

## Chapter 4

### Results

The purpose of this case study is to explore the experiences of online students and faculty and determine whether there are identifiable needs, trends or issues to address to ensure that online students and faculty are satisfied and successful. This exploration has been centered on theoretical constructs and best practices of distance education. One of the main goals is to discover the relationships between online student satisfaction and success in order to find ways to improve student success in online courses. The exploratory case study methodology included data gathering from (a) student and faculty focus groups, (b) student and faculty surveys, and (c) student and faculty data exported from the enterprise information system. The quantitative and qualitative results and analyses are presented in this chapter. The findings are summarized at the conclusion of this chapter, and the significant findings will be discussed in chapter five.

#### *Data Resources*

There were three types of data resources for this study: (a) focus groups, (b) surveys, and (c) enterprise data. The focus groups provided information for developing the survey questions and served as a reference for analyzing the survey results. There were two student surveys and one faculty survey. The student survey responses were tracked according to individual students. The faculty survey responses were anonymous. The first student survey was sent to all currently enrolled students as of the 12<sup>th</sup> week of the semester. This survey reached 1,541 students. The second student survey was sent

to those students who had dropped their online class (withdrawn) sometime after the four-week drop date and before the 12<sup>th</sup> week. This survey reached 239 students. As you may recall from the previous chapter, question #28 (open-ended response) was modified for the second survey, to ask for the reasons they dropped the course. The results of these two student surveys were combined for statistical analyses. The student and faculty survey results provided a rich source of data for quantitative and qualitative analyses. The third data resource was the enterprise information system which holds the demographic data and course records for all students and faculty. Demographic data and course grades for the student population were obtained from the enterprise system and merged with the student survey results per respondent. Likewise, the demographic and grade information was collected for the student population—not just the students that responded to the survey (sample). This provided a basis of comparison between the student sample, student population and student body. Demographic data was also obtained for the faculty population of the study.

All of the student and faculty data resources are described in Appendices A and B. They are organized according to input variables, process variables, and outcome variables. This chapter is also organized according to input variables, process variables and outcome variables. After the results are presented, they will be analyzed for significant differences and correlations related to student/faculty satisfaction and success. This chapter will conclude with a summary of the findings.

### *Input Variables for Students and Faculty*

Input variables are factors which describe the student and faculty populations before they began the online courses. They are selected properties of the students and instructors that may have a relationship to their experience of taking or teaching an online course. They are independent variables. For this study, the input variables are categorized into two groups: demographics and course-related characteristics.

#### *Student Demographics*

The demographic data for each student in the sample and population were obtained from the enterprise information system and included ethnicity, age, gender, and total unit load for fall 2007. It was beneficial to obtain this information directly from the enterprise system so as to ensure its accuracy, reduce the number of survey questions, and provide a basis of comparison between the demographics of the sample, population and student body.

The demographic data for students and faculty are provided in Appendices H and I. In comparing the demographics of the online student *population* to the entire student body, gender-wise, a larger proportion of online students are female (+8.8%). Ethnicity-wise, a slightly larger proportion are Unknown (+2.7%) and White (+1.3%); a smaller proportion are Hispanic (-2.3%) and Asian & Pacific Islander (-0.2%). Age-wise, a much larger proportion are 20 to 24 (+12.1%) and 25 to 29 (+4.4%); a much smaller proportion are below 20 (-9.6%) and over 40 (-8.1%). In comparing the online student sample to the online population, more are female (+5.2%), more are White (3.1%), more are over 30 (7.4%), and fewer are under 24 (-9.2%).

### *Faculty Demographics*

The faculty survey was anonymous, so it was not possible to match the survey respondents to specific demographic information. However, the faculty survey did ask for gender and age group, and these results are reported in aggregate (see Appendix I). Furthermore, demographic data for the online faculty population was obtained from the enterprise system to provide aggregate information.

In comparing the demographics of the online faculty population to the entire faculty, gender-wise, a larger proportion of online faculties are female (+6.9%). Ethnicity-wise, a larger proportion are Hispanic (+4.5%); a smaller proportion are Unknown (-3.1%). Age-wise, a larger proportion of online faculty are 31 to 40 (+3.4%); a smaller proportion are 21 to 30 (-2.4%). A much larger percentage of online instructors are full-time as compared to the entire faculty (+28.9%).

### *Analysis of Demographics*

The online students and online faculty have different demographics than the larger student/faculty bodies of the college. In comparing the online student population to the student body, a greater proportion of online students are female, younger, and of an unknown ethnicity. In comparing the online faculty to the faculty body, a greater proportion of online faculty are full-time, female, Hispanic and in the 31 to 40 age group. In comparing the online student sample to the online student population, a greater proportion of the sample is female, White and older than the online population it represents.

*Student Course-Related Characteristics*

The student survey posed several questions related to taking an online course. The following student survey questions were intended to measure course-related characteristics (input variables).

(#1) Please select the most important reason for taking this course in the online format.

(#3) Before you began this course, how many online courses have you completed?

(#4) How would you rate your computer skills?

(#24) Which campus do you primarily attend?

(#25) About how many miles do you live from the primary campus you attend (if applicable)?

(#27) Please select your primary educational goal at DVC...

The ordinal results of the student survey responses to are provided in Appendix J. The response highlights of the preceding questions are described in the following bullet points:

- The most important reason for taking a course in the online format was scheduling flexibility (76.9%). Preferring not to travel to campus was a distant second (9.2%). For the 57 students that selected “other” (8.0%), the most frequent reason cited was “course schedule issues” (28.8%), followed by “work” (20.3%), “other” (16.9%), “combination of all three above” (13.6%), “family” (10.2%), “distance” (3.4%), “medical” (3.4%), and “parking” (3.4%).

- Well over a third of the students had never completed an online course prior to enrolling in this course (37.9%).
- Respondents rate themselves as having “Average”, “High”, or “Very High” computer skills (97.4%). The mode was “High” (42.6%). The mean was 3.92 on a Likert scale from 1 to 5 ( $SD = 0.808$ ).
- The majority of students consider Pleasant Hill to be their primary campus (77.1%).
- The vast majority live within 30 miles of the campus (93.4%). A small percentage claim to be entirely online (10.1%).
- Transferring to a 4-year institution, either with or without an AA degree, is the primary educational goal (73.3%).

#### *Faculty Course-Related Characteristics*

The following faculty survey questions were intended to measure course-related characteristics (input variables).

(#1) Please select your employment status and location.

(#2) Prior to this semester (FA07), how many years have you taught online courses for DVC or elsewhere?

(#4) In priority order, please select up to three reasons for why you teach online.

(#7) How would you rate your computer skills?

(#21) Years of college teaching experience (online and traditional).

The ordinal results of the faculty survey responses to are provided in Appendix K. The response highlights of the preceding questions are described in the following bullet points:

- The average (mode) online instructor is full-time at Pleasant Hill (46.5%), followed by part-time at Pleasant Hill (39.5%).
- Prior to Fall 2007, the average (mode) online instructor had 3 to 5 years experience with teaching online (30.2%). A small percentage taught an online course for the first time (11.6%).
- The top three reasons for wanting to teach online were (a) enjoy the scheduling benefits of teaching online (65.1% of faculty placed in top three), (b) enjoy the process of teaching online (55.8% of faculty placed in top three), and (c) enhancement of professional growth (46.5% of faculty placed in top three). Following close behind was “Enjoy teaching a mixture of online and on-campus courses (44.2%). There were 10 faculty comments related to why they teach online, for example, “That’s where the students are”, “More accessible to students”, “Students want it (that is the ONLY reason)”, “No commuting”, “Improves tech skills”.
- Online faculty rate themselves as having “Average”, “High” or “Very High” computer skills with a mode of “High” (46.5%). The mean was 3.88 ( $SD = 0.731$ ) on a scale of 1 to 5.
- The average number of years of college teaching experience was a bimodal distribution of 21 to 30 years (25.6%) and 6 to 10 years (23.3%).

### *Analysis of Course-Related Characteristics*

For both the students and faculty, scheduling flexibility was the most important reason for taking or teaching online courses (65.1% and 76.9%). Students overwhelmingly selected scheduling flexibility over “prefer not to travel to campus” and “prefer to learn online.” For students who selected “other”, the primary reasons cited were “course scheduling issues” and “work”, further reinforcing the importance of flexible scheduling options. Over 93% of the students live within 30 miles of the campus (65% live within 15 miles of the campus), this supports the finding that students are enrolling in online courses because of *schedule*, not distance. Although online faculty acknowledge an appreciation for the scheduling flexibility of online teaching, many teach online courses because they enjoy the process and recognize that students are expecting more courses to be offered in the online format.

The student and faculty means for the self-rating of computer skills were nearly equal (3.88 and 3.92). In my view, these high means are reflective of the present information/communication age and the rising tide of digital natives and digital immigrants in society and schools. The vast majority of DVC students and faculty have at least average computer skills and using a computer is not a barrier to attending or teaching an online course.

Over 60% of online instructors are full-time faculty members and nearly 40% are part-time. There are at least two contractual differences between full-time and part-time instructors that may impact online students. First, unlike full-timers, part-timers are *required* to be evaluated on their online courses. This is an opportunity for peer

feedback and reflection that could foster professional growth in online instruction. The evaluation process may also help redirect those instructors who are not satisfied or successful in the online format. However, as was pointed out in the faculty focus group discussions, there is no contractual requirement that the evaluator should have any experience with teaching online. Secondly, part-timers are not contractually required to provide student office hours and this could be limiting the amount of teacher to student interaction for online courses taught by part-timers.

Over 10% of online instructors taught an online course for the first time last semester. It is their responsibility to seek out professional support from peers, support staff, college workshops, or elsewhere. The college does not require that new online faculty demonstrate any online teaching competencies before teaching their first online course. The need to ensure that new online instructors were adequately prepared and supported was identified as an important issue in the faculty focus groups and survey responses.

Many students are taking online courses for the first time, and that number has steadily increased over the past eight years. The fact that so many students do not complete online courses and/or get lower grades than students in traditional courses is a cause of concern for the college. These issues were raised in every faculty focus group meeting, and these issues of student retention and success are a major impetus for this study.

Concerning course registrations, faculty observed that their online courses are usually the first to fill, but online students will often times “drop” a course (stop

participating) before officially dropping it. By the time the instructor realizes this, it is too late to add students from the wait list. Students raised this same issue in the student focus groups—they could not get into online courses because they were full. Yet, they knew that many students would end up dropping an online course. They recommended that faculty allow a larger number of students into their online classes, knowing that a larger number will eventually drop the course.

Most of the “online students”, similar to “traditional students”, intend to transfer to a four-year institution. Indeed, this is because most of the “online students” are actually “traditional students”, who are simply supplementing their traditional course load (on-campus) with online courses.

#### *Process Variables for Students and Faculty*

Process variables are those factors which pertain to the experience of taking or teaching an online course. For this study, the process variables are categorized into two groups: course activities and course perceptions.

#### *Student Course Activities*

The following student survey questions were intended to identify and quantify online course activities (process variables).

(#2) Did you attend an instructor-led orientation?

(#5) What type of computer do you most often use to access your online course?

(#6) Which website platform is primarily used for your online course?

(#8) How many times have you received technical assistance for your current online course?

(#9) Who provided the technical assistance you received (check all that apply)?

(#26) About how many hours do you work for pay?

The response highlights of the preceding questions are described in the following bullet points:

- By a slim majority, most students did not attend an instructor-led orientation (52.9%).
- The vast majority of students use Microsoft Windows based computers to access their online course (89.4%). Macintosh users came in a distant second (7.8%).
- The majority of students access their online courses in WebCT (64.9%). A large percentage of students access their online courses in CourseCompass (25.6%), which is powered by Blackboard and hosted offsite by Pearson Education, Inc.
- Most students have not required any technical assistance for their online course (76.3%). Nearly 20% needed assistance once or twice, and very few needed assistance three or more times (4.1%).
- For those who required technical assistance, the class instructor was the primary support provider (20.5%), followed by website resources (8.2%) and peer support (5.0%). Staff support was relatively low (3.2%).
- The average (mode) online student worked 30 or more hours per week for pay (44.9%).

