

# MULTIDIMENSIONAL ASSESSMENT OF PILOT BLENDED LEARNING PROGRAMS: MAXIMIZING PROGRAM EFFECTIVENESS BASED ON STUDENT AND FACULTY FEEDBACK

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## ABSTRACT

Faculty and student feedback on blended courses is instrumental to improving blended courses and programs. The purpose of this article is to describe the process and results of blended learning outcome assessment at a large, multi-campus, private university. The outcome measures used in this assessment were developed in the context of current literature about best practice in assessment of blended learning and were designed to gather feedback from faculty and students on multiple aspects of the blended courses. The results suggest that, overall, students and faculty were satisfied with the blended courses. The sufficiency of the university's resources for blended learning emerged as the strongest predictor of student satisfaction. Faculty rated their blended courses high in terms of course organization, but low in terms of the availability of resources and information about online learning and the quality of pedagogy in blended instruction. This university has found great value in the use of student and faculty feedback toward the improvement of blended courses and programs. An emphasis has been placed on providing additional resources, making the available resources more accessible and offering faculty development and training in online and blended pedagogy.

## KEYWORDS

blended learning, outcomes assessment, program effectiveness, faculty feedback, student feedback

## I. INTRODUCTION

The success of integrating blended learning into a university culture depends on the institution's ability to adapt its teaching and administrative strategies and promote collaborations among all stakeholders [1]. Assessment becomes a key process in identifying systemic needs for development and implementation of such strategies. Garrison and Vaughan [2] write: "Assessment ...may well be the most pervasive issue in designing a deep and meaningful learning experience" (p. 100). As such, meaningful assessment of blended learning must be multidimensional and encompass data from direct and indirect measures of learning, with information gathered from faculty, students, and other stakeholders. This paper focuses on indirect measures of blended learning based on quantitative and qualitative feedback from students and faculty on two campuses of the same university.

## A. The Value of Student Feedback Toward Improving Learning in Blended Courses

The use of student perception-based data to improve higher education has been well documented in the literature on blended and other forms of e-learning. Quinn, Fitch and Youn [3], who have developed a construct validity model for assessing e-learning, stress the importance of studying “the construct of student” (p. 324), which they operationally define as students’ demographic data, learning style and satisfaction with the course. Several researchers have developed instruments to assess students’ feelings and attitudes about e-learning. Garrison, Cleveland-Innes, and Fung [4], investigated role adjustments of students new to the online community of inquiry. The study focused the impact of teaching, social and cognitive presence on students’ adjustment to the online environment. Richardson and Swan [5] studied the relationship between students’ social presence, and their perceived learning and satisfaction with the instructor. They found that the more comfortable students were interacting with each other and participating in course activities, the greater their satisfaction with the instructor and the higher their self-rating of learning. Similarly, Shea [6] found that where students report higher levels of teaching presence in the online environment (specifically, active directed facilitation and effective instructional design), they also report higher levels of online learning community.

Ozkan and Koseler [7] developed a self-report instrument to measure student satisfaction with a particular learning management system (LMS). They were able to identify and validate six dimensions that impact “perceived learners’ satisfaction from LMS” (p. 1291) that can be effectively used in the pedagogical design and use of learning management systems. These are: students’ attitudes about e-learning overall; students’ perceptions of the respective quality of the instructor; interface system used in e-learning; course content or information; services provided by administrators and staff (e.g., technical support); and, finally, supportive issues, which include ethical and legal issues, privacy, plagiarism, intellectual property, etc. The authors suggest that for e-learning to be effective, course design and delivery must take these dimensions into account.

Similarly, Pombo, Loureiro and Moreira [8] evaluated the effectiveness of a collaborative learning module in a blended course by assessing the students’ views and opinions about the module. They used student ratings of specific elements of the module to improve its pedagogy by addressing both the content of the module and the tools used to deliver it. Students’ feedback highlighted the importance of incorporating assignments that encouraged learning and critical reflection via peer assessment and interaction, using tools that were user-friendly and easy to navigate for both synchronous and asynchronous communication.

Student feedback can also provide important clues regarding higher order learning skills (vs. content mastery) developed via e-learning with implications for pedagogical design of e-learning courses. For example, Lopez-Fernandez and Rodriguez-Illera [9] used a mixed quantitative and qualitative approach to investigate students’ perceptions and attitudes towards the use of e-portfolios in a blended learning environment for the purpose of creating a better fit between the students and this particular strategy of teaching. Although the results suggested that use of the e-portfolio did not have a significant impact on students’ actual learning, the results did indicate that students expressed positive attitudes towards the use of the e-portfolio. The authors note that students’ favorable response to the e-portfolio has important implications for students’ ability to develop meta-learning skills such as autonomous management of their learning.

