (2007) framework. Three case studies were conducted involving both instructor-designers and students from their classes. There was one case each representing the blend preference categories of transforming, enhancing and enabling. The results of this study help inform instructional designers in practice, instructor-designers developing and implementing blended courses, and future research on interactions.

Instructor-designer blend preference influences strategies for interaction, development, and implementation of activities and acts as one benchmark for evaluation and iterative change. Blend preference, by itself, does not impact attainment of learning outcomes nor reporting by students of satisfaction of efforts at enhancement of interactions. The logic model presented can help future researchers develop research questions investigating the flow of design process from blend philosophy through strategies to develop online activities leading, ultimately, to enhanced face-to-face experiences.

This study suggests that students tend to adapt to such blend preference-based interaction strategies and activities reporting both satisfaction and perceived effectiveness in all cases. Further, blend preference, per se, does not appear to impact learner outcomes.

To the degree these three cases are representative of current practice, challenges exist to establishing long-term collaborative processes between instructional designers
and instructor-designers of blended learning courses. These long-term collaborations are necessary conditions for newly emerging instructional design models such as 3PD and PD4L to develop in practice. Thus, while all three cases in the current study resonate with the core components of 3PD (i.e., build, enhance, maintain), in every case this phasing occurred in isolation and apart from collaboration with instructional designers, peers or other formal supports. Such current realities are not conducive to the dynamic interplay instructional design systems need to continue to evolve.

Instructional designers working with faculty could benefit by both understanding and then supporting design consistent with the faculty members blend preference. Blend preference in general is a potentially rich area for further study.

Blended learning provides fertile ground for researchers. Decisions made by instructor-designers relative to online versus on campus, face-to-face components can help inform what we know about instructional design process.

Results might have been more informative had all three cases been able to have been drawn from the same institution in order to control for several co-variants including regional bias, if any. Generalization of these findings, as with any case study, should be handled with caution.

Logic modeling as an analytic qualitative device appears to hold promise for future researchers. Logic modeling bridges the gap between the coded raw data and the reported findings by clarifying the individuals underlying decision processes. Further, Logic Model Development Tables provide schema to communicate and to modify initial findings with the case study informants providing a measure of validation.
Finally, future quantitative research on interactions might consider disaggregating data based upon blend preference. For example, from this study it is clear that blend preference impacts the way instructor-designers view the importance of online discussions. Strachota (2003) found no significant difference in learner-instructor interaction as to satisfaction with discussion boards. Disaggregating data by blend preference, however, could yield different results. This study suggests that while grouped results might wash out any significant main effects, analysis between blend preference groups could be highly relevant.
REFERENCES


APPENDIX A. CASE STUDY PROTOCOL

Case Study Protocol for Instructor-Designers:
The following are the questions to be addressed following interviews with the instructor-designers:
How do they view interaction?
What types of interactions do they employ? What goes into those decisions?
How do they use face-to-face v. online components specific to interaction?
In the ideal, what is their expectation of what students will gain from their strategies, activities? What are interaction strategies that they feel are particularly effective? How are they measuring or determining effectiveness?
Which blend category do they prefer and how did they come to this preference? What opportunity, if any, did blended provide to them to ‘do things differently.’
What specific examples does each have of strategies they implemented to enhance interactions and how do they hope for students to experience them? That is, in the ideal, what would the student responses be?
APPENDIX B. INSTRUCTOR SURVEY

1. Approximately how many years have you taught at the post-secondary level?
2. Approximately how many times have you taught using a blended format?
3. Blended learning formats provide unique opportunities to enhance interactions with you and your students, students with each other and students with the course content. One potential benefit is the opportunity to change instruction. As you think about your own practice, how important is this function to you? [Very Important] [Important] [Somewhat Important] [Not Important]
4. Please provide an example of how blended learning has helped you change instruction.
5. Another potential benefit of blended learning is the ability to increase efficiency. That is it can allow you to do what you already do more efficiently. How important is this function to you? [Very Important] [Important] [Somewhat Important] [Not Important]
6. Please provide an example of how blended learning has helped you increase efficiency.
7. Finally, blended learning can provide more convenience for students and for you the instructor. How important is this function to you? [Very Important] [Important] [Somewhat Important] [Not Important]
8. Please provide an example of how blending learning has helped increase convenience.
9. Please describe your approach to enhancing interactions in blending learning situations. What do you do?
10. How do you decide which activities to employ in the face-to-face (i.e., on campus) versus online settings?
11. If you would be interested in participating in the case study, please provide the following contact information.
  Name:
  College:
  City/Town:
  State: 6
  Email Address:
## APPENDIX C. JUDGES’ RUBRIC

