

# **Predictors of Perceived Learning and Satisfaction in Web-based MBA Courses: A Test and Extension of Chickering and Gamson's (1987) Seven Principles of Good Practice in Education**

J. B. Arbaugh, College of Business Administration, University of Wisconsin Oshkosh  
800 Algoma Blvd., Oshkosh, WI 54901, (920) 424-7189, [arbaugh@uwosh.edu](mailto:arbaugh@uwosh.edu)

Steven C. Hornik, College of Business Administration, University of Central Florida  
4000 Central Florida Blvd., Orlando, FL 32816-1400, (407) 823-2685, [steven.hornik@bus.ucf.edu](mailto:steven.hornik@bus.ucf.edu)

**Abstract:** Chickering and Gamson's (1987) seven principles of good practice in undergraduate classroom education have received extensive attention in the higher education community. However, research that attempts to generalize their ideas to other contexts is rather limited. This study found support for extending five of the seven principles to web-based MBA courses. Using both survey-based and objective measures of the seven principles, we found that greater student-faculty contact and higher course expectations were strong predictors, while feedback, student collaboration, and time on task were moderately associated with learning and satisfaction.

## **INTRODUCTION**

The acceptance of web-based courses as a viable educational delivery medium greatly accelerated during the late 1990s. As research in this field emerges, some researchers have developed theoretical models of effective web-based course and program design (Alavi & Leidner, 2001; Brandon & Hollingshead, 1999; Leidner & Jarvenpaa, 1995). However, these theoretical frameworks have had limited influence on empirical work. This lack of integration between conceptual and empirical work suggests that this stream of research would benefit greatly from empirical tests of conceptual models of learning and/or instruction. One such model is called the Seven Principles of Good Practice in Undergraduate Education (Chickering and Gamson, 1987). Developed from a review of fifty years of educational literature, these seven principles focus on contact between students and faculty, consideration of multiple approaches to learning, and the engagement of students in learning. The development of these principles has generated significant interest in their application (Card, 2000; Ehrmann, 1999a), with recent attempts to apply them to more technologically-driven learning environments (Chickering & Ehrmann, 1996; Chizmar & Walbert, 1999). However, since the seven principles were focussed on undergraduate education, attempts to extend the generalizability of the framework to graduate education have been limited (Card, 2000). This paper seeks to build on the emerging literature of web-based education by examining whether Chickering and Gamson's (1987) seven principles of effective education can be generalized to graduate level courses.

## **LITERATURE ON THE SEVEN PRINCIPLES AND WEB-BASED EDUCATION**

Good Practice Encourages Contacts Between Students and Faculty. Much of the research on web-based courses published to date supports this principle. The literature related to this first principle can be categorized by studies of two constructs: instructor immediacy behaviors and participant interaction. Instructor immediacy behaviors have been thoroughly studied by communication education scholars and have generally been found to be significantly associated with student learning (Carrell & Menzel, 2001). Studies suggest that while student expectations and perceptions of nonverbal immediacy are lower than that of traditional classrooms (Frietas, Myers, & Avtgis, 1998; Witt & Wheelless, 1999), instructor immediacy behaviors are positively associated with course outcomes (Arbaugh, 2001; Comeaux, 1995).

One apparent requirement of web-based learning environments is the need for comparatively high levels of interaction amongst a relatively high number of class participants. Prior studies of computer-mediated communication in general and internet-based courses in particular suggest greater volume and more equal student participation in class discussions than in traditional classrooms (Arbaugh, 2000b; Bailey & Coltar, 1994; Strauss, 1996). However, more participation does not always mean a positive

classroom experience. Strauss (1996) found that while student groups in computer-mediated discussions participated more and more equally, they generally enjoyed the process less than students in face-to-face groups. Also, this interaction tends to be less efficient because initially it is more difficult to exchange information and develop social ties (Chidambaram, 1996; Warkentin, Sayeed, & Hightower, 1997). While instructor interaction behavior appears to be an important influence on web-based courses, it is also becoming apparent that student interaction behavior is critical for closing the interaction loop. Initial evidence suggests that the “verbal” behavior of the students as well as the instructor is critical for a successful web-based MBA course (Arbaugh, 2000a; 2000b; 2002; Hiltz, 1986; Hiltz & Wellman, 1997). Adequate opportunity to participate in on-line discussions has been associated with increased social presence and satisfaction with on-line courses and discussion forums, particularly when courses use smaller groups within the course to facilitate discussion (Gunawardena & Zittle, 1997; Jonassen, Davidson, Collins, Campbell, & Haag, 1995; Sherry, Fulford, & Zhang, 1998).

