Exploring Undergraduate Students' Perceptions of Teaching and Satisfaction in Blended Learning

by

Karon L. Dragon

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Department of Educational Psychology
University of Alberta

Abstract

This study investigates the influence of teaching attributes on student satisfaction as perceived by university students enrolled in a blended learning course when the learning context is predominantly a campus-based experience. It merges theory from educational psychology and marketing research to explore the psychometric functioning of a new teaching quality scale, the Blended Learning Questionnaire (BLQ). Secondary data from 178 undergraduate, Faculty of Education students using the BLQ instrument was used to investigate their perceptions of the teaching delivered in both formats, face to face and online, of a blended learning course. Results of exploratory factor analysis indicated that student-focused methods of teaching feedback are possible to measure in the relatively new educational context of blended learning, and that several key aspects of that context – the clarity of goals, quality of teaching strategies, and appropriate assessment methods - are salient to students. A multiple regression analysis using the recovered teaching factors predicted a total of 58% of student course satisfaction, with teaching in the face to face format predicting the majority of satisfaction (49%). However, when students' importance ratings about the teaching experience were considered in the analysis, less course satisfaction was explained. In borrowing from the service quality literature, the BLQ was used to capture the discrepancies between students' perceptions of the teaching (P) and their relative importance to satisfaction (I). A multiple regression analysis of the gap scores (P – I) predicted 22% less course satisfaction than students' perceptions approach alone, with the majority of satisfaction again predicted by teaching experienced in the face to face setting (36%). While the perceptions approach evidenced greater predictive power, the information gained by including importance weightings allowed for the identification of service gaps which provides greater

diagnostic power for blended learning educators than a single perceptions measure. In this study, efforts were primarily identified as best spent on improvements in specific aspects of online teaching delivery. Identifying areas of teaching that have the highest performance gap scores (i.e., high importance score and low perception score) is a step towards identifying which teaching qualities, or combinations, are most influential to the student experience. These findings support a growing trend in higher education research that links quality teaching to measures of student satisfaction so as to gather evidence of the effectiveness of teaching practices and curriculum change. As there has been little systematic quantitative research to date that has addressed key aspects of teaching quality across online and face to face experiences, this study represents an early exploration of this gap and contribution to the blended learning literature.

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Chapter 1: Introduction

Introduction

This chapter presents the rationale and the purpose of the study which explores the influence of students' perceptions of teaching quality on overall satisfaction in an undergraduate-level, blended learning course. The rationale culminates in the problem statement. Three research questions are then proposed and the significance of the study and delimitations are acknowledged. The chapter concludes with definitions of key terminology and a description of the organization of the remaining chapters.

Rationale

The great pendulum of education swings (Mellon, 1999). Bill Page, a veteran educator at the University of California, says the pendulum is a perfect, oft used analogue to explain the ebb and flow of technology's influence on mass education. In his own narrative he recalls the warnings of 40 years ago when *Time* magazine published an article proclaiming educational television as the learning technology of the future. Television's merits were instantly embraced as offering exciting action that could visually transport students to places around the globe or inside the human body in condensed time and living color. The initial television infusion sparked a mass revolution in electronic media which permeated all levels of education with video cassette recorders (VCRs), videotaped programs, computers, and Compact Disc Read-Only Memory (CD-ROM) programs. Along with the tools came untested approaches to standard, everyday classroom practice which became quickly plagued by a “been there, done that syndrome” (Page, 2002, para. 2). For some educators, the shifting waves of technology have repeatedly produced an oversaturated ocean of cool tools that, without sound pedagogical practice, have translated into little to no impact in the classroom (Moll, 1997). Page (2002) offers a cautionary reminder

that the educational ills of the day cannot be solved by simply putting technology into the hands of every student. Educational movements can become like pendulum swings, traveling with an irresistible thrust; then, unheralded, a new campaign drives yet another educational cause back the other direction, gaining momentum.

Teaching and technology frequently travel together on the education pendulum. While many new technologies have emerged throughout history, so has the cry for educators to find meaningful ways to incorporate them into the classroom – be it a typewriter, television, calculator or computer. Jane Terpstra, an educator at University of Wisconsin-Madison, has also witnessed numerous pendulum swings. She situates technology's current sway as being particularly impactful on teaching practices in higher education. In the modern classroom, instruction no longer focuses on the textbook, with a few instances of film or video embellishment, and even fewer occasions of group interaction, hands-on activities or discussion. Now, students engage in small groups with assigned situations such as case scenarios to debate issues or solve complex problems. Using Internet-based technology, online opportunities can be created that allow students to access course content on their own, reflect on their learning, and interact virtually from a distance by contributing to activities such as discussions, group projects, and collaborative writing (Terpstra, 2014). The present-day undergraduate has a never-before-seen advantage of open access to a wealth of learning content available anytime and anywhere, largely through electronic means. Terpstra's (2014) chronicle is a reminder that technology can offer more than an explosion of delivery options that are digital, readily available and now, mobile. In essence, it has shifted her pedagogical focus from one of reception and practice to engagement and interaction.

Arguably, technology holds enormous potential for the traditional lecture, but the fact remains that many faculty often make limited formal academic use of educational technology (Selwyn, 2007). Gone is an earlier zeitgeist, the fad that Mellon (1999) recollects as the rise of the technology zealots, those with the conviction that the path to educational excellence is lined with more and more sophisticated machinery "who worship at the altar of technology and learn the ever-expanding rituals of software mastery and hardware management" (p. 28). There has been a growing recognition in many institutional settings that the mere presence of technology – or computers – does not imply learning, the so-called delivery truck argument. The delivery truck debate began in 1983 when Richard Clark wrote an article claiming that the content and the way in which it is presented to students is the essential element, not the medium through which instruction is delivered (Clark, 1983). It is only when the connection between the process (technology) and the knowledge (organized information) is made through thought that (learning) can occur (McClusky, 1994). An excellent educational program will not materialize through hardware machinery alone, or even through innovative software. The success or failure of technology integration into the classroom has been shown to be dependent on factors beyond the adequate presence of technology (Chien, 2013). To be successful, educators must access increasingly sophisticated tools in a contextual matter that is culturally relevant, responsive and meaningful to their educational practice and that promotes quality teaching (Butler & Sellbom, 2002). In the absence of time to build a body of empirical evidence to guide the effective integration of these tools into curriculum goals, the anecdotal promise of new technologies can be quickly abandoned to make room for the next innovation. The education pendulum syndrome can become a cycle of unrealistically optimistic expectations followed by disappointment, disillusionment, and massive curtailment or outright abandonment (Maddux, 1992).

Despite historical portents, technology's current artifacts, including machines, tools, implements, and even entire networks of communication processes, are being rapidly absorbed into core educational practices in ways not previously possible. In the last decade, universities have invested billions annually around the world in network communications infrastructures as institutions have attempted to blend emerging technologies into all aspects of teaching and learning (Selwyn, 2007). Notable developments include databases, email, internet websites, course platforms such as Moodle and Blackboard, social networking tools, discussion boards, blogs, wikis, podcasts, videos, and instant messaging, among others. Key forces propelling the adoption *en mass* include broadening and expanding higher education access to students, improving educational quality, and raising institutional profiles worldwide (UNESCO, 2009). There are fundamental changes in the way in which higher education services are now being delivered, such as part-time programs, online study possibilities, and courses that allow students to acquire credit for current or professional experience. These innovations attempt to meet the needs of diverse learners who may be balancing work and family obligations, returning to schooling after a break, or pursuing lifelong learning (UNESCO, 2009). The global context, the technology, and the students who are part of contemporary higher education are now different and these changes are being reflected in the teaching practices of our institutions.

Higher education has responded in part by embedding technology's affordances into teaching for a number of reasons: for the convenience and flexibility for students; for the skills they may help to develop such as modern communication and collaboration methods; for the immediate access they provide to an increasing amount of professional knowledge; and for the understanding they engender if they support learning (Selwyn, 2007). These benefits have stimulated a novel approach to undergraduate course delivery which results in learning processes

for students that are spread across face to face and online contexts, referred to as "blended learning" (Garrison & Kanuka, 2004). According to the Centre for Higher Education Research and Innovation, blended learning is defined as the integration of traditional classroom teaching methods with online activities, with technology deployed to complement, not replace, traditional forms of learning (CERI, 2005). While online courses are nothing new, the idea of delivering them to students who are physically present in the university is unusual. The blended model, where students still go to lectures but take part of their course online, has understandable appeal. It satisfies the need for a diverse body of students to have face to face interaction with educators as well as with their peers, while at the same time allowing them to take some of their course in their own time and at their own pace. In fact, the *Chronicle of Higher Education* reports that the convergence between online and residential instruction is “the single-greatest unrecognized trend in higher education today” (Young, 2002, p. A33).

The side effect of blended learning is that higher education must now look at the design of core teaching activities in ways it never has before. Today, when educational theorists discuss technological innovation, there is consensus that having more computers is not the same as ensuring that technology in the classroom incorporates all the components needed to ensure that learning occurs (Mellon, 1999). Incorporating two different delivery platforms, online and face to face, into teaching practices places a highly complex set of demands on educators. Didactic decisions must now consider countless possibilities for instructional design (Graham, Allen & Ure, 2005). For example, a teacher of a large enrollment class (e.g. 100+) might use the online environment so that all students can contribute to a discussion. A different instructor may be concerned about motivation and may choose to use a face to face discussion where social presence and excitement for the topic can be communicated. A third educator might choose to

blend the two learning environments, starting with a brief face to face discussion to generate excitement for the topic, and then set the stage for in depth, follow-up discussion online. The key idea which unites these seemingly disparate approaches to course design is the complementary, enhancing role conceptualized for technology within the university course experience (Garrison & Vaughan, 2008).

Despite this potential, blended learning creates new challenges as there can be a gulf between traditional, knowledge-centered teaching and the diverse expectations of the new student cohort (Gorard, Smith, May, Thomas, Adnett, & Slack, 2006). With the expansion in teaching possibilities, the issue of coherence in evaluating the success of a blended learning approach becomes especially germane as the overall goal is to provide a mix of both online and face to face experiences which support each other. Along with the influx of new technology comes the challenge of identifying ways to evaluate its place and contribution to the student experience. In this respect, there is a history of research which supports that students' perceptions of teaching can form an important part of the evidence base used to determine the effectiveness of curriculum change. Even a casual review of that literature will underscore the perceived importance of this topic with hundreds of studies in specific pedagogical, psychological, and measurement journals (Dzuiban & Moskal, 2011). Research on teaching qualities important in traditional classrooms has found that student perceptions of key aspects of the learning context -- such as assessment methods, assigned workload, learning independence, the quality of pedagogy, and the clarity of the course goals and standards -- are closely related to the quality of learning (Entwistle & Ramsden,1983; Ramsden, 1991, 2002). Broadly speaking, students who perceive the workload as high, assessment tasks as orientated towards reproduction, a lack of clarity surrounding the goals and standards of the course, little

independence, and poor teaching tend to experience a lower quality of learning than students with positive perceptions of these aspects. These relationships have been identified in longitudinal, systematic research (Richardson, 2005; Prosser, Trigwell, Ramsden & Benjamin, 2002; Trigwell & Prosser, 1991; Wilson, Lizzio & Ramsden, 1997; Ramsden, 1991).

When referring to this early research, however, it is important to highlight that it was generated within traditional, face to face lecture settings. Innovations such as blended learning had not yet permeated the conventional landscape. Of the instruments historically cited in the literature, the Course Experience Questionnaire (CEQ) (Ramsden, 1991; Wilson, Lizzio and Ramsden, 1997) has been extensively used to gather students' perceptions of course-level teaching quality. However, a review of the educational psychology literature revealed no prior applications of the CEQ to the blended learning context. It is currently unknown whether or not past perceptions of core aspects of university teaching, such as course workload, assessment, clarity, teaching approaches, and skill development, are similarly observed by students experiencing new blended delivery teaching methods. As such, one avenue for ascertaining the coherence of a blended learning course would be to extend a known measure of teaching quality, such as the CEQ, to capture students' perceptions of the online teaching in addition to their experience of the lecture hall.

In gaining access to students' perceptions of teaching, important information for research and practice can be obtained, especially when institutions are trying to maintain course quality in the context of a new learning paradigm (Reinhart & Schneider, 2001). The merging of information technology and education has proven highly susceptible to the pendulum syndrome (Maddux & Cummings, 2004). Consequently, the teaching aspects of course delivery have frequently been investigated and found to be important determinants in students' perceptions of

satisfaction (DeShields, Kara, Kaynak, 2005; Elliott & Healy, 2001; Fraser, 1994; Hill, 1995). Consideration of the use of satisfaction as a valid teaching outcome measure corresponds with a body of research concerned with quality improvement and customer service (Harvey & Williams, 2010). Marketing theory has long supported the idea that the quality of services rendered is a critical factor in determining customer satisfaction and future purchasing behavior (Cronin & Taylor, 1994; Parasuraman, Zeithaml, & Berry, 1994, 1985). Such research has found that satisfying educational experiences do increase course retention rates and word of mouth recommendations (Chiu, Hsu, Sun, Lin & Sun, 2005), in addition to loyalty and reduced complaints (Webb & Jagun, 1997). Satisfied students are more likely to continue in their studies and are more likely to succeed academically. High student satisfaction helps in attracting and retaining high achievers who in turn increase the reputation and standing of the university (Elliott & Shin, 2002).

As a useful source, educational psychology is just beginning to employ concepts from customer satisfaction research to evaluate the effectiveness of teaching and course delivery methods. One prominent theory postulates that quality measures are best informed by customers to help organizations better understand service expectations and perceptions (Cronin & Taylor, 1994; Parasuraman, Zeithaml & Barry, 1994). Referred to as the disconfirmation paradigm, the approach seeks to explore the relationship between a customer's pre-purchase expectations and their perceptions of service performance (Voss, Gruber, Szmigin, 2007). As consumers evaluate the level of the service's performance, they cannot help but compare that performance to what they expected. In turn, these expectations provide a baseline for the assessment of a customer's level of satisfaction (Parasuraman, Zeithaml & Berry, 1994). In the context of higher education, the student is viewed as the "customer" and educators as key actors in "service delivery."

According to the theory, students' expectations of teaching at the outset of a course, coupled with perceived teaching performance over the duration of a term, would contribute to end-of-course satisfaction (perceptions exceed expectations) or dissatisfaction (expectations exceed perceptions). To date, there is an emerging body of research on student perceptions of teaching which has demonstrated that perceived teaching quality is an antecedent of student satisfaction (Voss, Gruber, Szmigin, 2007; Marzo-Navarro, Pedraja-Iglesias and Rivera-Torres, 2005; Wright & O'Neill, 2002). Further, when lacking, satisfaction has been found to present a significant barrier to successful blended learning adoption by students (Strachota, 2003).

Summary. This section narrated several incentives for incorporating new forms of educational technology into university teaching in relation to the emergence of course delivery methods that combine the traditional face to face lecture together with digitally delivered class content (blended learning). The pedagogical complexities associated with integrating technological tools and processes into teaching were considered along with the benefits for educators to identify ways to evaluate their contribution to the course experience. The value in gaining access to students' perspectives in the context of a new learning paradigm was posed as informative in identifying which teaching qualities, or combinations, are most influential to the student experience. To this end, research in higher education was introduced which shows a growing trend that links quality teaching to measures of student satisfaction so as to gather evidence of the effectiveness of teaching practices and curriculum change.

Problem Statement

As the introductory comments submit, there is opportunity to merge two streams of research -- educational psychology and service quality -- to investigate the contribution of online and face to face teaching attributes to student satisfaction in a blended learning course. Using a

new instrument adapted from the CEQ, called the Blended Learning Questionnaire (BLQ), this study will explore students' perceptions of core aspects of teaching along a range of variables related to course workload, assessment, goals, teaching practices, and skill development. In borrowing from the marketing literature, the disconfirmation theory will be relied upon to identify students' perceptions of the quality of these teaching attributes to help form part of the evidence base used to measure teaching practices and curriculum change. This approach is relevant in the context of a new learning paradigm as the dual delivery format presents a complex instructional challenge. Technological innovations become fads partly because they are without a firm foundation in theories or empirical evidence or because that foundation is not fully identified and communicated. The research and theories generated on teaching in higher education to date underscore the importance of asking questions about innovative combinations of pedagogy and technology, and of conducting research (gathering empirical evidence) from the student perspective to evaluate their contribution to course satisfaction.

Research Questions

Question 1. Which perceived teaching attributes and qualities contribute most to students' satisfaction with blended learning?

Question 2. What are the psychometric properties of the newly developed BLQ questionnaire used to measure students' perceptions of teaching?

Question 3. Does use of the importance-performance method (based in disconfirmation theory) provide information relevant to students' perceptual processing and satisfaction level that can be used for teaching feedback?

Significance of the Study

The study represents a first approximation of a disconfirmation approach to investigate the associations between quality teaching factors and student satisfaction in a blended learning course. In addition to adopting a unique research perspective, the study demonstrates the reliability and utility of a new measurement tool for capturing student perceptions of both online and face to face teaching attributes in a blended learning course.

Delimitations

When researching the term "blended learning," the sheer variety and abundance of definitions encountered in the literature becomes overwhelming and many researchers have attempted to address this issue with the goal of improving consistency. As the issue impacts this study, the literature review on blended learning is bounded by those contexts where it was delivered to students who are physically present and attending a full time, undergraduate program at a university campus.

Based on the delimitation, a literature search was conducted to locate papers on blended learning in postsecondary education using search engines and databases such as Google Scholar, ScienceDirect, ProQuest, ERIC, Educational Research Abstracts, and PsycInfo. The scope of the review included peer-reviewed research generated by English-speaking, postsecondary institutions around the globe, including North America, Britain, Australia, and Western Europe. The keywords used were blended learning, face to face learning, online learning, computer mediated learning, hybrid learning, mixed mode, and e-learning (as well as combinations of these). Following this literature search, only those papers with an emphasis on empirical research that specifically focussed on technology-based learning in higher education were included, rather than solely descriptive papers with no empirical research content. However, a discussion of some

key texts in the field was added because of the holistic perspective they bring to the issues involved (e.g., Glazer, 2012; Knowles, 1990; Mellon, 1999.

Organization of the Remainder of the Dissertation

Chapter 2 is divided into two major sections. Section I presents a review of the relevant literature centered around the issues and trends that arise in the research specific to blended learning. Section II discusses aspects of marketing theory and specifically the applicability of service quality theory to the higher education context.

In Chapter 3 the methods and procedures of the inquiry are described with particular emphasis upon the measure employed to capture students' perceptions of the teaching, the Blended Learning Questionnaire (BLQ).

Chapter 4 sets forth the findings of the study within the framework of each of the three research questions posed in this chapter.

Chapter 5 discusses the statistical outcomes and limitations, with future directions considered.

Definitions

Blended learning. The thoughtful fusion of face to face and online learning experiences. The basic principle is that face to face oral communication and online written communication are optimally integrated such that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose. Most important, blended learning is a fundamental redesign that transforms the approach to teaching and learning (Garrison & Vaughan, 2008).

Satisfaction. The favourability of a student's subjective evaluation of the various outcomes and experiences associated with education (Oliver & DeSarbo, 1989). The

measurement of satisfaction is commonly done through an aggregate (single-item) approach which assesses a student's overall or global satisfaction with a service, or in the case of this study, the teaching delivered for a blended course.

Service Quality. The difference between what is expected from a service encounter and the perception of the actual service encounter (Parasuraman, Zeithaml & Berry, 1994). Based upon the disconfirmation paradigm, the quality of services from a consumer perspective is operationalized by the expression: Service quality = fn (Perceived Performances – Expectations). In the case of a university student, perceptions would form on the basis of numerous transaction encounters from the beginning of a course through to its conclusion. Experiences from one lecture to the next will vary for each student as well as between students. This means that perceptions of quality can vary from one transaction to the next within the same course and between respondents. Thus, interactions between academics and students over the duration of a course are crucial in helping define service quality in higher education contexts.

Student as consumer. Thomas and Galambos (2004) argue that students are regarded as consumers of higher education. The massification of higher education to increase participation with an aim of creating a more educated workforce has led to competition between higher education institutions. Students are increasingly positioned as consumers and institutions as working to improve the extent to which they meet "consumer demands." The metaphor of student as consumer offers possibilities for the transformation of higher education because of how it shifts attention to the needs of students and towards a curriculum which develops practical skills in addition to intellectual ones.

Technology. Technology as used in the context of this research consists of not only hardware tools, implements, and artifacts, but also whole networks of communication processes

that structure, limit, and enable learning. As an extension, “educational technology” as a practice generally refers to the study of facilitating learning and improving performance by creating, using, and managing appropriate technological processes, tools, and resources (Robinson, Molenda, & Rezabek, 2016).

Chapter 2: Literature Review

Introduction

This chapter is divided into two sections with the overarching goal to present findings from educational psychology literature and marketing research to inform the three research questions posed.

Section I comprises a survey of the issues and trends that arise in the educational psychology literature specific to blended learning. The classification schemas, tools, and design features used to define various aspects of blended learning are organized in a manner that attempts to build a concise description of the blended course design under study. In addition to providing inroads to better situate the study findings within the broader research context, the underlying pedagogical shift that accompanies technology's current influence in higher education is described. The design complexities associated with integrating new technology into teaching in blended learning are reviewed and the benefits of soliciting student feedback in the context of a new learning paradigm are considered.

Section II highlights key concepts within the marketing literature related to service quality theory and their applicability to the higher education sector. The disconfirmation paradigm is explained which links consumers' expectations and perceptions of the quality of services received to satisfaction with the service. The exposition of theory is followed by a review of studies conducted in university settings which have adopted the disconfirmation paradigm to examine students' expectations and perceptions of the quality of services received and their contribution to satisfaction.

Section I: Educational Psychology

Blended Learning

Origins. The term "blended learning" has been in use for at least 20 years, with both its meaning and context constantly changing during this period (Sharpe, Benfield, Roberts, and Francis, 2006). According to Sharma (2010), it was first used in the corporate world to refer to a professional development course to allow professionals to both continue in the workplace and study. Rather than taking time out for a residential seminar, training was delivered via self-study manuals, videos, and the web. Blended learning was, in part, conceived of as a cost-saving measure (Driscoll, 2002). Since its inception in the commercial sector, it has become an increasingly important component of basic K-12 education delivery, particularly in the United States (iNACOL, 2008). More recently, within the world of higher education, the term "blended learning" has gained currency as a description of particular forms of teaching with technology. In 2006, the term became more concrete with the publication of the first *Handbook of Blended Learning* (Bonk & Graham, 2006).

Blended learning, simply defined here as learning that combines elements of online digital media with traditional classroom methods, has been increasingly incorporated into undergraduate course offerings in recent years. Evidence from the Sloan Consortium, an often-cited organization dedicated to integrating online learning into mainstream higher education, reported that almost 80% of public institutions in the United States have offered at least one blended course (Allen & Seaman, 2006). These findings were drawn from a data set collected across the years 2003-2005 intended to obtain an environmental scan of the extent and penetration of blended learning in higher education. In a detailed analysis of the data, researchers found that courses which institutions offered face to face were somewhat more likely to also be offered as a blended course rather than an online course. By itself, blended learning did not appear to be part of an institutional transition strategy from face to face to fully online courses. Rather,

institutional size was a key factor in adoption. The number of blended course offerings increased dramatically as institutional size increased, with the majority of institutions primarily using core faculty to teach blended courses. Of the disciplines identified, business had the greatest penetration rate (47.9%), followed by computer and information sciences (41.5%), and education third (36.5%) (Allen, Seaman & Garrett, 2007). The latter field represents the context of this study.

Definition. In attempting to answer the question "what is blended learning?" the sheer variety and abundance of definitions encountered in the literature can be overwhelming. Many researchers have expressed frustration over the innumerable definitions and considerable effort has gone into improving consistency and consensus in use of the term (e.g., Oliver & Trigwell, 2005). The problem of exactitude led to a special issue on the topic issued by the *Journal of Educational Media* (Whitelock & Jelfs, 2003). While the term continues to evolve today, it could be generally said that all definitions share the basic premise that a significant portion of course activities occur in two areas: in person (face to face) and online (at a distance). It requires the physical presence of both teacher and student, with some element of student control over time, place, path, or pace. Table 1 presents some of the commonly cited definitions of blended learning in the higher education context.