### Instructor Survey Scoring
Our task is ultimately to identify one case to fit each of the three blended categories proposed by Graham and Robison. We are looking for the primary purpose or intent of the instructor as they approach the design of the blended instruction. The following chart shows the definitions of each of the three categories and some suggested indicators for each.

<table>
<thead>
<tr>
<th>Blend Category</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transforming</td>
<td>Refers to blends where the primary purpose is to change/improve the pedagogy. Typically involves a movement from transmissive/objectivist to learner-centered/constructivist. The nature of the blend takes advantage of opportunities of blended environment (combing face-to-face and online).</td>
<td>• Course is redesigned from information transmission to problem-based learning with students working on cases employing discovery learning. • Interactive online simulations developed • Instructor adds online simulations to where only didactic material in the past • Components are add online that could never be done in class</td>
</tr>
<tr>
<td>Enhancing</td>
<td>Refers to changes designed to increase in productivity (student and/or faculty). May enhance pedagogy, but mainly ‘more of the same.’ Note: efforts may actually unintentionally decrease student productivity—e.g., uploading 100s of articles.</td>
<td>• Employing a discussion board to engage 100+ students who would not generally talk in the lecture hall. • Increased communication tools • More online content available • “saving class time” • Videos of lectures</td>
</tr>
</tbody>
</table>
Enabling

Primary purpose is to improve convenience (student) and/or to increase access.

- Moving components to online so that busy students “don’t have to come to class.”
- May make class sessions optional

You may access the survey at: https://www.surveymonkey.com/s
The password is “--------”.
Click on “Browse Response” (upper left).
It will take you to the LAST item. Enter ‘1’ to start at the beginning. “Next” takes you to the next item in the series. You can download a report if you want. Playing around with it, though, it’s easier (to me) to just read the items straight from the web.
To save some work, you can eliminate the 20 or so who took the survey but did NOT leave any identifying information. In effect, they do NOT want to be part of the case study. To filter them out, you can use the filter function. Use “filter by responses” and pick the last item from the drop down menu (“if you would be interested in participating in the case…”). Then “choice” = “name.” “Text” should be blank. And choose “any words” from the drop down. It’s a workaround to keeping the demographic information separate while cutting out the 20 or so who do not want to participate. If you rather I just send you the ID #s of the ones to skip, let me know.
For each item, please review the responses and then rank the primary purpose of the instructor-designer with a 1. Then rank the secondary purpose as 2 and, finally, the remaining category as 3. So, ideally, you have a 1, 2 and 3 in the blue columns.
When this is completed for all cases, rank each category from ‘the most representative’ as 1 to the next most as 2, etc. There should be 3 columns of rankings (green) for each of transformative, enhancing and enabling. That is, looking down the Transforming column (blue), rank all the cells that were rated as 1. Of all the potential cases that were primarily transforming, which is the most, etc. Then do the same for Enhancing and Enabling.
Hopefully this will be a relatively painless process for you. Let me know how it goes and we can compare our rankings.