**Good Practice Develops Reciprocity and Cooperation Among Students.** Success in virtual environments is increasingly being attributed to collaborative efforts within and between groups (Jarvenpaa & Leidner, 1999). Several authors have pointed out potential opportunities for collaborative interaction in cyber-education (Borthick and Jones, 2000; Dede, 1990; Dumont, 1996). One of the most comprehensive theoretical arguments in favor of using virtual classrooms for collaborative learning was presented by Leidner and Jarvenpaa (1995). These authors argued that features such as networked group software and electronic mail encourage more student-to-student interaction in both synchronous and asynchronous settings, and therefore best support cooperative models of learning. This approach also assumes that learners have appropriate levels of prior knowledge so that they can contribute to the discussion. This approach typically employs methods such as peer feedback on assignments (Leidner & Jarvenpaa, 1995) and the development of communities of practice (Alavi, 1994; Jarvenpaa & Leidner, 1999). The role of the instructor in this environment may be limited to selecting groups based on common interest or allowing groups to self-organize based on some common characteristics (Hung & Nichani, 2001) and/or synthesizing key ideas from group discussions (Gallini, 2001). While there are variations in the construct of collaborative learning, it is generally agreed that its focus is encouraging students to learn from each other (Jonassen et al., 1995; Leidner & Fuller, 1997).

**Good Practice Uses Active Learning Techniques.** The conclusions of several authors on distance education also suggest that the lecture model may not be as effective in virtual classrooms as it is in physical ones (Ahem & Repman, 1994). Previous studies of electronic classrooms suggest that the volume of text-based material can be overwhelming (Berger, 1999; Dumont, 1996; Hiltz & Wellman, 1997). In this setting, merely placing lecture notes on top of the “pile” of linked documents is usually not very helpful. Also, since the medium is considered to be a non-linear vehicle for instruction (Ehrmann, 1999b; Leidner & Jarvenpaa, 1995), students can supplement course material by incorporating the results of their own web searches and personal experiences into the classroom setting at their convenience. Approaches to active learning in web-based courses can also be consistent with the cognitive constructivist, or individualist, school of learning (Fosnot, 1996; Hung & Nichani, 2001). Therefore, activities such as situated learning and cognitive flexibility exercises are emphasized in cognitive constructivist learning environments to help students develop context-specific applications for their learning and build upon their prior experiences (Rossner-Merrill, Parker, Mamchur, & Chu, 1998). Therefore, learning tools such as databases, conceptual models, simulations and hypermedia have been considered to be most appropriate for this learning environment (Liaw, 2001; Leidner & Jarvenpaa, 1995).

**Good Practice Gives Prompt Feedback.** Researchers have suggested that instructors need to learn a different set of teaching skills for teaching on-line. One of the primary new skills is that of making the transition from being a “talking head” to a new role of discussion facilitator and manager (Brandon & Hollingshead, 1999; Berge, 1995). This new role includes the use of a more conversational style in on-line comments to help enhance student participation and discussion (Ahearn, Peck, & Laycock, 1992). These findings suggest that instructors of these courses need to place a high level of emphasis on interaction within the course and develop methods to facilitate interaction. One of the characteristics of this approach is an emphasis on prompt feedback (Berger, 1999). The relationship between emphasis on feedback and student learning in web-based courses has been supported by recent research (Arbaugh, 2002; Eastman & Swift, 2001; McIssac et al., 1999).