Griesbaum and Gortz [10] have taken a different approach to gathering student feedback. Rather than measure students’ *reactions* to a particular e-learning module or an e-learning tool, they assessed students’ rating of their own and their peers’ *performance* on a collaborative learning module. The authors found that self- and peer- feedback helped to identify group processes and learning behaviors that students display during a collaborative learning task (e.g., preparedness, active contribution to the assignment). This information can then be used to make informed instructional decisions in designing group assignments and in enhancing productive learning behaviors.

In sum, student feedback in an e-learning environment is effective as an indirect measure to assess students' satisfaction with their learning environment. As reflected in the literature cited above, there has been extensive exploration and analysis of student feedback on individual elements of the e-learning environment. The current study takes a more holistic approach in assessing students' experiences in blended courses along multiple dimensions.

## **B. The Value of Faculty Feedback Toward Improving Learning in Blended Courses**

Faculty input into and reflection upon the experience of teaching blended courses is considerable for the development of blended courses and programs. Faculty buy-in is essential to the success of blended learning, and research can shed light on factors that are associated with faculty's openness to this format of teaching. Through the use of focus groups, Hiltz, Shea, and Kim [11] found that faculty's motivation to engage in online teaching is associated with a variety of factors including the flexibility of time and location of instruction, and opportunities for increased personal interaction with students. Young [12] asserted that the success of the blended learning format requires that faculty feel in control of their blended courses. How faculty members define control seems to be a particularly important question in understanding their experience of teaching blended courses. Faculty control of content and format may need to be analyzed separately. For example, a faculty member who defines course objectives (content) may eagerly accept input from an instructional designer on assessment activities in a blended format that may help her know how well students are learning what she intends for them to learn. Indeed, at one university that has been highly successful with online education, the philosophy is that "faculty are discipline experts and should not have to become web designers or technical gurus. They should be able to concentrate on teaching and engaging their students" [13, p.63].

Niemiec and Otte [14] used the term *ownership* rather than *control*. They stated that "faculty must have ownership, must feel that blended learning is pursued through (and not against) their prerogatives, their responsibility for the design of instruction" (p.93). The assessment of how faculty members view the instruction of blended courses and what faculty members expect and want from their university with regard to training, resources and support for teaching in a blended format occurs in a variety of ways.

In their seminal text, *Blended Learning in Higher Education*, Garrison and Vaughn [2] presented a series of ten open-ended faculty interview questions along with a sampling of comments from interviews of faculty teaching blended courses. One semester's evaluation at the University of Calgary revealed planned changes including a more detailed student orientation to blended learning, a clearer alignment between assessment activities and learning objectives, and an earlier development of resources and activities to provide students with a clearer plan at the start of the course.

In a similar vein, Patsy Moskal [15] of the University of Central Florida's Research Initiative for Teaching Effectiveness (RITE) described the evaluation of blended learning as *dancing with a bear*, referring to the authors' favorite Russian parable suggesting that evaluating blended learning requires tireless persistence. She stated that evaluation must be both reflective and iterative. Faculty, who are surveyed repeatedly, are eager to share their successes and concerns, likes and dislikes in teaching blended courses. The information has been used to plan training sessions for faculty on specific challenges as well as new faculty orientations and faculty development workshops.

## **C. The Current Study: WLP Assessment Model Within Institutional Context**

In spring 2009, the university initiated a cross-campus Web Learning Project (WLP), whose major focus was the development of a blended format for five pilot graduate programs to be implemented in fall 2010. In academic year 2009-2010, the WLP was supervised by a university-wide Steering Committee co-chaired by the Deputy Vice President for Academic Affairs and the University Chief Information Officer. The Associate VP for Instructional Technology & Faculty Development became "Team Lead" and was assigned responsibility for supervision of the various functional teams involved in the project.

One of the most important functional teams within the WLP is the Assessment Team, whose original charge was to develop a framework for the assessment of the five graduate programs selected for inclusion in the project. The assessment team is characterized by an interdisciplinary collaboration of administration and faculty from the university's two main campuses. In addition to ensuring consistency of the blended learning assessment effort with existing university assessment processes, the Assessment Team also provides direct support to faculty, analysis of the assessment data, and assessment reports for the university community.

The assessment framework for the pilot blended programs includes: 1) assessing student's learning through direct measures of student learning via embedded course assignments; 2) assessing faculty teaching effectiveness using the University of Washington IAS Student Course Evaluation System, Form X [16] (administered for all courses in all programs, university-wide, each semester); 3) assessing students satisfaction with blended courses utilizing WLP Student Survey; 4) assessing faculty rating of course quality via the end-of-semester Faculty WLP Survey, and, 5) discussing overall impressions of the blended learning experience and the implications of assessment findings via end-of-semester focus groups with blended program faculty and administrators. The charge of the WLP Assessment team pertains to items 3, 4 and 5, which are the focus of this paper.