Table 1

Definitions of Blended Learning by Various Researchers

Researchers	Definitions of Blended Learning
Driscoll (2002)	(1) Combining or mixing web-based technology to accomplish an educational goal; (2) Combining any form of instructional technology with face to face instructor led training; (3) Combining instructional technology with actual job tasks.
Thorne (2003)	(1) Represents an opportunity to integrate the innovative and technological advances offered by online learning with the interaction and participation

Researchers	Definitions of Blended Learning
	offered in the best of traditional learning.
In Graham, Allen and Ure (2003)	(1) Combining instructional modalities (or delivery media) (Bersin & Associates, 2003; Orey, 2002a, 2002b; Singh and Reed, 2001; Thompson, 2002). (2) Combining instructional methods (House, 2002; Rossett, 2002). (3) Combination of face to face traditional learning with online instruction (Reay, 2001; Rooney, 2003; Sands, 2002; Ward & LaBranche, 2003; Young, 2002).
Dzuiban, Hartman & Moskal (2004)	(1) Courses that combine face to face classroom instruction with online learning and reduced classroom contact hours (reduced seat time). (2) Hybrid Learning should be viewed as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom with the technologically enhanced active learning possibilities of the online environment.
Bluic, Goodyear, & Ellis (2007)	(1) Describes learning activities that involve a systematic combination of co-present (face-to-face) interactions and technologically-mediated interactions between students, teachers and learning resources.
Allan (2007)	(2) The use of different internet based tools including chat rooms, discussion groups, Podcasts and self-assessment tools to support a traditional course and; (3) a mixture of face to face and eLearning
Littlejohn and Pegler (2007)	(1) The "blend" which may refer either to the combination of eLearning with other approaches such as face to face instruction, or the mixture within the eLearning mix of media. (2) Combining pedagogical approaches (i.e., constructivism, behaviorism, cognitivism) to produce an optimal learning outcome.
Vignare (2007)	(1) The integration of online with face to face instruction in a planned, pedagogically valuable manner that do not just combine but trade off face to face time with online activity (or vice versa).
Christensen Institute (2012)	(1) Courses in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace; at least in part in a supervised brick-and-mortar location away from home; and the modalities along each student's learning path within a course or subject are connected to provide an integrated learning experience.

The definitions presented in Table 1 illustrate the changing context of blended learning from initially focussed on media and tools towards a later conception of the term involving innovative transformations in teaching made possible with technology. Given this history, blended learning has inherited the liability of being loosely defined along a spectrum of more

versus less use of technology (Graham, 2013). Indeed, early research reflects this trend and often describes blended learning as simply any instruction where content is delivered both online and in onsite facilities (Mossavar-Rahmani & Larson-Daugherty, 2007). As a counterpoint, later researchers tend to specifically address the pedagogical credence of a blended approach. In this respect, one of the most frequently cited research definitions is provided by Garrison and Vaughan (2008):

> Blended learning is the thoughtful fusion of face to face and online learning experiences. The basic principle is that face to face oral communication and online written communication are optimally integrated such that the strengths of each are blended into a unique learning experience congruent with the context and intended educational purpose. Most important, blended learning is a fundamental redesign that transforms the structure of, and approach to, teaching and learning. (p.5)

In selecting this definition as an exemplar, it can be seen that the pedagogical implications of blended learning are clearly articulated. Blended learning is viewed as a pedagogical approach that combines the effectiveness and socialization opportunities of the classroom, with the technologically enhanced active learning possibilities of the online environment. In an earlier article explicating the term “transformational”, Garrison and Kanuka (2004) describe blended learning as a unique opportunity to fully integrate pedagogy and technology with teaching. With an understanding of the properties of the Internet, and knowledge of how to integrate technology with valued characteristics of face to face learning experiences, a transformational shift is theorized to occur in terms of the nature and quality of the educational experience (Garrison & Kanuka, 2004). Garrison and Vaughan’s (2008) definition assumes an optimistic consequence in that combining the best of the teacher with the best of the technology will deliver improved

teaching and learning. However, in translating this synergistic effect into more concrete terms, their definition poses a challenge as it presents a metaphorical "one plus one is more than two" argument. While a review of the literature revealed numerous references describing the transformational potential of blended learning on teaching and learning (Garrison & Kanuka, 2004; Graham & Dziuban, 2008; Graham & Robinson, 2007), a means with which to measure the concept of "transformational" to empirically support the definition was not found. As such, it is difficult to determine whether a course is transformational, and thus, truly blended. This point is revisited in closing remarks.

Ratio of blend. A second issue Garrison and Vaughan's (2008) definition does not fully address is how much online learning is needed to identify a course as blended versus simply technology enhanced or enabled. It has been argued by Voss (2006) that mere supplementation of a face to face course with online learning is not blended learning. However, other researchers (i.e., Littlejohn and Pegler, 2007) prefer to talk about strong and weak blends to indicate a continuum from significant to small amounts of technology infusion. In practical application of this approach, some researchers have developed classification ratios. Typically, these categories vary along a dimension of how much of a course is taught face to face versus mediated by technology. Table 2 displays Allen, Seaman and Garrett's (2007) classification model which is based on a continuum ranging from 0% to 80% or more of course instruction delivered online. In describing the categories, face to face instruction includes those courses in which zero to 29% of the content is delivered online; this category would subsume both Traditional face to face courses and Web Enhanced / Facilitated blends. The third category, Blended/Hybrid blends, can be defined as courses having between 30% and 79% of the content delivered online. This category represents the proportion of technology used in the current study, designed as a 50/50

ratio. The remaining category, Online, is defined as having at least 80% of the course content delivered online.

Table 2

Course Classifications Based upon Proportion of Content Delivered Online

Proportion of Content Delivered Online	**Type of Course**	**Typical Description**
0%	Traditional	Course with no online technology used – content is delivered in writing or orally
1-29%	Web Enhanced / Facilitated	Course which uses web-based technology to facilitate what is essentially a face to face course. Uses a virtual learning system or web pages to post the syllabus and assignments, for example.
30–79%	Blended / Hybrid	Course that blends online and face to face delivery. Substantial proportion of the content is delivered online. Typically uses online discussions, and generally has some face to face meetings.
80+%	Online	A course where most or all of the content is delivered online. Typically there are no face to face meetings.

Note: Adapted from *Blended Learning Research Perspectives*, p. 67, by I.E. Allen, J. Seaman, and R. Garrett, 2007, Needham, MA: Sloan-C

While the information in Table 2 provides a concrete guide to defining blended learning based on a ratio of technological content, it may not be sufficient for research to define fully a course's blended approach. The path of evolution from face to face learning to fully online is not easily quantifiable. The use of cut scores in the research context may create difficulties in judging whether the amount of technology used in a web-enhanced course is 29% or 30% , or if the technology content leveraged in a blended learning course falls below 79% and not at 80% or higher in order to meet classification criteria. Accordingly, studies that use the proportional model tend to define the blend by more broadly worded categories than percentage allocations; however, the use of a ratio-based dichotomy endures in the literature (Graham, 2013; Watson,

Murin, Vashaw, Gemin & Rapp, 2010). In this study, a 50/50 ratio of technology content to face to face instruction was approximated by matching the equivalent number of minutes spent each week in class (80 minutes) with online learning activities expected to require the same amount of time to complete (i.e., asynchronous discussions, learning assessments, videos), for a total of 160 minutes per week of instruction.

Purpose of blend. Due to these issues of exactitude, some research instead describes blended learning on the basis of how the technology is leveraged for pedagogical purposes. As an example, Table 3 summarizes Graham's (2006) research program which is based on the primary purpose of the technology enabled in the course. On the basis of this work, three usage models are commonly cited in the literature: Enabling Blends, which focus on addressing issues of increasing access and convenience through technology; Enhancing Blends, which allow for incremental changes to the pedagogy with web enhancement; and Transforming Blends, which allow for a radical transformation of the pedagogy.

Table 3

Purpose of Technology

Enabling Blends	Enabling blends primarily focus on addressing issues of access and convenience. For example, blends that are intended to provide additional flexibility to the learners or blends that attempt to provide the same opportunities or learning experience but through a different modality.
Enhancing Blends	Enhancing blends allow for incremental changes to the pedagogy but do not radically change the way teaching occurs. This can be at both ends of the spectrum, for example, a traditional face to face learning environment may have additional resources and perhaps some supplementary materials included online.
Transforming Blends	Transforming blends are blends that allow for a radical transformation of the pedagogy. For example, a change from a model where learners are just receivers of information to a model where learners actively construct knowledge through dynamic interactions.

Note: From *Blended Learning Systems: Definition, Current Trends and Future Directions,* p. 13, by C.R. Graham, 2006, San Francisco: John Wiley & Sons, Inc.

Of the categories listed in Table 3, Graham (2006) found the greatest focus has been on Enabling Blends in programs that come out of a distance learning tradition. There is also considerable focus in the educational literature on Enhancing Blends in traditional university settings. It is increasingly more commonplace for faculty to use some level of technology in their teaching (Chew & Jones, 2010). With respect to Transforming Blends, West and Graham (2005) found a greater abundance of examples in the corporate environment than in the university environment. This may be changing, however, as Transformational Blends, which are the focus of this study, are becoming increasingly more prevalent in the literature as structural barriers such as class timetabling, size, location and the availability of technology are addressed within higher education. The purpose of this type of blend is to reconceptualize and reorganize the teaching delivery. A source of the transformation stems from the ability of students to be both together and apart - and be connected to a community of learners anytime and anywhere, without being time, place, or situation bound (Garrison & Kanuka, 2004). For example, Internet discussion forums can provide a permanent record and expand time; as such, asynchronous discussions are often more thoughtful, reasoned, and supported by evidential sources compared to spontaneous face to face discussions (Meyer, 2003).

Level of blend. Further adding to the definitional contours of blended learning is that it can occur at any one of four levels of the educational enterprise: institutional, program, activity, and course (Sethy, 2008; West & Graham, 2005). At the institutional level, there are models for blending where students can choose to have face to face classes at the beginning and end of a course, with online activities in between. An example of this approach is the “M” course at the University of Central Florida which is used as a designation for blended courses with some reduction in face to face time (Sethy, 2008).

At the program level, the practice of blending can be more dynamic and often entails one of two models: a model in which the students choose a mix between face to face courses and online courses, or one in which the combination between the two is prescribed by the program. Entire programs of study, such as teacher education, can be offered in a blended format (Reynolds & Greiner, 2005).

At the activity level, blending occurs when a learning activity contains both face to face and online elements, such as extending online reading into classroom discussion. It entails a combination of distinct face to face and online activities used as part of a course. This approach is often incorporated to make learning activities more authentic, or to bring experts at a distance into the classroom (Oliver, Harrington & Reeves, 2006).

The remaining approach, course level blending, is the most common way to blend and is the focus of this study. This involves a combination of distinct face to face and technology-mediated activities that are embedded throughout course topics. As an example, Owston, Garrison and Cook (2006) describe eight cases of blending at the course level across universities in Canada. There is research evidence from very early on that faculty are experimenting at the course level with innovative approaches to teaching, such as the use of tools for simulations, visualization, communication, and feedback (West & Graham, 2005).

Learning platforms and tools. Along with the variation in ratio, purpose, and level of the blend, there is even greater range in the availability of tools to support instructional delivery. Any discussion of blended learning would be impossible without noting the centrality of technology tools (O'Byrne, 2010). Commercial or tailor-made software management systems are widely used as a learning portal to allow students to learn at anytime and anyplace as long as they have access to an Internet connection. These virtual learning environments (VLEs) are

commonly adopted to facilitate blended learning and contain the unique functionalities of the Internet and learning resources. Some examples include course management software, such as Moodle, Blackboard, and WebCT, which are used to organize course content into learning features such as announcements, emails, discussion boards, chat rooms, assignment groups, resources and links, online assessment, and so on (Boggs & Shore, 2004). With the increasing use of VLEs, the concept of the university campus has moved away from a "bricks and mortar" to a "clicks and mortar" model (Selwyn, 2007). Table 4 provides an update of Graham's (2006) well-defined taxonomy of available technology for VLEs.

Table 4

Summary of Face to Face and Online Technology Tools in Blended Learning

<table>
<tr><td rowspan="2">Face to Face (Live)[a]</td><td colspan="3">Technology (Online)[a]</td></tr>
<tr><td>Synchronous</td><td>Asynchronous</td><td>Self-Paced23 Asynchronous</td></tr>
<tr><td rowspan="2">Instructor led classroom (lectures)
Tutorials
Hands-on Lab
Workshops
Seminars/Conferences
Coaching/ Mentoring
Field Works/Site Visits
Placements
Examinations</td><td>Virtual Classroom / Online lecture
Online chat / Instant Messaging</td><td>Discussion Board / e-Forum
Announcement / Bulletin Board
Emails / Offline Chat
Search Engine
User Groups
Polling and questionnaires
Blog</td><td>Online Learning Materials
Online Tutorials
Online Self-Assessment
Podcasts
Video Streaming</td></tr>
<tr><td colspan="3">Online video and photo sharing such as YouTube, Google, Pinterest, Tumblr, Instagram, Flickr, etc.
Social Networking such as Twitter, Facebook, Linked In, Academia.edu, etc.
Immersive virtual world such as Second Life, Video Game Virtual Reality
Proprietary software packages and simulations for different disciplines such as programming simulator, Mat lab, etc.
Other general tools such as Microsoft/Apple Product Suite (i.e., Power Point, iMovie), Flashcard, Prezi, etc.</td></tr>
</table>

Note: Adapted from *Blended Learning Systems: Definition, Current Trends and Future Directions,* p. 7, by C.R. Graham, 2006, San Francisco: John Wiley & Sons, Inc.
[a]VLEs consist of more than one element above.

Table 4 highlights the distinction between Face to Face (live) and Technology (online) course components which is consistent with the dichotomy associated with the ratio and purpose classification methods previously discussed. However, in Table 4 the technology identified in the online component is further organized by speed of communication. According to this arrangement, the technology available is not restricted by a specific tool, but by contemporaneousness. The Synchronous category refers to online learning events in which a group of students are engaging in learning at the same time. Asynchronous learning is a student-centered teaching technique in which online information sharing is not limited by place or time. The Self-Paced use of technology is any kind of instruction that proceeds based on learner response (Bower, Dalgarno, Kennedy, Lee & Kenney, 2015). For the current study, the technology categories implemented included asynchronous and self-paced tools deployed using a VLE and organized with Moodle course management software.

Blended Learning Design

The advent of multimedia tools supported by VLEs has expanded the range of pedagogical possibilities for the learning environment. Educators and designers of blended courses must now directly address questions of whether content should be delivered face to face or online, and which tool best suits a particular learning goal.

Format sequencing. An essential design element in blended learning concerns the sequencing of instruction. Sequencing is the efficient ordering of course content which helps students achieve learning objectives. Garrison, Cleveland-Innes and Fung (2010) found that the order and organization of learning activities in the blended environment affects the way information is processed and retained by learners. Some content sequencing approaches engage learners in different but supportive face to face and online activities that overlap in time.

However, more commonly the face to face and online time blocks are separated so they are sequenced chronologically but are not overlapping. In the latter approach, Glazer and Rehm (2012), propose there are two ways to think about sequencing a blended course: front loading and back loading. In a front loaded course, students are exposed to most or all of the content in the online environment prior to the face to face class meeting. The assumption behind this strategy is that students will arrive at the face to face setting with some familiarity with the topic. As one might imagine, this strategy works well with students who have a high degree of foundational knowledge coming into the course, who are comfortable with the material, and who can learn independently. In the context of the current study, the course design was layered in a front loaded manner in order to prepare students to take their online learning to a new level of understanding in the subsequent face to face class. Conversely, back-loaded courses use the face to face class to introduce the content, provide an overview of the material, and present a framework for how it fits together. Students subsequently work online to incorporate the details and elaborate on the concepts.

Integration. To ensure a coherent learning experience, approaches to format sequencing need to be integrated by taking into account the affordances of each mode and deliberately linking what occurs in the online and face to face formats. Much ambiguity exists regarding the optimal integration of face to face and online components in different instructional situations (Bonk, Wisher, & Lee, 2003; Singh, 2004). Research suggests that designing the combination of virtual and physical environments should be made on the basis of an understanding of the strengths and weaknesses of each environment, as well as the appropriateness of the choice to the learners involved (Garrison, Cleaveland-Innes & Fung, 2010). In their research, Stacey and Gerbic (2008) found that encouragement, reminders from the teacher, and discussion of the

rationale for the addition of online discussions were not effective in connecting online discussions to the classroom and the course. As a result, the new online environment was marginalized by the students. The more effective process involved the teacher providing feedback on the quality of the online discussion in the face to face class and activities which prepared and coached students for their online activities. The teacher's attention in class to the new virtual environment legitimized it as part of the course and endorsed its importance for learning.

The importance of format integration is further emphasized by Garrison and Vaughan (2008) who operationalized the requirement into a four phase model which is anchored in the face to face environment. Through format integration, students engaged in blended learning can be directed in such a way that they see the need to attend to what happens in both the class and the online environment. If activities extend from online to face to face and back again, if participation is required in both places, if student work is turned in online and in the classroom, and if the instructor is visible in both places giving students feedback on their performance and moderating the discussions, then a course is well integrated, or as Glazer and Rehm (2012) explain, it is "layered."

Ascertaining this more holistic approach to blended learning is often viewed as a core educational challenge. Many papers on blended learning emphasize the challenges faced by designers to achieve the best proportion of online and face to face elements in every learning situation (e.g. Rossett, Douglis, & Frazee, 2003; Dentl & Motsching-Pitrik, 2005). According to a review of blended learning research in higher education, Bliuc, Goodyear and Ellis (2007) concluded that educationally useful research needs to focus on the relationships between the different modes of learning (e.g., face to face and online) and especially on the nature of their

integration. They call for a focus on the benefits for learning that might arise when students experience a well-planned combination of face to face and online activities. In a later meta-analysis of growth in blended learning, Drysdale, Graham, Spring and Halverson (2013) echoed the need for additional research on blended course integration. They found the majority of dissertation work focused on methodologies that compare learner outcomes in face to face courses against the same courses offered in other delivery formats (i.e., blended or online learning). While such research addresses the question of how blended learning compares to other delivery formats, there appears to be no current research program which considers points of articulation between online and face to face formats within a single course. Hence, there have been calls in the literature regarding the value of research into blended learning that focuses on the combination and integration, rather than the contrasting, of technology supported learning and other contexts and opportunities for learning (Bluic, Goodyear & Ellis, 2007). Consequently, the current study addresses this gap by pursuing an original methodological approach to blended learning research by collecting data specific to both delivery formats, face to face and online, in order to determine their respective contribution to higher-order course outcomes.

Implementation models. To design a well-integrated course, educators must decide among a broad range of sequencing approaches, potential learning activities, and technologies which magnifies the complexity of didactic decisions. For this purpose, implementation models are often adopted to help impose some order on how course variables are potentially interrelated and are useful to explain underlying factors that influence student behavior. Case study research has produced a number of models of how to develop synchronicity in blended learning. One example is provided by Glazer and Rehm (2012) who typify face to face time as being available for give-and-take discussion, thrashing out questions about difficult topics, identifying and

resolving students' assumptions and misconceptions about a topic, building community, doing hands on activities, and addressing any questions students may have about the technology. Alternatively, Ausburn (2004) identified online course design features containing options, personalization, self-direction and variety, while Zhao's (2003) online emphasis centres on pedagogical effectiveness and adequacy of technological access. There are also other, similar models that describe desirable characteristics of cohesive blended courses (Alexander & Golja, 2007).

While numerous approaches to teaching with technology are supported in blended learning, there is no single implementation model that suits all circumstances as a course may be organized in multiple ways. Although there is wide variation in research on blended learning models, there are also some strategic similarities that have been advanced. In efforts to organize and simplify the data available on implementation models, some academic studies and educational think tanks have adopted a typology of models. According to this schema, the majority of blended learning programs implemented today could be categorized as, or closely resembling, one of five primary models of blended learning as described in Table 5.

Table 5

Primary Models of Blended Learning

Type	Description
Rotation	Students cycle through a schedule of independent online study and face to face classroom time. a. Flipped Classroom: students participate in online learning offsite in place of traditional homework and then attend the brick and mortar school for face to face, instructor guided practice or projects. b. Station Rotation: students experience the rotation model within a contained classroom or group of classrooms. c. Lab Rotation: the curriculum is delivered via a digital platform but in a consistent physical location. Students usually take traditional classes in this model as well. d. Individual Rotation: each student has an individualized playlist and

Type	Description
	does not necessarily rotate to each available modality. An algorithm or instructor sets individual student schedules.
Flex	Most of the curriculum is delivered via a digital platform and instructors are available for face to face consultation and support.
Face to Face Driver	The instructor drives the instruction and augments with digital tools.
A La Carte (Self-Blend)	Students choose to augment their traditional learning with online course work. Online learning is remote, and traditional learning is in a brick and mortar school.
Online Driver	All curriculum and teaching is delivered via a digital platform and face to face meetings are scheduled or made available if necessary.

Note: Adapted from *The rise of K-12 learning: Profiles of emerging models.* By H. Staker, and M. Horn., 2012, Innosight Institute.

In locating the model used in the current study within the categories presented in Table 5, students could be described as having initially watched online lectures, collaborated in online discussions, carried out research at home, and then engaged in concepts in the classroom with the guidance of the instructor. Hence it would classify as a "Flipped Classroom" under the Rotation Model, a type of blended learning that reverses the traditional educational arrangement by delivering instructional content, often online, outside of the classroom and moves activities, including those that may have traditionally been considered homework, into the classroom (Abeysekera & Dawson, 2015).

Frameworks. Whereas implementation models provide a description of interrelationships between delivery formats, frameworks can provide an overarching structure needed to achieve a well sequenced and integrated course. Frameworks tend to be more prescriptive than models, showing relevant concepts and how they relate to each other, and can provide a theoretical rationale to justify both teaching decisions and explain research findings such as those found in Table 6 which are discussed shortly. In so doing, frameworks can inform the planning, implementation and evaluation of blended learning by indicating what concepts or key factors to take into account.

Cohesive design is often guided by a framework which provides direction with regard to the process of constructing knowledge. In their work, Glazer and Rhem (2012) describe instructional design as an intensive planning effort that includes consideration of many content and process issues related to the intended learning outcomes. In their view it is shaped at the conceptual level by assumptions, principles and purposes. Design begins with a holistic perspective of both environments which describes the assumptions and approaches to learning. This then provides a framework for principles and guidelines that shape the design process of choosing content, creating student learning activities of collaboration and interaction, and identifying assessment procedures. The planning process is further shaped at a practical level by educational and technical possibilities and constraints. The goal is to find a solution with the least compromise to the learners. A guiding framework allows the design process to bring into alignment the goals of education with the properties of the technology to realize an integrated learning experience.

A number of researchers have made a case for investigating how the process of developing integrated blended learning environments can further the goal of stimulating new approaches to content delivery. Several frameworks have been hypothesized for this purpose to provide direction and potentially avoid weak or unproductive designs. In a review of successful learning environments, Bransford, Brown and Cocking (2000) concluded that they all share certain characteristics. Well-designed pedagogical environments are learner-centered, knowledge-centered, assessment-centered, and community centered. Also known as the How People Learn (HPL) framework, it has spurred the work of other frameworks that consider the psychological, social, and developmental influences on blended learning. Alternatively, some researchers have chosen to focus directly on issues relevant to online pedagogy and processes. The Community of

Inquiry model for online teaching and learning (Garrison, Anderson & Archer, 2010) emphasizes the need to attend to various forms of online presence to achieve a cohesive learning experience. Among these are teaching presence, social presence and cognitive presence. Table 6 identifies several prominent frameworks used to provide evidence as to whether blended learning is truly a unique learning environment, or a simple combination of traditional face to face and online instructional approaches.