**Good Practice Emphasizes Time on Task.** Prior studies have shown that time on task is a strong predictor of computer-based learning (Brown, 2001; Ericsson, Krampe, & Tesch-Romer, 1993). This implies that students who spend more time on the web-based course and/or who have prior experience with

web-based courses are more likely to be satisfied with the experience and take more ownership of the learning process, thereby increasing their own learning. Another aspect of the time on task dimension is the potential for increased efficiency of learning that may be provided via the on-line environment (Chickering & Ehrmann, 1996; Ehrmann, 1999b). The delivery medium can change the learning environment from being at a set time and place to any time, any place (Brandon & Hollingshead, 1999; Harasim, 1990). While some raise concerns about lack of face to face contact in learning settings (Dyrud, 2000; Flaherty, Pearce, & Rubin, 1998), students increasingly appear to either tolerate this characteristic or leverage it for new ways of building communities (Berger, 1999). Initial research suggests that perceived flexibility is a significant predictor of student learning and satisfaction with web-based courses (Arbaugh, 2000a; Arbaugh & Duray, 2002). This flexibility is particularly attractive for graduate management education because managers have to manage conflict between their jobs, family, and work-related travel, thereby making arranging education around their schedule all the more appealing (Greco, 1999; Shea & Boser, 2001).

**Good Practice Communicates High Expectations.** One of the assumptions of collaborative learning is that it raises the bar for performance expectations. Therefore, it is expected that these increased expectations will be demonstrated in web-based courses. One way in which these higher expectations have been communicated in on-line courses is through the use of peer or public review of assignments (Chizmar & Walbert, 1999). The electronic media makes it much easier to make assignments visible to other participants and require student reviews and revisions of initial works (Ehrmann, 1995; 1999a).

**Good Practice Respects Diverse Talents and Ways of Learning.** A number of researchers are beginning to suggest that classroom and web-based settings are fundamentally different learning environments (Berger, 1999; LaRose & Whitten, 2000; McEwen, 2001; Shedletsky & Aitken, 2001). Media richness (Daft & Lengel, 1984) and social presence theories (Rice, 1984; Sproull & Kiesler, 1991) suggest that recreating the classroom learning environment to fit the internet in its present format would be rather difficult. Therefore, it has been suggested that blending both environments could provide the best of both worlds by supplementing text-oriented web-based courses with the use of physical meetings (Cagle & Hornik, 2001; Greco, 1999), videoconferencing (Alavi et al., 1997; Webster & Hackley, 1997), and the use of voice messaging, video clips and/or multimedia (Bailey & Cotlar, 1994; Greco, 1999). The implicit assumption behind the incorporation of various media into the on-line environment is that they enhance the learning experience beyond what text-based approaches can provide (Flaherty et al., 1998).

## **METHODS**

### **Sample, Data Collection, and Course Software Description**

The sample for the study was taken from all twenty-four class sections that were conducted using either Lotus LearningSpace or Blackboard course software platforms in the MBA programs of two midwestern U.S. universities during 2001. Nearly all students in these courses were also enrolled in the classroom-based MBA programs of these universities. Class section enrollments ranged from 9 to 31 students. Data collection was completed in a two step process. Students completed a survey either in class for courses that had a final physical meeting or via e-mail for those that did not. In the second step, the remaining non-responding students were mailed a copy of the survey. Three hundred eighty-five surveys were returned, of which 336 were usable for a response rate of 70 percent (336 of 480).

Six of the courses in the study were administered via its respective web site using Lotus LearningSpace software. Derived from the Lotus Notes platform, LearningSpace uses five sectors to simulate the classroom experience: (1) Schedule; (2) MediaCenter; (3) CourseRoom; (4) Profiles; and (5) Assessment Manager. The other courses in the study were delivered using the Blackboard CourseInfo platform. Blackboard uses up to eight sectors to simulate the classroom experience: (1) Announcements; (2) Course Information; (3) Staff Information; (4) Course Documents; (5) Assignments; (6) Communication; (7) External Links; and (8) Student Tools.