Thus, this assessment study addresses the following questions: (1) Are students satisfied with blended learning at the university? (2) How do faculty rate the quality of blended courses in the participating five pilot programs? and (3) What are the implications of the assessment findings?

## II. METHOD

### A. Participants

The WLP included five graduate programs across two campuses of the university: Nursing Education, Accounting and Taxation, Library and Information Sciences, Nurse Educator, and Computer Science. This pilot assessment project utilized an availability sampling method, which was drawn from the WLP faculty and students, and administrators who were involved in the project during the AY 2010-2011.

#### 1. Faculty

Overall, 23 faculty members, most of them full-time faculty, taught 37 blended courses (16 in the fall semester and 21 in the spring semester) within the above five programs. Ten of these faculty members taught multiple blended courses during the academic year. Table 1 summarizes the number of faculty members per program per semester.

Program	# of faculty members in the fall semester	# of faculty members in the spring semester
Nursing Education	2	2
Accounting and Taxation	3	3
Library and Information Sciences/ School Library Media	3	4
Nurse Educator	5	4
Computer Science	3	4

Table 1. Number of Faculty Members per Program per Semester

The sampling method yielded thirteen completed faculty surveys in the fall and eleven in the spring, representing a response rate of 81% and 65%, respectively. In order to preserve confidentiality, data were available in the aggregate only, making it impossible to ascertain which course (or faculty member) was associated with a particular response set.

## 2. Students

Overall, 197 students participated in 16 blended courses in the fall and 218 students participated in 21 blended courses in the spring. Table 2 summarizes the numbers of students per program per semester.

Program	# of students in the fall semester	# of students in the spring semester
Nursing Education	25	30
Accounting and Taxation	43	44
Library and Information Sciences/ School Library Media	51	64
Nurse Educator	62	66
Computer Science	16	14

Table 2. Number of Students per Program per Semester

The sampling method yielded 55 student responses to the survey in the fall and 52 student responses to the survey in the spring. Because each student had multiple opportunities to respond to the survey (equal to the number of blended courses that the student was enrolled in during each semester) the actual number of completed surveys (68 in the fall and 60 in the spring) represents 24.46% and 18.98% response rate, respectively. Table 3 summarizes student characteristics along the dimensions of gender, age, employment and experience with blended courses, per semester.

	% male	% female	Mean age	Mean # hours work per week	Mean # of blended courses
Fall semester (n=68)	18	82	36.04 (sd=10.99)	29.4 (sd=15.37)	2.53 (sd=.95)
Spring semester (n=60)	15	85	33.87 (sd=10.25)	27.67 (sd=15.04)	1.83 (sd=.76)

Table 3. Students' Characteristics

## 3. Administrators

Administrators who were involved in the WLP were invited to participate in the focus groups after each semester and were recruited using an availability sampling method. The following administrators were represented in each focus group: the program's respective chairs and/or deans, the University Director of Assessment, the Associate VP for Instructional Technology & Faculty Development, the university's instructional designers, and members of the WLP assessment team. Two focus groups were held each semester, one on each campus. Fall 2010 focus groups included 16 and 8 participants on each campus, respectively, and the spring 2011 focus groups included 8 participants on each campus.

## B. Instruments

### 1. The WLP Student Survey

The WLP Student Survey (Appendix A) is an online self-report, mixed quantitative and qualitative questionnaire. It consists of 3 parts: Part A gathers demographic data about students. Part B consists of 26 Likert-scale items that ask students to rate their experiences in their respective blended courses. These items are further divided into factors, respectively assessing: 1) Students' experiences in blended vs. f2f courses; 2) Students' rating of the overall quality of blended courses at [name of university blinded for review], and 3) Students' rating of the learning helpfulness of specific course components. Each of the close-ended ordinal-scale items in this section is followed by an invitation to the students to offer qualitative comments in relationship to that question. Part C consists of 3 open-ended questions inviting students to reflect on their overall experiences in the blended course. Table 4 presents the range of scores for each factor of the WLP Student Survey.