Table 6

Examples of Blended Learning Design Frameworks

Framework	Description
Kahn's Octagonal Framework Singh (2003)	A systemic understanding of eight factors can enable designers to create meaningful distributed learning environments: institutional (organizational, administrative, academic affairs); pedagogical (content delivered, learner needs, learning objectives); technological (Virtual Learning Environment, infrastructure support); interface design (usability, navigation, content structure); evaluation (assessment of learning); management (registration, scheduling of elements of blend); resource support (help); and ethical (equal opportunity, cultural diversity, nationality).
3-C Didactical Framework Kerres and De Witt (2003)	Any learning environment consists of three components: content (makes learning material available); communication (interpersonal exchange); and construction (guides individual and group activities to operate on learning tasks). Special emphasis is placed on the cost that is associated with different communication scenarios for the learner and must influence design decisions.
Constructivist Approach Rovai (2004)	Key elements of design and pedagogy suggested by research as promoting effective learning. Emphasizes presentation of content, instructor-student and student-student interactions, individual and group activities, and student assessment. Reflection on past experiences, interaction with other members of the learning community, immediate instructor behavior, authentic group activities, and diverse assessment tasks with timely feedback are underscored.
E-Learning Instructional Model Alonso, Lopez, Manrique	A psycho-pedagogical instructional model based on content structure, information processing psychology and social constructivism, and defines a blended approach to the learning process. Technologically speaking, the instructional model is

Framework	Description
and Viñes (2005)	supported by learning objects, a concept inherited from object-oriented paradigm.
3-C Conceptual Framework Stubbs, Martin and Endlar (2006)	A metaframework for assisting educational designers in creating coherent blended learning. The 3-C components include: Content (information, distribution), Communication (peer to peer; learner to tutor) and Construction (individual, cooperative). Calls for educational designers to be sensitive to their audience as well as the unintended and unanticipated consequences of their actions. Superimposes Kerres and de Witt's (2003) 3-C framework based on Anthony Gidden's (1984) Structuration Theory proposed as an appropriate tool for analysing and understanding human interactions with technologies. This perspective assumes that although a technology has particular material and cultural properties and is inscribed with its developers' assumptions and knowledge about the world at a point in time, it is only when it is used in recurrent social practice that it can be said to structure users' actions (Orlikowski, 2000)
Technological Pedagogical Content Knowledge (TPACK) Model Mishra and Koehler (2006)	Highlights complex relationships that exist between content, pedagogy and technology knowledge areas and may be a useful organization structure for defining what it is that teachers need to know to integrate technology effectively. Extends Shulman's (1986) idea of pedagogical content knowledge.
Four Dimensional Framework Verkroost, Meijerink, Lintsen & Veen (2008)	A four dimensional framework intended to produce a suitable mix of pedagogical methods for blended learning: structured (fixed pace versus student pace); learning context (individual versus group); face to face versus at a distance; self versus teacher directed learning. Extends Singh & Reed (2001); Troha (2003).
Six Dimensional Framework Chew & Jones (2010)	Involves consideration of a mixture of elements which fall along eight different sub-dimensions: media (tools, technologies and resources); chronology (synchronous and asynchronous interventions); locus (practice based versus class room based learning); roles (multi-disciplinary or professional groupings); pedagogy (different pedagogical approaches); focus (acknowledging different aims); direction (instructor-directed vs. autonomous or learner directed); and activity blend (learning and teaching activities, individual or group).

Blended learning frameworks such as those described in Table 6 are often adopted by researchers and are practiced for purposes of course development to help formulate testable hypotheses about the preconditions and activities likely to result in a successful course blend. This work recognizes the pragmatic value of informing instructional decisions through evidence-based approaches. In reviewing the articles presented in Table 6, it can be seen that some frameworks focus on technological aspects, others focus on social opportunities, and yet others attend to student diversity dimensions. Nonetheless, emphasized among the range of variables studied is the critical role of teaching in that each framework specifically addresses pedagogy or teaching factors as a key element in successful course delivery. The approaches highlighted in Table 6 provide evidence of potential pathways for pedagogical redesign which appears central to achieving successful integration between formats.

At this time, there is research to suggest there are limitations in the application of frameworks due to the newness of the field and rapid pace of change in technology which make such studies difficult to follow over time. One seminal review found that the literature is dominated by insider accounts of the introduction of blended learning in campus-based courses, generally using a learning management system and often including online discussions (Bliuc, Goodyear & Ellis, 2007). In their view, reports tend to be highly descriptive and factors that promote success are often hidden or implicit in concluding observations and recommendations. A perceived climate of atrophy and confusion has prompted some investigators to call for research into more pedagogical frameworks to better support teachers and address knowledge gaps (e.g., Bliuc, Goodyear & Ellis, 2007; Stacey & Gerbic, 2008).

Perhaps due to the absence of systematic, sustained research, a lack of theoretical fit with their own pedagogical views, or other possible variables, educators do not always adopt a

previously published framework for their own design process. The absence of a guide leaves course development more open to an exploratory approach to implementing, researching and evaluating blended learning. This was the case for the current study as the course was organized on the basis of constructivist pedagogy, as discussed in the next section (e.g., Rovai, 2004), without the benefit of an intermediating framework to guide course design, such as those described in Table 6.

Implications for Teaching

While the blended frameworks presented in Table 6 reflect a range of possibilities for stimulating new approaches to content delivery, they also provide evidence of the complexity associated with designing instruction for both online and face to face formats. The challenge that is repeatedly encountered and reflected in the literature is seeking to understand what teachers do very well and what machines do very well so that the strengths of both can be maximized in blended learning designs (Graham, 2013). Some research suggests the current popularity of blended learning is due to the fact that it provides a stable medium for both familiar face to face situations and new technological features (Boyle, 2007). In a similar vein, Levy (2005) stated that the field of blended learning is marked by a juxtaposition of new technology and old pedagogy. However, Salomon (2002, 2005) has warned of education systems' tendency to preserve existing practices whereby innovative technology is taken and domesticated in a way that it does more or less what its predecessors have done, but perhaps faster and a bit nicer. Since then concerns have been raised that the full potential of blended learning could be compromised by those not concerned with improving pedagogical quality (Garrison & Vaughan, 2008; Voss, Gruber & Szmigin, 2007; Vaughan, 2007). For blended learning to fulfill its promise, it is not sufficient to simply deliver old content in a new medium. It begins by questioning the dominance

of the lecture in favor of more meaningful learning activities and tasks. In studies reviewed by Heterick and Twigg (2003), typically, a large enrolment course replaces one or two lectures each week with any combination of online discussion groups, simulations, discovery labs, multimedia lessons, tutorials, assignments, research projects, quizzes, and digital content. These may be effectively facilitated by teaching assistants under the supervision of a professor. The professor then has more time to give to individual students and enhance the quality of the course through sustained course development and innovation as well as teaching development. Central to the transformative potential of blended learning is the need to reflect on how to redesign and deliver integrated content as most faculty and administration do not traditionally employ this approach to restructuring courses using technology (Garrison & Kanuka, 2004).

Pedagogical shift. The prevailing model of university instruction through the 1990s supported a transmission content-centered model of teaching which is associated with objective, positivist epistemologies. Knowles (1990) writes that the notion that knowledge is passed from teacher to student originated from assumptions created between the 7th and 12th centuries from the Monastic and Cathedral schools. The process of acquiring knowledge, where the teacher takes the responsibility for all learning decisions, was the sole pedagogic model and continued to be the favored method of instruction well into the 20th century (O'Byrne, 2010). There are good reasons for its longevity. The lecture format has many advantages: for instance, one person can present information to a large audience, it is an ideal format for auditory learners, and the action of note-taking during lectures aids concentration (Badger, White, Sutherland & Haggis, 2001). As well, good lectures are tailored to meet the requirements of the students, the content of the lecture can be easily updated, and it can provide human interaction (D'Allisandro, Kreiter, Erkonen, Winter & Knapp, 1997).

There are also disadvantages to the traditional lecture. It is constrained by location and time, tends to be teacher centred, the lecturer is required to have good delivery and communications skills, and enrolment is limited. There is no record of the interaction and this method assumes that all students learn at the same pace as their peers (Alberts, Murray & Stephenson, 2010). Despite these limitations, in 2001 the US Department of Education reported that 83 percent of instructors used the lecture as the predominant teaching strategy (Graham, 2006). Within the passage of time, there has been an increasing recognition by university institutions that the teaching provided must add something beyond the transmission of knowledge (O'Byrne, 2010). Adult learners are generally able to learn on their own and do so more or less successfully depending on inclination, need, and opportunity. What exactly should be added is a matter of debate. For faculty, blended learning can be viewed as a safer midpoint between the familiarity of face to face teaching and the often-unfamiliar online learning (COHERE, 2011). It can also reduce commuter time, increase flexibility, eliminate distance barriers, provide regular interaction, and maintain a large student audience while establishing personal rapport (Alberts, Murray & Stephenson, 2010). Available evidence shows that many students value both the richness of interactions in a face to face environment and the flexibility, convenience, and reduced costs associated with online learning (Graham, 2013).

However, research has also reported that online learning can be perceived by students as inferior to the face to face on campus learning experience. In their review of the literature, Alberts, Murray and Stephenson (2010) reported that disadvantages include feelings of isolation and loneliness. Some studies suggest that students partaking in an online course tend to "thrive or dive" as the students' grades were clustered at the extremes of very good or very poor. However, in face to face teaching, students either "thrived or survived" (Sapp & Simon, 2005). Other

possible disadvantages include higher performance anxiety leading to less enjoyment, access/server problems, and lack of hands-on experience. Also, the availability of online notes can lead to students using them as a complete replacement for attending lectures (Grabe, 2005). Rovai (2004) posits that at least part of the lower satisfaction of some students with distance education may be related to the online course design and pedagogy employed by some faculty. Dzuiban and Moskal (2011) add that it is the reframing of didactic possibilities from positivist to constructivist that can lead to success in blended learning.

Positivist versus constructivist. Distinguished from the lecturer transmitting accepted knowledge in traditional face to face teaching, "sage on the stage," or the role of instructor in traditional distance education, "guide on the side," the teacher in a blended environment is collaboratively present in designing, facilitating, and directing the educational experience (Chew, Turner & Jones, 2010). A research pattern emerging specific to blended learning supports the premise that it has provided many university educators with the opportunity and tools to move from a content-based curriculum based on a transmission model to a learning-centred pedagogy – what some educationists have labelled a "flipped" classroom paradigm (e.g., Staker & Horn, 2012). One of the primary reasons higher education is adopting blended learning is because of the pedagogical advantages it offers in terms of addressing the limitations of conventional classroom instruction (Twigg, 2003). The frequently cited *Seven Principles of Good Practice in Undergraduate Education*, as originally outlined by Chickering and Gamson (1987), has been shown to be a foundational guide in the translation of teaching principles from face to face to online learning (e.g., Chickering & Ehrmann, 1996; Graham, Cagiltay, Lim, Craner & Duffy, 2001). In blended learning, there is general consensus that pedagogical considerations should be given priority over technical issues (Chew, Turner & Jones, 2010). Early on, Jonassen (1994)

suggested that constructivism should be applied to distance education and proposed a design model which thinks less about providing instruction (the teaching paradigm) and more about producing learning (the learning paradigm). Since the early 1990s there has been a heightened awareness in Faculties of Education of the social nature of learning and a growing consensus on the positive effects of working cooperatively in groups (Abrami & Chambers, 1996). This change in focus has coincided with the developing prominence of the social constructivist approach to learning in the blended literature and in underpinning teaching strategies and approaches (Condie & Livingston, 2007). Constructivist theory postulates that:

> Knowledge is inseparable from the knowing subject and always retains a subjective or context bound identity. This contrasts with traditional positivist view that situated knowledge is an objective reality located outside the individual and validated by deductive reasoning and empirical theory. (O'Byrne, p.10)

Table 7 provides a summary of Rovai's (2004) differences in emphasis between traditional and constructivist pedagogy in higher education.

Table 7

Elements of Emphasis in Higher Education Traditional and Constructivist Learning Environments

Traditional	Constructivist
Instructional emphasis	
Teaching, knowledge reproduction, independent learning, competition	Learning, knowledge construction, collaboration, reflection
Classroom activities	
Teacher-centred, direct instruction, didactic, individual work	Learner-centred, Socratic, authentic, individual and group work
Instructor roles	
Expert, source of understanding, lecturer	Collaborator, tutor, facilitator, encourager, community builder
Student roles	
Passive, listener, consumer of knowledge, note	Active, collaborator, constructor of knowledge,

Traditional	Constructivist
taker	self-monitoring
Assessments	
Fact retention	Authentic knowledge application, portfolios, projects, performances

Note: Adapted from "A Constructivist Approach to Online College Learning", by A.P. Rovai, 2004, *Internet and Higher Education*, 7, p.81.

Table 7 demonstrates that, in adopting a constructivist approach, educators require not only knowledge of their subject, but also knowledge of the student. The paradigm shift about the nature of knowing has consequences for approaches to teaching. It impacts on relationships, alters the power structure, and requires changes in classroom organization as students become less reliant on the teacher as the primary source of support for learning (O'Byrne, 2010). Thus, the focus in the classroom shifts from teachers teaching to learners learning and from students as passive recipients to active creators of knowledge. Pockets of research have developed around specific applications of constructivism, including constructionism, anchored instruction, and problem-based learning. Many approaches in the constructivist vein have been realized in blended learning: cooperative learning, team based learning, just in time teaching, problem-based and case-based learning, and simulations; there is even room for the traditional lecture as long as it is not dominant (Glazer, 2012). Some educationists have complained of confusion around the complexity of theories and this has the capacity to provoke endless debates. In pursuit of clarification, many studies have focused on the pedagogical value of various teaching techniques from the educators' perspective (Barr & Tagg, 1995; Zoller, 2000), while others have reported on students' opinions (Feldman, 1988; Feldman, 1976). This study assumes the latter perspective in that learning is more likely to take place when students positively evaluate the learning experience (Feldman, 1988). The pedagogical data generated to date validates the importance of asking questions about new forms of teaching, and of conducting research from the students'

perspective to address those questions (Chew, Turner & Jones, 2010). By taking students' perspectives into consideration, the effectiveness of teaching practices could be explicated to guide the complex process of blended learning design.

Student perceptions. Generally, educators use student perceptions to gather feedback to identify the areas of strength and make improvements in teaching delivery. The term "feedback" in this respect refers to the students' opinions about the teaching they receive (Harvey, 2003). Research indicates this form of feedback can be a valuable source of information. For example, Hill (1995) found that student expectations in general and the expectations of academic aspects of higher education services, such as teaching quality, teaching methods, and course content in particular, are quite stable over time. There are studies that indicate the positive impact of meeting students' expectations on variables such as participation (Voss, Gruber & Szmigin, 2007), role clarity, and motivation (Rodie & Kliene, 2000). Relationships have also been established on the premise that more effective courses will produce greater student satisfaction and higher academic achievement. Systematic and extensive research into quality teaching in higher education has occurred since the 1970s which has found that student perceptions of key aspects of the learning context, such as the quality of the teaching, are closely related to satisfaction with the course experience (Ginns & Ellis, 2007).

While traditional, classroom-based studies have generated an established, student focused body of research, the collection of students' experiences of blended learning is comparatively more recent. Over the past 10 years, student feedback has been collected using a variety of methods. In some countries nationally organized and coordinated surveys have been introduced, such as the Australian Course Experience Questionnaire, the National Student Survey in the United Kingdom, and the National Survey of Student Engagement in the United States (Ellis,

Ginns & Piggott, 2009). As well, the Dziuban, Moskal, and Hartman (2005) collection of nearly 200,000 student surveys over seven years is extensive. There is research to suggest that blended learning approaches are effective and efficient and preferred by students over traditional forms of learning (Castle & McGuire, 2010; Farley, Jain, & Thomson, 2011; Martinez-Caro & Campuzano Bolarin, 2011; Paechter & Maier, 2010). A recent Canadian survey of student satisfaction in blended learning at York University reports several reasons for this result (Owston, York & Murtha, 2013). Because the delivery relies on a mix of online and face to face modalities, students perceive a number of positive benefits: unlimited accessibility; easier access to more information; it allows some learning to take place anytime anywhere; and it allows for self-pacing and a high level of student autonomy in regulating learning.

In addition to technological advantages, research has identified other components that lead to positive perceptions of blended learning. The findings generally yield that it is complicated and influenced by the expectations, goals, and preferences of the students (Bidder, Mogindol, Saibin, Andrew & Naharu, 2016; So & Brush, 2008; Wu, Tennyson & Hsia, 2010). In her formula of success factors for blended learning, Glazer (2012) explains that contemporary learners require active strategies to encourage participation. In a blended learning environment, students interact with each other, the content, and their own thoughts in both synchronous and asynchronous formats. The types of discourse facilitated through Internet tools provides a new platform where participants can confront questionable ideas and faulty thinking in more objective and reflective ways than might be practically possible in an exclusively face to face context (Garrison & Kanuka, 2004). As such, students need a way to take in information, but also to process it: they must check understanding, organize knowledge, and make connections with what they know in a more dynamic manner (Glaser, 2012). Similarly, Stacey and Gerbic

(2008) found students' learning maturity and readiness for blending learning, with its increased demands for independent learning, an important consideration to ensuring success. Learning in blended environments is also thought to require more self-discipline and self-motivation on the part of the learner (Mullen & Tallent-Runnels, 2006). As well, Vaughan (2007) reported a need to clarify student expectations, such as their ideas that fewer face to face classes mean less work, and the need for students to develop more responsibility for their learning and time management skills. Findings such as these illustrate the new "collaborator, tutor, facilitator, encourager, community builder" (Rovai, 2004, p.24) role of the teacher in a constructivist paradigm. Through a process of soliciting student perceptions of their course experience, consistent and transparent communication can be maintained around the new expectations needed in order to help students understand the blended process (Sharpe, Benfield, Robert & Francis, 2006).

When student feedback is utilized to inform practices and incorporate changes in teaching, the value of this approach becomes apparent when clarifying student issues that arise as a result of a new learning paradigm. Congruent with this idea, Sharpe and Benfield (2005) found that blended learning developments based on changes to traditional pedagogy evoked the most inconsistencies in student perceptions, particularly in how well students understood the teaching process. In a separate review of over 300 studies aimed to reveal evidence of the impact of blended learning on the student experience, Sharpe, Benfield, Roberts and Francis (2006) confirmed the importance of teaching delivery as an area worthy of continued investigation. Although there is some tendency to say that all factors in education form part of student satisfaction, even in traditional education we know some factors are more important than others. Other than the time flexibility provided by a blended format, the principle reasons that students give for high levels of satisfaction typically reside in the instructor's pedagogy and expertise

(Paechter, Maier, Macher, 2010). In their research collected over 16 years and consisting of over one million student surveys of early blended learning adopters at the University of Central Florida, Dziuban and Moskal (2011) reported that if students assigned an excellent rating to the instructor's ability to facilitate learning, then the probability of their assigning an overall rating of excellent to their course, approaches one (1.0). Such results leave little question that at the centre of the blended learning experience remains the students' perception of the teaching.

The Course Experience Questionnaire (CEQ)

While there are many potential sources of data on both teaching and course quality, one of the most frequently used is questionnaire feedback from students (Hoyt and Perera, 2000). Of the published instruments used to measure students' experiences of teaching, the CEQ has been extensively studied in the higher education context. The CEQ was developed with the assumption of a strong association between the quality of student learning and student perceptions of teaching. It is considered a valuable instrument for the purpose of improving the quality of teaching in universities (Griffin, Coates, McInnis & James, 2003). The specific theoretical and empirical basis of the CEQ instrument rests with the work of Ramsden and Entwistle (1981) and subsequent studies (e.g., Entwistle 1988; Ramsden, 1991, 2003; Ramsden, Martin & Bowden, 1989). Initial development of the CEQ used an item pool derived from the Course Perceptions Questionnaire (Ramsden & Entwistle, 1981), a subsequent School Experience Questionnaire (Ramsden et al., 1989), Experiences of Studying and Higher Education Questionnaire (Entwistle & Tait, 1989), and items developed from an analysis of open-ended student feedback. The results of these studies found that students were more likely to attempt to structure and understand the content of the course syllabus when they perceived the teaching to be clearly structured and helpful. Otherwise, they were more likely to adopt

minimalist approaches narrowly focused on assessment (e.g., rote-learning for examinations) under conditions of high workload and restricted choice over other methods and content of learning (Ramsden, 1991).

Although "good teaching" is undoubtedly complex, there was substantial agreement among these early empirical studies about its essential characteristics. Considerations such as concern for and availability to students; enthusiasm and interest of teachers; clear organization and goals; feedback on learning; the encouragement of student collaboration and active learning; an appropriate workload and relevant assessment methods; and the provision of a suitably challenging academic environment were among the key factors defining “good teaching” in higher education on which students were able to comment. On the strength of these preliminary studies, a national trial of a 30-item version of the CEQ (CEQ30) was recommended by the Australian Higher Education Performance Indicators Research Project (Ramsden, 1990). Further refinement of the 30-item instrument led to the development of a 23-item short-form version, the CEQ23, which is the most widely used version of the CEQ (Wilson, Lizzio & Ramsden, 1997). The strongest loading items from Ramsden’s (1991) analysis of the 30-item scale were retained to define the five subscales of the CEQ23: Good Teaching (6 items), Clear Goals and Standards (4 items), Appropriate Workload (4 items), Appropriate Assessment (3 items), and Generic Skills (6 items). A description of each scale follows:

(1) The Good Teaching scale measures respondents' perceptions of teaching standards. It focuses on teachers' feedback, motivation, attention, understanding of problems and skill in explaining concepts. High scores on this scale are associated with the perception that there are good practices in place, conversely lower scores reflect a perception that these practices occur less frequently;

(2) The Clear Goals scale measures respondents' perceptions of the clarity with which teachers communicated expected academic standards and course goals;

(3) The Appropriate Workload scale measures respondents' perceptions of the appropriateness of their course workloads. High scores indicate perceptions that workload levels were adequate but not so excessive so as to be detrimental to learning;

(4) The Appropriate Assessment scale measures respondents' perceptions about the extent to which assessment stresses the recall of information rather than other intellectual skills. High scores indicate that respondents perceived that skills other than recall were critical to successful academic performance;

(5) The Generic Skills scale measures respondents' perceptions of generic skill development (problem solving, communications, planning, team working) achieved in the course.

Both exploratory and confirmatory factor analyses of large multidisciplinary samples of undergraduate and graduate students from multiple universities have been used to establish the reliability and validity of the CEQ. For a review of this research literature, the reader is directed to review the work of Richardson (2005 a/b). Discriminant validity has also been demonstrated around the CEQ23 to differentiate between pedagogically distinct programs. It has been used with students in different academic departments on different degree programs to identify and compare students' perceptions of teaching (Wilson, Lizzio & Ramsden, 1997). The instrument has been implemented as a quality measure of teaching in university contexts worldwide and used as evidence for monitoring and evaluating the effects of curriculum change (Marsh, 1984; Ramsden, 1990, 1991; Richardson, 1994, 2005a/b; Wilson, Lizzio & Ramsden, 1997).

While the CEQ23 has been investigated across a wide variety of settings, its use with university students in a blended learning context has not previously been reported. The original CEQ was based on a theory of learning that emphasized the primary forces in the undergraduate experience as located within the classroom setting. However, concentrating analysis on what happens in the classroom fails to account for a significant part of the blended learning experience. As delivery modes expand and teachers increasingly search for improved ways of providing a quality higher education experience, an instrument limited to classroom interactions is increasingly inadequate (Griffin, Coates, McInnis & James, 2003). As discussed previously in the section on course integration, the current study takes a novel methodological approach to blended learning research by collecting teaching perceptions data specific to both delivery formats, face to face and online. To accomplish this, the CEQ23 was adapted to the blended learning context by developing additional, parallel items to solicit students' perceptions of the teaching in the corresponding online format. This information could then be used to determine overall course perception by format to compare these results to prior research (i.e., Wilson, Lizzio and Ramsden, 1997). Further details regarding parallel item adaptations to the CEQ23 leading to a revised Blended Learning Questionnaire (BLQ), are described in Chapter 3: Methods.

Section I Summary

A key objective of this section was to survey the issues and trends that arise in the blended learning literature to better describe and situate the present study within the broader research context. An influential body of work reveals that the term blended learning has been defined with considerable variation across institutional contexts likely owing to the fact that the landscape is still evolving within higher education. Based on the research reviewed, the course under study

can be described as a course-level blend using technology leveraged for course redesign purposes (i.e., transformative purpose blend), with a 50:50 ratio of virtual to live content, deployed via a VLE platform, and designed as a flipped classroom rotation model using front loaded content sequencing in order to coordinate online and face to face course modalities.

A second objective of this section was to review the pedagogical shift which has accompanied the influx of technology and expanded the range of learning experiences in higher education. A unique pattern emerging in the research specific to blended learning is that it has provided many educators with the opportunity to move from a content-based curriculum, based on a transmission model, to student-centred pedagogy. However, much ambiguity exists in the literature regarding the optimal integration of face to face and online components in different instructional situations. To attend to this gap, the current study will use an adapted version of the CEQ23 to solicit student perceptions of the teaching delivered in both formats, face to face and online, to determine their contribution to students' overall course perceptions. By taking students' perspectives into consideration, the effectiveness of new teaching practices may be explicated to guide the complex process of blended learning design.