### *Faculty Course Activities*

The following faculty survey questions were intended to identify and quantify online course activities (process variables):

(#3) Please indicate the number of units of your online course(s).

(#5) Which option best describes your approach to student orientations for your online course?

(#8) What type of computer do you most often use to access your online course?

(#9) Which website platform is primarily used for your online course?

The response highlights of the preceding questions are described in the following bullet points:

- The majority of online instructors are teaching online courses of 3 units or more (83.7%).
- Many instructors require on-campus (face-to-face) orientations (30.2%) while a slightly smaller percentage do not provide an orientation (27.9%). Many instructors provide *online* orientations as either optional (11.6%) or mandatory (11.6%).
- The vast majority of faculty use Microsoft Windows based computers to access their online course (90.7%). Macintosh users came in a distant second (9.3%).
- WebCT is the most widely used course management system by faculty (76.7%), followed by “Other” (18.6%).

*Analysis of Course Activities*

The majority of online instructors teach online courses of 3 units or more as reflective of the majority of online course offerings at DVC. These courses may be full-term, lasting the entire semester, or short-term. As discussed in the faculty focus groups, some of the short-term courses are scheduled over a 15 week period instead of the normal 17.5 week duration. The 15 week schedule appeals to some instructors because it provides them with even more flexibility over their schedules.

The majority of instructors provide an orientation that is either mandatory or optional, on-campus or online (58.1%). Almost half of the students reported attending such an orientation (47.1%). Faculties were asked to explain their rationale for requiring or not requiring student orientations. Most responded to this question (38 out of 43), and provided pro or con rationales for orientations. Those who commented in favor of orientations ( $n = 23$ ), cited the following types of reasons (some instructors cited multiple reasons): (a) provide technical demonstrations of the course management system ( $n = 8$ ), (b) facilitate verbal discussion of the syllabus and course requirements ( $n = 8$ ), (c) encourage social interactions among students ( $n = 3$ ), (d) check identification of students for security purposes ( $n = 3$ ), (e) handle student adds and drops ( $n = 2$ ), and (f) foster student success ( $n = 1$ ). Those instructors who did not provide orientations ( $n = 15$ ), cited the following types of reasons (some instructors cited multiple reasons): (a) unnecessary because students already know how to take an online course ( $n = 7$ ), (b) defeats the purpose of an asynchronous, online course ( $n = 6$ ), and, (c) not well

attended ( $n = 2$ ). Later in this chapter, we will examine the relationships between attending an orientation and online course retention/success.

Both students and faculty overwhelmingly used Microsoft Windows based computers to interact with their online courses (89.4% and 90.7%). A much smaller percentage of students and faculty used Macintosh computers (7.8% and 9.3%). Through the focus group discussions and survey responses, it is evident that some of the CourseCompass applications are not compatible with Macintosh computers, and this is a major source of frustration for such students. These applications include MyMathLab, MyEconLab, MyFinanceLab, and, MyAccountingLab—they are only compatible with Windows based computers. This was a serious issue for those students who registered for such an online course, only to learn that they could not access it with their Macintosh computer.

Although WebCT is the dominant CMS for DVC online courses, many students access their online courses elsewhere. CourseCompass is the second most widely used CMS and it is hosted by Pearson Education, Inc. Some instructors use CourseCompass because they require students to purchase a textbook or online course pack from this publisher. Pearson Education provides the CMS hosting services for these courses and passes the cost to students. However, on average, CourseCompass users required more technical assistance than WebCT users,  $M = .47$  ( $SD = .878$ , Range 0-3) versus  $M = .32$  ( $SD = .694$ ). This is a significant difference at the 95% confidence level,  $t(df=285.345) = -2.020$  and  $p=.044$ . A small number of instructors simply use a website and a personal email account to conduct their online course. All of these different CMSs have unique

website addresses and unique student login accounts—each system is separate, requiring extra work for such online students. By contrast, when a student has multiple courses within WebCT, after logging into the system, they see all of their online courses displayed under MyWebCT. This enables students to easily navigate between multiple online courses and eliminates the need to become familiar with different systems. The benefits of using just one CMS apply not only to online courses, but to hybrid and traditional courses that use the CMS. However, as will be described later, not all students or instructors think that all courses should be hosted with one CMS.

#### *Student Course Perceptions*

The following student survey questions were intended to measure student course perceptions (process variables). A set of six, multi-part questions, were asked about various aspects of the student's *interaction* with the online course—technology (interface), instructor, content, other learners, self, and support services. These were theoretically important questions for this study. The item response options ranged from very unsatisfied (1) to very satisfied (5); each question category provided for optional comments. In addition, a set of questions was asked about how the actual workload, difficulty, and time requirements of the online course compared to expectations (more, less, same).

(#10) How satisfied are you with the following technical aspects of your online course (8 items)? If you have not used a resource, leave it blank.

(#11) How satisfied are you with the following instructional aspects of your online course (6 items)?

(#12) How satisfied are you with the following content aspects of your online course (6 items)?

(#13) How satisfied are you with the following student aspects of your online course (4 items)?

(#14) How satisfied are you with your own participation in the online course (4 items)?

(#15) How satisfied are you with the following DVC online support services (9 items)? If you have not used a resource, leave it blank.

(#16) How does the workload of this course match your expectations?

(#17) How does the difficulty of this course match your expectations?

(#18) How do the time requirements of this course match your expectations?

First, the highlights of the last three questions are described in the following bullet points. Next, the highlights of the satisfaction questions will be discussed at length, and will include various statistical analyses of the learner interaction questions.

- The majority of students thought that the *workload* of the online course was about what they expected (63.8%). However, a large percentage thought the course was more work than expected (30.2%).
- The majority of students thought that the *difficulty* of the online course was about what they expected (62.7%). However, a large percentage thought the course was more difficult than expected (30.1%).

- The majority of students thought that the *time requirements* of the online course was about what they expected (56.4%). However, a large percentage thought the course required more time than expected (36.6%).

The mismatch between a student's expectation and experience in an online course could be a source of dissatisfaction that will be analyzed later in this chapter.

The student satisfaction questions are a very important part of this study. According to Astin, "there is a consistent positive association between student satisfaction, undergraduate GPA, and retention" (1993, p. 311). According to distance education interaction theory, the interactions between the learner and instructor, learner and content, learner and learner, and learner and interface are especially important for the design, implementation and evaluation of DE courses. In addition, interactions with online student support services and student perception of self are significant factors. Student satisfaction with these interactions is associated with overall satisfaction and retention/success.

*Factor analysis of student satisfaction variables.* To ensure that the survey questions for each of the learner *interaction* categories were properly grouped together, SPSS 16.0 (Graduate Student Version) was used to run a factor analysis. As a budding quantitative analyst, I closely followed Richard Ho's guidelines and procedures for conducting a factor analysis with SPSS (Ho, 2006). First, I checked to ensure that the variables met the minimum requirements for factor analysis—ordinal level or higher, several variables per factor, sample size of at least 100. Then, I selected all 37 of the learner interaction survey items for factor analysis. Following Ho's guidelines and

procedures, a Principal Components extraction method was applied using Eigenvalues over 1, and suppressing coefficient values less than 0.33. Oblique rotation using the Oblimin rotation method with Kaiser Normalization was applied. The rotation converged in 14 iterations. The resulting Scree plot (Appendix L) showed a total of six components above the Eigenvalue of 1, and these accounted for 72.0% of the total variance (Appendix M). The Pattern Matrix (Appendix N) was used to identify which variables (survey items) went with each component (learner interactions). The Pattern Matrix showed a definitive grouping of the interaction variables into six components, with the exception of three variables, which were each associated with two components. After reviewing the variables and components, it made theoretical sense to group those dual-variables with the component in which they had the largest correlation.

The factor analysis provided strong and striking evidence that the learner interaction variables were perceived by the students to be highly correlated to each other—with four exceptions. The factor analysis placed four of the variables into different groups than were originally intended in the student survey. The first regrouped variable was item 10c, satisfaction with access to the online textbook. This item was intended to measure satisfaction with technology (interface). Instead, the factor analysis grouped it with content. The next regrouped variable was item 10a, satisfaction with technical assistance. This item was intended to measure satisfaction with technology (interface). Instead, the factor analysis grouped it with student support. The third regrouped variable was item 12e, satisfaction with instructor's assessment of learning. This item was intended to measure satisfaction with content. Instead, the factor analysis

grouped it with instructor. The last regrouped variable was item 12b, satisfaction with course organization. This item was intended to measure satisfaction with content. Instead, the factor analysis grouped it with instructor, and also, to a weaker extent, content (it was grouped with both components). I decided to group it with the component that had the stronger association, instructor, which also made theoretical sense. The second variable that was associated with two components was item 10g, satisfaction with interactive quizzes/tests. It was intended to measure satisfaction with technology (interface), but the factor analysis grouped it with both technology and content. I left it with technology because of the stronger correlation, however, it is clearly related to content. The third and last variable to be associated with two components was item 10e, satisfaction with the chat room. It was intended to measure satisfaction with technology (interface), but the factor analysis grouped it with both technology and other learners. I left it with technology because of the stronger correlation, however, it is clearly related to interaction with other learners. As a result of the principal component factor analysis, the following survey items were now grouped together to constitute the new learner interaction scales:

1. Learner to Interface: 10b, 10d, 10e, 10f, 10g, 10h
2. Learner to Instructor: 11a, 11b, 11c, 11d, 11e, 11f, 12b, 12e
3. Learner to Content: 10c, 12a, 12c, 12d, 12f
4. Learner to Learner: 13a, 13b, 13c, 13d
5. Learner to Self: 14a, 14b, 14c, 14d
6. Learner to Support: 10a, 15a, 15b, 15c, 15d, 15e, 15f, 15g, 15h, 15i

Four items were moved from their intended categories (as organized on the survey), to a new interaction group, as determined through factor analysis. These items were 10a, 10c, 12b, and 12e.

Next, Cronbach's Alpha testing was applied in order to test the reliability of these new scales. According to Ho, "if the alpha is high (0.80 or higher), then this suggests that all of the items are reliable and the entire test is internally consistent" (2006, p. 240).

Cronbach's Alphas are listed for each of the new learner interaction scales:

1. Learner to Interface: 0.874
2. Learner to Instructor: 0.955
3. Learner to Content: 0.874
4. Learner to Learner: 0.926
5. Learner to Self: 0.921
6. Learner to Support: 0.897

The magnitudes of the Alphas indicate a very high consistency among the variables within the interaction scales. Thus, the new grouping of variables replaced the original grouping of variables, to constitute the actual learner interaction scales. The results of the factor analysis validated most of the interaction item groupings and provided statistical information for regrouping four of the variables to correspond to the student's perceptions. Cronbach's Alphas confirmed the reliability of the new variable groups. Thus, these survey items appear to be measuring their intended targets of student satisfaction with learner interactions.

For the sake of doing inferential analyses, six new composite variables were computed from the individual variables to represent each of the interaction scales. The new composite variables were formed by calculating the sum of the individual variables in the scale and dividing it by the number of items in the scale. Student cases that were missing one or more item responses for a given scale were excluded from the computation of the new variable. The following six tables display the descriptive statistics for each variable of the six learner interaction scales—including the new composite variables.

*Learner to interface interaction variables.* The interactions between the learner and interface are a critical aspect of online education. For DVC students, the most common interface to the online course is WebCT, followed by CourseCompass. If a student is having difficulties interacting with the interface, they are probably having difficulties with the online course. The following six items listed in Table 1 represent significant types of interactions between the learners and interface. It is up to each instructor to decide which interface tools to use for their class.