- Tom
## APPENDIX D. CASE 1 LOGIC MODEL DEVELOPMENT

<table>
<thead>
<tr>
<th>Pre-Requisites</th>
<th>Instructional Activities</th>
<th>F2F v Online</th>
<th>Interaction intent</th>
<th>Decision Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Build a conceptual base</td>
<td>Meeting period: lab type exercises, testing, true lab and/or post lab conference or pre-lab conference and group work</td>
<td>F2F</td>
<td>Concept reinforcement</td>
<td>Testing is political and learner preference – “Everybody’s happier if you do testing face-to-face.” Students can ask clarifying questions. Transferability!</td>
</tr>
<tr>
<td>Piloted the labs in his f2f classes. When students could complete successfully w/o his assistance was ready for online.</td>
<td>Virtual labs (Physio-X)</td>
<td>online</td>
<td>Focus is on concentration of learning effort (student-content) by eliminating inefficiencies such as learning use of equipment. Content tends to be physiology which is largely conceptual</td>
<td>Transformational: moving toward online Political: “had to convince the curriculum committee that I was doing ‘lab type’ activities equivalent to the missing hours.</td>
</tr>
<tr>
<td>Asks “What is most efficient way for students to interact to match content to objectives.”</td>
<td>In vivo labs</td>
<td>F2F</td>
<td>Content tends to be anatomy</td>
<td>Online is 2-D but more efficient interaction when view in 3-D</td>
</tr>
</tbody>
</table>
Students need to be prompted to ask “Why does it do that” or “How does it do that. That is what this course is all about.”

| Directed discussion | F2f | Students first interact with the virtual labs. Instructor-student interaction is to help them “put it all together” (synthesize) Strategy = “whatever I see them responding to.” |

| Emphasis on learner control: students have to think about objectives for the module and how they will approach them. |
| Schedule online activities that spur thinking | online | Student-content Leads to questioning which is resolved either by the student or in f2f |

| Design template He has learned to keep what he calls a “stable structure” |
| Module at a Glance |
| Mini-lecture |
| Assignment |
| Helpful Ideas |
| Review questions at end of chapter |
| Help focus for quizzes |

| Materials |
| Ask a Question |
| Quizzes |
| Students have 2 attempts at this untimed |
| Open book: designed like a pre-lecture quiz to drive them toward the reading |

<p>| Lab Assignment |
| Online OR f2f |</p>
<table>
<thead>
<tr>
<th>Lab discussion board</th>
<th>online</th>
<th>Student-student where can ask questions about using the software (instructor would assist only if needed)</th>
<th>Not many questions typically</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab reports</td>
<td>online</td>
<td>Highly structured series of questions submitted as a “quiz essay” focusing student-content</td>
<td>Goal is “can you report the data? Can you manipulate it a little bit?”</td>
</tr>
<tr>
<td>Discussion</td>
<td>online</td>
<td>Required by points—very few used even the best students</td>
<td>Student survey: more fun to ask professor in class 😊</td>
</tr>
<tr>
<td>Communicate (e-mail)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E. CASE 2 LOGIC MODEL DEVELOPMENT

<table>
<thead>
<tr>
<th>Pre-Requisites</th>
<th>Instructional Activity</th>
<th>F2F v Online Activity</th>
<th>Interaction Intent</th>
<th>Decision Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need develop accelerated program for adult learners (degree completers)</td>
<td>Hybrid chosen</td>
<td>Determined by schedule. One class met every week and other section met every other week.</td>
<td>Adapt based on learner characteristics</td>
<td>Students would be lost in completely online environment. Views cohort effect as powerful and more powerful with face to face component. Needed a way for students to complete one course at a time, but 2 in a semester—i.e., full time.</td>
</tr>
<tr>
<td>Originally ‘handed off’ another’s course</td>
<td>Critical Analyses were a major component</td>
<td>Online</td>
<td>Intent appeared to be to keep standards high</td>
<td>M felt task was too complex for beginning learners. Required reading and analyzing peer-reviewed journal articles. Too much of a burden to these particular students. Too many lacking pre-requisite skills (e.g.,</td>
</tr>
</tbody>
</table>
| **Critical Analyses not working** | Replaced with Cases | F2F and Online
Section 1: Cases were online during the online weeks and in class the alternate weeks | Wanted students working together (student-student) and have a basis (mental model) for the new content. | Determined that these learners were more familiar with clinical experiences than research. Certainly more motivated to learn clinical applications (e.g., performance reviews). Decreased reading burden by working in teams and having one write the report for the group. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initially excessive reading</strong></td>
<td>Two textbooks were used one of which was especially rigorous</td>
<td>online</td>
<td>Student-Content. However, amount and depth of reading precluded</td>
<td>Reading load would prove burdensome based on learner characteristics.</td>
</tr>
<tr>
<td>Commitment to online discussion</td>
<td>Online discussion required</td>
<td>Online with clarification and expansion during week.</td>
<td>Strong, individualized instructor-student. She did not participate in discussions. Instead, she provided individualized meta-processing comments via e-mail to each student each week. The intent was to support and to shape responses and less to correct content.</td>
<td>Based reading assignments around one core case each week that M felt would be most beneficial to reaching learning objectives. Students would pull from reading what they needed for case analysis. This is a key and unique component to M’s overall strategy. M does not immerse herself in discussions in part because she wanted individualized feedback and when she was making similar comments did not want to lessen the impact. Discussions are the glue to making her overall strategy succeed. They</td>
</tr>
</tbody>
</table>
are used to help apply reading concepts to cases, to develop cases and to enhance critical thinking. Further, M believes more Ss participate in online discussion than f2f. Also, discussion during the week drives Ss to read and to interact v. the false belief that they can succeed just by attending class.