### **Measures**

Dependent Variables. Because the multi-disciplinary, multi-instructor nature of the sampling frame inhibited the use of a common measure of actual learning, perceived learning was used as a dependent variable. Perceived student learning was measured by using Alavi's (1994) six-item scale. This scale has been used in several studies of on-line learning (Alavi et al., 1995; Alavi et al., 1997; Arbaugh, 2000a; 2000d; Arbaugh & Duray, 2001). These items had a coefficient alpha of .95.

Satisfaction with course activities often has been included as a dependent variable in studies of distance education, computer-mediated communication and web-based courses (Alavi, Wheeler, & Valacich, 1995; Alavi et al., 1997; Chidambaram, 1996; Warkentin et al., 1997). In this study, student satisfaction was measured using a twelve-item scale that focussed on student satisfaction with taking the course via the internet and their likelihood of taking future courses via the internet. A factor analysis revealed that these items loaded onto two factors: (1) Satisfaction with the delivery medium (eight items loading at .60 or higher; coefficient alpha=.90); and (2) Satisfaction with the course (four items loading at .80 or higher; coefficient alpha=.91.).

Independent Variables. Since the Flashlight Project has been a champion of the study of whether and how the use of technology promotes the Seven Principles (Chickering & Ehrmann, 1996), a seventeen-item survey from The Flashlight Project – Current Student Inventory (Ehrmann & Zuniga, 1997) was used to attempt to measure the Seven Principles. However, a factor analysis of these items produced five factors, which could only be clearly linked to four of the principles. Two of the factors from the factor analysis were used to measure the level of contact amongst students and faculty. These factors were named student faculty contact (five items loading at .56 or higher, coefficient alpha=.80) and perceived isolation (three items loading at .44 or higher, coefficient alpha=.60). Feedback (three items loading at .58 or higher, coefficient alpha=.74) and student cooperation and reciprocity (three items loading at .48 or higher, coefficient alpha=.70) were measured using a single factor. Since the factor for higher expectations had a Chronbach's alpha below .7 (three items loading at .63 or higher, coefficient alpha of .62), the number of times in a course that student teaching or evaluation of course also was used to measure of higher expectations since peer or public review opportunities have been associated with increased student performance in web-based courses (Chizmar & Walbert, 1999). Since the factor analysis revealed no measures for active learning, time on task, or diversity of teaching and learning styles, other measures were developed for these variables. Active learning was operationalized in this study by taking the sum of the number of non-exam performance measures used in a course since this concept has been characterized as learning in ways other than traditional examinations (Chickering & Ehrmann, 1996; Leidner & Jarvenpaa, 1995). Two measures of time on task were used in this study. Student usage of the course site was measured by student self-reports of the average minutes per week they spent logged on to the course site. The efficiency of course time was measured using Arbaugh's (2000a) eight-item measure of perceived course flexibility. The coefficient alpha for these items was .88. Since the principle of respect of diverse talents and ways of learning reflects the use of a variety of learning tools and techniques (Chickering & Ehrmann, 1996), this principle was measured multidimensionally. We measured diversity of learning formats in this study by taking the sum of the number of sets of lecture notes, power point presentations, audio/video clips and links to other web sites on the course site along with the number of examinations and projects used to assess learning in the course.

Control variables. There were eight control variables used in the study. These variables were student age and gender, student skill level in web-based courses, student and instructor prior experience with web-based courses, whether the course was required and/or quantitative in nature, and the number of students in the course. Student skill level was measured using a three-item scale of students' skills in using computers, computer keyboards, and the internet and had a coefficient alpha of .91. Two dummy variables were used to measure whether a course was required or elective and whether it was quantitatively oriented.