Table 1

*Learner to Interface Interaction Variables*

Student Survey Items	<i>M</i>	Mode	<i>SD</i>	Valid	Missing
10b. How satisfied are you with access to your online course website?	4.43	5	.724	697	42
10d. How satisfied are you with the discussion board?	4.12	5	.931	663	76
10e. How satisfied are you with the chat room?	3.61	3	1.002	516	223

10f. How satisfied are you with email?	4.21	5	.882	664	75
10g. How satisfied are you with the interactive quizzes/tests?	4.13	5	.964	648	91
10h. How satisfied are you with the online gradebook?	4.09	5	1.022	658	81
<i>Composite Interface Variable</i>	4.07	5	.706	491	248

The highest satisfaction mean is for access to the online course website (4.43). The lowest satisfaction mean is for the chat room (3.61). The difference between the highest and lowest mean is 0.82. Five of the six items have a mode of 5, very satisfied, and the composite variable mode is 5.

There were 62 student comments for this scale. A total of 41 comments were negative (66.1% of responses), 12 comments were positive (19.4%) and 9 comments were neutral (14.5%). The negative comments referred to technical difficulties with the Mac, CourseCompass, Videos, WebCT, low use of existing tools such as chat and discussion board, not keeping the grades up to date, not providing answers to tests. The positive comments referred to the instructors (e.g., “great online teacher”), ease of use of the interface, podcasts, online discussions, and the online gradebook.

*Learner to instructor interaction variables.* The interactions between a learner and instructor are very important. As was discussed in chapter 2, dialog between a student and instructor is an important determinant of transactional distance—the distance of understanding and perceptions that needs to be overcome. Effective dialog will reduce the transactional distance, making for a more effective student experience, while ineffective dialog will increase the distance. The following eight items listed in

Table 2 represent significant types of interactions between the learners and instructor.

It is up to each instructor to decide how they will interact with their students—how often, how much, how so (email, phone, chat, discussion board, office, etc.), how consistently, however.

Table 2

*Learner to Instructor Interaction Variables*

Student Survey Items	<i>M</i>	Mode	<i>SD</i>	Valid	Missing
11a. How satisfied are you with the quality of instruction?	4.02	4	1.054	732	7
11b. How satisfied are you with the clarity of course goals?	4.13	5	.984	735	4
11c. How satisfied are you with the effectiveness of interactions with the instructor?	3.97	5	1.126	727	12
11d. How satisfied are you with the promptness of instructor feedback?	4.05	5	1.099	726	13
11e. How satisfied are you with the adequacy of instructor feedback?	4.08	5	1.062	723	16
11f. How satisfied are you with the availability of instructor?	4.06	5	1.042	714	25
12b. How satisfied are you with the course organization?	4.14	5	.954	728	11
12e. How satisfied are you with the instructor's assessment of your learning?	3.85	4	1.075	682	57
<i>Composite Instructor Variable</i>	4.03	5	.927	656	83

The highest satisfaction mean is for course organization (4.14). The lowest satisfaction mean is for the instructor's assessment of learning (3.85). The difference

between the highest and lowest mean is 0.29. Six of the eight items have a mode of 5 and the composite variable mode is 5.

There were a total of 51 student comments for this scale. A total of 30 comments were negative (58.8% of responses), 20 comments were positive (39.2%) and 1 comment was neutral (2.0%). Most of the negative comments were about the instructor being non-responsive or slow to respond to the student’s questions. For example, “it takes forever for my instructor to answer her email and answer questions.” Most of the positive comments were about the instructor’s “prompt response”, or “availability”, or doing an “excellent job.”

*Learner to content interaction variables.* The other variable to transactional distance is the *structure* of the content of the course. If the online course structure is flexible, the instructor can change it as needed to decrease the transactional distance of the student. If the structure of the content is fixed, it cannot be changed for the student and the instructor must rely on dialog to decrease the distance. To be successful, the learner must be able to effectively interact with the content. The following five items listed in Table 3 represent significant types of interactions between the learners and content. It is up to each instructor to decide which content resources to use for their class.

Table 3

*Learner to Content Interaction Variables*

Student Survey Items	<i>M</i>	Mode	<i>SD</i>	Valid	Missing
10c. How satisfied are you with access to the	3.86	5	1.055	545	194

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online textbook?

12a. How satisfied are you with the course materials?	4.13	4	.893	726	13
12c. How satisfied are you with the course textbook?	4.00	4	.955	711	28
12d. How satisfied are you with self-assessment practice opportunities?	3.90	4	1.030	660	79
12f. How satisfied are you with multimedia, audio, and video (if applicable)?	3.88	4	.981	590	149
<i>Composite Content Variable</i>	3.93	5	.805	469	270

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The highest rated satisfaction mean is for course materials (4.13). The lowest satisfaction mean is for the online textbook (3.86). The difference between the highest and lowest mean is 0.27. Only one of the five items has a mode of 5, however, the composite variable mode is 5.

There were a total of 42 student comments for this scale. A total of 27 comments were negative (64.3% of responses), 9 comments were positive (21.4%) and 6 comments were neutral (14.3%). The negative comments referred to difficulty with videos (many comments), difficulty with multimedia, dislike of textbook and “corporate education”, not enough multimedia, poor organization. The positive comments referred to the videos, interesting books, MyAccountingLab, outstanding review sessions, and video of instructor.

*Learner to learner interaction variables.* Learner to learner interactions occur between students in a class. Student interactions may be required for group assignments, or they may be informal interactions. For students that take an online course because of their demanding schedules, group projects can be difficult if they

require students to interact at specific times or places. The social interactions between students (and the instructor) affect the degree of connectedness (belonging), or disconnectedness (isolation), that learners experience with a class. The following four items listed in Table 4 represent significant types of interactions between learners. It is up to each instructor to decide which interactions to encourage or require.

Table 4

*Learner to Learner Interaction Variables*

Student Survey Items	<i>M</i>	Mode	<i>SD</i>	Valid	Missing
13a. How satisfied are you with interactions with other students?	3.70	4	.970	698	41
13b. How satisfied are you with the student sense of belonging in the class?	3.67	3	.994	712	27
13c. How satisfied are you with student participation in group discussions (if applicable)?	3.78	4	.967	620	119
13d. How satisfied are you with student collaboration on group projects (if applicable)?	3.55	3	.979	460	279
<i>Composite Learner Variable</i>	3.69	3	.899	457	282

The highest rated satisfaction mean is for group discussions (3.78). The lowest rated satisfaction mean is for collaboration on group projects (3.55). The difference between the highest and lowest mean is 0.23. None of the items has a mode of 5 and the composite variable mode is 3.

There were a total of 37 student comments for this scale. A total of 19 comments were negative (51.4% of responses), 5 comments were positive (13.5%) and 13 comments were neutral (35.1%). The negative comments referred to a lack of group

interactions (several comments), lack of interactions with other students (several), requirements to interact with other students (prefer independence), group projects, and not using chat rooms. The positive comments referred to instructors leading of group activities and students helping each other (several).

*Learner to self interaction variables.* Learner to self interactions represent a student's ability to work independently in a course. These interactions have to do with control theory, the degree to which a student can effectively control their learning while working autonomously. Many online courses require a high degree of self-motivation and self-discipline. Students may blame themselves or their instructor for disorganization or failing to achieve the learning objectives, depending upon how they view themselves. The following four items listed in Table 5 represent significant types of interactions between learners and self.

Table 5

*Learner to Self Interaction Variables*

Student Survey Items	<i>M</i>	Mode	<i>SD</i>	Valid	Missing
14a. How satisfied are you with your self-motivation to participate in online class?	3.98	4	1.009	727	12
14b. How satisfied are you with your self-discipline to complete assignments on time?	4.02	4	1.017	730	9
14c. How satisfied are you with your ability to organize course materials?	4.15	4	.866	729	10
14d. How satisfied are you with your achievement of learning objectives?	4.03	4	.986	727	12
<i>Composite Self Variable</i>	4.05	5	.870	718	21

The highest satisfaction mean is for self ability to organize course materials (4.15). The lowest satisfaction mean is for self-motivation (3.98). The difference between the highest and lowest mean is 0.17. None of the items has a mode of 5, however the composite variable mode is 5.

There were a total of 29 student comments for this scale. A total of 16 comments were negative (55.2% of responses), 5 comments were positive (17.2%) and 8 comments were neutral (27.6%). The negative comments referred to lack self-motivation, difficulty learning online, requirements to come to campus, no reminders, no opportunities to participate, and low morale. The positive comments were pretty general. The neutral comments were mostly about personal reasons why they were not able to complete the course or get a decent grade.

*Learner to support interaction variables.* It is considered a best practice to provide effective student support services to online students. The accrediting commission strongly recommends that institutions provide the same support services for online students as traditional. Although student support interactions are not theoretically equivalent to instructor/content/interface/learner interactions, they are reputed to be important factors for student retention and success. The following ten items listed in Table 6 represent significant types of interactions between learners and support. Many students did not respond to these survey items (see Missing column) because they have never used these support services.

Table 6

*Learner to Support Interaction Variables*

Student Survey Items	<i>M</i>	Mode	<i>SD</i>	Missing	Valid
10a. How satisfied are you with the technical assistance for your online course? If you have not used a resource, leave it blank.	3.64	3	.892	291	448
15a. How satisfied are you with information about online courses?	4.08	4	.833	156	583
15b. How satisfied are you with E-advisor counseling?	3.48	3	.888	452	287
15c. How satisfied are you with the online library?	3.90	4	.818	338	401
15d. How satisfied are you with online tutoring?	3.62	3	.852	440	299
15e. How satisfied are you with online textbook orders?	3.74	4	1.004	315	424
15f. How satisfied are you with online seminars on financial-aid?	3.52	3	.913	446	293
15g. How satisfied are you with online career and employment services?	3.44	3	.964	445	294
15h. How satisfied are you with online services to students with disabilities?	3.54	3	.885	483	256
15i. How satisfied are you with online student services in general?	3.79	4	.861	284	455
<i>Composite Student Support Variable</i>	3.59	3	.665	521	218

The highest satisfaction mean is for information about online courses (4.08). The lowest satisfaction mean is for online career and employment services (3.44). The difference between the highest and lowest mean is 0.64. None of the items has a mode of 5 and the composite variable mode is 3.

There were a total of 29 student comments for this scale. A total of 18 comments were negative (62.1% of responses), 2 comments were positive (6.9%) and 9 comments were neutral (31.0%). The negative comments referred to the lack of being able to schedule counseling appointments online (several) and receive live online counseling, receiving textbooks late (several), price of textbooks, more time for DSS student testing. The positive comments were general. Most of the neutral comments were suggestions to offer more support services online.

In all, 12 of the 37 student satisfaction items have a mode of 5 (32.4%), 16 have a mode of 4 (43.2%), and nine have a mode of 3 (24.3%). The number of student comments per scale decreased for each succeeding question—from 62 to 51 to 42 to 37 to 29 and 29. The first scale (learner to interface), garnered the most comments and had the largest range between means (0.82). The fifth scale, learner to self, had the lowest range between means (0.17). Most of the student comments were negative, even though all of the modes ranged from neutral to very satisfied. Perhaps this is because a relatively small percentage of respondents offered any comments at all—from 9.7% to 7.1% to 6.5% to 5.9% to 4.0% to 7.8%. Nevertheless, from my experience, I am sure that many of the comments represent significant issues that need to be addressed. These include issues such as Mac incompatibility with CourseCompass, video problems, lack of feedback from the instructor, lack of effective interaction with other students, etc.

#### *Faculty Course Perceptions*

The following faculty survey questions regarded course perceptions. Like the student survey, these questions referred to interactions with technology (interface) and

content. They also referred to the instructor's perceptions of learner to learner interactions, and learner to support service interactions. Unlike the student survey, there were no questions about interactions with other faculty or with self (perhaps a future study).

(#11) How satisfied are you with the following technical aspects of your online course? If you are not familiar with a resource, leave it blank.