<b>Factor 1: Important considerations for students when they choose to participate in a blended program (items 6-11)</b>	
<b>Factor Score</b>	<b>Descriptive Category</b>
5-8	Not at all important
9-13	Slightly important
14-16	Moderately important
17-20	Very important
21-25	Extremely important
<b>Factor 2*: The experience of blended courses compared to f2f courses (items 13-17, 29, 30).</b> <i>*Higher scores indicate blended courses to be a better experience compared to F2F.</i>	
<b>Factor Score</b>	<b>Descriptive Category</b>
6-10	Much worse
11-15	Somewhat worse
16-20	Neither worse nor better
21-25	Somewhat better
26-30	Much better
<b>Factor 3*: The overall quality of blended courses at the university (items 19-22, 24).</b> <i>*Higher scores indicate a higher rating of overall quality of blended courses' overall quality.</i>	
<b>Factor Score</b>	<b>Descriptive Category</b>
5-8	Strongly disagree
9-13	Moderately disagree
14-16	Neither disagree nor agree
17-20	Moderately agree
21-25	Strongly agree
<b>Factor 4*: Helpfulness of specific course components (items 25-27; 31-39)</b> <i>* Higher scores indicate a higher rating of course components' helpfulness.</i>	
<b>Factor Score</b>	<b>Descriptive Category</b>
12-22	Not at all helpful
23-33	Slightly helpful
34-44	Moderately helpful
45-54	Very helpful
55-60	Extremely helpful

**Table 4. The WLP Student Survey Range of Scores for Part B Factors**

The WLP Assessment Team developed the WLP Student Survey specifically for assessing students' experiences in blended courses. The instrument is adapted from a student survey questionnaire [2] from which it derives its initial content validity (e.g., rating the interaction between students and instructor in the course, rating the quality of various course components and rating the goodness of fit between the online and in-class learning aspects of the course). Additional validation for content of specific items on the survey emanates from the Sloan-C goal for student satisfaction as associated with discussion and interaction with instructors and peers, satisfaction with services (e.g., advising, registration, access to materials), and orientation to online learning [17]. Finally, assessing students' various considerations when choosing a blended program derives its content validity from Allen, Seaman, & Garrett [18], who have documented delivery mode (i.e., campus-dominated vs. blended or online delivery), work, and family responsibility to be likely factors in program selection. The WLP Assessment Team modified the instrument to include additional items that were relevant to the university. Moreover, items were added to rate students' experiences in the blended course as compared to their experiences in face-to-face courses

in order to help the university assess student perceptions of the relative efficacy of these learning modalities.

In an effort to increase the instrument’s content and face validity, the survey was pre-tested twice. A first draft of the instrument was shared with faculty members who were scheduled to teach WLP blended courses the following academic year and who had developing their respective blended courses. Based on their feedback, the instrument’s items and the respective response options were modified to enhance content and clarity. For example, items that detail specific components that faculty incorporated into their blended courses were added. e.g., media content, textbooks, online discussions, and exams. Furthermore, a response option of *Not Applicable* was added to all items that assess course components, allowing for the fact that different courses feature different components. Second, upon uploading the instrument to the CampusLabs (formerly StudentVoice) platform, members of the WLP Advisory Committee reviewed the online version of the instrument. Adjustments were then made to ensure that the platform was user-friendly. Finally, feedback from faculty and WLP Advisory Committee members also helped to reduce ambiguity in the language of several items.

To increase the reliability of the instrument, an effort was made to avoid compounded items without unduly lengthening the instrument. All ordinal items on Part B feature a 5-point response option (with the exception of items that assess course components and that offer a 6<sup>th</sup> response option: NA) for unified scoring across all items. Because the instrument assesses several constructs, its reliability was tested separately for each factor. Cronbach Alpha coefficients range from .8-.9 for the fall semester and from .7-.8 for the spring semester.

## 2. The WLP Faculty Survey

The WLP Faculty Survey (Appendix B) is an online, self-report questionnaire that is based upon the California State University: Chico Rubric for Online Instruction (ROI) [19]. The ROI offers a framework for addressing the question, “What should a quality online course look like?” This rubric has been used and modified at the university with the understanding that blended course design and delivery is a developmental process that benefits from continual faculty self-assessment.

Six categories from the rubric are represented in thirty items: (1) Learner Support and Resources, (2) Online Organization and Design, (3) Instructional Design and Delivery, (4) Assessment and Evaluation of Student Learning, (5) Innovative Teaching with Technology, and (6) Faculty Use of Student Feedback. Three response options are presented: baseline, effective, or exemplary. Aside each of these response options is a statement defining that particular classification. Table 5 presents the range of scores for each category of the WLP Faculty Survey.

<b>Category 1 - Learner Support and Resources (items 1-5)</b>	
<b>Category Score</b>	<b>Descriptive Category</b>
5-8	Limited
9-12	Adequate
13-15	Exemplary
<b>Category 2 - Online Organization and Design (items 6-10)</b>	
<b>Category Score</b>	<b>Descriptive Category</b>
5-8	Limited
9-12	Adequate
13-15	Exemplary
<b>Category 3 - Instructional Design and Delivery (items 11-17)</b>	
<b>Category Score</b>	<b>Descriptive Category</b>
7-12	Limited
13-18	Adequate
19-21	Exemplary