Section II: Marketing

Introduction

This Section introduces relevant concepts from the marketing literature and illustrates their application to the higher education context. Prominent in the review is the repositioning of students as recipients of higher education services towards a consumer-oriented perspective. Disconfirmation theory is detailed which seeks to quantify the underlying importance ascribed by consumers to the quality of services received. A review of higher education research follows

which operationalizes the theory by linking students' perceptions of the quality of university services received, including teaching, to consumer satisfaction.

Service Quality

Massification. While the technology explosion holds the promise of breaking down barriers of time, space, access, and creativity in teaching, on the world stage there are growing segments of the workforce that now require the advanced education offered in postsecondary institutions in order to participate in the knowledge economy. A recent UNESCO report describes the phenomenon as the massification of higher education that is largely responsible for an academic revolution the equivalent of which has not been seen since the research university first evolved in 19th century Germany (UNESCO, 2009). In describing the upheaval, sociologist Martin Traw (2006) proposes there are three stages of developmental change in higher education worldwide: elite, mass, and universal access. Traw's position is that most nations, at varying times, will move toward mass participation in postsecondary education. As universities in North America realize the massification stage, some have coped with demand by addressing the need for expanded infrastructure and larger teaching staff. Other institutions wrestle with the implications of massification and diversity and are considering which subgroups are still in need to be served (Altbach, Reisberg & Rumbley, 2009). The expanding and increasingly diverse student body creates pressure to put in place new systems for innovative approaches to teaching. Higher education is now challenged with preparing an influx of students with new skills, a broad knowledge base, and a range of competencies to enter a more complex and interdependent world.

Student-as-consumer. The expansion of higher education to increase participation with an aim of creating a more educated workforce has led to competition between institutions. Students are increasingly positioned as consumers and institutions as working to improve the extent to

which they meet "consumer demands" (Molesworth, Nixon & Scullion, 2009). The idea of conceptualizing students as consumers rather than beneficiaries of higher education is not new. At the turn of the century, international organizations such as the Centre for Higher Education Research and the Information Quality Assurance Agency for Higher Education began to operationalize terms and phrases such as "consumers," "active participants," "co-producers," "partners," "community of learning" and "apprentices" to describe the relationship between universities and students, each with its own progressive agenda. Some reformists suggest the shift is long overdue and a result of monolithic institutions that have grown unresponsive to a changing student demographic – an apathy enabled through public funding and a lack of concern with delivering value (Modell, 2005; Elliot & Healy, 2001). More moderate perspectives consider the trend inevitable as many global institutions have preceded North America in reframing the relationship between students and higher education (Naidoo, Rajani & Jamieson, 2005). According to business communications scholars Cheney, McMillan and Schwartzman (2011), the metaphor of student-as-consumer offers promise for transforming higher education because of how it shifts attention to the needs of students and toward a curriculum which develops practical skills in addition to intellectual ones. Progress will involve developing new ways to engage students in their learning and to include their perspectives in the design and planning of quality assurance systems. The point is that higher education may be considered to be in the business of service provision, with students as their primary consumers (Hill, 1995).

Quality. While academic staff has traditionally played a central role in defining quality, as higher education becomes more oriented to the marketplace, traditional measures of quality are mutating (Harvey & Williams, 2010). According to O'Neill and Palmer (2004), the term "quality" did not exist in the lexicons of most universities until the recent massification gave way

to large-scale provision for a sizeable proportion of young people and, increasingly, non-traditional mature groups. For the most part, this has not been an easy transition with many educationists still questioning the legitimacy of a customer orientation and whether this approach is well suited to higher education (Emery, Kramer & Tian, 2001). Of course, pedagogically sound teaching can be consistent with a method of provision which is perceived as being student-friendly and high in the quality of student support offered. There is a growing realization that providing service excellence may represent the difference between business success and failure (Parasuraman, Zeithaml & Berry, 1994; Cronin and Taylor, 1992). A body of research exists that maintains the student experience and its improvement should be at the forefront of monitoring the quality of higher education (Douglas & Douglas, 2006; Joseph, Yakhou, & Stone, 2005). Accordingly, there have been widespread calls in the undergraduate literature to incorporate new approaches into evaluating teaching and new curricula that respond more effectively to the unique identities and diversity of students pursuing higher education (e.g., Maier & Macher, 2009; Owston, York and Murtha, 2013; Paechter, Wu, Tennyson & Hsia, 2010).

Satisfaction. If the services sector generally views quality as making a positive contribution to their competitive position, it follows that in a business such as higher education, where staff-student interaction is a major part of the total service offering, providing teaching excellence should occupy a position of prime importance (Slade, Harker & Harker, 2000). As students are increasingly positioned as consumers of higher education services, their satisfaction becomes important to institutions recruiting new students (Thomas & Galambos, 2004), and is a desired outcome in addition to learning (Joseph, Yakhou, & Stone, 2005). To understand satisfaction from a "student-as-consumer" perspective, then, requires some translation of what is meant by "service quality" in the higher education context. The quality assurance literature posits

a concise definition of services which are considered distinct from goods (Teas, 1994, Parasuraman, Zeithaml & Berry, 1994). Specifically, services are regarded as intangible which makes it difficult for consumers to evaluate the service before it is consumed. Services are consumed at the same time they are produced and cannot be stored; and the variation in human interaction and labor involved in service delivery renders each service act unique (Li & Kaye, 1988). A distinctive aspect of services is that consumers are often part of the production and delivery processes. In the case of higher education, some examples of student inputs may be undertaking the necessary advance preparation for lectures, asking questions during lectures, completing homework, and so on. Consequently, the quality of service provided will be influenced by the consumer's input.

As mentioned, the human interaction and labor dynamic involved in the delivery of services over time would be considered heterogeneous. In the case of teaching services, student perceptions would form on the basis of repeated transaction encounters based on class attendance from the beginning of a course through to its conclusion. Experiences from one lecture to the next will vary for each student, as well as between students. This means that perceptions of quality can vary from one transaction to the next within the same course and between respondents (Hill, 1995). Given this, there is general consensus that perceptions of quality result from the consumer's evaluation of accumulated interactions over a period of time (Hill, 1995; Li & Kaye, 1998). In this view, interactions between academics and students over the course of a term will aggregate to form an overall perception of teaching quality. This effect is mediated through positive or negative disconfirmation between two constructs: expectations and performance. In the case of students, if the teaching outperformed expectations, positive disconfirmation will result; in other words, the service is evaluated as satisfactory. If the teaching

fell short of expectations, negative disconfirmation will result, that is, the service is evaluated as unsatisfactory. This relationship is expressed in the literature as: *Service Quality* (Q) = *fn* [*Perceived Performances* (P)] – [*Expectations* (E)] (Parasuraman, Zeithaml & Berry, 1994).

Performance-Importance Analysis (IPA). Over the years, researchers have adopted a variety of techniques to operationalize use of the disconfirmation theory for research purposes, including both inferred and direct disconfirmation models (O'Neill & Palmer, 2004). The inferred method measures consumer expectations and perceptions of performance separately and seeks to estimate the size of any gap between the customer's expectations and the actual performance received. This produces a gap score which is a quality measure of how well the service has performed relative to what the consumer expected (Parasuraman, Zeithaml & Berry, 1994). Alternatively, direct disconfirmation measures seek to evaluate consumer perceptions only, thereby providing an absolute measure of performance. It is a measure of how the service has performed on the basis of the consumer's absolute level of satisfaction or dissatisfaction with the service received (Cronin & Taylor, 1992). The prevailing argument in favor of adopting the inferred approach is that consumers should have well-defined expectations concerning criteria that are important to them regarding the quality of services (Li & Kaye, 1998). In the case of this study, university students would be considered well-positioned to evaluate teaching quality after accumulating repeated exposures to transaction-specific interactions in the classroom.

Within the marketing literature, there is an ample body of research which adopts inferred approaches to estimate the size of the gap between the customer's expectations and the actual performance received. Pre-eminent among these studies has been the work of Martilla and James (1977) from which the Importance-Performance Analysis (IPA) method emerged. Based upon

disconfirmation theory, the IPA technique seeks to identify the underlying importance (consistent with expectations) ascribed by consumers to the various quality criteria of the service perceived (consistent with performance). According to Wright and O'Neill (2002), importance is viewed as a reflection by consumers of the relative value of the various quality attributes. It is this information which makes the technique suited to the task of directing improvement based on what is deemed most important by consumers. Lower importance ratings are likely to play a lesser role in affecting overall satisfaction (consistent with negative disconfirmation), while higher importance ratings are likely to play a more critical role in determining consumer satisfaction (consistent with positive disconfirmation). The objective is to identify which attributes or combinations of attributes are more influential to satisfaction and which have less impact. The information derived helps direct resources to areas where efforts to improve perceptions are likely to have the most effect on overall customer satisfaction (high importance, low perception ratings). It also has the benefit of pin-pointing which service attributes should be maintained at present levels (equal importance and perception ratings) and those on which significant improvement will have little impact (low importance, high perception ratings) (Lovelock, Patterson & Walker, 2001).

Within the literature, Oh and Parks (1998) have raised the issue of confusion among researchers between IPA constructs and their corresponding relationship to disconfirmation theory, with a number of studies using the terms perceptions and performance interchangeably (O'Neill & Palmer, 2011; Ortinau, Bush, Bush & Twible, 1989) and/or have used importance as a replacement variable for consumer expectations (Martilla & James, 1977; Oh, 2001) when measuring and interpreting quality. For clarification purposes, the relationships between

disconfirmation theory constructs and their alignment with IPA terminology as used in this study is shown below in Figure 1.

Figure 1. Conceptual Equivalents Between Disconfirmation Theory (Service Quality) and IPA Analysis

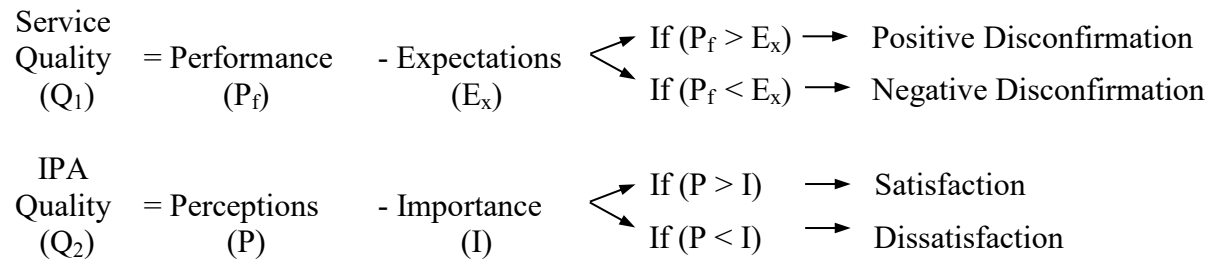

Figure 1. Algebraic representation of the theoretical relationships between Service Quality (Disconfirmation Theory) constructs (Q_1) and IPA satisfaction terminology (Q_2), where $Q_1 \approx Q_2$. Adapted from "Revisiting Importance-Performance Analysis" by H. Oh., 2001, *Journal of Tourism Management, 22*, 617-627.

This study adopts the IPA method (Martilla & James, 1977) to extend the scant research available, as discussed in the next section, to investigate the relationship between students' perceptions of teaching quality and course satisfaction. By soliciting students' feedback on the teaching experienced along the dimensions of perceptions and importance, the goal will be to identify which teaching qualities, or combinations, are most influential to satisfaction. Further details regarding rating scale adaptations to the CEQ23 leading to a revised Blended Learning Questionnaire (BLQ), are described in Chapter 3: Methods.

Applications in Higher Education

The following presents a review of studies conducted in the higher education context which use the disconfirmation approach to investigate students' experiences of the quality of various aspects of postsecondary services and their relationship to satisfaction.

Institutional satisfaction. Researchers Tan and Kek (2004) used the disconfirmation paradigm to determine which aspects of campus services offered at two separate universities in Singapore contributed most to institutional satisfaction. A questionnaire was developed based on a review of the quality literature (Harvey, 2002) which focused on educational services and student encounters. In line with the IPA approach, statements were constructed to ask students about their importance (expectations) of the item, as well as their perceived experience of the teaching (teaching performance). The sample included 497 completed questionnaires from University A, and 461 completed questionnaires from University B. An initial factor analysis with the gap scores was followed by multiple regression analyses which revealed five factors that accounted for 59% of the variation in satisfaction for University A, which were: "Course Quality," "Fair Assessment," "Learning," "Communicating with University Management," and the "Quality of University Facilities." For University B, 67.4% of the variation in satisfaction was explained by five factors: "Course Content," "Learning," "School Authority," "University Appearance" and "University Facilities." A detailed evaluation of gap scores (perceptions/performance – importance/expectations) indicated a range of predominantly negative gaps at both universities. For University A, the largest negative gaps occurred for the "Communicating with University Management" factor, with the item "Willingness of the university management to listen to the opinion of students," and the "Learning" factor, with the item "Channels for reflecting students' ideas," indicating the highest item-level gaps within the respective factor. For University B, the factor with the largest negative gap score was the "Learning" category, with the individual items "Channels for reflecting student ideas," and "Knowing what to expect from your course and tutor," indicating the largest gaps at the attribute

level. Overall, the authors concluded that meaningful gaps exist between students' perceptions and importance appraisals which can be used to improve service quality.

In a cross-cultural examination of student satisfaction with institutional services, Mai (2005) used an inferred method to examine differences in the perception of education quality, and the main factors affecting that perception, between students in the United Kingdom (UK) with students in the United States of America (US). A sample of 332 post graduate UK business school students, 184 UK students from 11 universities and 148 US students from 12 universities, completed a 20 item questionnaire which captured their perceptions of the quality of various institutional services offered. Sample items included "Lecturers expertise in their subject area," "Lecturers' interest in the subject matter," and "Quality and accessibility of the IT facilities." The design of the measurement for the independent variables was based on formula 5 (Grönroos 1982), which compares a person's perceptions of each service dimension with their expectation prior to the study, ranging from "Much better than I expected" = 5, "Better than I expected" = 4, "Somewhat similar to what I expected" = 3, "Worse than I expected" = 2, to "Much worse than I expected" = 1. Comparative results between country means indicated there were significant differences between British and American education as perceived by students, with UK students expressing significantly lower levels of satisfaction towards most items measured. Multiple regression analysis on the combined expectations scores revealed that the item "Overall impression of the quality of education" significantly predicted students' overall satisfaction. A subsequent analysis using "Overall impression of the quality of education" as the dependent variable revealed that the items: "Lecturers expertise in their subject area," "Lecturers' interest in the subject matter," and the "Quality and accessibility of the IT facilities," were significantly correlated with the criterion. The author concluded that findings were consistent with service

quality theory which suggests that satisfaction is a result of the perception of service quality, which implies that the US provided a better quality of education than the UK.

Researchers Joseph and Joseph (1997) used an IPA approach to ascertain 616 business students' perceptions of institutional quality at a large New Zealand university. A 20 item questionnaire was developed for the study. Section I dealt with students' perceptions of an excellent university; Section II dealt with the ranking of the most important attributes; Section III was concerned with students' perceptions of their own university; and Section IV collected background information on the participants. A factor analysis of the important choice criteria for students resulted in a model of seven factors including "Program Issues," "Academic Reputation," "Physical Aspects," "Career Opportunities," "Location," "Time" and "Other." The difference between the actual (perceptions) and ideal means (importance) for each of the seven categories was then calculated and all were negative except one for "Location." The list of factors was ranked in order of importance and used by the educational institution to determine whether they were allocating efforts in the areas that are considered important by student consumers. Subsequently, in comparing actual and ideal means of the subscale responses with regard to students' perceptions of their own university and that of an ideal quality university, poor performance for their university across the most important dimensions was found. The author's concluded that an importance/perceptions instrument to measure service quality in education can be used to track performance over a period of time, and performs as a current diagnostic tool to identify possible areas of concern that could lead to dissatisfaction.

Student services satisfaction. Khodayari and Khodayari (2011) used the disconfirmation approach to investigate the quality of student services provided to students attending university in Iran. A 22 item questionnaire was developed to capture 384 students' experiences of service

quality using IPA analysis. Perception minus importance scores per attribute were computed to identify quality gaps. Factor analysis was then used with the gap scores to identify five underlying service quality dimensions central to students in evaluating the services offered, including “Reliability” (ability to perform the service dependably), “Assurance” (knowledge and courtesy to convey trust and confidence), “Tangibles”, (physical facilities, equipment, personnel and communications materials), “Empathy,” (provision of caring, individualized attention) and “Responsiveness” (willingness to help and provide prompt service). Findings indicated that significant negative gaps were found in students’ perceptions of quality for four of the five factors, with the exception of “Assurance.” The authors concluded that the method can trace the trend of customer perceptions of quality and identify specific gaps in order to improve the overall level of service.

Researchers O’Neill and Palmer (2004) drew similar conclusions in their study of student perceptions of the quality of administrative support services offered by a large university in Western Australia. A total of 368 undergraduates completed a 22 item scale which queried their perceptions of the attributes listed on a five-point Likert scale, as well as the level of importance ascribed to each attribute on a similar scale anchored from low importance to high. Item examples included “Aesthetically pleasing environment,” “Interest in solving student problems,” and “Willingness to assist students.” A subsequent factor analysis of the perceptions items recovered three service areas, “Empathy,” “Process,” and “Tangibles.” An IPA analysis of each of the 22 attributes was used to examine students’ responses across individual items and by subscale. To highlight areas of actual concern from the student’s point of view, 22 paired samples t-tests revealed areas where mean perception scores differed from importance scores revealing a range of negative gap scores. The items were then organized by factor and mean gap

scores calculated. The results indicated the university seemed to be experiencing most difficulty with respect to the quality of "Empathy," which is reflective of the softer aspects of the institution's approach to dealing with students. Their study provides evidence of the practical value of the IPA technique in identifying how educational services are performing from the student perspective, and to pinpoint problem areas and target corresponding improvement efforts.

In an earlier study using student importance and perceptions ratings as they relate to an online library service offered at Cowan University in Western Australia, Wright and O'Neill (2002) used the IPA technique to investigate the core service quality dimensions of significance to students in using the service. Scales were developed on the basis of student perceptions scores that took the form of an 18 item questionnaire completed by 269 students which measured the service quality factors of "Reliability," "Assurance," "Tangibles," "Empathy," and "Responsiveness." Results indicated that the library was clearly under performing in relation to the provision of key library services, recording an overall mean performance which was statistically lower for perceptions than importance. Further analysis revealed the largest gaps for the "Reliability" factor, followed by "Responsiveness," and "Tangibles." The authors' demonstrated the relative ease with which the IPA technique is able to identify not only how a service is performing along a range of quality attributes, but also which attributes are deemed most salient and/or relevant by the student in the context of a particular educational service.

Course satisfaction. For educational services delivered at the course level, Marzo-Navarro, Pedraja-Iglesias Rivera-Torres (2005) investigated factors that determined satisfaction for undergraduate students attending summer courses offered by a Spanish university using a direct confirmation approach. A principal components analysis of 442 questionnaires based on

questions related to perceived aspects of the courses such as teaching methods, materials handed out, the planning, etc., revealed the existence of a common 3-factor structure. Of the components that acted as explanatory variables, the component that grouped together the aspects directly related to "Teaching Methods" (course administration, teaching methods, and teaching staff) explained 44.7% of the variation in course satisfaction. Marzo-Navarro et al. (2005) concluded that those aspects related to the characteristics that a good professor should have are those that determine, to a large extent, the satisfaction with the course taken. The teaching method used, the level at which the students were treated, their content, the capacity of the professor to put him/herself in the student's place, those elements directly associated with teaching, were the elements that mainly determined satisfaction.

A University of Ottawa study investigated the impact of teaching attributes on student satisfaction using the disconfirmation approach. In selecting an inferred method, Guolla (1999) created statistically derived importance scores to investigate the impact of students' perceptions of teaching factors on course and instructor satisfaction. A total of 164 undergraduate and MBA students completed an end of course questionnaire which was used to determine the relative impact of seven perceived teaching factors ("Learning," "Enthusiasm," "Organization," "Interaction," "Rapport," "Assignments," and "Material") on instructor and course satisfaction. Results indicated that all seven factors explained 74% of the variance in course satisfaction, and 67% of the variation in instructor satisfaction. Using Partial least squares analysis (PLA), Guolla (1999) was able to rank the impact of all quality measures on course satisfaction from highest to lowest in order to determine the relative priority or importance of each factor. For the course satisfaction criterion, the "Learning" factor was found to have the greatest impact on satisfaction, followed by "Enthusiasm," and "Organization." In contrast, for the instructor variable,

"Enthusiasm" had the greatest impact on instructor satisfaction, followed by "Learning." The author highlighted the strengths of using importance data to provide direction on which teaching factors needed improvement, and what factors were less critical to satisfaction.

Researchers Li and Kaye (1998) investigated the relationship between quality measures and approaches to teaching in higher education at the University of Portsmouth. Their study examined the influence of two methods of measuring perceived teaching quality, the IPA approach (Q = P - I), and a perceived performance only approach (P), on students' overall course satisfaction. A 26 item questionnaire was administered to 138 undergraduate students enrolled in a civil engineering course, and 123 undergraduates enrolled in a mathematics course. The two samples approach was used to provide a cross validation throughout the model-testing process. The study found that both approaches showed a significant relationship between teaching predictor variables and overall course satisfaction, with the perceptions only approach explaining more of the variation in satisfaction (35%) compared to the IPA approach (14%). The authors concluded that the perceptions only approach provided a methodological advantage as it was simpler to administer and was a better predictor of satisfaction. However, they also found that the IPA approach was a better diagnostic tool for identifying large service gaps in order to direct improvement efforts in the areas of "Teaching" and "Advising" for both groups.

Last, Ortinau, Bush, Bush, and Twible (1989) used IPA analysis to investigate the quality of marketing education offered at a large southeastern US university. A 14 item questionnaire was developed based upon four distinct areas of the course described as "Course Content," "Textbook," "Professor", and "Student Self-Related" attributes. Responses from 146 undergraduate students enrolled in a marketing course were collected which solicited the degree of importance associated with each item as well as the actual performance (perceptions)

responses. The rating results were then plotted in matrix format where each item consisted of a pair of coordinates, with importance ratings along the y-axis and perceptions along the x-axis. The axes' intercept was placed at the mean of the importance and perceptions ratings. The 14 attribute coordinates were plotted in a grid format. The item results were spread over three quadrants, with items falling in quadrant 1 (low perception, high importance) highlighting areas of concern for "Course Content" (items 4, 5), "Textbook" (item 14), "Professor" (item 20), and "Student-Self" (items 21, 24, 25, 26) categories. The authors concluded that to develop strategies which will lead to academic courses of higher quality, university administrators and faculty members must first identify the strengths and weaknesses of the critical dimensions of a course. The article focused on how IPA analysis can serve as an easily applied technique for reducing the difficulties in translating faculty-course performance results into meaningful actions.

Section II Summary

A key objective of this Section was to introduce important concepts from the marketing literature and discuss the links between service quality theory and its applicability to the higher education context. Formative research conducted within the marketing field has established that quality performance exceeding some form of standard leads to satisfaction while performance falling below this standard results in dissatisfaction. Referred to as the disconfirmation paradigm, the goal is to identify which quality attributes, or combinations, are more influential in satisfaction and which have less impact. This study will extend the research gathered on use of the IPA method in university settings by adapting the CEQ23 to solicit student perceptions of teaching, as well as the level of importance attributed to each attribute. In obtaining teaching quality data, educators and course designers can identify service shortfalls and use this information to allocate resources to improve teaching quality.

A second objective was to review relevant marketing services research which makes use of the disconfirmation paradigm, and more specifically the IPA method, to investigate the determinants of student satisfaction with various aspects of postsecondary services. Findings revealed the approach has been used to address questions related to student satisfaction with an institution's overall perceived quality, to applications related to specific university services, such as library or student services, as well as course level applications. The latter illustrated findings that the quality delivered by teaching is an essential element in student satisfaction which is the focus of this study. A consistent finding throughout the review was on the usefulness of the IPA approach in reducing the information gathered to provide a coherent message for decision making.

Chapter Summary

This chapter set out the findings from the educational psychology literature and marketing research to inform the three research questions posed in Chapter I. Key findings from both disciplines were used to inform modifications to the data collection instrument used in the current study, the CEQ23. Based on the blended learning literature, the CEQ23 was adapted by developing parallel items to solicit students' perceptions of teaching in both delivery formats. As well, in accord with the marketing literature and IPA analysis, the CEQ was further modified to include importance rating scales (I), as well as perception rating scales (P). Details regarding rating scale modifications to the CEQ23 leading to a revised Blended Learning Questionnaire (BLQ) are described in Chapter 3: Methods.