(#12) How satisfied are you with the following content aspects of your online course (only respond to items which are applicable for you)?

(#13) How satisfied are you with the following student aspects of your online course?

(#14) How satisfied are you with the following DVC online support services for students? If you are not familiar with a resource, leave it blank.

For the faculty satisfaction items, factor analysis was not possible because the sample size was much smaller than the minimum recommendation of 100 ( $N = 43$ ). The descriptive statistics for each of the faculty satisfaction items is provided in the next four tables. Following each table is a brief description of the faculty survey comments for the respective questions.

*Faculty to interface interaction variables.* The interaction between faculty and interface is very important. If an instructor is comfortable with the interface, he/she is more likely to use more of its features and encourage the same of students. If an instructor is uncomfortable, he/she may try to avoid the interface, and will likely be dissatisfied with the experience of teaching online. For example, some students

expressed dissatisfaction that the chat feature was not used in their online classroom, this could be due to the instructor's lack of comfort with the tool. The instructor's satisfaction (or dissatisfaction) with the interface can have a large influence on the student's satisfaction (or dissatisfaction) with the interface, and thus, the online course. The following nine items listed in Table 7 represent significant types of interactions between the faculties and the interface. It is up to each instructor to decide which interface tools to require or allow the students to use.

Table 7

*Faculty to Interface Interaction Variables*

Faculty Survey Items	Valid	Missing	<i>M</i>	Mode	<i>SD</i>
11a. How satisfied are you with the technical assistance provided for you?	38	5	3.97	5	1.102
11b. How satisfied are you with the technical assistance provided for your students?	36	7	3.56	4	1.027
11c. How satisfied are you with access to the course website?	42	1	4.50	5	.773
11d. How satisfied are you with access to the online textbook?	24	19	3.58	3	.929
11e. How satisfied are you with the discussion board?	37	6	3.89	4	.809
11f. How satisfied are you with the chat room?	29	14	3.34	3	1.010
11g. How satisfied are you with email?	41	2	4.29	4	.782
11h. How satisfied are you with the interactive quizzes/tests?	37	6	3.95	4 <sup>a</sup>	1.026
11i. How satisfied are you with the online gradebook?	32	11	3.47	4	1.218

a. Multiple modes exist. The smallest value is shown

The highest satisfaction mean is for access to the online course website (4.50). The lowest satisfaction mean is for the chat room (3.34). The difference between the highest and lowest mean is 1.16. The faculty comments pertained to difficulties with entering grades in the WebCT gradebook, frustration with technical assistance for faculty, and issues with the discussion board.

*Faculty to content interaction variables.* Many instructors create and maintain content for their online course. The interaction between instructors and content determines which content is used for an online course. Some instructors choose pre-packaged content that may go along with a textbook. Yet, they still need to interact with the content to customize it for their online class. This process can be relatively easy or relatively difficult, depending upon the instructor's background and the format of the content. This can have a large affect upon the instructor's satisfaction or success with an online course. The following five items listed in Table 8 represent significant types of interactions between the faculties and content. It is up to each instructor to decide which content to develop or use.

Table 8

*Faculty to Content Interaction Variables*

Faculty Survey Items	Valid	Missing	M	Mode	SD
12a. How satisfied are you with the course materials you developed?	41	2	4.44	5	.594
12b. How satisfied are you with course materials developed by others?	29	14	3.52	4	1.022
12c. How satisfied are you with the online supplement to your course textbook?	28	15	3.50	3	1.202

12d. How satisfied are you with your assessment of student learning outcomes?	31	12	3.52	4	.962
12e. How satisfied are you with multimedia, audio, video?	29	14	3.38	4	1.178

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The highest satisfaction mean is for course materials that were self developed (4.44). The lowest satisfaction mean is for multimedia, audio, and video (3.38). The difference between the highest and lowest mean is 1.06. The faculty comments pertained to video, the desire to use/create more video, have higher quality video, and receive more technical support for it. Instructors expressed an interest in creating more multimedia resources and disappointment with “substandard” publisher materials.

*Faculty to learner interaction variables.* Faculty to learner interactions can be very time consuming for online instructors. If an instructor does not carefully structure how he/she will interact with the students, and communicate that structure to the students, then students tend to expect the instructor to interact as often as the student requests. Faculties interact with their online students in many ways, but the typical way is through email. The discussion board can be an effective means for one-to-many communications that can reduce the time spent at one-to-one communications. In an effort to keep some of the faculty survey questions similar to the student survey questions, these survey questions were about faculty perception of learner to learner interaction. However, in hindsight, I believe the survey would have been more informative had it included questions about the instructors’ actual interactions with their students.

Table 9

*Faculty to Learner Interaction Variables*

Faculty Survey Items	Valid	Missing	<i>M</i>	Mode	<i>SD</i>
13a. How satisfied are you with student interactions with other students?	43	0	3.26	4	1.255
13b. How satisfied are you with the student sense of belonging in the class?	42	1	3.60	4	1.014
13c. How satisfied are you with student participation in group discussions (if applicable)?	33	10	3.45	4	1.277
13d. How satisfied are you with student collaborations on group projects (if applicable)?	17	26	3.06	3	.659

The highest satisfaction mean is for student sense of belonging in class (3.60).

The lowest satisfaction mean is for student collaboration on group projects (3.06). The difference between the highest and lowest mean is 0.54. The faculty comments pertained to the difficulty, but necessity, of fostering student to student interactions—“If an instructor is not actively using the discussion board in class for student-student activities, the online class is nothing more than a correspondence course.”

*Faculty to student support interaction variables.* These survey questions are listed in Table 10 and are really about the online instructor’s perception of student support services.

Table 10

*Faculty to Student Support Services Interaction Variables*

Faculty Survey Items	Valid	Missing	<i>M</i>	Mode	<i>SD</i>
14a. How satisfied are you with information about online courses?	33	10	3.48	4	1.121
14b. How satisfied are you with E-advisor counseling?	13	30	3.00	3	.816
14c. How satisfied are you with online library resources?	21	22	3.81	3	.814
14d. How satisfied are you with online tutoring?	19	24	3.21	3 <sup>a</sup>	.976
14e. How satisfied are you with online textbook orders?	28	15	4.07	4 <sup>a</sup>	.979
14f. How satisfied are you with online seminars on financial-aid?	14	29	3.14	3	.535
14g. How satisfied are you with online career and employment services?	13	30	3.00	3	.577
14h. How satisfied are you with services to students with disabilities?	19	24	3.63	3	.895
14i. How satisfied are you with student services in general	19	24	3.53	3	.772

a. Multiple modes exist. The smallest value is shown

The highest satisfaction mean is for online textbook orders (4.07). The lowest satisfaction mean was a tie between e-advising and online career services (3.00). The difference between the highest and lowest mean is 1.07. The faculty comments pertained to the need for online tutoring, counseling, helping students to access online instructors before enrolling, and more clearly providing information about online class meeting times. In all, three of the 27 faculty satisfaction items have a mode of 5

(11.1%). These are #11a (technical assistance provided to instructor), #11c (access to the course website), and #12a (course materials developed by instructor). Thirteen items have a mode of 4 (48.1%), and 10 items have a mode of 3 (37.0%). The responses were neutral for a large percentage of items, indicating that these items are candidates for improvement.

### *Analysis of Course Perceptions*

The surveys provided valuable information for understanding the satisfaction levels of students and faculty around important theoretical constructs for distance education. As a researcher, it was very satisfying to analyze the student survey learner interaction scales and confirm that most of the variables were grouped appropriately on the survey (even though four variables needed to be regrouped). The factor analysis validated the theoretical constructs of learner interactions, and Cronbach's Alphas verified the reliability of the satisfaction survey questions. These results supported the development of six composite variables of learner interaction to be used for inferential analyses.

The composite variables for learner interactions are listed in order from the highest to lowest mean:

1. Learner to Interface: 4.07 ( $SD = .706$ ), Mode = 5
2. Learner to Self: 4.05 ( $SD = .870$ ), Mode = 5
3. Learner to Instructor: 4.03 ( $SD = .927$ ), Mode = 5
4. Learner to Content: 3.93 ( $SD = .805$ ), Mode = 5
5. Learner to Learner: 3.69 ( $SD = .899$ ), Mode = 3



It was not possible to do a factor analysis for the faculty interaction groupings. However, the satisfaction items with the highest and lowest means per grouping are listed here.

- |                          |  |
|--------------------------|--|
| 1. Faculty to Interface: | Access to online course (4.50)               |
|                          | Chat room (3.34)                             |
| 2. Faculty to Content:   | Course materials, self-developed (4.44)      |
|                          | Multimedia, audio, video (3.38)              |
| 3. Faculty to Student:   | Student sense of belonging (3.60)            |
|                          | Collaboration on group projects (3.06)       |
| 4. Faculty to Support:   | Online textbook orders (4.07)                |
|                          | E-advisor counseling (3.00)                  |
|                          | Online career and employment services (3.00) |

It is interesting to discover that satisfaction with access to the course website was the highest mean for faculty *and* students. Satisfaction with online career and employment services was the lowest mean for faculty *and* students. Satisfaction with the chat room was also the lowest mean for both faculty and students for the interface scale. The shared perceptions of the students and faculty reinforce the validity of their responses.

#### *Outcome Variables for Students and Faculty*

Outcome variables are those factors which possibly relate to an outcome of the experience of taking or teaching an online course. The outcome variables are categorized into three groups: recommendations/plans, overall satisfaction, and course

grade. I am especially interested in the relationships between outcome and process variables for discovering the relationships between student satisfaction and success.

#### *Student Recommendations/Plans*

The following student survey questions were related to recommendations or plans. Presumably, their responses were based on their experiences (outcome variables):

(#7) There are several website platforms used by online instructors (e.g., WebCT, CourseCompass, etc.). In your opinion, should everyone use the same web platform for all DVC online classes?

(#20) Would you recommend this course to another student?

(#21) Do you plan to take another online course at DVC?

(#22) Before you began this course, if DVC had offered a free seminar for how to succeed in online courses, would you have participated?

(#23) In your opinion, how many DVC courses should also be offered in the online format?

The highlights of the student responses are described in the following bullet points:

- Almost half of the students responded positively that DVC should standardize on one website platform (49.5%). The remainder of the students were pretty evenly split between “No” (15.2%), “Maybe” (15.7%), and, “No Opinion” (16.7%).

- A large percentage of students would recommend their course to another student (68.6%). A small percentage would not recommend their course to another student (13.3%); the rest were undecided.
- A large percentage of students planned to take another online course at DVC (66.0%). A small percentage did not plan to take any more online courses at DVC (11.7%); the rest were undecided.
- A majority of students indicated they might have attended a free seminar on how to succeed in online courses before they began this course (54.4% responded yes or maybe). The average (mode) student would not have taken such a seminar (45.7%). However, students with no prior online course experience were more interested in attending such a seminar than students with prior experience ( $M = -.12$  compared to  $M = -.33$ ) and this is a significant difference at the 99% confidence level,  $t(df=734) = -3.653$  and  $p = .000$ .
- The most frequent student response was that most all courses should be offered in the online format (33.6%). The vast majority think that at least 25% of all courses should also be offered in the online format (83.0%). The remaining students had no opinion (9.1%) or wanted no change (7.8%).

### *Faculty Recommendations*

The following faculty survey questions were related to recommendations (outcome variables):

(#10) There are several website platforms used by online instructors (e.g., WebCT, CourseCompass, etc.). In your opinion, should everyone use the same web platform for all DVC online classes?

(#15) In your opinion, how many DVC courses should also be offered in the online format?

(#17) Would you recommend teaching online to other faculty at DVC?

(#18) What advice would you give to a faculty member who is considering teaching an online course for the first time?