<b>Category 4 - Assessment and Evaluation of Student Learning (items 18-22)</b>	
<b>Category Score</b>	<b>Descriptive Category</b>
5-8	Limited
9-12	Adequate
13-15	Exemplary
<b>Category 5 - Innovative Teaching Technology (items 23-26)</b>	
<b>Category Score</b>	<b>Descriptive Category</b>
4-6	Limited
7-9	Adequate
10-12	Exemplary
<b>Category 6 - Faculty Use of Student Feedback (items 27-30)</b>	
<b>Category Score</b>	<b>Descriptive Category</b>
4-6	Limited
7-9	Adequate
10-12	Exemplary
<b>Total scoring</b>	
30-50	Limited
51-71	Adequate
72-90	Exemplary

Table 5. The WLP Faculty Survey Scoring Categories

In spring 2011, the survey was revised to include examples for each item. These examples were modified from the Instructional Design Tips for Online Learning, developed by Joan Van Duzer at Humboldt State University, to be used in conjunction with the Rubric for Online Instruction [20]. Specific examples relevant to the university were included. Reliability coefficients for the faculty survey were calculated separately for each semester, yielding an excellent reliability for this instrument (Cronbach Alpha=.94 and .97, in the fall and spring semesters, respectively).

### 3. Focus Groups

The purpose of the focus groups was to convey the assessment results to the faculty and to provide an opportunity to discuss implications of the findings. Accordingly, three central questions were posed during each focus group: (a) What is the faculty's reaction to the findings? (b) How do these results influence faculty's thinking about their blended courses in subsequent semesters, and (c) What do faculty need to implement the improvements they seek in their blended courses?

## C. Procedure

The university's Institutional Review Board (IRB) permitted data collection and dissemination, utilizing the procedures detailed below.

### 1. The WLP Student Survey

Utilizing the CampusLabs interface, the WLP Student Survey was made available to each student in each of the WLP blended courses towards the end of the fall 2010 and spring 2011 semesters. Each instructor provided the students with a link to the survey, and students could log onto CampusLabs and complete the survey using their individually created verification screens. Each student had an opportunity to complete a separate survey for each blended course in which he or she was enrolled in during that semester. To preserve anonymity and confidentiality, no faculty, administrator or staff member at the university was granted access to data regarding the students' verification screens. Each faculty member had access to aggregate data from his or her course, provided that there were three or more surveys completed for that course. Members of the WLP Assessment Team and of the WLP Advisory Committee had access to aggregate data across all the courses, which included all completed surveys.

## 2. The WLP Faculty Survey

The WLP faculty survey was administered via CampusLabs to all faculty members who taught a blended course in one of the five WLP programs during the fall or spring semesters of AY 2010-2011. An email from the University Director of Assessment on behalf of the WLP Assessment Team requested faculty's participation. To preserve participants' anonymity and confidentiality, the assessment team had access to the results only in the aggregate, not by individual faculty member. The assessment team was not provided with the names of the faculty members who completed the survey.

## 3. The Focus Groups

The office of the Associate Vice President for Instructional Technology and Faculty Development emailed the WLP faculty to request their participation in focus groups at the end of each semester. The AVP and members of the WLP Assessment Team facilitated the 90-minute group discussions.

## D. Design

The WLP assessment of blended learning utilizes a combined quantitative and qualitative survey design.

# III. RESULTS

## A. The WLP Student Survey

The results for the WLP Student Survey were calculated separately for the fall 2010 and spring 2011 semesters. For both semesters, students reported that their most important consideration when choosing to participate in a blended program was the flexibility of being able to complete assignments any place/any time ( $M_{fall}= 4.09$ ;  $sd=1.03$ ;  $M_{spring}=3.87$ ,  $sd=1.26$ ), closely followed by the convenience of not having to come to campus as often ( $M_{fall}= 3.95$ ;  $sd=1.13$ ;  $M_{spring}=3.73$ ,  $sd=1.38$ ). Students in the fall semester reported that, on the average, their experiences in blended courses were somewhat worse than in traditional f2f courses ( $M=13.25$ ,  $sd= 7.12$ ). Students in the spring semester reported that, on the average, their experiences in blended courses were neither better nor worse than in f2f courses ( $M= 17.28$ ,  $sd=4.24$ ). Students from both cohorts reported that they perceived the workload in blended courses to be somewhat heavier compared to f2f ( $M_{fall}= 2.31$ ,  $sd= .68$ ;  $M_{spring}=2.28$ ,  $sd=.87$ ). Both cohorts reported that overall, they liked the blended courses at the university ( $M_{fall}= 21.6$ ,  $sd= 2.89$ ;  $M_{spring}= 19.86$ ,  $sd=4.08$ ). Finally, both cohorts reported that on the average, they found specific components of blended courses to be moderately helpful ( $M_{fall}= 41.5$ ,  $sd= 8.10$ ;  $M_{spring}= 42.36$ ,  $sd=6.73$ ).