Chapter 3 sets forth the methodology used in this study, including a discussion of the research design, variables, population sample, instrumentation, and ethical considerations.

Chapter 3: Method

Introduction

This chapter focuses on the method of the study and is divided into four sections: research design, data source, measures, and data analyses relevant to the conduct of the study.

The purpose of this study is to explore the contribution of teaching factors to student satisfaction in a blended learning course (Research Question #1). Secondary aims include investigating the psychometric properties of a new measurement tool, the Blended Learning Questionnaire (BLQ), for capturing student feedback about teaching (Research Question #2), as well as establishing the usefulness of the importance/performance dimension of the BLQ to measure the effectiveness of blended learning teaching practices and curriculum change (Research Question #3).

Research Design

This study is a correlational analysis of existing data to identify course-level teaching factors that are associated with students' satisfaction in blended learning. Correlation is a description of the relationship or association between or among variables. Correlations cannot be interpreted as evidence for causation and this represents an inherent limitation in the design (Creswell, 2005). Because the data have already been collected and are readily available from another source, the study incorporates secondary data analysis. Secondary analyses of data sets involve the use of existing data, collected for the purposes of a prior study, in order to pursue a research interest which is distinct from the original work by studying an alternative perspective on the original question (Glaser, 1963; Goodwin, 2012).

The data for this study were obtained from the Digital Learning Pilots: Research and Development (DLP:R&D) project, a survey-based research study which was initiated in January

2013 at the University of Alberta and continued until July 2014. The DLP:R&D project developed a Blended Learning Questionnaire (BLQ) for surveying students' satisfaction (i.e., expectations and perceptions) with teaching at the end of their blended course experience. As was mentioned previously, most secondary data analyses use the data differently than was originally intended in order to answer a new research question; this has been identified as a design weakness (Creswell, 2005). However, the present study is strengthened by the fact the data are analysed to serve a similar purpose as for the original project but with greater detail and depth. As part of the DLP:R&D project, pilot courses were initiated in the Faculty of Education which focused on the development of blended learning courses intended to combine both face to face and online learning components. In total, five courses in the undergraduate teacher education program underwent blended delivery conversions which were offered to large sections of undergraduate students. By studying the BLQ survey data already collected for a single course in greater detail and depth compared to the previous project (DLP:R&D), this study is designed to offer a better understanding of the teaching factors associated with student satisfaction at the end of their blended course experience than has previously been done.

Data Source

Sample. Of the five courses available for data analysis, the course selected for this study had the highest questionnaire completion and return rate. The sample consisted of undergraduate Faculty of Education students at the conclusion of a blended learning course scheduled in Winter Term 2014 at the University of Alberta. Based on a total course enrolment of 287 students, 198 participating students returned the BLQ. More specifically, 20 questionnaires were returned incomplete and 178 were returned fully completed for a response return rate of 69%.

Course description. The course in which students participated and that forms the basis of the present study included content based on elementary and secondary educational applications of psychology and met core curriculum and instruction requirements for undergraduate students enrolled in a Bachelor of Education program. In alignment with the literature review, the course blend can be described as using a 50:50 ratio of virtual to live content deployed via a Moodle platform. A flipped classroom rotation model with front loaded content sequencing was used in order to coordinate face to face and online modalities. One instructor delivered the face to face class sessions and moderated the online content of the course. The class met in face to face sessions for 80 minutes once per week coupled with 80 minutes of planned virtual content each week. The full length of the course was 12 weeks.

Procedures. In the original survey-based research design the BLQ data were collected by paper and pencil format on conclusion of the course according to ethical standards reviewed by the Institutional Review Board of the University of Alberta to ensure reduction of risk to participations. Permission for use of the data used in this study was granted by the Principal Investigator, Dr. Patricia Boechler, for secondary analyses.

Student data from the BLQ were imported into the Statistical Packages for the Social Sciences (SPSS) version 19 from the Microsoft Excel data file provided to the researcher. The file contained the following information: Project IDs, Demographic Data, and 198 participant responses to the BLQ questionnaire. On inspection of the data, 20 student questionnaires contained missing data points and thus were excluded from further analysis. The final data set used in this study contained 178 fully completed BLQs.

Measures/Materials

Participant demographics (Appendix A). For the purpose of describing the sample, basic demographic information was collected from participants, including the following: Gender, Student Status, Type of Degree, Year of Program, Prior Blended Courses Taken, Employment Status, Level of Proficiency with Course Technology, and Anticipated Course Grade. It should be noted that student Grades Assigned in the course were unavailable for analysis.

The Blended Learning Questionnaire (BLQ) (Appendix B). The BLQ was designed to measure students' expectations and perceptions of undergraduate teaching delivered in blended learning by measuring both aspects of the instructional environment, face to face and online, as well as students' satisfaction with the course as a whole. The final form of the BLQ has the following structure: the obverse of the questionnaire presents students with a set of 14 questions about their expectations and perceptions of the teaching in the face to face format. Each item captures an expectation and perception responses from each respondent: (a) their level of agreement with the item (Performance or Perception), and (b) the importance of the item (Importance or Expectation), using a 5-Point Likert-type response scale, Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5). On the reverse of the questionnaire students are asked to repeat the rating process for a set of 14 questions about teaching factors in the online environment. The reverse side also includes a question designed to have students rate their overall level of Course satisfaction using a single, 5-Point Likert-type scale.

The mean of all 28 BLQ items for the sample under study was $M = 3.64$ ($SD = 1.07$). Skewness (-0.61) and Kurtosis (0.17) values indicated respondents' scores on this measure were sufficiently normally distributed (Bandalos & Finney, 2010). Since the current study represents the first analysis of the BLQ data, there is no published reliability or validity data available for

the instrument. However, the author was involved in developing the original survey tool used in the primary collection of the data which involved item design and pilot study. This information is relevant to understanding the theoretical considerations underlying the BLQ design for data analysis purposes. Further details regarding instrument development are described in the following subsections.

BLQ development based on CEQ23. The items for the BLQ questionnaire were developed by the DLP:R&D project team and adapted from the 23 item, short-form Course Experience Questionnaire (CEQ23) (Wilson, Lizzio & Ramsden, 1997). As discussed in the literature review, the CEQ23 is an instrument designed to measure students' experiences in response to teaching in higher education institutions. The instrument is comprised of five subscales derived from an extensive program of research which addresses matters of Good Teaching, Clear Goals, Appropriate Assessment, Appropriate Workload, and Generic Skills. The psychometric properties of the five subscales of the short-form CEQ23 and their defining items are shown in Table 8.

Subscale Characteristics of the Original CEQ23

Scale	Defining/Illustrative item	Cronbach alpha
Good Teaching	Teaching staff normally give helpful feedback on how you are doing (6 items)	0.88
Clear Goals	You usually have a clear idea of how well you are doing and what's expected of you (4 items)	0.76
Appropriate Workload	The sheer volume of work to finish in this course means you can't comprehend it all thoroughly (negative) (3 items)	0.69
Appropriate Assessment	Staff seem more interested in testing what you've memorized that what you've understood (negative) (4 items)	0.70
Generic Skills	This course has helped develop my ability to work as a team member (6 items)	0.77

The advantages of using the CEQ23 as a basis for item development of the BLQ in the present study include the theoretical foundation underlying the CEQ23 -- its concision and prior identification of core dimensions of student perceptions of traditional forms of university teaching. However, substantive changes were made in the development of the BLQ in order to adapt the original CEQ23 questions for the current study. The changes are described in the following paragraphs.

First, updated wording as well as the formulation of new questions to better align with the blended learning pedagogy were made in keeping with the literature review conducted in Chapter 2. As the overall goal of a blended learning experience is to provide a mix of both online and face to face experiences which support each other in achieving desired outcomes, the revision included the development of items specific to both "parts" of blended learning, online and face to face formats (Ginns & Ellis, 2009; 2007). As part of this effort, a set of two, roughly parallel questions were generated from each of the original CEQ23 items, one pertaining to teaching in the face to face format, and the other pertaining to the online format (See Appendix C). Table 9 provides an example of each of the original subscales and their new defining items for each aspect of the blended format.

Table 9.

CEQ23 Item Revisions: Blended Learning Format

Subscale	Original CEQ23 Defining/Illustrative Item	BLQ Face to Face Defining/Illustrative Item	BLQ Online Defining/Illustrative Item
Good Teaching	Teaching staff normally give helpful feedback on how you are doing	I received teacher feedback about my learning during class which helped me understand the subject better	I received online feedback about my learning which helped me understand the subject better (5 items)
Clear Goals	You usually have a clear idea of how well you are	I had a clear idea of where each class was	Guidelines for using online resources were

Subscale	Original CEQ23 Defining/Illustrative Item	BLQ Face to Face Defining/Illustrative Item	BLQ Online Defining/Illustrative Item
	doing and what's expected of you	going	clear to me (3 items)
Appropriate Workload	The sheer volume of work to finish in this course means you can't comprehend it all thoroughly (negative)	Instructional time was designed effectively for classroom learning	The amount of online material we studied was appropriate (2 items)
Appropriate Assessment	Staff seem more interested in testing what you've memorized than what you've understood (negative)	Classroom assessment activities helped me to learn effectively	Self-assessment activities helped me to learn effectively (2 items)
Generic Skills	This course has helped develop my ability to work as a team member	Classes helped develop my ability to work as a group member	Online work encouraged collaboration with other students (2 items)

Second, based upon the theoretical work of Parasuramen, Zeithaml, and Berry (1994), Martilla and James (1977) recommend that a *gap score* be calculated to measure students' perceptions of the *quality* of teaching provided in a blended course. A gap score is the difference between a respondent's perceptions of the teaching delivered (or what Parasuramen et al. term a consumer's performance rating) and the relative importance (or what Parasuramen et al. term a consumer's expectation) assigned to overall satisfaction with teaching. To be specific, this study adopts the IPA approach to evaluating teaching quality which is defined as the degree and direction of discrepancy between students' perceptions of teaching and their ratings of the level of importance for each teaching attribute. A positive gap value means that perceptions (P) exceeded importance (I); in other words, students are satisfied with their experience of the teaching ($P > I$). In contrast, a negative gap value indicates that importance (I) exceeded perceptions (P); in other words, students are dissatisfied with their experience of same ($P < I$). This approach to evaluating quality (Martilla & James, 1977) was used to alter the original single response scale for the BLQ. One dimension of the rating scale probed for perceptions of

performance on teaching (P) in the BLQ, whereas the other probed for ratings of importance of the attribute (I) to student satisfaction.

Pilot study of BLQ design. A pilot study of the BLQ was conducted during fall term 2013. A total of twelve (12) second and third year undergraduate students enrolled in the Faculty of Education were recruited through the DLP:R&D research initiative to help clarify question wording and reduce any redundancies. Volunteers were selected on the basis of having completed at least one prior blended learning course within the Faculty of Education. Volunteers were asked to identify any problems on the questionnaire, such as poorly worded questions, questions that did not make sense in a blended learning context, if questions seemed redundant or repetitive, or if it took an excessive amount of time to complete the BLQ instrument. Written comments were made directly on the survey. No data were formally analyzed as the intent of the pilot study was to formatively evaluate the data collection tool.

Based on this pilot feedback, 9 sets of parallel questions were removed from the original 46-item BLQ (23-questions for each format – face to face and online) on the basis of student comments indicating extraneous or repetitive content. Given the data collection demands associated with two response scales per item, a 9-item reduction in the total number of items was considered to be reasonable to prevent respondent fatigue. The final 28-item BLQ (14 face to face questions; 14 online questions) was reviewed by three professors in the Faculty of Education who instructed blended learning courses in order to obtain preliminary evaluation of the content validity of the BLQ. As a result of this effort, negatively worded items were revised to positive worded items as the negative items were deemed confusing in the context of both rating scales; thus all questions were positively worded in the final BLQ phrasing. With this

revision, the instructors approved the relevance of the BLQ as covering the concept of student expectations and perceptions of teaching in a blended learning environment (Appendix B).

Study Variables

The present study explores several key variables. The first variable is format modality or delivery of teaching, namely, online versus face to face. The second set of variables involve the BLQ, namely, the teaching perception/performance scores (P), the teaching importance scores (I), the gap scores that involve the difference between perception and importance, and the overall Course satisfaction scores. It is critical to note that the performance and importance ratings used to create quality/gap scores (G) are derived variables calculated by applying the expression G = P – I for each teaching attribute or item on the BLQ. The observed (P) and (I) variables are hypothesized to be dependent on format modality. It is further hypothesized that students' perceptions (P) of teaching responses to the BLQ items are influenced by underlying latent constructs consistent with Wilson, Lizzio and Ramsden's (1997) original five factors of good teaching found using the CEQ23, namely Good Teaching, Clear Goals, Appropriate Workload, Appropriate Assessment, and Generic Skills.

Data Analysis

Preliminary analysis. The accuracy of data entry was first assessed by selecting a random sample of 20% (n = 36) of cases and manually comparing the values entered into the database with those recorded by the student on the paper BLQ questionnaire (Kazdin, 1998). Of 11,570 data points scrutinized (178 questionnaires with 65 data points each resulting from 28 data points for the face to face format, 28 data points for the online format, one satisfaction question, and 8 demographic data points), all data were found to have been entered correctly. Based on this finding, no additional cases were selected for inspection. Descriptive statistics for

each item included in the BLQ were then examined to identify items with little or no variability. Data were screened for univariate outliers using a z-score criterion of more than +/- 3 standard deviations from the mean (Bandalos & Finney, 2010). No multivariate outliers were identified by calculating Mahalanobis D^2 with a set criterion of a $p \leq .001$ (Osborne & Overbay, 2004) to avoid spurious variability. In the next section, the analysis used to answer each research question is outlined beginning with research question 2 as it was explored before tackling research questions 1 and 3.

Research question 2. Following the recommendations of Bandalos and Finney (2010), an initial inquiry into the psychometric properties of students' perceptual (P) responses to the BLQ questionnaire was conducted using Confirmatory Factor Analysis (CFA) using Mplus version 7.11. CFA is a statistical technique used to verify the factor structure of a set of observed variables which allows testing of hypotheses about the latent constructs underlying the relationship among observed variables (Brown, 2015). As the original five factors of the CEQ23 provided an obvious a priori model structure, an initial CFA was conducted using robust maximum likelihood estimation (MLR). Contingent on the results of this five-factor model, a second two-factor model was tested based on the format modality dimensions (face to face or online) underlying the BLQ items. Several key fit indices were selected in order to test if the theoretical models fit the data: chi-square, comparative fit index (CFI), and root-mean-squared error of approximation (RMSEA). First, a chi-square value of 0 (perfect fit) indicates no difference between values in the sample variance-covariance matrix and the reproduced variance-covariance matrix based on the specified theoretical model. Second, CFI rescales the chi-square value into a 0 (no fit) to 1.0 (perfect fit) range, with values greater than .90 considered to be indicators of good fitting models. RMSEA uses the square root of the mean-squared

differences between the sample variance-covariance matrix and the reproduced variance-covariance matrix to compare the fit; good models have RMSEA values that are between .05 and .08 (Schumacker & Lomax, 2010). Based on the adequacy of CFA results, a decision was made to also run an Exploratory Factor Analysis (EFA).

Using the Statistical Package for the Social Sciences (SPSS) Version 19, EFA was conducted to explore the factor structure of the BLQ questionnaire items. EFA is a statistical method used to describe variability among observed, correlated variables in terms of a potentially lower number of unobserved variables called factors. EFA is often used after CFA when the theoretical basis for the factor model is weak (Bandalos & Finney, 2010). Following Costello and Osborne's (2005) recommendations for conducting EFA, principle axis factoring with oblique rotation was employed to reduce the dimensionality of the BLQ. Using an iterative process, "problem items" were identified and removed one at a time. The factor matrix with the greatest simple structure that was clearly interpretable based on theoretical considerations was retained. Cronbach's coefficient alpha, which evaluates the consistency of participants' responses to items believed to measure the same construct, was calculated for each subscale identified based on EFA results. Coefficient alphas greater or equal to 0.70 are considered satisfactory and those greater than or equal to 0.80 are deemed good (McCrae, Kurtz, Yamagata & Terracciano, 2011). After identifying factors, subscale scores were used in a multiple regression analyses to respond, in part, to research question 1.

Research question 1. This research question was addressed by conducting two separate multiple regression analyses. First, students' perceptions (P) of teaching were used to predict course satisfaction. Secondly, students' perceptions of teaching quality (G = P – I) were used to predict course satisfaction. In describing the first inquiry, the enter method was used to

determine the relationship between BLQ teaching perceptions subscale scores identified using EFA for predicting students' overall satisfaction. Prior to conducting these analyses, relevant distributional assumptions were checked including: (1) reliability of measured variables, (2) multivariate normality of variable distribution, (3) linearity and homoscedasticity, and (4) absences of multicollinearity (Osborne & Waters, 2002). For the analyses, the enter method was chosen as no a priori hypothesis was identified for determining which subscale scores would be most strongly predictive of students' overall satisfaction. Following the full regression analysis, a forward stepwise analysis was performed to find out the individual contribution of each subscale score to overall satisfaction (Field, 2013).

In describing the second inquiry, after completing the IPA analysis described in Research Question 3 below, a separate stepwise regression was performed which included students' importance (I) ratings as well as their perceptions (P) scores to explore the predictive value of students' perceptions of teaching quality (Q = P – I) towards course satisfaction to respond in the second part to Research Question 1. To describe the size of the associations, Cohen (1992) gives the following guidelines based on his *d* index: small effect $r = 0.10$; medium effect $r = 0.30$; and large effect $r = 0.50$.

Research question 3. To determine how importance ratings influenced students' perceptions of teaching quality, gap scores were explored at the item level for each format modality using the difference between importance and performance (G = P – I). All subscale items were analyzed using 27 paired-samples t-tests in order to identify significant gaps at the item level. Bonferroni's correction was used to reduce the likelihood of Type I errors by dividing the critical *p* value (α) by the number of comparisons being made (α/n = .05/27). Scores were considered significant if the corresponding *p* value was ≤ .002. Using IPA analysis, the

items were then shown graphically to present the results. The graph is represented by the importance (expectancy) values on the vertical axis, while perceptions (perceived performance) values are represented on the horizontal axis, with mean values for perceptions and importance representing the crosshairs (Martilla & James, 1977). The items were plotted into one of four teaching quality quadrants according to their mean and relative importance in order to identify stronger and weaker teaching attributes.

Ethical Considerations

Ethical considerations were considered for this study and were minimal regarding potential risk to participants. Special permission was obtained from Dr. Patricia Boechler to analyse and present the Blended Learning Questionnaire (BLQ) data. In the original survey-based research design the primary data were collected according to ethical standards and reviewed by the Institutional Review Board of the University of Alberta to ensure reduction of risk to participations.

Chapter Summary

This chapter presented the methods used in this study. Included were a discussion of the research design and use of secondary data for the project, as well as the procedures employed, variables of interest, description of the data source, adaptations to the instrumentation, and ethical considerations. Chapter 4 sets forth the findings of the study within the framework of each of the three research questions posed in this chapter.

Chapter 4: Results

Introduction

The research questions guided the data design, analysis and interpretation of results. The findings and results are presented in several parts. First, student perceptions of the teaching performance within their course experience are presented. Descriptive statistics and frequency analyses of the Blended Learning Questionnaire (BLQ) are provided to explore the ways in which students responded to the items. Second, because the BLQ has a theoretical structure, an initial analysis focused on the psychometric properties of the BLQ using confirmatory factor analysis (CFA), followed by exploratory factor analysis (EFA) to explore how items are related to reveal factor structure. After identifying the factor structure, a reliability analysis of each of the subscales or factors is presented. Third, multiple regression analyses are used to identify the perceived teaching factors that help predict students' overall course satisfaction using the factors recovered from EFA. Fourth, an IPA analysis (i.e., difference between importance and perceptions ratings)[Martilla & James, 1977] is conducted at the item level for both face to face and online formats. Last, a second stepwise regression analysis is conducted with the teaching quality factors recovered from IPA analysis which is then compared to the predictive value of teaching perception factors toward explaining students' course satisfaction.

Participant Demographics

Of the 178 participants, 73% of the respondents were female and 33% were male, with a majority of the respondents reporting full time student status (98%). The variability of degree programs listed in Table 10 is representative of program offerings in the Faculty of Education, with a majority of students indicating current enrollment in a four-year degree program (73%), followed in frequency by the two-year after degree program (18%), and the remainder (8%) in a

five-year combined degree program. As well, the majority of students enrolled in the course were senior level students in program year 3 or higher (90%). The majority of students were employed while enrolled as full time students (70%), and worked an average of 17 hours per week.

With respect to the students' prior experiences with blended learning courses, almost half (41%) indicated they had never taken a blended course before, with the remainder (59%) reporting having taken one or more prior blended courses. The majority of students reported being skilled to very proficient in levels of technology use (76%), with the remainder reporting somewhat less skill level (24%). No students indicated difficulties with the technology used in the course. Lastly, students rated their anticipated grade in the course, with the majority estimating grades in the B- to A+ range (76%) and the remainder expecting a passing grade of C- to B- (24%). Table 10 presents the demographic distribution of participants.

Table 10

Demographic Distribution of Participants

	Frequency (n)	%
Age		
17-23	136	73.0
24-29	36	19.0
30+	15	8.0
Gender		
Female	126	67.0
Male	61	33.0
Student Status		
Full Time	183	98.0
Part Time	4	2.0
Degree Program		
Elementary Education	84	45.0
Secondary Education	53	28.0
Five Year Combined	16	9.0
After Degree	34	18.0
Year of Program		
1	1	0
2	18	10.0

	Frequency (n)	%
3	82	44.0
4+	52	28.0
After Degree	34	18.0
Employment Status		
Not employed	57	30.0
Employed	130	70.0
If Yes, Avg. Hrs/Week	17	
Prior Blended Courses Taken		
None	77	41.0
1	64	34.0
2	30	16.0
3 or more	16	9.0
Proficiency with Technology		
Not Proficient	2	0.0
Somewhat Skilled	43	24.0
Skilled	82	44.0
Very Proficient	60	32.0
Anticipated Course Grade		
A- to A+	51	27.0
B- to B+	92	49.0
C- to C+	44	24.0
D- to D+	0	
Other (i.e. audit)	0	

Descriptive Statistics

Descriptive statistics for students' perceptions ratings are presented first in Tables 11 through 16 in accord with the educational psychology literature (Guolla, 1999; Ramsden, 1991; Wilson, Lizzio and Ramsden, 1997), and for ease-of-reference to the psychometric exploration of students' perceptions of teaching which is addressed in the first analyses. Conversely, descriptive statistics for students' importance ratings are presented separately in Table 24 for placement proximity in the context of the IPA analysis in accord with the marketing literature (Martilla & James, 1977).

This section presents students' responses to the perceived teaching attributes by focusing on groupings of items that were considered similar on a priori grounds. Previously described

research using the CEQ23 consistently found a five-factor structure for the instrument consisting of: (1) Good Teaching, (2) Clear Goals, (3) Appropriate Workload, (4) Appropriate Assessment, and (5) Generic Skills (e.g., Ramsden, 1991; Wilson, Lizzio and Ramsden, 1997). Tables 11 through 16 show the descriptive statistics for each of these factors as they pertain to the BLQ and quality of teaching in a blended learning context. It is important to note that the five-factor structure is not yet determined for the BLQ but the descriptive statistics are presented nonetheless in Tables 11 through 16 for comparison purposes with past research.

For Tables 11 through 16, the mean and standard deviation are displayed by item for each of the five factors (e.g., Good Teaching). Moreover, for each item, the percentage of students who disagreed ("Disagree" and "Strongly Disagree" responses) are aggregated, the percentage who were neutral ("Neutral" category) are presented exclusively, and the percentage of students who agreed ("Agree" and "Strongly Agree" responses) are also aggregated.

Table 11

Descriptive Statistics for BLQ Items Focusing on "Good Teaching" in a Blended Context

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
FACE TO FACE						
1a.	A variety of methods were used to explain course content	3.92	.965	9	12	79
2a.	Classroom teaching considered current developments in the field	4.08	.875	6	12	82
3a.	I received feedback about my learning during class time which helped me understand the subject better	3.16	1.034	24	39	37
4a.	Attending classes helped make the subject more interesting	3.65	1.188	19	16	65
5a.	Classroom teaching approaches seemed responsive to individual student needs	3.32	1.041	22	31	47
ONLINE						
1b.	The online materials were good at explaining things	3.62	.890	9	31	60

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
2b.	There was a lot of choice in how to complete the online activities	2.44	1.127	58	24	19
3b.	I received helpful online feedback about my learning	2.93	1.071	34	35	31
4b.	The online materials were designed to try to make topics interesting	3.19	1.122	27	26	47
5b.	The teaching team had a strong presence in the online part of the course	3.62	1.081	13	28	58

The items in Table 11 focus on students' perceptions of qualities related to face to face and online "Good Teaching." Within the face to face format, students generally perceived the teaching positively, with all recorded mean values above 3. Students most positively endorsed that a variety of teaching methods were used, and that teaching approaches were current and relevant to their future careers (Items 1a and 2a). However, students were least positive about the amount of feedback provided during class time (Item 3a).