The highlights of the faculty responses are described in the following bullet points:

- Nearly one third of instructors are in favor of standardizing on one website platform for all online courses (31.0%). However, a larger percentage was not in favor (40.5%); a significant percentage was undecided (28.6%).
- The most frequent response of faculty was that about 25% of all courses should also be offered in the online format (29.3%). About half that ratio thought that most all courses should be offered online (14.6%). Overall, a strong majority thought that about 25% or more of all courses should be offered online in the future (68.3%).
- A majority of faculty would recommend teaching online to other DVC faculty (66.7%). Only one person would not recommend it.

### *Analysis of Recommendations*

The question of whether or not to standardize on one CMS for all online courses was more strongly favored by students than faculty. When combining the percentages

of the students/faculty who responded “yes” or “maybe” to standardization, the ratio of students to faculty was 65.2% to 59.6%. There were a total of 56 student comments in favor of standardization. Here is a representative sample of student comments from this group:

- “It would make things a lot less confusing!!”
- “It becomes easier for students who want to take multiple online courses at the same time.”
- “Each website has it's own unique navigation [navigation] and processes. Part of the difficulty of an online class is learning the new system so you can then access the information. With one platform, repeat online students can progress directly to the learning process without having to learn how to access the assignments and information”

There were a total of 21 student comments from those who responded “no” to standardization. Here is a representative sample of comments from this group:

- “I think whichever the instructor is more comfortable using is more beneficial to the students. If the instructor knows how to use the website platform it makes teaching easier and the class runs smoothly.”
- “In my opinion it doesn't matter” [“maybe” would have been a better option]
- “One platform may not be suitable for all courses”

There were a total of 22 student comments from those who responded, “maybe”, to standardization. Here are a few comments from this group:

- “Each of them has its own benefits but it's good to use just on [one] platform”

- “Will [Well] it kind of depends on the student”
- “Depends on the class.”

There were a total of 16 faculty comments regarding course standardization. Here is a representative sample of comments from this group:

- “It would certainly streamline things and make it less confusing for students”
- “DVC has selected WebCT as the course management system that we support. ALL online instructors should be using WebCT to deliver their online classrooms, even if it's only as a portal to other sites. Doing this is in the best interest of our students. Students will then learn how to use this platform effectively, giving them more time to focus on the subject matter. In addition, many students take multiple online courses. If all instructors use WebCT, all of their online courses will appear in one place on their myWebCT page, making things must easier and more efficient for them.”
- “I want prospective students to be able to examine the course content well in advance. WebCT denies them that opportunity.”
- “There are some websites that are discipline specific for e.g Aplia is specific to Economics.”
- “This is most relevant to the faculty evaluation process -- if evaluators are unfamiliar with the platform the instructor is using the evaluation process can be onerous.”

CMS standardization is a multifaceted issue that needs to be fully addressed by the college to ensure that students and faculty receive the resources and support to be satisfied and successful with online courses.

About two-thirds of the students indicated that they would recommend the online course to another student (68.6%) and take another online course in the future (66.0%). A similar ratio of online faculty would recommend teaching online to other faculty (66.7%). These responses imply a significant measure of student and faculty satisfaction with online courses. However, one-third was either neutral or against recommending online courses, and that is also a significant measure. Why wouldn't they recommend them? This could be an interesting question to pursue in a future study.

Currently, about 10% of all courses are offered online. A resounding majority of the students would like for at least 25% of all courses to be offered online (83.0%). Almost half of the online faculty would like for at least 25% of all courses to be offered online (49.4%). The desire for more online courses was also frequently voiced in the student focus groups. The clear message is that students and faculty would like a significant increase in the number of courses offered online, at the very minimum, by a factor of 2 or 3.

The faculty were asked to provide advice to instructors who were considering teaching online in the future, 37 out of 43 responded. Here is a representative sampling of their advice:

- "I believe ALL online teachers must have either taken an online course or taken a course in online teaching or have worked on a collaborative online teaching

team. No one should consider teaching online if they have not had some experience with online in some aspect.” [There were 8 comments recommending potential online instructors first become online students (22%).]

- “Be prepared to spend a great deal of time setting up the course. The preparation is quite labor intensive. Develop techniques to encourage a sense of inclusion. Be aggressive about student contact at the beginning of the course.”
- “Make sure you fully understand the tool you are using, and make sure you have backup plans in case things don't work. Never lose track of your students -- stay in communication. If students appear to not be participating, contact them.”
- “Teaching online requires that all of the instructions and course material be well documented and detailed - - as you are not "in class" to clarify issues or answer questions. You must go out of your way to provide as much one on one support as you can via email, etc. Otherwise, some students tend to lose heart and/or feel isolated and just drift away. Done properly it is more work than face to face classes.”
- “Get as much feedback from experienced online faculty and support, get access to and navigate courses to see how they work, and then think long and hard about how to design it before starting.”
- “Find a faculty mentor in your discipline that teaches online and ask to view their course for ideas on how to format your class.”

The faculty advice strongly recommended that potential online faculty participate in an online course as a student or guest. New online instructors should be advised that it is a

lot of additional work up front, before the actual teaching of the online course begins.

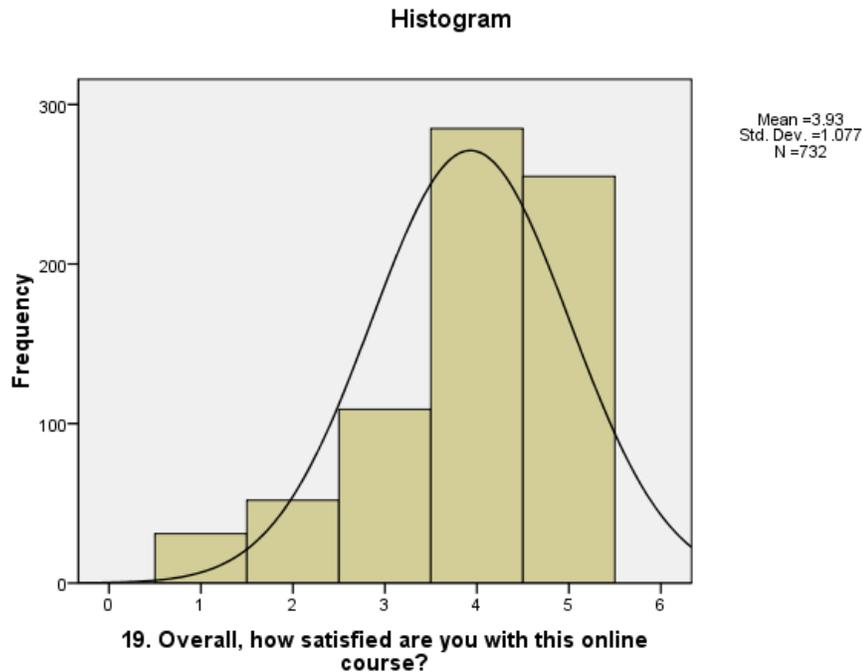
New online instructors need to learn about pedagogy that is specific for teaching online, and they are advised to get assistance from a faculty mentor in their discipline.

### *Overall Satisfaction*

Students were asked to rate their overall satisfaction with the online course and faculty were asked to rate their overall satisfaction with teaching online at DVC. This response is presumably an outcome of their experience and a conglomerate of their responses to the specific satisfaction questions. This is an important variable that will be used to explore the relationships between overall satisfaction and course success, and the relationships between individual satisfaction items and overall satisfaction.

*Overall student satisfaction.* On a scale from 1 to 5, the overall student satisfaction level was 3.93 ( $SD = 1.077$ ), where 1 is very unsatisfied and 5 is very satisfied. The mode response was 4—satisfied (see Figure 1).

Figure 1

*Histogram of Overall Student Satisfaction*

A relatively small percentage of students were either unsatisfied or very unsatisfied (11.3%), and a large percentage was very satisfied (34.8%).

Of the students that were either unsatisfied or very unsatisfied, 58 (nearly 70%) responded to question #28, “What else would you like to say about online courses at DVC?” Here is a representative sample of their general comments:

- “online is not for everyone. Online teachers are very important and should be tested whether they are compatible for such a different course.”
- “I took two online courses this semester and was unsatisfied with both. Both classes seemed to exceed expectations in the workload that I thought I would

have gotten less of if I applied to a non-online class. In one of the classes, it seemed as though a windows program was key to succeeding in the course and I owned a MAC which the program did not work on. I was very dissapointed taking both courses.”

- “The way this class is organized makes it much more difficult than necessary. Also, every class should have a survey. My other online classes are excellent!”
- “The online courses are okay themselves but being able to get a hold of teachers is impossible... they never respond to emails. It makes you feel like you don't even have a teacher.”
- “Teachers website was a mess. I never was really sure what part of it was for our class. I never knew what was to be done for that week.”
- “Very difficult to learn the information without a teacher present. 3hrs of homework a day, in order to get an A. Not enough different sample problems.”

Of the students that were either satisfied or very satisfied, 236 (nearly 44%)

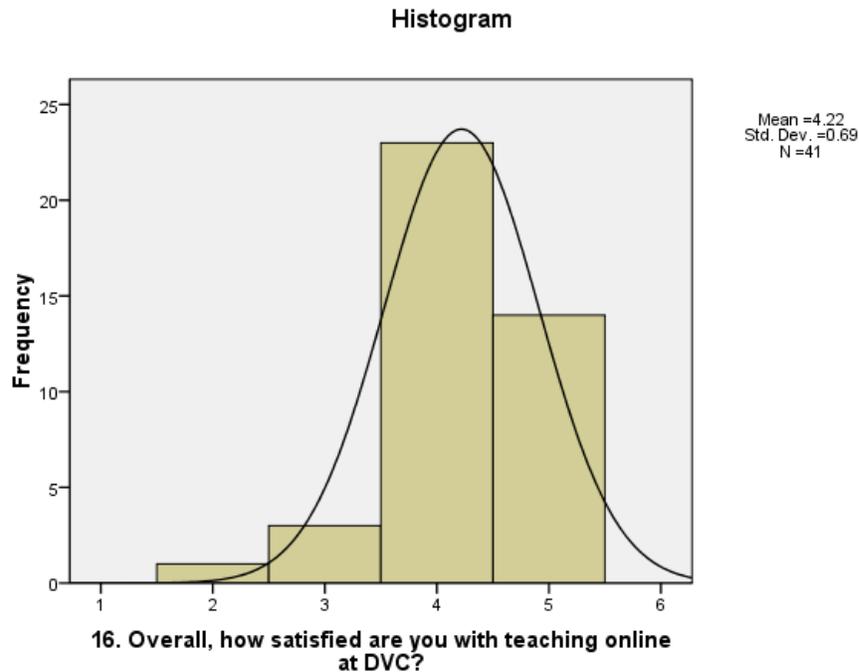
responded to question #28, “What else would you like to say about online courses at DVC?” Here is a representative sample of their general comments:

- “I think the online courses are great and there need to be more!”
- “thank you for offering them, it has allowed me to take courses and do them on my timing, it is very difficult to find classes that fit within my work schedule.”
- “For the first time I have been able to achieve two goals in life. One, to stay home and raise my children and two, finishing my education! Thank you for this opportunity!”

- “I think that the teachers are doing good with the Online classes so far. It really depends on the subject and the teacher. Overall, It's been pretty good.”
- “need to offer more and have them at san ramon campus because you have to meet on campus sometimes and i avoid those classes because its hard to make it all the way out to pleasant hill especially during comute hours. it is also dificult to incorporate other classes on campus because the few required meeting often interfere with the classes taken on campus.”
- “with my disablities the on-line courses work so much better for me because I am in a wheel chair, visionally impaired, & have trouble getting set up in time for each class on campus. When I take regular classes on the campus it takes more energy and effort just to show up on time and ready to each class, where at home I have easier time getting assignments done, better consentration, & a easier set up system to get right down to bussiness in my class assignments & lessons.”
- “They are fine, as long as a student is self-motivated.”

*Overall faculty satisfaction.* On a scale from 1 to 5, the overall faculty satisfaction level was 4.22 ( $SD = 0.69$ ), where 1 is very unsatisfied and 5 is very satisfied. The mode response was 4—satisfied (see Figure 2).