A regression analysis was conducted to test predictors of students' satisfaction with blended learning courses. Because the distribution of scores on the variable measuring overall satisfaction with the blended course was negatively skewed, this variable was transformed to achieve an approximation of normalcy for the purpose of conducting a regression analysis. The results for both cohorts indicate that the factor measuring students' rating of specific course components' helpfulness is not a significant predictor of students' overall satisfaction with a blended course. Instead, students' rating of the sufficiency of resources for blended learning provided by the university (which both cohorts rated, respectively, as moderate) emerged as the strongest predictor of students' satisfaction ( $B_{fall}=-.674$   $p=.00$ ;  $B_{spring}=-.624$ ,  $p=.00$ ). This variable accounted for 60% of the variability in students' satisfaction during the fall semester and for 38% of the variability in students' satisfaction during the spring semester.

A content analysis of students' narrative responses on the survey revealed that students found the following to be the most effective aspects of blended learning courses:

1. Flexible scheduling as helpful with time management;
2. Opportunities for independent work;
3. Opportunities for interaction with the instructor and with peers;
4. Good organization of the course and course materials by the instructor;

5. Instructor’s sympathetic attitude towards students.

The following aspects were identified as the least effective aspects of blended learning courses:

1. The challenge of independent time management;
2. Lack of opportunities to interact interpersonally with the instructor and with peers;
3. Confusion regarding assignments and the scheduling of F2F sessions;
4. Technical difficulties with the LMS or limited computer skills.

## B. The WLP Faculty Survey

The results for the WLP Faculty survey were calculated separately for each semester. Analysis of measures of central tendency indicated that the distribution of scores approximated the normal curve for each factor and for total score for both semesters, with the exception of the scores on the Assessment of Learning category for the fall semester, which were slightly positively skewed. The results further indicated that, on average and for both semesters, faculty rated the overall quality of their respective blended courses as adequate. Table 6 summarizes the results for the total score as well as for each of the six categories of the WLP Faculty Survey for each semester.

	Fall		Spring	
	M	sd	M	sd
<b>Category 1 - Learner Support and Resources</b>	9.86	2.53	9.36	2.97
<b>Category 2 - Online Organization and Design</b>	10.6	2.44	11.9	2.54
<b>Category 3 - Instructional Design and Delivery</b>	16.21	3.33	15	3.63
<b>Category 4 - Assessment and Evaluation of Student Learning</b>	9.92	2.01	9.72	2.72
<b>Category 5 - Innovative Teaching Technology</b>	8.21	1.76	8.09	2.62
<b>Category 6 - Faculty Use of Student Feedback</b>	8.14	2.59	8.27	1.84
<b>Total score</b>	59.6	17.12	62.36	14.10

\* All scores fell within the “adequate” range.

Table 6. The WLP Faculty Survey Mean Category and Total Scores\*

A step-wise multiple regression analysis was conducted to test the relative predictive value of each of the categories on the overall faculty rating of course quality. The results for the fall semester revealed that faculty ratings on five of the six categories (with the exception of innovative teaching with technology) were significant predictors of the overall quality rating of the course. With a *B* value of 3.744 ( $p=.001$ ), the category measuring the quality of learner support and resources emerged as the strongest predictor of overall course quality score, accounting for 61% of the variance in faculty rating of course quality. The second strongest factor, with a *B* value of 3.20 ( $p=.022$ ) was the category measuring the quality of online organization and design of the course, accounting for 15% of the variance in faculty rating of course quality. The quality of instructional design and delivery ( $B=1.83$ ,  $p=.003$ ) and assessment of learning ( $B=1.97$ ,  $p=.018$ ) emerged as the next two strongest factors, contributing 14% and nearly 5 %, respectively, to the variance in faculty rating of course quality. Finally, the use of student feedback ( $B=1.27$ ,  $p=.006$ ) emerged as a modest contributor to the overall rating of the course quality, accounting for 3% of the variance in faculty rating of course quality.

The results for the spring semester revealed that faculty ratings on only three of the six categories were significant predictors of the overall quality rating of the course. Consistent with the results of the fall semester, the quality of learner support and resources emerged as the strongest predictor of overall course quality rating ( $B= 4.10$ ,  $p=.001$ ), accounting for 75% of the variance in faculty rating of course quality. Instructional design and delivery emerged as the next strongest predictor ( $B=2.23$ ,  $p=.00$ ) accounting for nearly 19% of the variance in faculty rating of course quality. Finally, innovative teaching technology emerged as a modest predictor of overall course quality rating ( $B=1.62$ ,  $p=.005$ ), accounting for just under 2% of the variance in faculty rating of course quality.