Compared to the face to face format, student perceptions of "Good Teaching" were less positive in the online delivery. For example, two mean values below 3 were recorded in the "Good Teaching" category. Students were most negative about the amount of choice available to complete activities (Item 2b), and about the amount of feedback they received about their online learning (Item 3b). They were most positive about the quality of the online materials (Item 1b) and the presence of the teaching team in the virtual aspect of the course (Item 5b).

Table 12

Descriptive Statistics for BLQ Items Focusing on "Clear Goals" in a Blended Context

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
FACE TO FACE						
1a.	Classes seemed to have a logical buildup of knowledge	4.28	.866	5	5	90

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
2a.	I had a clear idea of where each class was going	3.78	1.067	15	17	68
3a.	Classes helped clarify my understanding of the online part of the course	3.60	1.159	18	18	64
ONLINE						
1b.	There seemed to be a logical buildup of knowledge in the online work	3.77	.876	7	26	67
2b.	Guidelines for using online resources were clear to me	3.85	.980	11	17	72
3b.	Learning materials were important for understanding the face to face situations	3.20	1.203	31	22	47

The items in Table 12 related to "Clear Goals" and were generally found to elicit more positive responses for the face to face teaching format than the online delivery format. Within the face to face setting, respondents were most positive about the degree to which the classes built on prior knowledge (Item 1a). Respondents were least positive about the clarity of goals articulating the class-based and online components (Item 3a). In the online environment, students were comparably negative about the connection between their online learning materials and the face to face situations (Item 3b). However, they endorsed positive ratings for the clarity of guidelines for using online resources (Item 2b).

Table 13

Descriptive Statistics for BLQ Items Focusing on "Appropriate Assessment" in a Blended Context

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
FACE TO FACE						
1a.	I generally found class time to be intellectually challenging	2.95	1.181	36	29	35
2a.	It was clear how class activities were related to assessment	3.56	1.091	20	20	60

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
ONLINE						
1b.	The online resources and materials were generally challenging	3.05	1.065	25	36	39
2b.	Self-assessment activities helped me to learn effectively	3.06	1.001	25	44	31

The items in Table 13 related to Appropriate Assessment and again appeared to lead to disparate responses between delivery formats. In the face to face format, students were most positive about how class activities were related to assessment (Item 2a). However, the level of intellectual challenge appeared lowest during the class-based portion of the course (Item 1a). In the online environment, students were fairly neutral about the level of intellectual challenge offered online, as well as the quality of self-assessment activities (Items 1b and 2b).

Table 14

Descriptive Statistics for BLQ Items Focusing on "Appropriate Workload" in a Blended Context

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
FACE TO FACE						
1a.	Instructional time was designed effectively for learning	3.66	1.076	14	21	65
2a.	The pace of classroom instruction was suited to learning the material	3.69	1.071	16	18	66
ONLINE						
1b.	The amount of online material we covered was appropriate	3.44	1.132	22	18	60
2b.	I had enough time to understand the things I had to learn online	3.82	1.113	13	18	69

The items in Table 14 related to "Appropriate Workload" and were rated positively by students across both teaching delivery formats. Within the face to face format, the pace of learning received the highest endorsement (Item 2a), followed by the effectiveness of

instructional design in the classroom (Item 1a). In the online format, students viewed the pace of online learning (2b) positively; followed by the amount of material covered (Item 1b).

Table 15

Descriptive Statistics for BLQ Items Focusing on "Generic Skills" in a Blended Context

No.	Item	Mean	S.D.	Likert-type scale response (%)		
				Disagree	Neutral	Agree
FACE TO FACE						
1a.	The classroom atmosphere encouraged students to share ideas	4.17	.950	7	12	81
2a.	Classes helped develop my ability to work as a group member	4.11	.994	9	10	81
ONLINE						
1b.	Interactions with students on eClass helped clarify some of my own ideas	2.82	1.023	30	47	23
2b.	Online work encouraged collaboration with other students	2.77	1.200	43	28	29

The items in Table 15 indicated the largest discrepancy in item responses between formats with responses favoring the face to face teaching environment. In the face to face setting, students strongly endorsed that the classroom provided an atmosphere of collaboration and support (Items 1a and 2a). Within the online environment, both values fell below 3, with respondents endorsing fewer positive perceptions about the level of collaboration with other students in the virtual environment (Item 2b), as well as the quality of online interactivity (Item 1b).

Table 16

Descriptive Statistics for BLQ Items Focusing on Overall Blended Learning and Course Outcomes

Item	Mean	S.D.	Likert scale response (%)		
			Disagree	Neutral	Agree
I am satisfied with this course	3.64	1.078	13	23	63

Table 16 focuses on respondents' generally positive experience with the blended learning course as a whole, with well over half the students indicating satisfaction. This item was not measured separately for each of the delivery formats.

In summary, these descriptive results indicate some differences in perceptions between online and face to face teaching in a blended learning environment. In general, it appears that students responded more favorably to the face to face teaching format. For example, 13 of 14 items for the face to face format (93%) fell above the value of 3.0; however, for the online format, only 10 of 14 items (71%) were above 3.0. Although no tests have at this point been conducted to evaluate the statistical significance of these mean differences, an inspection of the item means for the face to face and online formats do reveal evidence that students may be less satisfied with teaching in the online format. With regard to students' overall combined course experience, students indicated mostly positive perceptions with well over half (63%) indicating they were satisfied with the blended course. However, this single global item may be masking important concerns with the online teaching component of the course that is being revealed in the item-level responses.

Psychometric Properties of the Blended Learning Questionnaire (BLQ)

Confirmatory factor analysis (CFA). A CFA was conducted to determine whether the five-factor structure found for the CEQ23 might also describe the factor structure of the BLQ, which was derived from the CEQ23. CFA is designed to uncover latent traits that can explain variation in item level (observed) responses, and can also lead to the creation of subscales based on factors found for the instrument. In this way, CFA can provide statistical evidence that the theoretical basis followed in designing the BLQ is empirically recovered based on the observed item clustering that corresponds to the different factors (Bandalos & Finney, 2010). Additional

evidence of validity would need to be generated from samples with different characteristics to ensure the instrument worked as expected across distinct populations.

Preliminary analysis. Screening for univariate and multivariate outliers was conducted prior to analysis. No univariate outliers were identified using the criteria of z-scores greater than +/- 3 standard deviations from the mean. Also, no multivariate outliers were identified by calculating Mahalanobis D^2 with a set criterion of $p \leq .001$ (Osborne & Overbay, 2004).

CFA of BLQ. Because the BLQ was developed based on the CEQ23, confirmatory rather than exploratory factor analysis was initially conducted to test whether the five-factor structure associated with the CEQ23 could be identified for the BLQ (Bandalos & Finney, 2010). The five- factor structure included: (1) Good Teaching, (2) Clear Goals, (3) Appropriate Assessment, (4) Appropriate Workload, and (5) Generic Skills. A CFA of the BLQ, using robust maximum likelihood estimation (MLR), a method appropriate for ordinal observed variables was conducted. The five-factor theoretical model was found to not provide adequate fit to the observed data as the fit indices failed to reach the recommended cut-offs [(RMSEA (0.102); CFI (0.670); $\chi^2 = 974.446$, $p < 0.05$)]. On the basis of the rejection of the five-factor structure, a two-factor model was then considered as the BLQ differed in an important way from the CEQ23, namely, the CEQ23 comprised items reflecting a single teaching format (face to face), whereas the BLQ comprised face to face and online teaching items. However, this two-factor model also did not provide an adequate fit to the observed data [(RMSEA (0.097); CFI (0.723); $\chi^2 = 932.5$, $p < 0.05$)] and was rejected.

Although with CFA, any item that does not fit the measurement model due to low factor loadings should be removed from the model, neither the five-factor nor the two-factor model was modified in these analyses as their respective fit indices suggested relatively poor fit and should

be re-specified. A further investigation of a possible nested model with two higher order factors, namely, face to face and online, each with subscales corresponding to the original five factors of the CEQ23 was not explored due to inadequate sample size ($n < 200$) (Schumacker & Lomax, 2010). Given the poor fit found for the five-factor and two-factor models to the data and no further theoretical basis with which to specify a model, the focus of the analysis shifted to identifying the factor structure for the BLQ using exploratory factor analysis (EFA).

Exploratory factor analysis (EFA). EFA was conducted to identify the factor structure of the BLQ. EFA is often used after CFA if the a priori modelling results in misfit (Bandalos & Finney, 2010).

Preliminary analysis. The factorability of the 28 BLQ items was examined. First, a sample size of 178 was deemed adequate given the 28 variables to be included in the analysis (Gorsuch, 1983). Descriptive statistics for each item included in the BLQ were examined to identify items with little or no variability. Such items are not suitable for factor analysis. The results of the Kaiser-Mayer-Oklin measure of sampling adequacy indicated, with a value of 0.88, that the proportion of variance among variables was acceptable, and Bartlett's test of sphericity, approximate $\chi^2 = 2{,}358.74$, $p < .001$, confirmed that the variable correlation matrix was not an identity matrix and thus EFA was appropriate for this sample and scale items.

EFA – 28 items. An EFA of the 28 BLQ items was conducted using principal axis factoring with oblique rotation (Costello & Osborne, 2005). Eigen values greater than 1 (Guttman's rule) and the Scree test indicated a five-factor solution (Bandalos & Finney, 2010). This solution appeared to be relatively consistent with the five-factor structure of the CEQ23. Upon inspection, however, many BLQ items were found to load on different factors than those originally proposed for the CEQ23 and/or did not show simple structure. More specifically, the

first factor found for the BLQ contained the majority of items; the second, third, and fourth factors each had three items that cross loaded across two or more factors; and the fifth factor contained only one item with a loading over 0.4. Tabachnick and Fidell (2007) recommend item loadings of at least 0.3 as these suggest at least 10% shared variance with other items loading on the same factor.

Given the pattern of loadings, this initial five-factor EFA solution was deemed theoretically uninterpretable. Consequently, a two-factor solution was then considered given that BLQ items were designed to measure both online and face to face teaching delivery. Another EFA of the 28 BLQ items was conducted with two factors specified to extract. The two-factor pattern matrix revealed that the first factor combined a majority of items designed to measure face to face teaching, and the second factor captured a majority of items intended to assess online teaching. Further evaluation and revision of this two-factor model resulted in seven items being eliminated as they presented cross-loadings and did not contribute to simple structure. In particular, two face to face items: “It was clear how class activities were related to assessment,” and “Classes helped develop my ability to work as a group member” presented factor loadings above 0.4 on the online teaching factor, which was theoretically difficult to interpret. Likewise, four online items cross-loaded on the face to face teaching factor: “There seemed to be a logical buildup of knowledge in the online work,” “Guidelines for using online resources were clear to me,” “Learning materials were important for understanding the face to face situations” and “The online resources and materials were generally challenging.” As well, one online item: “The online materials were designed to try to make topics interesting” failed to load above 0.3 on either scale. A final EFA was done on the remaining 21 items. The factor loading matrix for the final solution is presented in Table 17.

Table 17

Pattern Matrix: Exploratory Factor Analysis of the BLQ - 21 Items

21 Items (n=178)	Face to Face Teaching	Online Teaching
A variety of methods were used to explain course content	.747	
Classroom teaching considered current developments in the field	.696	
I received feedback about my learning during class time which helped me understand the subject better	.436	
Attending classes helped make the subject more interesting	.720	
Classroom teaching approaches seemed responsive to individual student needs	.542	
Classes seemed to have a logical buildup of knowledge	.850	
I had a clear idea of where each class was going	.601	
Classes helped clarify my understanding of the online part of the course	.671	
I generally found class time to be intellectually challenging	.570	
Instructional time was designed effectively for learning	.734	
The pace of classroom instruction was suited to learning the material	.646	
The classroom atmosphere encouraged students to share ideas	.662	
The online materials were good at explaining things		.413
There was a lot of choice in how to complete the online activities		.413
I received helpful online feedback about my learning		.739
The teaching team had a strong presence in the online part of the course		.436
Self-assessment activities helped me to learn effectively		.563
The amount of online material we covered was appropriate		.584
I had enough time to understand the things I had to learn online		.459
Interactions with students on eClass helped clarify some of my own ideas		.405
Online work encouraged collaboration with other students		.567

Item loadings below .30 are not included.

The results in Table 17 illustrate a two-factor solution for the BLQ. The first factor accounted for 34.3% of the item variance, and the second factor accounted for 8.4% of the variance. No items had communalities below 0.30 and all loaded to reveal simple structure. The

conceptual meaning of the two factors can be best described as “Good Face to Face Teaching” and “Good Online Teaching” as the first factor contained 12 items designed for the face to face teaching format, and the second factor contained nine items designed for the online teaching format. This pattern supports a two factor solution for the BLQ questionnaire, “Face to Face Teaching” and “Online Teaching” as the dominant underlying dimensions for the BLQ.

Internal consistency reliability. The items loading on each of the two factors (subscales) found to underlie the BLQ were evaluated for their internal consistency using coefficient alpha. The coefficient alpha values for the two subscales were 0.81 and 0.91, respectively for the face to face and online scales (see Table 18). No meaningful improvements to the internal consistency of subscales were identified if any one item was removed. Descriptive statistics for the subscales are presented in Table 18.

Table 18

BLQ –Two Factor Solution Descriptive Statistics (n = 178)

	No. of Items	Mean	(SD)	Skew	Kur-tosis	Coefficient Alpha
Face to Face Teaching	12	3.71	1.019	-.798	.580	.91
Online Teaching	9	3.21	1.052	-.274	-.248	.81

EFA - Subscale analyses. Given that the BLQ items tended to load on one of two latent variables, Face to Face and Online, an EFA was separately conducted for face to face and online items to test whether the five-factor structure associated with the CEQ23 could be found for each delivery format of the BLQ.

EFA - Face to face items. An EFA was conducted with all 14 face to face BLQ items using principal components analysis with oblique rotation. Since the face to face items are derived from the original CEQ23 which is purported to contain five subscales, several pattern

matrices for two, three, four, and five factors were considered. The three-, four-, and five-factor solutions were deemed uninterpretable as multiple items did not load on the proposed factor and/or did not reveal simple structure. More specifically, the three-factor solution considered indicated the second factor included three items each from different proposed CEQ23 subdomains. The four-factor solution resulted in no items loading on the third factor. The five-factor solution indicated that no items loaded on the third factor and only one item loaded on the fourth and fifth factors. Use of Guttman's rule and the Scree test produced a two-factor solution which provided the best fit of the data. On inspection of this solution, one item "Classes helped develop my ability to work as a group member" was eliminated from further analysis because it represented a single item on the second factor. Thus, the final EFA was run with the remaining items which resulted in a single, unrotated factor. The factor matrix for this solution is presented in Table 19.

Table 19

Factor Matrix: Exploratory Factor Analysis of the BLQ –Face to Face Items

13 Items (n=178)	Good Face to Face Teaching
I generally found class time to be intellectually challenging	.789
Instructional time was designed effectively for learning	.750
The pace of classroom instruction was suited to learning the material	.735
Classroom teaching approaches seemed responsive to individual student needs	.718
Attending classes helped make the subject more interesting	.701
Classes helped clarify my understanding of the online part of the course	.700
I received feedback about my learning during class time which helped me understand the subject better	.691
A variety of methods were used to explain course content	.660
Classes seemed to have a logical buildup of knowledge	.627
I had a clear idea of where each class was going	.625

13 Items (n=178)	Good Face to Face Teaching
Classroom teaching considered current developments in the field	.609
It was clear how class activities were related to assessment	.583
The classroom atmosphere encouraged students to share ideas	.525

Item loadings for single factor are shown.

The results in Table 19 indicate a single factor solution for the face to face items of the BLQ. The factor accounted for 45.4% of the face to face item variance. No items had communalities below 0.30 and all loaded as expected. The conceptual meaning of the factor can best be described as overall "Good Face to Face Teaching" as it contained all 13 teaching aspects of face to face teaching questions with the exception of the one eliminated item "Classes helped develop my ability to work as a group member." The other four CEQ23 factors corresponding to "Appropriate Assessment," Appropriate Workload," "Clear Goals," and "Generic Skills" were not recovered. This pattern supports a single factor solution "Good Face to Face Teaching" for the face to face portion of the BLQ.

EFA – Online items. A second EFA was conducted with all 14 online BLQ items. Several pattern matrices for two, three, four, and five factors were explored based on the five-factor structure of the CEQ23. The two-, four-, and five-factor solutions were again found to be uninterpretable as multiple items did not load on the intended factor and/or did not maintain a simple structure. More specifically, the two-factor solution indicated that one item did not load and two items cross loaded above .4. The four-factor solution resulted in only one item loading on the final or fourth factor. The five-factor solution revealed that only one item loaded on the fourth and fifth factors. Use of Guttman's rule and the Scree test indicated a three-factor solution which provided the best model fit to the data and produced an interpretable model of the original measure. The pattern matrix for this final solution is presented in Table 20.

Table 20

Pattern Matrix: Exploratory Factor Analysis of the BLQ – Online Items

14 Items (n=178)	Good Online Teaching	Appropriate Online Workload	Appropriate Online Assessment
The online resources and materials were generally challenging	.708		
Interactions with students on eClass helped clarify some of my own ideas	.557		
There was a lot of choice in how to complete the online activities	.552		
Learning materials were important for understanding the face to face situations	.532		
The online materials were designed to try to make topics interesting	.521		
The teaching team had a strong presence in the online part of the course	.458		
I had enough time to understand the things I had to learn online		-.771	
There seemed to be a logical buildup of knowledge in the online work		-.649	
The amount of online material we covered was appropriate		-.573	
Guidelines for using online resources were clear to me		-.422	
The online materials were good at explaining things		-.409	
I received helpful online feedback about my learning			.569
Online work encouraged collaboration with other students			.515
Self-assessment activities helped me to learn effectively			.507

Values below .30 suppressed

The results in Table 20 indicate a three-factor solution for the online BLQ items. The first factor accounted for 30.3% of the online item variance, the second factor accounted for 7.3% of the variance, and the third factor accounted for 5.3% of the variance. No items had

communalities below 0.30 and all loaded to show simple structure. The first factor included six items with the majority of items interpreted to measure good teaching, the second factor included five items with the strongest loadings interpreted to measure appropriate workload, and the third factor captured three items primarily interpreted to measure appropriate assessment. These are similar to three of the factors from the CEQ23 subscales; Generic Skills and Clear Goals were not recovered. This result supports a proposed three factor solution for the online portion of BLQ with the following three factors: "Good Online Teaching," "Appropriate Online Workload," and "Appropriate Online Assessment."

Internal consistency reliability. A reliability analysis of the four BLQ subscales recovered using EFA indicated near less than adequate to good internal consistency as measured by coefficient alpha, ranging from 0.62 to 0.91 (see Table 21). No meaningful improvements to the internal consistency of subscales were identified if any one item was removed. Descriptive statistics are presented in Table 21.

Table 21

BLQ –Four Factor Solution Descriptive Statistics (n = 178)

	No. of Items	Mean	(SD)	Skew	Kur-tosis	Co-efficient Alpha
Good Face to Face Teaching	13	3.70	1.021	-.774	.490	.91
Good Online Teaching	6	3.09	1.088	-.261	-.455	.79
Appropriate Online Workload	5	3.73	0.973	-.671	.186	.75
Appropriate Online Assessment	3	2.95	1.072	-.024	-.522	.62

In summary, findings support that the BLQ can be conceived of as having either two subscales or four subscales. For the two-factor solution, the BLQ can be used to assess two general aspects of teaching quality, Good Online Teaching and Good Face to Face Teaching. For the two-factor solution, 7 of 21 items were eliminated with only one factor from the original

five-factor CEQ structure proposed by Wilson et al. (1997) retained for each teaching format. Good internal consistency was demonstrated for each of the two subscales. For the four-factor solution, the BLQ can be used to assess four facets of teaching quality, Good Face to Face Teaching, Good Online Teaching, Appropriate Online Workload, and Appropriate Online Assessment. However, the internal consistency of the 3-item Appropriate Assessment subscale is weak at 0.62. One of 14 items was eliminated from the single face to face subscale; and none of the items were eliminated from the three-factor online subscale. Satisfactory internal consistency was demonstrated for the face to face subscale and two of the three online subscales.

Multiple Regression Analysis of Teaching Perceptions on Satisfaction

The next analysis focused on exploring the predictive value of the BLQ teaching perception factors toward explaining students' overall course satisfaction. A comparison of the EFA solutions indicated that the four-factor BLQ explained slightly more of the variance (1%) as follows.

Preliminary analysis. To reduce the number of predictors in the regression analysis, four subscores were created based on the perception ratings that loaded on each of the subscales or factors: (1) Good Face to Face Teaching, (2) Good Online Teaching, (3) Appropriate Online Assessment, and (4) Appropriate Online Workload. Prior to conducting multiple regression analyses, distributional assumptions of the data were tested (Tabachnick & Fidell, 2007). First, the sample size of 178 was deemed adequate given the Pedhazur and Schmelkin (1991) recommendation of a participant to predictor ratio of 30 to 1. An analysis of standard residuals was also carried out which showed that the data contained no outliers (i.e., Std. Residual Min = -3.010, Residual Max = 2.429). The assumption of collinearity was met as collinearity statistics were all within accepted limits: Tolerance levels are recommended to be no more than .10 and

corresponding Variance Inflation Factor (VIF) less than 10. The subscale predictors met these criteria as follows: Good Face to Face Teaching, Tolerance = .513, VIF = 1.949; Good Online Teaching, Tolerance = .453, VIF = 2.209; Appropriate Online Workload, Tolerance = .652, VIF = 1.533; Appropriate Online Assessment, Tolerance = .720, VIF 1.388. The data also met the assumption of independent errors as the Durbin-Watson value, which measures the correlation of the residuals and ranges from 0 to 4, was not substantially below 2 at 1.680. The histogram of standardized residuals indicated that the data contained approximately normally distributed errors, as did the normal P-P plot of standardized residuals that showed data points hovering around the line. The scatterplot of standardized residuals showed that the data met the assumptions of homogeneity of variance and linearity. Finally, the data met the assumption of non-zero variances (i.e., Face to Face Good Teaching = .530; Online Good Teaching = .586; Appropriate Online Workload = .481; Appropriate Online Assessment = .659).

Full model analysis. Since no a priori hypothesis was made to determine the order of entry of the predictor variables, the default enter method was used for the regression analysis. The four subscale predictors produced an adjusted R^2 of .58, F (4, 173) = 62.452, p = .001, for accounting of the variance on students' overall course satisfaction. A model that explains 58% of the variance represents a large effect size. The results are presented in Table 22.

Table 22

Multiple Regression Analysis of the Four BLQ Teaching Perceptions Subscale Factors Contributing to Overall Course Satisfaction

Variables	CS[a] (DV)	F-GT	O-GT	O-AW	O-AA	*B*	*SE B*	β
Face to Face Teaching (F-GT)	.699					.674	.100	.458***
Online Teaching (O-GT)	.633	.671				.227	.101	.162*

Variables	CS[a] (DV)	F-GT	O-GT	O-AW	O-AA	*B*	*SE B*	*β*
Online Workload (O-AW)	.556	.487	.505			.290	.093	.187**
Online Assessment (O-AA)	.433	.280	.468	.430		.196	.076	.148**
Constant						-1.132	.328	
R^2								0.59
$R^2_{adjusted}$								0.58
Mean		3.71	3.09	3.73	2.95			
SD		.728	.766	.694	.812			

Note *$p < .001$, **$p < .01$; ***$p < .05$; [a]CS = Course Satisfaction

As shown in Table 22, all four predictors had significant partial effects in the full model: Good Face to Face Teaching ($\beta = .458$, $t[173] = 6.738$, $p < .001$); Good Online Teaching ($\beta = .162$, $t[173] = 2.243$, $p < .05$); Appropriate Online Workload ($\beta = .187$, $t[173] = 3.111$, $p < .01$); and Appropriate Online Assessment ($\beta = .148$, $t[173] = 2.589$, $p < .01$)]. For each of the four predictors the proportion of uniquely explained variance was computed by adding the squared semi-partial correlations (unique variance). Shared variance was then calculated by subtracting the uniquely explained variance from R^2 (Tabachnick & Fidell, 2007). Together, these four predictors shared 26% of the explained variance and uniquely predicted 32% of the variance in course satisfaction.