Figure 2

*Histogram of Overall Faculty Satisfaction*

Only one instructor was unsatisfied with teaching online, and no one was “very unsatisfied.” Three were neutral and the vast majority was satisfied or very satisfied (90.2%).

Overall, the vast majority of students and faculty are satisfied or very satisfied with learning and teaching online. Many of the satisfied student comments pertained to the benefits of scheduling flexibility, the desire to take more courses online, and the hassle of attending on-campus events (i.e., orientations, tests, etc.). However, online learning and teaching is not a satisfactory match for all learners and instructors. Many of the dissatisfied student comments pertained to course organization issues, student to instructor communication issues, textbook issues, and course workload issues.

### *Course Grades, Retention, and Success*

The distribution of course grades from the student sample and student population is shown in Table 11. This data was obtained from the enterprise information system after the semester was over and grades were submitted. To be “successful” in a course, by definition, a student must earn a grade of A, B, C or CR. By this definition, three-quarters of the student sample were successful.

Table 11

#### *Course Grades of Student Sample and Student Population*

Grade	Student Sample		Student Population	
	<i>f</i>	%	<i>f</i>	%
--	10	1.4	--	--
A	278	37.6	613	26.8
B	178	24.1	445	19.4
C	87	11.8	298	13.0
CR	12	1.6	29	1.3
D	30	4.1	123	5.4
F	28	3.8	208	9.1
I	4	.5	15	.7
NC	2	.3	7	.3
RD	--	--	1	.0
W	110	14.9	549	24.0

Note. W is withdraw. NC is no credit. I is incomplete. CR is credit. RD is Report Delayed.

Dashes indicate no grade available.

The success rate of the student sample was 75% ( $n = 739$ ,  $SD = .433$ ); the retention rate was 85% ( $n = 739$ ,  $SD = .356$ ). However, the success/retention rates of the actual student population were much lower. The student success rate was 61% ( $SD =$

.489,  $N = 2,288$ ); the student retention mean was 76% ( $SD = .427$ ,  $N = 2,288$ ). Thus, it is shown that the student sample over represents successful students and has a higher proportion of A/B/CR grades and lower proportion of C/D/F/I/W grades.

### *Analysis of Satisfaction and Success*

An important part of this study is to explore the relationships between student satisfaction and student success. The expectation being that online student satisfaction is positively associated with success, as it is for traditional education. Furthermore, to show that online student satisfaction is positively related to success, provides an approach for achieving greater success—achieve greater satisfaction. For the purpose of exploring these relationships, the key outcome variables (a) overall student satisfaction, (b) course grade, and, (c) overall faculty satisfaction, will be compared and correlated to input and process variables, most especially the learner interaction variables.

### *Student Satisfaction and Success*

There are many ways to analyze the relationship between student satisfaction and student success. Do satisfied students have a higher success or retention rate than non-satisfied students? How do satisfaction means differ between successful and non-successful students? What factors are strongest or weakest? These are some of the many questions that will be addressed in this section.

*Success and overall satisfaction.* The first question is, do satisfied students have a higher success rate than non-satisfied students? Theoretically, this applies to traditional students, but does it apply to online students at DVC? Satisfied students are those who indicated 4 or 5 (satisfied or very satisfied) to question #19 (overall satisfaction). Non-

satisfied students are those who indicated 1-3 (very unsatisfied, unsatisfied, or neutral).

The null hypothesis is that the success mean of satisfied students is no different than the success mean of non-satisfied students. To test this hypothesis, a t-test was run at the 99% confidence level. The success mean of satisfied students is .84 ( $SD = .368$ ,  $n = 540$ ) and the success mean of non-satisfied students is .51 ( $SD = .501$ ,  $n = 192$ )—a 33% difference. Is it a significant difference? Yes it is:  $t(df=267.718) = 8.450$  and  $p = .000$ .

Satisfied students have a higher success mean than non-satisfied students. It is also true that satisfied students have a higher retention mean: 0.93 ( $SD = .254$ ,  $n = 533$ ) versus .62 ( $SD = .486$ ,  $n = 189$ )—a 31% difference. This is a significant difference at the 99% confidence level,  $t(df=225.623) = 8.277$  and  $p = .000$ . So it is established that there is a significant difference (positive) between the success and retention means of students who indicate overall satisfaction with an online course!

A similar test will show that the opposite is true, there is a significant difference between the overall satisfaction mean of successful versus non-successful students. Successful students had an overall satisfaction mean of 4.16 ( $SD = .915$ ,  $n = 550$ ), while non-successful students had an overall satisfaction mean of 3.24 ( $SD = 1.223$ ,  $n = 182$ ). The mean difference is 0.92. The null hypothesis is that there is no difference in the overall satisfaction levels of successful versus non-successful students. An independent samples t-test indicates the contrary,  $t(df = 251.432) = -9.357$ ,  $p = .000$ , at the 99% confidence level. Thus, the null hypothesis is rejected—there is a significant difference between the satisfaction means of successful versus non-successful students—successful students are significantly more satisfied (as you would expect).

The next step is to explore the satisfaction differences between successful and non-successful students. In particular, to explore their satisfaction levels among the six composite variables of learner interaction. This will provide insights for understanding the specific differences between successful and non-successful students, so as to help more online students to succeed in the future.

*Satisfaction by success per interaction scale.* For this analysis, the student sample was divided into two groups: successful and non-successful. The means were computed for each group, for each of the six composite interaction variables. The results are shown in Table 12. With the exception of student support, the satisfaction mean per interaction scale was lower for non-successful students than successful students.

Table 12

*Satisfaction Mean of Successful versus Non-successful per Interaction Scale*

Interaction Scale	Successful	<i>M</i>	<i>n</i>	<i>SD</i>
Interface	No	3.92	127	.809
	Yes	4.12	364	.660
Instructor	No	3.68	161	1.03
	Yes	4.14	495	.864
Content	No	3.70	123	.929
	Yes	4.01	346	.740
Learner	No	3.39	123	.962
	Yes	3.80	334	.851
Self	No	3.44	177	1.09
	Yes	4.25	541	.679
Support	No	3.61	63	.746

Interaction Scale	Successful	<i>M</i>	<i>n</i>	<i>SD</i>
Interface	No	3.92	127	.809
	Yes	4.12	364	.660
Instructor	No	3.68	161	1.03
	Yes	4.14	495	.864
Content	No	3.70	123	.929
	Yes	4.01	346	.740
Learner	No	3.39	123	.962
	Yes	3.80	334	.851
Self	No	3.44	177	1.09
	Yes	4.25	541	.679
Support	No	3.61	63	.746
	Yes	3.58	155	.632

The largest satisfaction mean difference was for the *self* interaction scale: 0.81. The next largest difference was for the *instructor* interaction scale: 0.46. The learner interaction scale difference was a close third at 0.41, followed by content (.31), interface (.20), and student support (-.03). With the exception of student support, all of the satisfaction mean differences were significant at the 99% confidence level, (no significant difference for student support interactions). This analysis demonstrates that there is a significant difference in the satisfaction means by successful versus non-successful students for each of the learner interaction scales (except support). Furthermore, it shows the magnitudes of the differences for each scale—from high to low: Self (.81), instructor (.46), learner (.41), content (.31), interface (.20), and student support (-.03).

To continue exploring the learner interaction scales between successful and non-successful students, bivariate correlations were run separately for each group of students, for each of the scales. The overall satisfaction variable was included, and is the reference variable for comparing the correlations. All of the interaction correlations were significant at the 0.01 level (2-tailed) and they are listed in Table 13.

Table 13

*Interaction Correlations of Successful and Non-Successful Students*

	Successful			Non-Successful		
	<i>r</i>	<i>n</i>	<i>p</i>	<i>r</i>	<i>n</i>	<i>p</i>
Overall satisfaction	1.000	550	--	1.000	182	--
Interface	.519**	363	.000	.562**	126	.000
Instructor	.763**	492	.000	.747**	160	.000
Content	.658**	345	.000	.679**	122	.000
Other Learners	.466**	332	.000	.519**	122	.000
Self	.586**	538	.000	.574**	176	.000
Student Support	.341**	155	.000	.376**	63	.002

\*\* Correlation is significant at the 0.01 level (2-tailed)

For both successful and non-successful students, the instructor interaction had the highest correlation to overall satisfaction. This shows that the instructor interactions have the greatest correlation to overall student satisfaction compared to the other interaction variables. As shown in Table 12, non-successful students were significantly less satisfied with instructor interactions than successful students. Given the high correlation between instructor satisfaction and overall satisfaction, this identifies

learner to instructor interactions as a very important area to address for improving student success.

Student support interactions had the smallest correlation to overall satisfaction for both groups of students. Non-successful students were slightly more satisfied with student support than successful students (see Table 12), but it was not a significant difference. However, perhaps non-successful students used the support services more than successful students, and thus, associated it more strongly with overall satisfaction. Given that this scale was the least satisfactory of the six interaction scales, it needs to be addressed.

The largest correlation difference between successful and non-successful students was with other learners. Non-successful students associated these interactions more strongly to their overall satisfaction than successful students. Yet, the satisfaction mean for this interaction was significantly lower for non-successful students than successful (see Table 12). Given that learner interactions are strongly correlated to overall satisfaction for non-successful students, and, non-successful students are relatively dissatisfied with learner interactions, the college will need to focus on improving learner to learner interactions to improve student satisfaction and success.

Successful and non-successful students strongly correlated self-interactions with overall satisfaction, successful more so than non-successful. However, successful students were well satisfied with their self interactions while non-successful students were relatively dissatisfied with their self interactions (see Table 12). This is an important factor of student satisfaction and success that needs to be addressed—it may

require counseling-related resources (i.e., incorporation into college success courses or course counseling awareness).

Successful and non-successful students strongly correlated content interactions to overall satisfaction, non-successful more so than successful. Given the significant difference between successful and non-successful students with content interactions (see Table 12), this is an area that needs to be addressed.

Satisfaction with the interface was strongly correlated to overall satisfaction, non-successful more so than successful. Given the problems that have been identified with CourseCompass and Macintosh computers and other technical issues, this is clearly an important area to address to improve satisfaction and success.

*Success by satisfaction per interaction scale.* To explore the relationship of satisfaction to success another way, the course success mean differences are shown for each of the interaction scales in Table 14, based on whether students were satisfied with the specific interaction scale or not.

Table 14

*Success Mean of Satisfied versus Non-satisfied per Interaction Scale*

Interaction Scale	Satisfied	<i>M</i>	<i>n</i>	<i>SD</i>
Interface	No	.69	192	.465
	Yes	.78	299	.418
Instructor	No	.66	237	.474
	Yes	.81	419	.395
Content	No	.67	205	.470
	Yes	.79	264	.410

Learner	No	.68	251	.467
	Yes	.79	206	.407
Self	No	.54	227	.499
	Yes	.85	491	.356
Support	No	.71	157	.457
	Yes	.72	61	.452

Table 14 shows that for every learner interaction, the course success rate is higher for satisfied than for non-satisfied students. For example, students who were satisfied with the interface scale had a success mean of .78, while students who were non-satisfied with the interface scale had a success mean of .69. The course success mean differences, from greatest to least, are: self (.31), instructor (.15), content (.12), other learners (.11), interface (.09), and support (.01). With the exception of support, these are remarkable differences in success rates per interaction scale. But, are they significant differences?

*Significance test for success differences per interaction scale.* To answer that, independent samples t-tests were run for each of the interaction scales based on the following, generic, null hypothesis: Students who are satisfied with the XYZ scale have the same course success rate as students who are unsatisfied with the XYZ scale. Table 15 lists the *t*, *df*, and *p* values for each test.

