

Table 6 - Sample of Research Involving Web-Based Instruction: Chapter 3 - Research on Online Learning

Topic: Web-Based Instruction	Author	Description/Procedures	Results	Instructional Strategies/Activities Suggested by Study
Course Web Site and Student Performance	Heines (2000)	<ul style="list-style-type: none"> ▪ Experimental study including analysis of student attitudes across 5 semesters and final grades across 10 semesters before and after implementing a course Web site in computer science course ▪ 58 undergraduate students surveyed ▪ 1451 undergraduate students' final grades examined in computer science course across 10 semesters 	<ul style="list-style-type: none"> ▪ Students agreed strongly that the presences of course materials on the Web site had a significant impact on their ability to keep up with the Graphical User Interface course ▪ The majority also agreed strongly that they wished other professors would maintain Web sites like this one ▪ Students accessed the site 3-5 times per week and about half printed out materials from the site more than 10 times ▪ For Computer Science I course, there was statistically significant difference in student performance after Web site was introduced into the course ▪ Dramatic increase in success after Web site was introduced in fall of 1998, however, these results need to be interpreted cautiously as the difference could be due to change in professor However, the same professor taught in 1994 and there was an increase when taught again in 1998 by the same professor after the addition of the Web site 	<ul style="list-style-type: none"> ▪ Students respond positively to particular course Web sites ▪ Creation and careful maintenance of a course Web site can be worth extra time and effort ▪ Web-based courses may be one important factor related to the increase of students' probability of success in particular courses with large enrollments However, caution should be taken in interpreting these results based on numerous possible educational variables

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Topic: Web-Based Instruction	Author	Description/Procedures	Results	Instructional Strategies/Activities Suggested by Study
Effect of Computer-Mediated Collaborative Learning on Solving ill-defined Problems	Uribe, Klein & Sullivan (2003)	<ul style="list-style-type: none"> ▪ Mixed method quantitative experimental study and qualitative analysis of online interaction ▪ 59 Reserve Officer Training Corps (ROTC) students enrolled in aerospace studies ▪ Participated in Web-based instructional program on problem solving in the Blackboard course management system ▪ Course covered four steps in problem solving and practice sequences with scenarios, a knowledge quiz and assessment problem scenario answered by essay responses ▪ Participants placed into higher and lower ability groups based on grade point average and average in ROTC class ▪ Examined performance by individuals and in pairs on problem scenario scored by rubric as well as by ability levels Time on task and attitudes related to problem solving and course were also investigated 	<ul style="list-style-type: none"> ▪ Participants who worked together in pairs performed better in solving ill-defined problem scenarios in a computer-mediated communication environment than those who worked alone ▪ The pairs spent significantly more time on task than those who worked alone ▪ The paired participants indicated more positive attitudes about working collaboratively, about the course and using the problem solving skills learned 	<ul style="list-style-type: none"> ▪ Working with a partner in Web-based or computer-mediated instructional environments can promote higher level performance when engaged with problem solving scenarios ▪ Consider pairing lower ability students with higher ability students in Web-based instructional tasks focused on problem solving ▪ Encourage sharing perspectives and different solutions in pairs of students to promote a better understanding of problem ▪ Recognize that increased time may be needed for interaction in Web-based or computer-mediated communication courses and communication is limited to text-only online that may not be learners' preferred manner of interaction