Forward stepwise analysis. In accord with Field (2013), a forward stepwise analysis was then conducted to determine the individual contribution of the four predictors to overall course satisfaction. An analysis of the four predictors into one model resulted in an adjusted R^2 of 58%. The results are presented in Table 23.

Table 23

Forward Regression Analysis Model of the Four BLQ Factors Predicting Course Satisfaction

Variables Entered By Steps	R^2	Adjusted R^2	*SE B*	Change Statistics		*β*
				R^2 Change	*F* Change	

Variables Entered By Steps	R^2	Adjusted R^2	*SE B*	Change Statistics		β
				R^2 Change	*F* Change	
Face to Face Teaching (F-GT)	.489	.486	.100	.489	168.246	.458*
Online Assessment (O-AA)	.550	.545	.076	.061	23.708	.148**
Online Workload (O-AW)	.579	.572	.093	.029	12.066	.187**
Online Teaching (O-GT)	.591	.581	.101	.012	5.030	.162***

Note: *$p < .001$, **$p < .01$, ***$p < .05$

As shown in Table 23, all four predictors were significant in contributing to overall student course satisfaction. Face to Face Good Teaching ($\beta = .458$) emerged as the strongest of the four predictors accounting for most of the explained variance (49%). In step 2, Appropriate Online Assessment ($\beta = .148$) accounted for another 6% of the explained variance and increasing the adjusted R^2 to .55. In step 3, Appropriate Online Workload ($\beta = .187$) accounted for an additional 2% of the explained variance, with the last predictor, Good Online Teaching ($\beta = .162$) accounting for 1% of the explained variance and bringing the adjusted R^2 to .58.

In summary, all four BLQ subscale factors had significant effects in predicting students' overall course satisfaction. The BLQ appears to be capturing a substantial number of perceived teaching attributes which contribute to student satisfaction. The stepwise forward regression analysis of the contribution of each of the four predictors indicated that Good Face to Face Teaching was the dominant factor in explaining the majority of the variance in student satisfaction (49%), followed by weaker contributions from the remaining three online variables: Appropriate Online Assessment (6%), Appropriate Online Workload (2%), and Good Online Teaching (1%).

For comparison purposes, subsequent to conducting the IPA analysis described in the next section, the reader is referred to a second stepwise regression which includes students'

importance ratings as well as their perceptions scores to explore the predictive value of teaching quality (gap scores) toward explaining students' course satisfaction.

Importance-Performance Analysis (IPA) Analysis of Student Perceptions of Teaching Quality

The purpose of this analysis was to determine if there were any differences between students' ratings of the level of importance of the teaching attributes and the perception of teaching performance itself for each teaching attribute in the four-factor BLQ.

Preliminary analysis. Gap scores were calculated for all 27 BLQ items by subtracting students' Importance (I) or expectation ratings from students' Performance (P) or perception of teaching quality ratings (G = P – I). Paired-samples t-tests were run to evaluate the mean differences between the two aspects of the gap scores.

Gap analysis. The mean of the importance and perceptions scores are displayed separately for each of the items in Table 24. For the purposes of analysis, the items are presented individually and by BLQ subscale teaching factor.

Table 24

BLQ Mean Perception-Importance Ratings by Subscale Factor and Individual Attribute

Quality Attribute	Mean Perform	Mean Import	GAP Score (P – I)	*t* value	Sig. (2-tailed)
Good Face to Face Teaching					
1. A variety of methods were used to explain course content	3.92	4.19	-0.27	-3.795	.000*
2. Classroom teaching considered current developments in the field	4.11	4.15	-0.04	-.646	.519
3. I received feedback about my learning during class time which helped me understand the subject better	3.20	4.07	-0.88	-11.307	.000*
4. Attending classes helped make the subject more interesting	3.67	4.20	-0.53	-6.123	.000*

Quality Attribute	Mean Perform	Mean Import	GAP Score (P – I)	*t* value	Sig. (2-tailed)
5. Classroom teaching approaches seemed responsive to individual student needs	3.34	3.90	-0.56	-7.355	.000*
6. Classes seemed to have a logical buildup of knowledge	4.30	4.45	0-.15	-2.290	.023
7. I had a clear idea of where each class was going	3.81	3.92	-0.11	-1.226	.222
8. Classes helped clarify my understanding of the online part of the course	3.62	4.11	-0.49	-5.980	.000*
9. I generally found class time to be intellectually challenging	2.96	3.91	-0.96	-9.145	.000*
10. It was clear how class activities were related to assessment	3.61	4.08	-0.47	-6.344	.000*
11. Instructional time was designed effectively for learning	3.70	4.09	-0.39	-4.811	.000*
12. The pace of classroom instruction was suited to learning the material	3.71	4.08	-0.38	-4.486	.000*
13. The classroom atmosphere encouraged students to share ideas	4.16	4.13	0.03	.367	.714
Appropriate Online Assessment					
14. I received helpful online feedback about my learning	2.96	4.02	-1.06	-10.768	.000*
15. Online work encouraged collaboration with other students	2.81	3.26	-0.46	-4.304	.000*
16. Self-assessment activities helped me to learn effectively	3.10	3.59	-0.49	-7.457	.000*
Appropriate Online Workload					
17. I had enough time to understand the things I had to learn online	3.85	4.12	-0.27	-3.295	.001*
18. There seemed to be a logical buildup of knowledge in the online work	3.79	3.93	-0.15	-2.130	.035
19. The amount of online material we covered was appropriate	3.48	3.93	-0.46	-4.878	.000*
20. Guidelines for using online resources were clear to me	3.87	4.11	-0.24	-3.494	.001*
21. The online materials were good at explaining things	3.65	4.16	-0.51	-7.076	.000*
Good Online Teaching					
22. The online resources and materials were generally challenging	3.09	3.56	-0.47	-5.315	.000*

Quality Attribute	Mean Perform	Mean Import	GAP Score (P – I)	*t* value	Sig. (2-tailed)
23. Interactions with students on eClass helped clarify some of my own ideas	2.86	3.26	-0.40	-5.769	.000*
24. There was a lot of choice in how to complete the online activities	2.49	3.71	-1.22	-13.062	.000*
25. Learning materials were important for understanding the face to face situations	3.21	3.71	-0.49	-6.260	.000*
26. The online materials were designed to try to make topics interesting	3.19	4.17	-0.98	-10.563	.000*
27. The teaching team had a strong presence in the online part of the course	3.69	3.85	-0.16	-2.086	.038
Mean Values	3.49	3.95	-0.46	-7.611	.000*

*$p<0.001$

The results in Table 24 demonstrate that students' perceptions of the teaching are generally satisfactory with all means above or very near 3. However, the course is actually underperforming in relation to student importance given the overall gap score of -0.46 resulting from an overall mean perceptions score of 3.49 and an overall mean importance score of 3.95. Using a paired samples t-test, these means were found to be significantly different ($t = -7.611$, $p < 0.001$).

Further inspection of the individual items reveals that students appear to have concerns on quite a number of fronts with minus (-) values being recorded for a majority of teaching variables in the perceptions minus importance column. The majority of negative scores are indicative of the fact that given the importance of these items to students, actual teaching performance was somewhat below what they had expected. Using the Bonferroni correction ($p/27$), two-tailed significance tests reveal that these negative differences are significant at the level of $p < 0.001$ in the case of 21 of the 27 attributes assessed. For the remaining attributes,

perceptions of teaching were more aligned with their importance to students (Items 2, 6, 7, 13, 18, 27). In summary, findings in this section indicate that there were a number of discrepancies between students' perceptions of teaching and the importance or expectation of the teaching attribute within each factor.

Performance-importance matrix. To explore the relationship between perception of teaching and importance, the 27 BLQ item values were plotted graphically as this can assist in interpretation of teaching quality. The graph shown in Figure 2 is represented by the importance values on the horizontal axis and perception values on the vertical axis. Items are then plotted into an appropriate quadrant according to their mean values on both dimensions (Watson, Saldana & Harvey, 2002). Figure 2 highlights the dimensions of the BLQ results in matrix format.

Figure 2. BLQ Performance-Importance Grid for Performance and Importance Scores

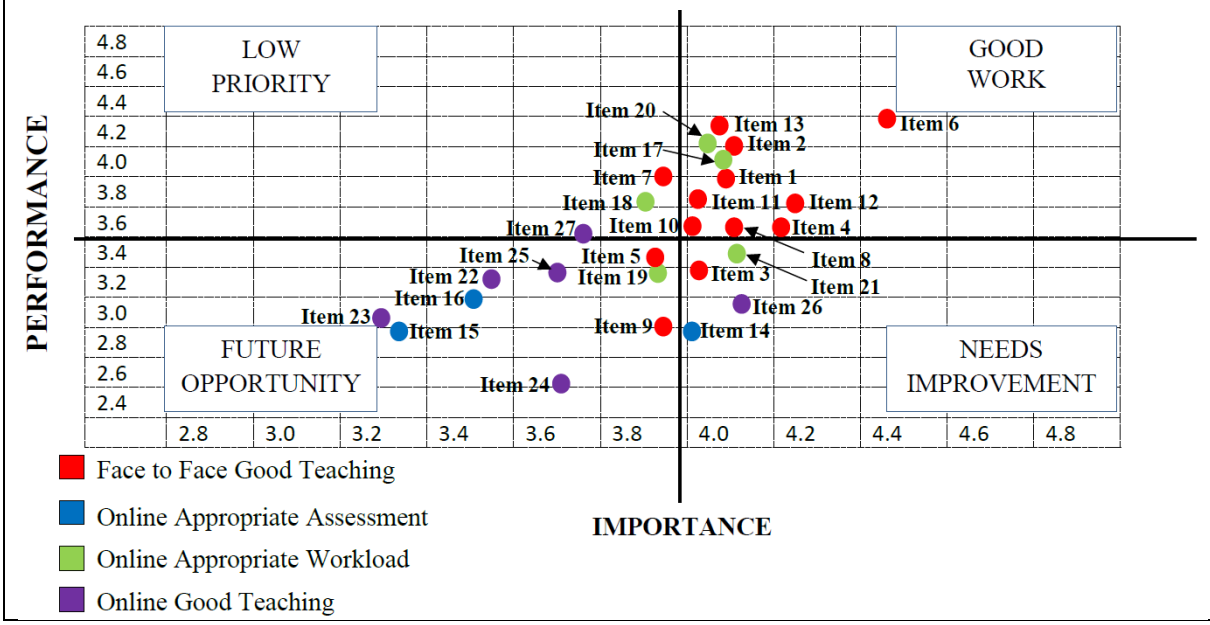

Figure 2 illustrates that the upper right quadrant, Good Work, has 11 items that have been judged as having high importance and high performance (9 face to face items: 1, 2, 4, 6, 8, 10,

11, 12, 13; and 2 online items: 17, 20). Here, there is little room for raising the quality of these items as they are high in satisfaction. In contrast, the lower right quadrant, Needs Improvement, indicates four items that have high importance but low performance. For the attributes identified in this quadrant teaching quality should be addressed since they are highly relevant for satisfaction but students are rating teaching performance as lower than expected (3 online items: 14, 21, 26; and 1 face to face item: 3). The lower left quadrant, Future Opportunity, represents nine items that have less importance for course satisfaction, but have also been judged as not demonstrating well in the classroom as there is room for improvement (7 online items: 9, 15, 16, 19, 22, 23, 25; and 2 face to face items). Finally, the upper left quadrant, Low Priority, has three items that have less importance for satisfaction, but have higher performance means (2 online items: 18, 27; and 1 face to face item: 7).

In summary, findings in this section revealed that of the 27 items plotted, 11 items were judged as having high importance but also high performance and thus should be maintained at these high levels (e.g., upper right; Good Work; High P ≈ High I). However, four items should be addressed so that students will have more satisfaction with the course given their high expectations (e.g., lower right; Needs Improvement; P < I); nine items could be addressed that have lower importance scores but teaching performance could be improved (e.g., lower left; Future Opportunity; Low P ≈ Low I); and three items are over performing in relation to their importance to students (e.g., upper left; Low Priority; P > I).

Multiple Regression Analysis of Teaching Quality on Satisfaction

The final inquiry involved a second stepwise regression analysis to explore the predictive value of the BLQ teaching quality (gap scores) as compared to the BLQ teaching factors (perception only scores) toward explaining students' overall course satisfaction.

Preliminary analysis. To reduce the number of predictors in the regression analysis, four subscores were created based on the 27 BLQ teaching quality items (Q = P - I) that corresponded to each of the four teaching quality quadrants of the performance-importance matrix: (1) Good Work - 11 items (9 face to face: 1, 2, 4, 6, 8, 10, 11, 12, 13; and 2 online items : 17, 20); (2) Needs Improvement - 4 items (3 online items: 14, 21, 26; and 1 face to face item: 3); (3) Future Opportunity - 9 items (7 online items: 9, 15, 16, 19, 22, 23, 25; and 2 online items: 5, 9); and (4) Low Priority - 3 items (2 online items: 18, 27; and 1 face to face item: 7).

Forward stepwise analysis. A forward stepwise analysis was conducted to determine the individual contribution of the four teaching quality predictors to overall course satisfaction. An analysis of the four predictors into one model resulted in an adjusted R^2 of 36%. The results are presented in Table 25.

Table 25

Forward Regression Analysis Model of the BLQ Teaching Quality Categories Predicting Course Satisfaction

Variables Entered By Steps	R^2	Adjusted R^2	*SE B*	Change Statistics		
				R^2 Change	*F* Change	β
Good Work	.331	.327	.160	.331	87.159	.390*
Future Opportunity	.367	.360	.140	.036	9.845	.265**

Note: *$p < .001$, **$p < .01$

As shown in Table 25, only two of four teaching quality predictors were significant in contributing to overall course satisfaction. Good Work ($\beta = .390$) emerged as the strongest of the BLQ gap score predictors accounting for most of the explained variance (33%). In step 2, Future Opportunity ($\beta = .265$) accounted for another 3% of the explained variance and increased the adjusted R^2 to .36. A model that explains 36% of the variance represents a medium effect size. The two remaining teaching quality categories, Needs Improvement (P < I) and Low Priority (P

> I), did not significantly contribute to overall course satisfaction as service levels varied and were less optimal (P ≠ I).

In comparing these results to those obtained for the perceptions only teaching factors, it is evident that less overall satisfaction is explained when students' importance values are included in the regression analysis. The contribution of two teaching quality factors (i.e., Good Work, Future Opportunity) to explaining course satisfaction was lower and accounted for 36% of the variation, compared to those findings based on perceptions only (i.e., Good Face to Face Teaching, Good Online Teaching, Good Online Assessment, Good Online Workload) which predicted 58% of course satisfaction.

In summary, two of four teaching quality predictors, Good Work and Future Opportunity, based on gap scores had significant effects in predicting students' overall course satisfaction. Good Work was the dominant teaching quality factor which explained 33% of the variation in student satisfaction, comprising a majority of face to face items (9 face to face items, 2 online items); followed by a 3% contribution from the Future Opportunity category comprising a majority of online items (7 online items; 2 face to face items). The other two quadrants, Needs Improvement and Low Priority (5 online items; 2 face to face items), did not significantly contribute to the outcome.

A final comparison of teaching quality regression results based on gap scores with those found for teaching perceptions alone indicated that 22% less variation in course satisfaction was explained when students' importance ratings were included in the analysis. Further inspection of the performance-importance matrix revealed that quality improvement efforts are best directed toward teaching delivery of items plotted in the Needs Improvement quadrant comprising a

majority of online items (3 online items, 1 face to face item) which are underperforming relative to their perceived importance.

Chapter Summary

This chapter presented the demographics of the sample and the statistical procedures employed to answer the three research questions: 1) Which perceived teaching factors contribute most to students' satisfaction with blended learning? 2) What are the psychometric properties of the newly developed BLQ questionnaire used to measure students' perceptions of teaching? 3) Does use of the perceptions-importance method provide additional information relevant to students' perceptual processing and satisfaction level that can be used for teaching feedback?

Descriptive results indicated generally positive student perceptions of the face to face teaching components, with less satisfaction of the online components. When combined, the results indicated well over half the respondents (67%) were satisfied with the blended course.

An initial investigation of the psychometric properties of the BLQ using CFA indicated a poor fit of the theoretical models tested to the sample data. EFA was then used to explore two different factor structures for the BLQ. First, all BLQ items were entered into an EFA which produced a two-factor solution: Good Online Teaching and Good Face to Face Teaching. Second, an independent exploration of each format resulted in a combined four-factor solution: Good Face to Face Teaching emerged as the single factor in the face to face format; and Appropriate Online Assessment, Appropriate Online Workload, and Good Online Teaching emerged as the three factors for the online format. Adequate internal consistencies were revealed by the two-factor solution and three of the four subscales (factors) in the four-factor solution.

To explore the determinants of teaching perceptions (P) on overall course satisfaction, subscores were constructed for each of the four BLQ subscales. The four subscores accounted

for 58% of the variation in student overall course satisfaction. A subsequent stepwise analysis indicated the strongest predictor was the Good Face to Face Teaching factor (49%), followed by much weaker contributions from the online subscales: Appropriate Online Assessment, Appropriate Online Workload and Good Online Teaching (9%).

To explore the determinants of teaching quality (Q = P – I) on overall course satisfaction, each of the 27 BLQ items was plotted into one of four performance-importance matrix quadrants: Good Work, Needs Improvement, Future Opportunity, and Low Priority. A stepwise analysis of the four quadrants indicated the strongest predictor was the Good Work quadrant (33%), comprising a majority of face to face items, followed by a weaker contribution from the Future Opportunity category (3%), comprising of a majority of online items, thereby explaining a total of 36% of the variation in course satisfaction.

A comparison of teaching quality regression results with those found for the perceptions only approach indicated that 22% less variation in course satisfaction was explained by students' perceptions of quality. Since the regression analyses does not provide information as to the direction of the discrepancy, plotting the BLQ attribute coordinates (P, I) into a performance-importance matrix can illustrate where improvement efforts are best directed. Inspection of the matrix indicated that teaching quality attributes in the Needs Improvement category, comprised of a majority of online items, are underperforming due to their high importance to students, but low perceptions of the teaching. It is noteworthy that the majority of course satisfaction for both regression analyses, perceptions and quality, was explained by teaching delivered in the face to face format.

Chapter 5 includes a discussion of the statistical outcomes in relation to the research questions in further detail and elucidates study limitations, ideas for improving the BLQ, and suggestions for future research.

Chapter 5: Discussion

Introduction

This chapter presents conclusions from the study and begins with a summary of the research. An in depth focus on the research findings follows which connects current results to comparable studies in higher education and reflects on lessons learned. Discussion of educational implications, opportunities for further investigation, limitations of the study, and concluding remarks complete the chapter.

Summary of Research

The present study represents an early exploration in the development of a student-focussed approach to obtaining teaching feedback in a blended learning course based on foundational research in the educational psychology literature. Using secondary data collected from a new questionnaire, the BLQ, this correlational study explored 178 undergraduate students' perceptions and expectations of core aspects of teaching delivered across both formats, face to face and online. The results of an EFA recovered four latent teaching factors underlying the BLQ which were used to predict students' overall satisfaction with a blended learning course using multiple regression analyses. The Good Face to Face Teaching factor was the strongest predictor which explained 49% of course satisfaction, while the remaining three online teaching factors, Good Online Teaching, Appropriate Online Assessment, and Appropriate Online Workload, contributed a total of 9%. Taken together, regression results indicated that students' perceptions of online and face to face teaching methods predicted a total of 58% of course satisfaction.

From a service quality research perspective, it would be premature to conclude that the BLQ is capturing a substantial proportion of student satisfaction. When students' ratings of attribute importance are included in the analysis, the course is actually less satisfying to students

in a number of areas. For this study, item-level discrepancies between students' experiences of the teaching and their importance were calculated and plotted into one of four quadrants of a performance-importance matrix. A regression analysis of the four BLQ teaching quality quadrants indicated that items contributing to the Good Work category, comprising a majority of face to face questions, explained 33% of course satisfaction, with items plotted in the Future Opportunity category, comprising mostly of online items, explained an additional 3% and predicted a total of 36%.

In comparing this result to those obtained with perceptions only scores (58%), less course satisfaction (22%) was explained by students' gap scores, reflective of teaching quality. While it appears that the "perceptions only" approach has greater predictive power, the information gained by including importance weightings allows for the identification of service gaps which may provide greater diagnostic power for blended learning educators than a single perceptions only measure. In this study, inspection of the importance-performance matrix illustrated that improvement efforts are best directed toward the delivery of a majority of online items plotted the Needs Improvement quadrant.

Discussion of the Findings

In revisiting the research questions, the purpose of this study was to explore the contributions of teaching factors to student satisfaction in a blended learning course (Research Question #1). Secondary aims included investigating the psychometric properties of a new measurement tool, the Blended Learning Questionnaire (BLQ), for capturing student feedback about teaching (Research Question #2), as well as establishing the usefulness of the importance-performance dimension of the BLQ to measure the effectiveness of blended learning teaching practices and curriculum change (Research Question #3).

Research question 1. This research question was addressed in two parts. First, students' perceptions of teaching were used to predict course satisfaction. Secondly, students' perceptions of teaching quality were used to predict course satisfaction. In responding to the first part, as with the few comparable classroom studies conducted to date, students' perceptions of the teaching were found to explain a large proportion of their satisfaction with the blended course experience. For the data in this analysis, a total of 58% of the variation in the criterion variable was explained by positive perceptions of teaching performance across both face to face and online formats. There is a moderately strong, positive relationship between students' perceptions of teaching and overall blended course satisfaction.

In comparing the current results to prior studies conducted in traditional lecture settings, the strength of the relationship found between perceived teaching attributes and student satisfaction is comparable. In returning to the research findings from Chapter 2, Guolla (1999) reported that eight essential teaching factors, including instructor attributes such as enthusiasm and rapport, emerged from an analysis of the 32-item SEEQ questionnaire which explained 73% of the variation in course satisfaction. Li and Kay's (1998) teaching quality study obtained somewhat lower perceptions-based results with a 53-item instrument derived from the SEEQ and the CEQ which resulted in five service factors, including instructor responsiveness and empathy, which explained 50.1% of course satisfaction. Last, Marzo-Navarro Pedraja-Iglesias & Rivera-Torres (2005) used a 17-item questionnaire which divided into three factors, course administration, teaching methods, and teaching staff that predicted 73% of course satisfaction.

In its favor, the BLQ appears to be capturing a substantial amount of satisfaction using a parsimonious number of factors focused on teaching delivery methods. It is important to recognize that character traits and infrastructure variables associated with course delivery are not

included in the conceptualization of "good teaching" for this study. Although the total student experience is becoming ever more central to students' perceptions of the institution, this research does not consider administrative and infrastructure variables associated with course delivery, nor does it capture the views of educators, course developers, faculty, administrators, etc., engaged in the delivery of quality teaching services.

In addition to predictive power, satisfaction findings also demonstrated that the BLQ can be used to discriminate between student perceptions of the teaching methods delivered in the face to face setting versus those offered in the online format in a blended learning course. An EFA of the BLQ revealed a four-factor solution which was used to predict the respective contributions of each of the four factors to overall course satisfaction. The strongest predictor of emerged from the face to face format, Good Face to Face Teaching, which explained 49% of course satisfaction, followed by weaker contributions from the online format, Appropriate Online Assessment (6%) and Appropriate Online Workload (2%), with Good Online Teaching (1%) representing the least significant predictor.

At this juncture, it is important to emphasize that satisfaction results were heavily weighted in favor of the face to face environment with this study's sample. The Good Face to Face Teaching factor explained nearly half the variation in student course satisfaction, with three online factors, Good Online Teaching, Appropriate Online Workload, and Appropriate Online Assessment, comparably explaining one tenth of the variation. Since the BLQ questions were derived from items originally designed for the lecture setting, it may be that further psychometric refinements to increase reliability and construct coverage of the BLQ will need to address this discrepancy, particularly for items in the online format discussed further in research question 2.