Table 15

*Significant Difference Test for Success Mean of Satisfied Students*

Interaction Scale	<i>M-Difference</i>	<i>t</i>	<i>df</i>	<i>p (2-tailed)</i>
Interface	.09	2.139	375.737	0.033*
Instructor	.15	3.969	421.539	0.000**
Content	.12	2.771	405.914	0.006**
Learner	.11	2.688	453.277	0.007**
Self	.31	8.402	336.214	0.000**
Support	.01	0.208	216	0.835

\* $p < .05$ , \*\* $p < .01$

Table 15 shows that, with the exception of student support, the probability of the null hypotheses being true is less than 5% for the interface scale and less than 1% for the others. Thus, the null hypotheses are rejected (except for support), and the course success means are deemed significantly different (higher) for satisfied students per interaction scale than for non-satisfied students. Thus, it is important to ensure that students are satisfied with *each* of the learner interaction scales in order to promote success (albeit the student support difference was not significant).

*Correlations between satisfaction and success.* Next, we will explore the correlations between the learner interaction scales and overall satisfaction, for all students. A bivariate correlation table of the seven variables is provided in Appendix 0 and shows that all of the correlations are significant at the 0.01 level\*\* (1-tailed). The following list enumerates the associations that had the highest Pearson correlation coefficients (greater than or equal to .600):

1. Instructor and overall satisfaction,  $r = .767^{**}$
2. Content and interface satisfaction,  $r = .701^{**}$
3. Instructor and content satisfaction,  $r = .685^{**}$
4. Content and overall satisfaction,  $r = .673^{**}$
5. Self and overall satisfaction,  $r = .641^{**}$
6. Self and content satisfaction,  $r = .617^{**}$
7. Learner and interface satisfaction,  $r = .600^{**}$

The highest correlation is between the instructor interaction and overall satisfaction. Content and self-satisfaction are also strong correlates of overall satisfaction. There are strong satisfaction correlations between content and the interface, and content and the instructor. The instructor's use of the interface to provide content is a significant area to address for student satisfaction.

Finally, the associations between the learner interaction variables and overall satisfaction were correlated to the course success variable. Unlike the correlations between the learner interactions and overall satisfaction, these correlations were all less than .600. However, with the exception of student support, they were all significant at the .01 level: self (.399\*\*), overall (.371\*\*), instructor (.218\*\*), learner (.200\*\*), content (.171\*\*), and interface (.119\*\*). This shows that overall satisfaction is strongly associated with course success. It also shows that the strength of the correlations between the learner interactions and course success are in the same relative order as the magnitude of the satisfaction differences by success per interaction scale (see Table 12): self, instructor, learner, content, and interface. These two different statistical

analyses provided similar results in showing the significance of learner interactions to satisfaction and success, and showing the relative significance of the learner interactions.

*Section summary.* This section has clearly demonstrated that there are significant differences in the course success means of online students based upon their satisfaction levels: overall and per learner interaction scale. For overall satisfaction, the success mean of satisfied students is .84 while the success mean of non-satisfied students is .51, a difference of .33 (the difference in retention was .31). The opposite relationship was also shown; there is a significant difference in the overall satisfaction of successful versus non-successful students (of course): overall and per learner interaction scale.

The significant differences in satisfaction per interaction scale, between successful and non-successful students, from greatest to least, were: self (.81), instructor (.46), learners (.41), content (.31), and interface (.20), (student support interactions did not have a significant difference in satisfaction means). The opposite analysis showed significant differences in course success means per interaction scale, between satisfied and non-satisfied students: self (.31), instructor (.15), content (.12), learners (.11), and interface (.09). The magnitudes of the differences in satisfaction/success per scale are in nearly the same order.

There are significant correlations between each of the interaction scales and overall satisfaction, and course success. The magnitudes of the learner interaction correlations to course success were in the same relative order as the magnitudes of the satisfaction by success differences (per scale): self, instructor, learners, content, and

interface. Different interaction scales were shown to be *strongly* correlated to each other, such as content and interface ( $r \geq .600$ ). All of the interaction scales were significantly correlated to each other, overall satisfaction, and course success, with the exception of student support.

These findings show that each of the learner interaction scales are significant factors of student satisfaction and course success. And, these findings demonstrate the relative significance of the interaction scales for successful and non-successful students.

### *Student Retention*

According to the literature review of best practices, several studies have linked various online student characteristics or processes to increased student retention and/or success. For California Community Colleges, retention rates are the ratio of students who complete a course with any grade except for a W (withdraw). Success rates are the ratio of students who complete a course with a grade of C/CR or better. The following student characteristics were included in this study and will be tested for whether they made a significant difference upon student retention or student success:

- Orientation attendance for online course
- Prior online course experience
- Prior computer experience
- Locus of control
- Hours worked at a job per week
- Lower unit load
- Older age of student

- Satisfaction with student support services

*Orientation.* Attending an orientation for an online course is often cited as a best practice for increasing student retention. Is it true for DVC students? On average, DVC students who attended an orientation had a slightly lower retention rate than students who did not attend an orientation, (.86 versus .84). The null hypothesis is that students who attend an orientation have the same retention rate as those who do not attend an orientation. Based on an independent samples t-test, the null hypothesis cannot be rejected:  $t(df=725) = .800$  and  $p = .424$ . There is no significance difference in the retention rate of students who complete an orientation and those who do not. Likewise, there is no significant difference in the success rate of students who attend an orientation and those who do not:  $t(df=735) = .744$ ,  $p = .457$ .

*Prior online experience.* Students with prior online course experience are said to have higher retention rates than students with no prior online experience. Is it true for DVC students? On average, DVC students with prior online course experience have a slightly higher retention rate than students with no prior experience, (.86 versus .83). The null hypothesis is that students with prior online course experience will have the same retention rate as students with no prior online course experience. Based on an independent samples t-test, the null hypothesis cannot be rejected:  $t(df=538.777) = 1.008$  and  $p = .314$ . There is no significant difference between the retention rate of DVC students with prior online course experience and those with none. Likewise, there is no significant difference in the success rate of DVC students with prior online course experience:  $t(df=554.754) = 1.772$  and  $p = .077$ .

*Prior computer experience.* Students who have prior computer experience are said to have higher retention rates than students with no computer experience. For students in this sample, only 2.5% claimed to have low or very low computer skill. So, for the means test, the computer skill groups were divided by very low to average (1 to 3), and high to very high (4-5). It so happens that DVC students with high computer skills have a slightly lower retention rate than students with average computer skills, (.84 versus .88). The null hypothesis is that students with average computer skills have the same retention rate as students with high computer skills. Based on an independent samples t-test, the null hypothesis cannot be rejected:  $t(df=500.70) = -1.585$  and  $p = .114$ . Likewise, there is no significant difference in the success rate of DVC students with high versus average computer experience:  $t(df=487.254) = -1.881$  and  $p = .061$ .

*Locus of Control.* Locus of control is related to whether students attribute their success to factors within their control (internal), or factors outside of their control (external). This is related to student interactions with self. It has already been shown that self satisfied students have a significantly higher success rate than non-satisfied students. For retention, the null hypothesis is that students who are satisfied with their self interactions have the same retention rate as students who are non-satisfied with their self interactions. Based on an independent samples t-test, the null hypothesis is rejected:  $t(df=336.214) = 8.402$  and  $p = .000$  (99% confidence). Thus, at DVC, there is a significant difference (positive) for retention and success of students who are satisfied with their self interactions versus students who are not.

*Hours worked.* According to the literature, there is a negative correlation between the number of hours worked at a job and student retention. The greater the number of hours worked, the lower the probability of retention. Is this true for DVC students? For the DVC sample, over forty percent of the students worked 30 or more hours per week; their retention rate was .82 and their success rate was .70. About 60% worked less than 30 hours per week; their retention rate was .90 and their success rate was .79. The null hypotheses are that students working less than 30 hours per week have the same retention/success rates as students working 30 or more hours per week. Based on independent samples t-tests, the null hypothesis cannot be rejected for retention:  $t(df=656.768) = -1.360$  and  $p = .174$ . However, it can be rejected for success at the 99% confidence level:  $t(df=656.216) = -2.874$  and  $p = .004$ . There is a significant difference in the success rate (lower) of DVC students who worked 30 or more hours per week. However, the number of hours worked did not make a significant difference on the retention rate.

*Unit load.* According to the literature, there is an inverse relationship between unit load and online retention/success. Is this true for DVC students? The median unit load of the DVC sample was 10 units. So, the null hypotheses are that students taking less than 10 units will have the same retention/success rates as students taking 10+ units. The retention rate of students taking less than 10 units was .85 and the retention rate of students taking 10+ units was .85. The t-test showed no significant difference between the two groups. Similarly, the t-test showed no significance in the success rate between the two groups.

*Student age.* According to the literature, older students have a higher retention rate than younger students. For this sample, none of the demographic age groups had a significantly higher retention rate than the other age students. For example, 20 to 24 year old students did not have a lower retention rate than other age students. However, one demographic age group did have a significantly higher success rate, and that is the 30 to 34 year old group. Their success rate was .86, compared to .74 for all other aged students. This was a significant difference at the 95% confidence level,  $t(df=60.636) = -2.235$  and  $p = .029$ .

*Student support.* According to the literature, satisfaction with student support services is linked with retention. For DVC students, the retention rates were .87 for students satisfied with support services and .79 for non-satisfied students. However, this difference was not significant according to the independent samples t-test:  $t(df=129.498) = 1.362$  and  $p = .176$ . The success rates for the two groups were .72 and .71 and the difference was not significant ( $p = .835$ ).

#### *Other Factors of Student Satisfaction*

As appropriate, t-tests were run for the remaining independent variables to research whether there are any significant differences for overall student satisfaction. As summarized in Table 16, five variables were tested.

Table 16

*Overall Satisfaction Mean per Independent Variable*

Variable	Group	<i>M</i>	<i>n</i>	<i>SD</i>
CMS	CourseCompass	3.88	186	1.001
	WebCT	3.94	475	1.103
Computer type	Mac	3.56	57	1.350
	Windows	3.96	655	1.049
Workload	More	3.61	220	1.139
	Same/Less	4.08	508	1.010
Difficulty	More	3.47	220	1.148
	Same/Less	4.14	509	.974
Time	More	3.68	266	1.148
	Same/Less	4.08	461	.997

Table 16 shows that WebCT users were more satisfied than CourseCompass users, and Windows users were more satisfied than Mac users. The t-tests show that there is not a significant difference in satisfaction based on the type of CMS that is used, ( $p = .524$ ), but there is a significant difference at the 95% confidence level based on the type of computer that is used, ( $p = .032$ ). Windows users average higher overall satisfaction. The last three variables measure student expectation versus experience for workload, difficulty, and time requirements of a course. For these cases, students who found the courses to be *more* work/difficult/time than expected, had a lower satisfaction mean than students who found the courses to be the same or less work/difficult/time than expected. All three differences are significant at the 99% confidence level ( $p = .000$ ).

*Section summary.* In summary, most of the best practices identified in the literature for improving student retention and success did not make a significant difference at DVC. Table 17 summarizes the results.

Table 17

*Significant Differences for Retention and Success*

Test Variable	Significant Difference	
	Retention	Success
Orientation attendance	No	No
Prior online experience	No	No
Prior computer experience	No	No
Locus of control	Yes	Yes
Hours worked at job	No	Yes
Lower unit load	No	No
Older age of student	No	Yes (30-34)
Student support services	No	No

For overall satisfaction, several other factors made a significant difference. Windows users have a higher satisfaction mean than Macintosh users. WebCT users have the same satisfaction mean as CourseCompass users. Students who thought the course was more work, more difficult, or more time than they expected were significantly less satisfied than students whose expectations were met.

*Factors of Faculty Satisfaction*

In order to explore which satisfaction items were most strongly associated with overall faculty satisfaction, a bivariate correlation analysis was performed for the

individual satisfaction items and overall satisfaction (Appendix P). Of the 27 satisfaction items, eight were statistically correlated to overall satisfaction. Table 18 displays a listing of these items, sorted by the Pearson correlation coefficient, from high to low.