## RESULTS

The variable means suggest comparable levels of perceived learning (5.16), delivery medium (4.77), and course satisfaction (4.98). These means for the dependent variables are somewhat higher than those for any of the five independent variables generated by the items from the Flashlight instrument, for which the range of the means was between 3.98 and 4.28. Table 2 shows the results of hierarchical regression analysis for each of the dependent variables. These regressions provide the tests for the study's hypotheses, the results of which will be summarized in the following paragraphs.

| Variables                            | Student Learning |         | Satisfaction - Delivery Medium |         | Satisfaction - Course |          |
|--------------------------------------|------------------|---------|--------------------------------|---------|-----------------------|----------|
|                                      | M 1              | M 2     | M 1                            | M 2     | M 1                   | M 2      |
| Age                                  | .00              | -.01    | .01                            | .00     | -.00                  | -.00     |
| Gender                               | -.31**           | -.39*** | -.32**                         | -.30**  | .19+                  | .20*     |
| Skill Level                          | .11*             | .03     | .01                            | -.03    | .22***                | .11**    |
| No. of Prior Internet Courses Taken  | .04              | -.04    | -.04                           | -.09**  | .14***                | .05*     |
| No. of Prior Internet Courses Taught | .04**            | .04*    | .04**                          | .04*    | .01                   | -.03+    |
| Required Course                      | .09              | .22     | -.04                           | .05     | .11                   | .08      |
| Quantitative Course                  | -.25+            | -.12    | -.29*                          | -.09    | -.22+                 | -.05     |
| Class Section Size                   | -.01             | -.00    | -.04*                          | -.00    | .02                   | .00      |
| Student-Faculty Contact              |                  | .10+    |                                | .10+    |                       | .18***   |
| Perceived Isolation                  |                  | -.13**  |                                | -.15**  |                       | -.14***  |
| Feedback                             |                  | .27***  |                                | .40***  |                       | .06      |
| Collaboration                        |                  | .12*    |                                | .18***  |                       | -.00     |
| Use of Discussion Groups             |                  | -.42+   |                                | -.15    |                       | .03      |
| High Expectations                    |                  | .23***  |                                | .13*    |                       | .12**    |
| Use of Peer Teaching/Feedback        |                  | -.06    |                                | -.18*   |                       | .13*     |
| Active Learning                      |                  | .08     |                                | -.01    |                       | -.00     |
| Time on Course                       |                  | .00*    |                                | .00*    |                       | -.00     |
| Site                                 |                  |         |                                |         |                       |          |
| Perceived Flexibility                |                  | .17***  |                                | .03     |                       | .48***   |
| Teaching/Learning Range              |                  | .01     |                                | .01     |                       | -.00     |
| F                                    | 4.28***          | 7.60*** | 4.19***                        | 7.78*** | 6.96***               | 23.31*** |
| D.F.                                 | 8,278            | 19,265  | 8,277                          | 19,265  | 8,277                 | 19,265   |
| Adj. R-square                        | 0.09             | 0.31    | 0.09                           | 0.31    | 0.14                  | 0.60     |
| Change in R-squared                  |                  | 0.22*** |                                | 0.22*** |                       | 0.46***  |

Note. Standardized regression coefficients reported. + $p < .1$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 1:** Results of Hierarchical Regression Analyses on Student Learning and Satisfaction (n=288)

Hypotheses 1a and 1b were generally supported. Student-faculty contact was moderately associated with perceived learning ( $b=.10$ ,  $p<.1$ ) and satisfaction with the delivery medium ( $b=.10$ ,  $p<.1$ ), and strongly associated with course satisfaction ( $b=.18$ ,  $p<.001$ ). Perceived isolation was significantly negatively associated with all three dependent variables ( $b=-.13$ ,  $p<.01$  for learning,  $b=-.15$ ,  $p<.01$  for medium satisfaction,  $b=-.14$ ,  $p<.001$  for course satisfaction). Hypothesis 2a and 2b were only partially supported. While collaboration was positively associated with perceived learning ( $b=.12$ ,  $p<.05$ ) and delivery medium satisfaction ( $b=.18$ ,  $p<.05$ ), it was not a significant predictor of course satisfaction. The use of groups within the course was actually a negative predictor of perceived learning ( $b=-.42$ ,  $p<.1$ ) and was not a significant predictor of satisfaction. Hypothesis 3a and 3b predicted that increased active learning opportunities would be associated with greater student learning and satisfaction. Since the total number of class projects was not a significant predictor of learning or either type of satisfaction, this hypothesis was not supported. However, since feedback ( $b=.27$ ,  $p<.001$ ), student time spent on the course site ( $b=.00$ ,  $p<.05$ ), and perceived flexibility ( $b=.17$ ,  $p<.001$ ) were strongly associated with perceived learning, Hypotheses 4a and 5a were strongly supported. Hypotheses 4b and 5b received moderate support. Feedback was strongly associated with delivery medium satisfaction ( $b=.40$ ,  $p<.001$ ) and perceived flexibility was strongly associated with course satisfaction ( $b=.48$ ,  $p<.001$ ). Hypotheses 6a and 6b generally