Item analysis across categories was conducted to identify faculty's perceptions of the strengths and weaknesses of their blended courses. The findings indicated that during the fall semester, faculty gave the three highest ratings to items that assess organization of the course: Clarity of the syllabus ( $M=, 2.5$   $sd= .65$ ), clarity of learning objectives ( $M=, 2.57$   $sd= .51$ ), goodness of fit between learning activities and learning objectives ( $M=, 2.57$   $sd= .51$ ). Faculty assigned the lowest 3 ratings to items that assess availability of information on online learning and campus resources ( $M=, 1.57$   $sd= .64$ ) and to items that assess the quality of pedagogy in blended courses: assessing students' readiness for learning ( $M=, 1.64$   $sd= .63$ ), use of multimedia elements to support different learning styles ( $M=, 1.64$   $sd= .63$ ), and enhancement of student learning by addressing multiple learning styles ( $M=, 1.71$   $sd= .72$ ). Similar findings emerged from the spring semester data. Faculty gave the highest ratings to items that assess organization of the course ( $M=, 2.63$   $sd= .50$ ) and the clarity of the syllabus ( $M=, 2.63$   $sd= .50$ ). Additionally, faculty also gave a high rating to an item that assesses the degree to which course activities develop students' problem solving skills ( $M=, 2.54$   $sd= .52$ ). Consistent with the fall semester data, faculty in the spring semester assigned the lowest three ratings to items that assess the degree to which the course provides information for online learners'; support ( $M=, 1.63$   $sd= .67$ ), the degree to which the course provides information on resources for learning ( $M=, 1.45$   $sd= .68$ ), and to items that assess the quality of pedagogy in blended courses: the degree to which the course enhances student learning by addressing multiple learning styles ( $M= 1.36$   $sd= .67$ ).

### **C. The Focus Groups**

A constant comparative analysis was used to analyze the content of focus group discussions on each campus following each semester. The focus groups brought to life the needs of each program, some of which were found to be consistent across programs, and others that were unique to a particular program. Universal themes that emerged during the focus groups on both campuses over both semesters included the need for more faculty development in pedagogy specific to blended instruction and enhanced support for students in terms of resources, computer literacy, and organizational and time management skills.

Regarding the theme of faculty development, there was much discussion on identifying opportunities and mechanisms for additional support that would be coordinated and provided by the university's instructional designers. For example, one participant commented: "We're doing a faculty development program where faculty receive hands-on training with Blackboard". Another participant suggested that there should be "more dialogue and sharing [of ideas] among faculty."

On the theme of enhanced support for students, the focus group discussions included the type of challenges that students face in blended learning courses. For example, several participants highlighted the issue of students' preparedness relative to computer skills in general, and lack of familiarity with the Blackboard, the university's course management system. One participant offered the following example: "One of our peeves is when we ask students to post assignments and it would be posted in the body of the discussion. [This] reflects a lack of computer tech knowledge". Another participant suggested that it would be "useful to have pre/post-test for entering blended graduate students to self-assess their strengths and weaknesses". The issue of time management was also noted as a challenge for students in blended programs. Several participants noted that for students who are taking more than one blended course per semester, there is a potential for "conflicts related to scheduling the face-to-face days and online days". It was pointed out that "faculty would like to work more closely within their respective department in the scheduling remote classes and making it more convenient for the student."

The findings further identified program-specific needs and concerns. For example, during one focus group, it was revealed that entering students in a graduate nursing education program needed orientation in certain basic computer functions such as disabling pop-up blockers so they could upload attachments in Blackboard. Entering students in a graduate computer science program, on the other hand, did not require such instruction. However, some computer science students needed greater in-person communication with the instructor than had been anticipated.

## IV. SUMMARY AND CONCLUSIONS

### A. Interpretation of Findings

This article focuses on indirect measures of blended learning, with an emphasis on the development and utility of quantitative and qualitative instruments to gather feedback from students and faculty on blended learning during the first year of the university Web Learning Project. Previous work in the area of blended learning assessment focused on assessment of specific components of blended learning from either the student perspective [3-10] or the faculty point of view [11-15].

This study takes a more comprehensive approach by looking at student and faculty feedback and collapsing data across disciplines to gain a deeper understanding of the overall experiences of students and faculty in blended programs. Overall, the findings revealed that students in the five pilot programs moderately liked their blended courses and that faculty thought their blended courses were adequate in terms of quality. The findings further suggested that faculty believed they were doing best with aspects of blended courses that were shared by traditional f2f courses such as organization of the syllabus and clarity of the learning objectives. However, faculty assigned a lower quality value to course aspects that were unique to blended learning, such as the use of specific pedagogy. Possibly, faculty were able to draw on their traditional teaching experiences to aid them in designing and delivering specific aspects of the blended course, but had difficulties with course components that were unique to blended learning and with which they might have had less experience. This discrepancy in skill level has implications for designing support services and professional development activities for faculty that target pedagogy for blended courses.