Table 18

*Faculty Satisfaction Item Correlation to Overall Satisfaction*

Faculty Satisfaction Questions	<i>r</i>	<i>p</i>	<i>n</i>
16. Overall, how satisfied are you with teaching online at DVC?	1.00	--	41
12d. How satisfied are you with your assessment of student learning outcomes?	.511**	.004	30
11i. How satisfied are you with the online gradebook?	.491**	.005	31
12e. How satisfied are you with multimedia, audio, video?	.451*	.016	28
11h. How satisfied are you with the interactive quizzes/tests?	.424*	.011	35
12b. How satisfied are you with course materials developed by others?	.421*	.029	27
13b. How satisfied are you with the student sense of belonging in the class?	.372*	.018	40
12a. How satisfied are you with the course materials you developed?	.366*	.022	39

\**p* < .05, \*\**p* < .01

Of all of the satisfaction items, the strongest correlation to overall satisfaction was satisfaction with assessment of student learning outcomes. Indeed, three of the top four correlates of overall satisfaction were related to assessment—overall assessment of student learning, gradebook, quizzes/tests. Looking back, there were faculty comments about the difficulty of using the WebCT gradebook; this correlation supports the significance of those remarks. Three of the items related to course content—multimedia, self-produced, other-produced. It makes sense that overall satisfaction is

correlated to satisfaction with course content given how important content is to the learning and instruction process. The last item was student sense of belonging. Several faculties commented on the importance of student interactions for effective online courses, and this shows it is positively correlated to an instructor's overall satisfaction.

There were two significant correlations between the faculties background characteristics (input variables) and overall satisfaction with online courses. These were (a) self rating with computer skills ( $r = .515^{**}$ ,  $p = .001$ ,  $n = 41$ ), and (b) computer type used to access online course, ( $r = -.347^*$ ,  $p = .026$ ,  $n = 41$ ). Interestingly, satisfaction with computer type had an inverse correlation to overall satisfaction. In further analysis, Macintosh users have an overall satisfaction mean of 3.50 ( $SD = 1.291$ ,  $n = 4$ ) and Windows users have an overall satisfaction mean of 4.30 ( $SD = 4.30$ ,  $n = .571$ ). Like students, Mac users are less satisfied with online courses than Windows users, however, it is not a significant difference for faculty,  $t(df=3.128) = 1.222$  and  $p = .306$ .

#### *Indicators of Faculty Success*

There are no definitions by which to measure overall faculty success for this study. For the purpose of considering faculty success, it seems that the student success mean would be an indicator of faculty success. Similarly, it seems that the student satisfaction mean and student retention mean would be other indicators of faculty success. At DVC, we know that the average student success/retention rates are lower for online courses than traditional courses. However, we do not know how much of that is attributable to the students, instructors, technology, institution, or other. Thus, for the purpose of this study, we will simply examine the range of student satisfaction,

retention and success means per instructor, and consider these to be indicators of faculty success.

For the faculty sample in this study, the student satisfaction mean per instructor ranged from 2.83 to 4.50 with an overall mean of 3.97 ( $SD = 1.077$ ,  $n = 732$ ). The student success mean per instructor ranged from 0.50 ( $SD = .509$ ,  $n = 28$ ) to 0.97 ( $SD = .180$ ,  $n = 31$ ) with an overall mean of 0.75 ( $SD = .433$ ,  $n = 739$ ). The student retention mean per instructor ranged from 0.64 ( $SD = .488$ ,  $n = 28$ ) to 1.00 ( $SD = .000$ ,  $n = 13$ ) with an overall mean of 0.75 ( $SD = .433$ ,  $n = 739$ ). There was a large variation of student satisfaction, retention, and success means per instructor.

By comparison to the online faculty population of this study, the student success mean per instructor ranged from .34 ( $SD = .475$ ,  $n = 95$ ) to .88 ( $SD = .331$ ,  $n = 41$ ) with an overall mean of .61 ( $SD = .489$ ,  $N = 2,288$ ). The student retention mean per instructor ranged from 0.57 ( $SD = .499$ ,  $n = 61$ ) to 0.93 ( $SD = .252$ ,  $n = 45$ ) with an overall mean of .76 ( $SD = .427$ ,  $N = 2,288$ ). The student satisfaction means were not available for the entire online faculty population. However, like the sample, there was a large variation of student retention and success means per instructor. To the degree that these are indicators of faculty success, there is a large variation among the success of online faculty.

### *Summary of Findings*

This study has demonstrated that satisfied students are more successful than non-satisfied students in online courses at DVC. This was a very important question, and now that it is answered, it points to an important strategy for improving online student

success—increase online student satisfaction. This study has shown that all of the learner interactions, except for student support services, are significantly correlated to satisfaction and success. The most significant learner interactions for success were with self, instructor, and content. The most significant learner interactions for satisfaction were self, instructor and other learners. Non-successful students were much less satisfied with learner to learner interactions than successful students, yet, this was highly correlated to overall satisfaction for them. Many other areas were identified as significant to address for improving student and faculty satisfaction and success. This study also demonstrated that many “best practices” do not make a significant difference at DVC. This could be for a variety of reasons that will be discussed in chapter five.

The research methodology and results provided a rich source of data for quantitative and qualitative analysis. In the process, the student survey was validated and revised to serve as a reliable instrument for measuring satisfaction with learner interactions. A multitude of data and analyses were presented throughout this chapter to address the research questions, and to learn more in general about online students and faculty at DVC. The findings are enumerated here, beginning with some general findings about online students and faculty, and progressing to significant findings for student/faculty satisfaction and success. In the following and final chapter, the most significant findings will be discussed in light of the research questions.

#### Enumeration of Findings:

1. Online students and faculties share many commonalities:

- a. The vast majority of students and faculties are satisfied or very satisfied with online courses.
- b. A large majority of students and faculties would recommend online courses to others.
- c. The primary reason that students and faculty take and teach online courses is for scheduling flexibility.
- d. The vast majority of students and faculty think that the college should double or triple the number online courses that are currently offered.
- e. Compared to the faculty and student bodies, a greater proportion of online students and faculty are female.
- f. The vast majority of students and faculty use Windows based computers and rate their computer skill as high.
- g. Students and faculty partially support the standardization to one CMS, but have reasons for wanting exceptions.
- h. Among the learner interaction scales, students and faculty are the most satisfied with the interface (technology) and the least satisfied with online student support services.
- i. Students and faculty want something to be done about the high number of students who register for online courses, take up the spots, and then drop the courses.

- j. Faculty and students want more online support for students such as tutoring, counseling, career and employment services, and general support.

2. Additional online student characteristics:

- a. Most students live within 15 miles of DVC.
- b. The average (mode) student works 30 or more hours per week.
- c. Students find extra-scheduled course activities difficult to attend (e.g., orientation, meetings, tests, group work, etc.).
- d. A vast majority plan to transfer to a four year institution.
- e. Most students use WebCT and do not require any technical assistance.
- f. Many students use CourseCompass and report significantly more technical assistance needs than WebCT users.
- g. Macintosh users cannot use CourseCompass because the lab applications are not compatible.
- h. Students expect an easily accessible and well organized website with clearly communicated course requirements and reasonable expectations.
- i. Students expect timely and effective instructor feedback and are dissatisfied when they do not receive it.

3. Additional online instructor characteristics:

- a. Most online instructors are full-time at DVC.
- b. A greater proportion of online faculties are full-time in comparison to faculty at DVC.

- c. Experienced instructors recommend that new online instructors: attend an online course before they teach an online course, plan to spend a lot of time preparing for teaching online, plan to learn about online pedagogy, try to obtain lots of support when starting out.
  - d. Instructors desire more technical support for developing multimedia resources and creating/using quality video.
  - e. Instructors desire a better gradebook for WebCT (technical limitations).
4. The student survey effectively measured the satisfaction levels of six theoretically important learner interactions: learner to self, instructor, content, other learners, interface, and student support.
- a. The student survey provided valid and reliable measures of learner interactions with very high reliability (Cronbach's Alphas).
  - b. Students were most-to-least satisfied with the following learner interactions: (a) interface, (b) self, (c) instructor, (d) content, (e) other learners, and (f) student support services.
  - c. *Successful* students were most-to-least satisfied with (a) self, (b) instructor, (c) interface, (d) content, (e) other learners, and (f) student support services.
  - d. *Non-successful* students were most-to-least satisfied with (a) interface, (b) content, (c) instructor, (d) student support, (e) self, and (f) other learners.

- e. The highest satisfaction item from each interaction scale was (a) access to course website, (b) course organization, (c) course materials, (d) group discussions, (e) self ability to organize course materials, and (f) information about online courses.
  - f. The lowest satisfaction item from each interaction scale was (a) chat room, (b) instructor's assessment of learning, (c) access to online textbook, (d) collaboration on group projects, (e) self-motivation, and (f) online career and employment services.
  - g. Of the learner interaction scales, the highest correlate to overall student satisfaction was the instructor scale.
5. There is a *significant difference* in student success and retention rates based on the following:
- a. The success rate for satisfied students is 33% higher than for non-satisfied.
  - b. The retention rate for satisfied students is 31% higher than for non-satisfied.
  - c. Overall satisfaction is strongly correlated to course success.
  - d. The success rate for students satisfied with self-interactions is 31% higher than non-satisfied. The success rates are 9-15% higher for each of the other learner interaction scales (except student support).

- e. The differences in course success means per learner interaction, between satisfied and non-satisfied students, were (a) self (.31), (b) instructor (.15), content (.12), other learners (.11), and interface (.09).
  - f. The satisfaction mean for successful students is greater for each learner interaction scale than the satisfaction means for non-successful students.
  - g. The differences in satisfaction means per learner interaction scale, between successful and non-successful students, were: self (.81), instructor (.46), other learners (.41), content (.31, and interface (.20).
  - h. All of the learner interaction scales (except student support) are positively correlated to success at the 99% confidence level.
  - i. The success rate is higher for students who work *less* than 30 hours per week.
6. There is a *significant difference* in overall student satisfaction based on the following:
- a. All of the learner interaction scales, with the exception of student support, are positively correlated to overall satisfaction at the 99% confidence level.
  - b. Successful students were considerably more satisfied than non-successful students.
  - c. Students who found the course to be the same (or less) amount of work/difficulty/time than expected were more satisfied than students who found the course to be more work/difficult/time.

- d. Windows users were more satisfied than Mac users.
7. Contrary to the literature for best practices in online education, there is *NOT a significant difference* in the retention rates of DVC students according to the following characteristics or activities:
    - a. Attend an orientation
    - b. Have prior online experience
    - c. Have high skills with computers
    - d. Satisfied with student support services
    - e. Lighter unit load
    - f. Younger students (however, students age 30 to 34 have a significantly higher success rate than other age students)
    - g. Work 30 or more hours per week
  8. Faculty satisfaction items:
    - a. In all, for the 27 faculty satisfaction items, the mode was 5 (very satisfied) for 11.1% of the items, 4 (satisfied) for 48.1% of the items, and 3 (neutral) for 37.0% of the items. None of the item modes were less than 3.
    - b. The highest satisfaction item from each interaction category was (a) access to course website, (b) self-developed course materials, (c) student sense of belonging, and (d) online textbook orders.
    - c. The lowest satisfaction item from each interaction category was (a) chat room, (b) multimedia, (c) student collaboration on group projects, and (d) tie between e-advisor and online career services.

- d. There were *significant positive correlations* in overall faculty satisfaction with the following items (from highest to lowest): (a) assessment of student learning, (b) online gradebook, (c) multimedia, audio, video resources, (d) interactive quizzes/tests, (e) other-produced course materials, (f) student sense of belonging, (g) self-developed materials, (h) self-rating of computer skills.
  - e. There was a *significant negative correlation* between overall satisfaction and type of computer used (Windows versus Macintosh).
9. Faculty success indicators: Student satisfaction, success, and retention means per instructor vary greatly between online instructors.