Conversely, this finding may also point towards early evidence that good teaching methods will always be perceived as more salient to students when delivered in the classroom setting as opposed to the virtual environment. As Clark (1983) has speculated, technology's influence on the learning process may be limited to delivery and access; it may not affect the learning process any more than the "truck that delivers our groceries causes changes in our nutrition." (Clark, 1983, p. 445). With further psychometric refinements, additional research with the BLQ could prove evidential in the delivery truck debate. Although blended learning has provided an ever-increasing array of tools and features which have transformed the delivery truck into a supersonic jet, the findings of this study throughout all levels of analysis indicate that students' experience of the teaching was much less satisfying in the online environment as compared to the face to face setting. It may be that educational technology, while constantly evolving, is still mainly focused on content delivery. Perhaps it has added diversity, speed and convenience, but it has not yet revolutionized the mental and emotional processes involved in teaching. Further research with the BLQ could help determine if students consistently perceive the three core aspects of good teaching found in this study (or five as per Wilson, Lizzio & Ramsden, 1997) to be primarily delivered by humans, not machines.

Before settling the debate, however, it is equally noteworthy and not insignificant that a small effect size was found in this study for students' course satisfaction with the teaching delivered in the online environment. Unreliable technology, or technology that really does not convey the information in a guided or orderly manner, from the perspective of the student, may indeed affect the learning process adversely (G.H. Buck, personal communication, May 21, 2017). While future research could determine that technology lacks the capacity to replace teachers, when combined with good teaching practices it can transform the traditional lecture-

based learning paradigm (Garrison & Vaughan, 2008). According to the literature review in Chapter 2, the real test of blended learning is the effective integration of the two main components, face to face and online technology, such that we are not just adding on to the existing dominant approach or method. In this study, an additional 10% of the variation in student satisfaction was explained by teaching delivered through technology in excess of that provided in the class setting. The didactic implications of this finding are that teachers in blended learning contexts need to focus not only on the technical capacities and functions of online materials and activities, but should also seek to understand their students' online experience of the teaching used in this learning environment.

In addition to supporting the view that the medium (technology) and the method (teaching) both have a role in the design of instruction, the relationship between online teaching factors and course satisfaction has broader educational implications for teaching evaluation feedback and research in higher education. In reviewing the questions designed for the CEQ23, and by derivation the BLQ, most sessional instructors and faculty members will immediately recognize the question items as very similar to those routinely asked of students on conclusion of a lecture-based course. In many instances, these student ratings become high stakes issues for faculty members because they contribute to end-of-year evaluation portfolios, promotion status and salary decisions, as well as forming the basis for teaching awards. The study's online satisfaction findings support the postulation that measures which focus exclusively on classroom teaching, as opposed to those that also include online aspects of the course, may underrepresent student satisfaction with the teaching delivered as a whole. In fact, educators who are able to effectively incorporate technology into the classroom may be potentially penalized if traditional student

evaluation methods are used to measure the effectiveness of new and innovative teaching practices involving technology.

The discriminative power of the BLQ also has implications for general blended learning research. There appears to be no current research program which similarly considers points of articulation between online and face to face formats within a single course (Drysdale, Graham, Spring & Halverson, 2013). The parallel question design of the BLQ provides a unique methodological approach to address potential questions that are pedagogically distinct to blended learning, such as: 1) Does teacher effectiveness vary across formats?, 2) Do effective teachers change teaching methods across online and face to face classes?, and 3) Is there an optimal ratio of online and face to face content associated with effective teaching? Such questions remained unanswered from the current study.

In responding to the second part of Research Question 1, it is important to note that the study makes a purposeful distinction between students' perceptions of teaching, based on the educational psychology teaching literature, and their perceptions of teaching quality, based on the marketing sector's IPA approach to consumer quality. In this study, findings revealed that the predictive power of the BLQ was reduced when gap scores as opposed to perceptions only scores were used in the regression analyses. While the perceptions measure of satisfaction predicted 58% of satisfaction, the teaching quality or gap score approach predicted only 36% of satisfaction, a reduction of 22% in explained variation in the outcome variable. This result appears to support Li and Kaye's (1998) conclusion that the direct confirmation approach to data collection (perceptions only) is superior to inferred approaches (perceptions – importance) in explaining and predicting the overall degree of students' satisfaction. As discussed in the literature review, their study found that students' perceptions explained 35% of satisfaction,

whereas 14% of satisfaction was predicted by teaching quality. In both studies, although students' positively perceived the teaching, their assessment of the quality of the teaching delivered was substantially lower. This interpretation has general research implications as outcomes from other educational studies may overstate satisfaction if perceptions-only based teaching measures are used as an implied indicator of quality, particularly if the relative importance of the attributes is high.

As was found with the perceptions only findings, it is noteworthy that the majority of satisfaction was explained by teaching quality attributes perceived in the face to face format (33%). The negative differences between the means of the item responses with regard to students' perceptions of the teaching performance and the importance of that teaching attribute to satisfaction suggest that the blended course has not achieved a high level of service quality, particularly in the online format (Table 24). According to the customer satisfaction literature (Cronin and Taylor, 1992; Martilla & James, 1977: Parasuraman, Zeithaml, & Berry,1985) this should lead to customer dissatisfaction. However, the vast majority (63%) of the students responded that they were somewhat satisfied or more with their overall blended course experience. The mean response to the question about their overall satisfaction with the course was 3.64 on a five-point scale. In looking to the marketing literature to interpret these results, it could be argued that the performance of the teaching falls within the students' "zone of tolerance" (Berry & Parasuraman, 1991). This suggests that, even though students perceived the teaching as lower "quality", they are happy with the course as a whole as long as certain conditions are met. As applied to the outcomes of this study, students might consider a range of teaching performance satisfactory, bounded by "desired" at the upper end, and "adequate" at the lower end. It may be that teaching in the blended course met conditions to be perceived as

adequate quality, largely anchored by the teaching delivered in the face to face environment. However, the course as a whole provided students with a generally satisfactory university experience. This idea is based on Berry and Parasuraman (1991) who posited that customers may accept variation within a range of performance attributes and any increase in performance will only have a marginal effect on satisfaction. Only when performance moves outside of this range will it have any real impact. Further research may help verify the presence of and conditions needed to meet the range of minimal and maximal acceptable teaching performance, and how different levels of student expectations influence the teaching quality-course satisfaction relationship.

Research question 2. In turning to the second research question, the psychometric properties of the BLQ were explored in this study by drawing on previous research on students' experiences of coursework and the relation of these experiences to quality outcomes. Using the CEQ23 (Ramsden, 1991, 1990; Richardson, 2005; Wilson, Lizzio & Ramsden, 1997), a set of items was developed for the BLQ which loaded on four distinct teaching dimensions of a blended learning experience. The Good Face to Face Teaching subscale measured student perceptions of teaching standards in the classroom delivery format. The focus of this factor is on teachers' feedback, motivation, attention, understanding of problems, and skill in explaining concepts to students. The remaining three factors captured students' perceptions of teaching standards in the online delivery format. The Good Online Teaching subscale measured good teaching practices and whether online materials and activities were perceived to assist students' learning. The Appropriate Online Workload subscale measured students' perceptions of the volume of work needed to cope with the online component of the course. The focus is on adequate workload levels that are not so excessive as to be detrimental to learning. Last, the

Appropriate Online Assessment scale measured respondents' perceptions about the extent to which assessment activities provided learning feedback and helped develop intellectual skills.

In exploring the subscale properties, the intent was to capture the extent to which students feel positive about structured teaching, workload, and assessment methods, and to develop a potential mechanism for measuring blended learning and higher-order outcomes of undergraduate courses. Of the four subscales recovered in this analysis, three demonstrated satisfactory internal consistency indicating they can be reliably used to assess their intended constructs with this study's sample. When compared to Ramsden's (1991) original five factor solution for the CEQ23, the reliability of the subscales found in the current study for Good Face to Face Teaching, Good Online Teaching, and Appropriate Workload were consistent with or higher than those previously reported. However, the fourth factor recovered, Appropriate Online Assessment, demonstrated comparably weaker internal consistency. Low reliability can occur when there are fewer variables representing a factor. Although the Cronbach's alpha of 0.69 for Appropriate Online Assessment is low, it is not surprising given the few number of items ($k = 2$) which loaded on this subscale. Constructs with a wide domain that are conceptualized as multidimensional generally require many items to assess the construct (Yong & Pearce, 2013).

Although it is possible to obtain an interpretable factor structure along with a low estimate of reliability as found in this study, it is important to highlight that revisions were made to the BLQ as a result of the exploratory analysis with the present sample. With scale length a concern, 9 of the 23 original paired sets of items were eliminated during the pilot study based on student feedback. As well, one additional face to face item was removed during EFA due to a loading that was inconsistent with the theoretically proposed dimension. Accordingly, the reduction in items raises the issue of reduced coverage of the breadth of the "good teaching" construct

captured by the BLQ as compared to the original CEQ23. Bandalos and Finney (2010) caution about the conservative removal of items for this reason, given the assumption that these items were intentionally chosen to evaluate a specific theoretical construct and removal of items may alter the definition of the construct being evaluated. In fact, study findings revealed that several of the hypothesized latent constructs drawn from previous research using the CEQ23, such as Generic Skills and Clear Goals, did not form stable factors in either delivery format of the BLQ. In addition, only four of 10 possible subscales were recovered during EFA: all face to face items merged into one of five possible factors, Good Face to Face Teaching, and the remaining four factors: Clear Face to Face Goals, Appropriate Face to Face Assessment, Appropriate Face to Face Workload, and Face to Face Generic Skills, were not recovered. In the online environment, three of five potential subscales emerged: Good Online Teaching, Appropriate Online Assessment, and Appropriate Online Workload. The remaining two factors: Clear Online Goals and Online Generic Skills, were not found.

Given the highly correlated nature of the items and reduction in questionnaire length the overlap among items and factors may not be surprising. For example, it is reasonable that the items “Interactions with students on eClass helped clarify some of my own ideas” and “The classroom atmosphere encouraged students to share ideas” which were originally derived from the CEQ23 Generic Skills factor, would load positively on the Good Online Teaching and Good Face to Face Teaching subscales, respectively. In contrast to Costella and Osborne’s (2005) recommendation to remove items that cross load on more than one factor, the choice was made to retain items as long as their highest loading was consistent with the underlying theory. In future refinements of the BLQ, researchers may want to examine whether items with cross loadings consistently load most highly on the anticipated subscale, or whether shifts occur

depending on the characteristics of the participant sample. By retaining these items in future analyses, further exploration and comparison of the BLQ with other samples can be undertaken. This may help determine if these results are a stable feature of students' blended learning experience or if these constructs will require alternative wordings to be captured effectively.

In addition to addressing reliability, future scale development efforts might be invested in pre-testing the BLQ items for content adequacy and consistency. This could help broaden conceptual coverage leading to full recovery of all five hypothetical CEQ23 factors in each format. Assuring content adequacy can provide support for construct validity as it allows the deletion of items that may be conceptually inconsistent (Hinkin, Tracey &1997). One common method requires respondents to categorize or sort items based on their similarity to the construct definitions. Students are also often included during this stage of scale development which is a similar approach used by Ramsden and colleagues in the development of the Course Perceptions Questionnaire which led to the eventual development of the CEQ23 (see Wilson, Lizzio & Ramsden, 1997). For the BLQ, this could be conducted using both experts in blended learning as well as students who could rate the extent to which items correspond with each of the construct definitions, in this case the five factor descriptions for each delivery format. The responses could then be factor analyzed and those items that load appropriately retained for subsequent administration to an additional sample.

Research question 3. As for the final research question, it appears that the method of gap scores uncovers specific details for different teaching quality attributes and provides a summary of what students may value as they form their teaching quality judgments. The CEQ23 was further adapted in this study to support the inclusion of both a Perceptions (P) rating scale and an Importance (I) rating scale to discriminate between students' perceptions of the teaching methods

and their evaluation of its importance to course satisfaction. By plotting these values into a performance-importance grid, one can visually inspect which teaching attributes were most salient and relevant to students.

For the current sample, results showed that 11 attributes should be maintained at high levels of performance (e.g., Good Work), four items were identified with significant gaps requiring improvement (e.g., Needs Improvement), and 12 items were associated with lower priority for improvement (e.g., Future Opportunity and Low Priority). The Good Work category is reflective of students' perceptions of a level of optimal teaching performance. For this category, the classroom atmosphere, buildup of knowledge and clarity during class, and group collaboration in the face to face format were performing well above average in relation to the those service attributes also deemed important by students. In the Needs Improvement category, several aspects of the online teaching were not performing to their full-service potential. In this study, while the teaching can be seen to be under-performing for four teaching attributes, they are nonetheless performing well above average (3.0) in most cases. The Low Priority category is reflective of perceptions that the service provided is judged to be performing well above average, yet students have deemed these same attributes to be relatively unimportant. Three attributes fell into this quadrant suggesting there are small efficiencies to be gained in the teaching performance. For the final category, Future Opportunity, nine items were determined not to be performing to their full potential. When viewed in the context of the corresponding importance weightings, any improvement effort would have to be questioned as the importance of these attributes to students was not high.

While the inclusion of importance weights adds to the diagnostic power of the BLQ, the choice in this study was balanced against the additional task of data collection. By including a

second rating scale to collect importance data, respondents were asked to answer each question twice. Considering this, nine sets of questions during the BLQ pilot study were removed due to the potential for questionnaire fatigue. In shortening the BLQ length, both reliability and construct coverage may have been impacted. However, as is concluded in this study, other researchers agree that when the objective is to identify areas relating to service quality shortfalls for possible intervention, capturing importance provides valuable information about perceptions of quality (Parasuraman, Zeithaml, & Berry, 1994). Such utility can help educators make professional judgments about how to influence or maintain course outcomes through quality improvement initiatives.

Study Limitations

This study is a correlational analysis of the extent to which two variables are related, teaching and satisfaction. A correlation identifies relationship between variables. In this study it provided a measure of the relationship between teaching factors and student satisfaction. While a strong positive association was found between many sets of variables, this research cannot conclude that a causal relationship exists between quality teaching and student satisfaction.

As well, due to the exploratory nature of the analyses, no conclusions can be drawn regarding the generalizability of the proposed factor structure to other samples of students (Bandalos & Finney, 2010). The results from the EFA represent the structure of the data for this particular sample. In order to assess the stability of the factor structure, there is a need for further replication across independent samples from the same population. Study respondents were primarily between the ages of 17-23, female, full time, elementary education students enrolled in their third of four program years, and employed at least part-time outside of school. Additional

studies are required that cross-validate the present findings with other representative samples of students.

Research is also needed to explore whether a similar factor structure will emerge when the BLQ is used with students of different ages, different programs, greater prior experience with blended learning, or less financial resources. It is important to note that a number of items on the BLQ had communalities below 0.40; this suggests that large samples of participants may be necessary to produce stable factor solutions (Floyd & Widaman, 1995). Nonetheless, this study's sample of 187 participants was adequate for the analyses conducted.

As well, additional evidence supporting the validity and reliability of the BLQ is needed. This could include examining whether students respond in a similar manner to both the BLQ and other validated measures of teaching quality, the relationship between the BLQ and student satisfaction and student achievement, and test-retest reliability.

While the results of this exploratory study appear to suggest that a multiple-attribute gap score approach to measuring teaching quality provides diagnostic value and valuable insights to educators, there are other issues to be examined. For example, Peterson and Wilson's (1992) research reveals that measurements of customer satisfaction exhibit tendencies of confounding and methodological contamination. They argue that issues like response rate bias, data collection mode bias, the manner in which questions are asked, measurement timing, and so on can significantly affect the results of a satisfaction survey.

Finally, scores on evaluation instruments such as the BLQ, while reliably indicating areas of general teaching strength and weakness, do not in themselves provide a sufficient basis for decision-making or intervention regarding specific improvements in teaching quality. The quantitative analysis used here does not explain why the observed ratings occurred – for this,

supplementary qualitative research would be useful. Educators should regard a BLQ profile more as a point of departure than an end point in an evaluation process, and use the survey results to indicate directions for investigation into underlying factors affecting teaching quality. The interested reader is referred to Marsh and Roche's (1997) excellent article on the appropriate uses (and misuses) of student evaluation measures.

Conclusion

In summary, this dissertation provided support for the BLQ as a measure to assess four dimensions of teaching in blended learning: Good Face to Face Teaching in the class environment; and Good Online Teaching, Appropriate Online Assessment, and Appropriate Online Workload in the virtual format (Research Question 2). In developing these subscales, the intent was to link students' perceptions of teaching in each format with overall course satisfaction (Research Question 1). By including students' expectations of the teaching in the analysis, findings indicate that the BLQ may be used to assess the strengths and weaknesses of teaching quality by format and to ascertain their contribution to course satisfaction (Research Question 3). The present exploratory research helps inform how technology complements the face to face experience of students. However, more evidence is needed that provides an indication of how the combination of technology and teaching is contributing to the quality of student experiences in university education.

Closing Remarks

As a field, education is easily seduced by technological promises. Technology can open doors, expand minds, and change the world. Classrooms are changing and without a doubt they will look even more different in five or ten years than they do today. New technologies are being developed quickly, which means there is an ever greater need for educators to be willing to take

chances and determine not just how technology works, but how it works for each student, and where its use is most appropriate. Imagine a pendulum. At one extreme, we find face to face educational techniques, such as lectures and demonstrations – traditional methods that have stood the test of time but with certain limitations. At the other extreme, we find modern technological approaches, such as fully online learning – exciting methods full of promise and potential but, again, with limitations. Somewhere in the middle lies blended learning, a method that when properly deployed promises the best of both worlds.

As to whether the course under study fully realized this dual promise, the design of the BLQ affords a reconsideration of Garrison and Vaughan's (2008) definition of "blended learning" in light of the study's online and face to findings. As the course was comprised of a 50/50 blended ratio of online and face to face content, the expectation is that both environments would contribute equally and substantially to perceptions of quality and overall course satisfaction, given the integration of both is required for a transformational educational experience. However, this was not established as the Good Work teaching quality factor, comprised mostly of face to face attributes, significantly outperformed in terms of explaining course satisfaction compared to online attributes -- a less than optimal balance, or integration, between formats based on students' perceptions of quality. The overall course satisfaction rating of 63% sheds further doubt. Beyond the affordances of accessibility and individual pacing, the findings of this study revealed that teaching in the online environment did not wield more than a small influence on teaching quality and course satisfaction. As such, the teaching and learning possibilities for blended learning, at least for this study, did not exceed the trajectory of anecdotal promise.

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Appendix A: BLQ Demographic Information

PARTICIPANT INFORMATION:

This survey will ask you about your blended learning course experience. After providing some basic student information, you will be asked a set of questions about your **face to face** class experience, your **on-line** experience, and then your **whole course** experience.

University of Alberta 7 Digit Student ID #: ____/ ____/ ____/ ____/ ____/ ____/ ____/

Age (please check one): 18-24 □ 25-29 □ 30+ □

Gender (please check one): M □ F □

Student Status: Full Time □ Part Time □

Degree Program:
- □ Elementary Education
- □ Secondary Education
- □ Five Year Combined Degree
- □ After Degree (B.Ed.)
- □ Other (specify): _____

Year of Program:
- □ 1
- □ 2
- □ 3
- □ 4 +
- □ After degree Year 1
- □ After degree Year 2

How many hours per week did you spend online (on eClass) for this class?
- □ None
- □ 1 - 2 hours
- □ 3 - 4 hours
- □ 5 +

How many blended courses have you previously taken?
- □ None
- □ 1
- □ 2
- □ 3 +

Do you work at a job in addition to attending university?
- □ No
- □ Yes, average hours/week _____

How skilled are you with the technology used in this course?
- □ Not proficient
- □ Somewhat skilled
- □ Skilled
- □ Very Proficient

Appendix B: BLQ Instrument

SIDE A: For the Face to Face (Class-Time) component of the blended course, please read each statement and complete two ratings: 1) How strongly you agree with the statement; and 2) How important the statement is to you…

Strongly Disagree = [1]; Disagree = [2]; Neutral = [3]; Agree = [4]; Strongly Agree = [5]

FACE TO FACE (CLASS-TIME) COURSE COMPONENT	PERFORMANCE					IMPORTANCE				
A variety of methods were used to explain course content	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Classroom teaching considered current developments in the field	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
I received feedback about my learning during class time which helped me understand the subject better	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Attending classes helped make the subject more interesting	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Classroom teaching approaches seemed responsive to individual student needs	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Classes seemed to have a logical buildup of knowledge	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
I had a clear idea of where each class was going	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Classes helped clarify my understanding of the online part of the course	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
I generally found class time to be intellectually challenging	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
It was clear how class activities were related to assessment	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Instructional time was designed effectively for learning	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
The pace of classroom instruction was suited to learning the material	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
The classroom atmosphere encouraged students to share ideas	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Classes helped develop my ability to work as a group member	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]

…/OVER

SIDE B: For the Online (eClass) component of the blended course, please read each statement and complete two ratings: 1) How strongly you agree with the statement; and 2) How important the statement is to you…

Strongly Disagree = [1]; Disagree = [2]; Neutral = [3]; Agree = [4]; Strongly Agree = [5]

ONLINE (eCLASS) COURSE COMPONENT	PERFORMANCE					IMPORTANCE				
The online materials were good at explaining things	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
There was a lot of choice in how to complete the online activities	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
I received helpful online feedback about my learning	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
The online materials were designed to try to make topics interesting	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
The teaching team had a strong presence in the online part of the course	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
There seemed to be a logical buildup of knowledge in the online work	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Guidelines for using online resources were clear to me	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Learning materials were important for understanding the face to face situations	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
The online resources and materials were generally challenging	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Self-assessment activities helped me to learn effectively	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
The amount of online material we covered was appropriate	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
I had enough time to understand the things I had to learn online	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Interactions with students on eClass helped clarify some of my own ideas	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]
Online work encouraged collaboration with other students	[1]	[2]	[3]	[4]	[5]	[1]	[2]	[3]	[4]	[5]

Appendix C: Item Comparisons: CEQ23 and BLQ Pilot Study Questions

CEQ 23		BLQ Item Pool
Staff seem more interested in testing what you have memorized than what you have understood	(1)	a) FACE TO FACE: Classroom assessment activities helped me to learn effectively b) ONLINE: Self-assessment activities helped me to learn effectively
To do well in this course all you really need is a good memory	(2)	a) FACE TO FACE: I generally found class time to be intellectually challenging b) ONLINE: The online resources and materials were intellectually challenging
The sheer volume of work to be got through in this course means you cannot comprehend it all thoroughly	(3)	a) FACE TO FACE: Instructional time was designed effectively for classroom learning b) ONLINE: The amount of online material we covered was appropriate
We are generally given enough time to understand the things we have to learn	(4)	a) FACE TO FACE: The pace of classroom instruction was suited to learning the material b) ONLINE: I generally had enough time to understand the things I had to learn online
You usually have a clear idea of where you are going and what is expected of you	(5)	a) FACE TO FACE: I had a clear idea of where each class was going b) ONLINE: Guidelines for using online resources were clear to me
The staff here make it clear right from the start what they expect from students	(6)	a) FACE TO FACE: Classes helped clarify my understanding of the online part of the course b) ONLINE: Online learning materials were important for understanding the face to face situations
It is often hard to discover what's expected of you in this course	(7)	a) FACE TO FACE: Classes seemed to have a logical buildup of knowledge b) ONLINE: There seemed to be a logical buildup of knowledge in the online work
Our lecturers are extremely good at explaining things to us	(8)	a) FACE TO FACE: Teaching methods used during class time considered multiple ways of learning b) ONLINE: The online materials were good at explaining things
Teaching staff here normally give helpful feedback on how you are going	(9)	a) FACE TO FACE: I received feedback about my learning during class which helped me understand the subject better b) ONLINE: I received helpful online feedback about my learning which helped me understand the subject better

CEQ 23		BLQ Item Pool
Teaching staff here work hard to make subjects interesting	(10)	a) FACE TO FACE: Attending classes helped make the subject more interesting b) ONLINE: The online materials were designed to try to make topics interesting
The staff make a real effort to understand difficulties students may be having with their work	(11)	a) FACE TO FACE: Classroom teaching approaches seemed responsive to individual student needs b) ONLINE: The Teaching Team had a strong presence in the online part of the course
The teaching staff of this course motivate students to do their best work	(12)	a) FACE TO FACE: Classroom teaching considered current developments in the field b) ONLINE: There was a lot of choice in how to complete the online activities
This course has helped develop my ability to work as a team member	(13)	a) FACE TO FACE: Classes helped develop my ability to work as a group member b) ONLINE: Online work encouraged collaboration with other students
This course has improved my communication skills	(14)	a) FACE TO FACE: The classroom atmosphere encouraged me to share ideas b) ONLINE: Interactions with other students online helped clarify some of my own ideas