Students and faculty identified the availability of university resources and support for online learning (such as library and information resources, academic support services, technical support and student services) as important predictors of students' satisfaction with blended learning and course quality. While the value of university resources and support for online learning remained a strong predictor of faculty rating of course quality during both semesters (accounting for 61% and 75% of overall course quality during the fall and spring semesters, respectively), there was a significant drop in its predictive value on students' satisfaction with their blended courses (from 60% of the variance in the fall to 38% of the variance in the spring). Possibly, as students gained more experience with blended learning, they became more comfortable with online activities and tasks and thus the availability of university support and resources became less central to their overall satisfaction with blended learning. Nevertheless, feedback from both semesters suggested that students and faculty believed that there was a need for increased university resources and support for online learning as well as an increase in accessibility of resources already in place.

### B. Next Steps

The university has taken a comprehensive approach in utilizing these findings and translating them into institutional initiatives along three main dimensions: resources and support for students and faculty, professional development for faculty, and expanding the blended learning programs within the university.

#### 1. Resources and support for students and faculty initiatives

In response to findings regarding the importance of university resources and support for online learning, and in an effort to better communicate to faculty and students the availability of existing resources in the institution, the Office of Academic Affairs launched a new blended and online learning website in fall 2011 ([www.liu.edu/online](http://www.liu.edu/online)) that includes additional resources on blended/online learning for faculty. The new website, still under development, lists and links to all blended and online programs at the institution, and will eventually serve as a repository for a variety of blended and online learning resources, including a link to the Centers for Student Information supervised by the Offices of Information Technology. Additionally, the Office of Information Technology will work to increase the availability of both on-campus and web-based services during normal business hours, as well as during evenings and weekends.

## **2. Professional development for faculty**

In response to the faculty's expressed need for training in specific blended learning pedagogies, the university is launching three major initiatives: (A) an online faculty training course leading to internal certification and delivered within Blackboard to develop instructional competency. The training will focus on pedagogical issues including the creation of a blended/online learning community via appropriate interactions between and among faculty and students. To aid in this effort, the university has purchased licenses for Adobe Connect Pro, a web conferencing software tool, for synchronous communications within blended and online courses, and will gradually release the licenses to faculty and provide training to ensure appropriate use of the tool; (B) additional online faculty training courses on topics such as facilitating online discussions; facilitating group work in online courses; creating and using rubrics for assessment of blended/online courses, and using Blackboard and Web 2.0 tools to aid faculty in their teaching; (C) faculty access to a dedicated server and training workshops in the development of multimedia content, including podcasts. This particular initiative responds directly to the faculty's expressed need to develop expertise in accommodating multiple student learning styles.

## **3. Expanding the blended learning programs within the university**

In light of the general favorable response by students and faculty to blended learning programs, the university is in the process of launching additional blended courses and programs, as well as some fully online programs. Within this initiative, the university is exploring suitable mechanisms for designing original blended courses and/or programs as well as for converting f2f courses or programs into a blended format. Further, the university is exploring mechanisms to increase support for blended and online learning in the areas of admissions, advising, registration, financial aid procedures, etc., within the existing university infrastructure.

## **C. Strengths and Limitations of the Study**

This evaluation study has several strengths: first, it utilized multiple levels of data collection, thus capturing both student and faculty perspectives on blended learning, and highlighting the corresponding perspectives and needs of learners and instructors. Second, the combined quantitative/qualitative design of the instruments affords a deeper understanding of the student and faculty experience in the blended learning programs. Third, the study encompassed feedback on blended learning from various disciplines, thus affording the university a comprehensive perspective of blended learning at the institutional level. Fourth, the study collected two separate sets of data during two semesters, providing a replication of the design and procedures and enhancing the reliability and validity of the findings.

A major limitation of this study is its relatively small sample size. It is important to note that this was a pilot project in its first year with modest enrollment. Additionally, during this first year, as the assessment team was developing the data gathering procedures, students and faculty were acclimating to both the LMS and the external web-based surveying platforms that were used for assessment of blended learning, which may explain the relatively low response rate to the assessment instruments. The WLP assessment team will be working with faculty next year on strategies to increase the response rates to both the student and faculty surveys. Hopefully, as the university expands its blended learning programs, there will be opportunities to collect data from a larger number of students and faculty. Furthermore, while collecting data across disciplines is useful in understanding the overall institutional needs of the university as it develops its blended learning programs, the small sample size has prevented a more specific evaluation of departmental outcomes and needs. As the university expands its blended learning program, future assessment can focus on discipline-specific feedback for maximizing program effectiveness.

## **V. ABOUT THE AUTHORS**

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