received strong support. High expectations was a significant positive predictor of all three dependent variables ( $b=.23$ ,  $p<.001$  for learning,  $b=.13$ ,  $p<.05$  for delivery medium satisfaction, and  $b=.12$ ,  $p<.01$  for course satisfaction). While not a significant predictor of perceived learning, the number of peer teaching opportunities a course had was positively associated with course satisfaction ( $b=.12$ ,  $p<.05$ ). Lastly, since the range of learning tools and techniques used in the course did not predict perceived learning or satisfaction, Hypotheses 7a and 7b were not supported.

## DISCUSSION

Support for the study's seven hypotheses was mixed. Two of the hypotheses were strongly supported, three received at least partial support, and two others received no support. The findings that greater participant contact and collaboration, an emphasis on feedback, and the effective use of learning time would be associated with learning and satisfaction is consistent with previous findings of studies of web-based courses (Arbaugh, 2000d; 2002; Arbaugh & Duray, 2001; Hiltz & Wellman, 1997; McIssac et al, 1999). However, the communication of high expectations has not been widely addressed. This finding suggests that concerns over whether web-based education is an inferior delivery mechanism (Dyrud, 2000; Eastman & Swift, 2001; Noble, 1998) may be unfounded. Therefore, instructors may not need to be as concerned about whether they should relax their expectations of students merely because of the relative novelty of this delivery medium (Gibson & Gibson, 1995). The lack of support for active learning and support for diverse learning styles has some support in the distance education literature. Fornaciari and Matthews (2000) found that certain personality types would tend to express preferences for and gravitate toward distance education, suggesting that the need to accommodate a variety of styles and approaches in a distance education context may not be as great as some have conceptualized. If future research supports this non-finding, then the substantial increase in instructor time to prepare and arrange for the additional media may not be justified (Berger, 1999; Dumont, 1996), and time would be better spent focussing on the relational aspects of web-based courses. Also, these findings may provide additional support for the contention that classroom and web-based course settings are fundamentally different learning environments and therefore should use differing approaches to design and instruction (Bowman, 2001; LaRose & Whitten, 2000; McEwen, 2001; Wiegel, 2000).

There are several limitations that make these findings tentative. The primary limitation is the development of the measures of the seven principles. While the Flashlight inventory was based in part on the seven principles, the fact that only four principles could be derived from the factor analysis is disappointing. The seven principles as constructs can certainly be further refined. Other limitations emerge from the nature of the sample. Because the sample was gathered from MBA programs that use on-line courses as a complement to their classroom-based courses, the findings may not be generalizable to MBA programs that are exclusively on-line. Also, since classroom-based courses were not included in the sample, it cannot be stated with certainty that the findings are unique to web-based learning environments. These limitations should be addressed in future studies. In spite of these limitations, there are a number of potential implications of the study on the design and practice of web-based education. First, the findings supporting the need for contact amongst students and faculty should be encouraging to faculty new to the on-line environment. Therefore, new instructors may want to focus their initial attention on generating and maintaining class discussion and developing reasonable expectations for responsiveness with the realization that they can cultivate their skills with the technology in future course offerings. While most of Chickering and Gamson's seven principles received at least partial support, the evidence was not convincing enough to merit designation of the seven principles as a silver bullet for effective design and conduct of graduate-level web-based courses. However, there is enough support here to suggest that as further refinements of the measures of the seven principles are developed it could be a framework that could serve as a starting point for the development of a theory of web-based education.

References available upon request from J. B. Arbaugh.