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Topic: Web-Based Instruction	Author	Description/Procedures	Results	Instructional Strategies/Activities Suggested by Study
Structured Support of Students Versus Learner Choice of Using Web-Based Resources, Supports and Feedback	Collis, Winnips & Moonen (2000)	<ul style="list-style-type: none"> ▪ Quasi-experimental exploratory Case study ▪ 25 graduate students ▪ Two forms of participation in a Web-based course, one offering structured support where students were required to submit work via the WWW for regular feedback and make use of WWW tools. The other form of participation made same tools available but did not require their use allowing learner choice of using support 	<ul style="list-style-type: none"> ▪ Students in the structured- support course which included required collaborative, discussion and interaction with the instructor activities spent twice as much time on the course as students in the learner-choice variant that made these options available but did not require their use ▪ No significant difference in overall performance on final exam and little difference in attitudes ▪ Dividing final exam questions into knowledge and transfer indicated a marginally significant ($p=.054$) difference on transfer type questions favoring structured support ▪ Attrition was higher in the learner choice group with four students not completing course while only one did not complete the course in the structured support group ▪ Participation and fulfilling requirements was more evident in the structured support group as all students submitted work on time and completed the final exam. Students in the learner choice group demonstrated less participation with 4 of the 11 students failing to submit work and not taking final exam or take advantage of personal discussions with instructors ▪ Instructors spent 2 to 3 times more time on the course than the structured support students and between 4 to 6 times more time on the course than the learner-choice students. While some of this may be related to redesign and setting up the study, the investment of instructor time is still high 	<ul style="list-style-type: none"> ▪ Although only suggestive, these results indicate that students may respond well to a structured approach but may not do as well when left to their own structuring and decision- making in regard to studying in Web-based courses ▪ Redesigning or designing a Web-based course and responding to students is time-intensive for the instructor ▪ The payoff for more communication, discussion, self-selection of materials, summarizing and feedback may not be necessary or better for student learning ▪ Providing structured support in the form of required discussion, collaboration, summarizing and feedback prompts students to spend more time on the course but may not influence achievement

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Topic: Web-Based Instruction	Author	Description/Procedures	Results	Instructional Strategies/Activities Suggested by Study
Building Interactive Web Learning Environments to Match and Support Individual Learning Differences	Martinez & Bunderson (2000)	<ul style="list-style-type: none"> ▪ Quantitative experimental, 3x3 factorial research design ▪ 71 adult volunteers ▪ Investigated how people learn in computer-based environments that support their individual learning styles ▪ Analyzed the independent and interactive effects of two independent variables (learning orientation and intentional learning training) on four dependent variables (satisfaction, learning efficacy, intentional learning performance and achievement) ▪ Used an adapted Web-based system for intentional learning and performance assessment (SILPA) 	<ul style="list-style-type: none"> ▪ Learners enjoyed greater success including achievement in learning environments that recognized and supported their individual learning orientation and learned less successfully in those that conflicted with their learning orientation ▪ Groups separated by orientation scored highest in the environment that best suited their orientation ▪ The experimental group including intentional learning training and resources best matched all three learning orientations and included highest group means for all three dependent variables 	<ul style="list-style-type: none"> ▪ Evidence suggests that recognizing and adapting to learning orientations in advance is useful in guiding the design of instructional learning environments ▪ Determining learner profiles can assist in designing, matching learning environments to learners for the greatest success
Use and Effects of Web-Based Instruction	Lu, Zhu & Stokes (2000)	<ul style="list-style-type: none"> ▪ Correlational study pooling data based on individual use of WBI features to examine relationships among prior knowledge, online learning behavior and final outcome of learning in a Web-based course ▪ 100 undergraduate students in a Modern Physics course ▪ Use of WebCT features – specifically notes section containing summaries, quizzes, self-test components; solutions- providing answers and explanations to tutorial problems, quizzes and tests; tools – represented non-content related discussion and communication features 	<ul style="list-style-type: none"> ▪ Full-time students visited the notes pages more frequently than part-time students ▪ Full-time students surfed less frequently than part-time students ▪ Students who reported that they surfed the Web frequently, on average, scored 11 points lower on the final exam than those who surfed occasionally and 22 points lower than those who claimed to never surf the Web ▪ The use of notes pages had a positive impact on learning. Each visit to the notes pages resulted in a .25 increase in final exam points 	<ul style="list-style-type: none"> ▪ Full-time students may be more focused on content than part-time students who enjoy exploring Web features ▪ Encourage focus on core content and discourage Web surfing for unrelated content in online courses ▪ Promote the use of self-tests, quizzes and summaries in content-based Web courses

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