| Lectures | Lectures had been entirely online as additional reading for the online course. | F2F | Present information as mini-lectures to support what was needed to develop cases. | M wanted to reduce overall reading. Felt she could present and revise on the fly during face to face time what students needed to help with their cases. |
| Online course assets | This course was offered first fully online and the online course was available in its | Online | Structure the materials so Ss had what they needed for hybrid. | M believes why it would be easier to simply use the entire online course, that that might |
entirety.

<table>
<thead>
<tr>
<th>PowerPoint</th>
<th>Online</th>
<th>Removed all but the slides and no supporting notes</th>
<th>M presented content to support the cases as mini-lectures. PPT was available online for review and to help with test.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests are required</td>
<td>Traditional multiple choice tests</td>
<td>Online</td>
<td>Help students synthesize and analyze</td>
</tr>
</tbody>
</table>
Final projects are traditional component | Includes final project | F2F | Help students synthesize and analyze a topic of their choice was demonstrating engaging interaction during presentation. | M certainly models what she teaches. Students are expected to engage the class in some way during the final project presentation as she did throughout the course. “Death by PPT” is not acceptable.

more of a learning experience.


<table>
<thead>
<tr>
<th>Pre-Requisites</th>
<th>Instructional Activities</th>
<th>F2F v Online</th>
<th>Interaction intent</th>
<th>Decision Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used ethics case for years—it’s ‘ancient’. Got from a management institute.</td>
<td>Analyze video of two deans applying interactional justice</td>
<td>“Works fine in both.”</td>
<td>Student-student work analyze case and apply interactional justice concepts correctly</td>
<td>Video readily available online as in classroom. Interactional justice ‘lectures’ are the same. Students succeed equally well online v. face to face without added, of task, inefficiency. Continue to use.</td>
</tr>
<tr>
<td>Used Man on the Moon case for years. From a publisher.</td>
<td>Students need to determine what they would take with them in a crisis.</td>
<td>Works fine face to face.</td>
<td>As group engages, analyze their own group process.</td>
<td>Inefficient to use online. “You could do it in a discussion format, I guess.” Too inefficient to get to get to level of engagement.</td>
</tr>
<tr>
<td>Discussions</td>
<td>Online only for instructor-student</td>
<td></td>
<td></td>
<td>To do it right, takes too many steps. Have to have a rubric for ‘value added’ response. Would be difficult to score</td>
</tr>
<tr>
<td>Description</td>
<td>Action</td>
<td>Suggestion</td>
<td>Reason</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Reading materials is important</td>
<td>Take quiz online before come to class</td>
<td>Structure activity so read ahead</td>
<td>Online quizzes are self-scored. Students can retake several times. Easy way to make sure did the reading before class.</td>
<td></td>
</tr>
<tr>
<td>Been using group projects for year</td>
<td>Typically based around cases.</td>
<td>Work fine either way.</td>
<td>Want students interacting with content, instructor and each other to apply underlying theories.</td>
<td></td>
</tr>
<tr>
<td>Has existing online course.</td>
<td>Make it not only available to web-enhanced class but require all activities online!</td>
<td>Put all activities online including lectures, tests, drop boxes. Very convenient for students and frees up class time for other activities.</td>
<td>Provide activities during face to face to enhance. Don’t just lecture. “They must be learning something, or they wouldn’t show up.”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Face to face becomes optional (class does not need to meet. Implement enhancement activities such as additional cases, role plays.</td>
<td></td>
</tr>
</tbody>
</table>