USING THE THEORY OF EQUIVALENCY TO BRING ON-SITE AND ONLINE LEARNING TOGETHER

Suzanne Queen Hoffman and Michael S. Martin
Intelligent Decision Systems, Inc.

John Edward Jackson
U.S. Naval War College

Abstract: Distributed learning, considered by many to be a "poor excuse for the real thing" (McIsaac, 1998) is gaining respect within the education arena. Nonetheless, an aura of suspicion regarding how well distributed education courses can approximate their on-site counterparts lingers. That equivalent learning outcomes can be achieved for both scenarios through the application of appropriate instructional strategies and technology is the argument put forth in this paper and grounded in Simonson, Schlosser, and Hanson's (1999) Theory of Equivalency.

INTRODUCTION

Historically, distance education has been set apart, thought of as the stepchild of education (Merisotis & Phipps, 1999), and referred to as a "poor excuse for the real thing" (McIsaac, 1998). Can advanced technology applications, in particular the World Wide Web, close what many educators view as a gap between "real" education and distance education? If distance education has focused on the logistics of getting things done with little appreciation for building practices on a firm, theoretical foundation as Holmberg (1985) maintain, is this lack of a firm, theoretical foundation negatively affecting the evolution of distance education?

The authors of this paper maintain that thanks to advanced technology applications, the gap between "real" education and distance education is closing, and a theory (the Theory of Equivalency) not only exists but also provides the underpinnings and context within which distance education can flourish. The project specifically referred to in this paper is currently underway at the U.S. Naval War Col-

• **Suzanne Queen Hoffman**, Principal Scientist, Intelligent Decision Systems, Inc., 11130 Main Street, Suite 200, Fairfax, VA 22030. Phone: 334 344-9743. E-mail: suzhoff@earthlink.net

The Quarterly Review of Distance Education, Volume 1(4), 2000, pp. 327–335 ISSN 1528-3518

lege (NWC). It encompasses the conversion of several nonresident courses to an online learning format and provides a good illustration of how well a course delivered online can provide the key ingredient so long missing in distance education—extensive and relatively effortless collaboration between and among instructors and learners. The electronically facilitated collaboration made possible in the Web environment has effectively closed the gap referred to above by enabling educators to approximate the synchronous and asynchronous encounters that define the traditional classroom.

BACKGROUND

Parties Involved

The speed with which technology is reshaping how we educate in the United States is nowhere more apparent than in the military, that must effectively educate and train large numbers of individuals to perform a staggering number and variety of tasks on an everyday basis. Intuitively, educators appreciate the Web as a teaching/learning environment because it is highly flexible and can be manipulated to fit the needs of a wide array of learners with an even wider array of intellectual needs and preferences.

U.S. Naval War College

The NWC consists of a senior division, the College of Naval Warfare, and a junior division, the College of Naval Command and Staff. Under the auspices of the College of Naval Command and Staff are programs for both resident and nonresident students. Programs (Correspondence and Nonresident Seminar programs) for nonresident students are administered by the College of Continuing Education (CCE). The NWC's mission is to provide advanced education in military strategy and operations. Like the other service war colleges, the NWC is being called upon to help produce Phase I Professional Joint Education (PJE) certified officers respond to the increasingly joint nature of military operations, and provide the military education necessary within the highly competitive career advancement process. The demands of an increasingly diverse population of students with multiple locations and professional obligations and the flexibility of the Web with its ability to meet "any time, anywhere, anyone" educational goals have led the NWC to look to the CCE as the branch of that institution best suited to respond to these educational needs.

The purpose of the initiative referred to in this paper was to investigate how the CCE might use advanced distributed learning technologies to provide the curriculum of the College of Naval Command and Staff to distance learning students. Success in this endeavor will enhance the facility with which the NWC's CCE can respond to the existing and growing demand from officers and senior civilians for additional military education.

Intelligent Decision Systems, Inc. (IDSI)

The Navy contracted with Intelligent Decision Systems, Inc. (IDSI), a small, private company comprising professionals with expertise in program management, instructional systems design, evaluation, training analysis, and training problem solutions, to help it determine how best to accomplish its task.

NWC AND IDSI'S TASK

Correspondence courses offered through the NWC's CCE are subject to a rigorous process that identifies and incorporates key components of the College of Naval Command and Staff program. Because of the rigorous standards imposed on the CCE's correspondence courses and because revision of course content is within the purview of the NWC, IDSI's role in this project was limited to identification of instructional strategies for the existing content. In an effort to ensure the highest degree of equivalency between the College of Naval

Command and Staff course and the correspondence course, the instructional strategies of both programs were investigated. In the process, currently possible advanced technologies enabled incorporation of instructional strategies previously impossible in distance learning programs.

As part of this contract, IDSI developed a proof of concept to demonstrate distributed learning strategies and technologies. Three correspondence courses, each derived from the resident program counterpart, are currently offered through the NWC's CCE: Joint Maritime Operations (JMO), Strategy and Policy (S&P), and National Security Decision Making (NSDM). Of these three courses, JMO is most compatible with its equivalent resident course (80%) and meets the highest percentage of criteria for PJE Phase I certification (80%). For these reasons it was the course selected for the proof of concept development illustrating conversion to an online Web-supported instructional format.

A BRIEF LOOK AT DISTANCE EDUCATION

Despite its rather humble origins more than 150 years ago, both the physical presence and the promise of distance education, or distance learning as it is also called, have grown exponentially in recent years. Much of the credit for this dynamic growth can be attributed to the development of increasingly powerful computer-related technologies (McIsaac, 1998).

Theories of distance education that have reigned until recently have come primarily from outside the United States and have dealt with distance education as a distinct form of education, cut off and set apart from the field of education in general. However, the widening availability and diversity of communications technologies has encouraged a search by American educators for a theory to envelop the advanced communications technologies and the characteristics that define the American system of education with its focus on "local control, classroom teachers, small classes, rapport between teacher and students, and highly personalized instruction" (Simonson, Schlosser, & Hanson, 1999). Distance education is no longer considered a deviation from mainstream education, and the classical theories of distance education that stressed independence and autonomy, industrialization of teaching, and interaction and communication must be reconsidered in light of the burgeoning variety of interactive telecommunications available.

The original mission of distance education (to make desired learning readily accessible to learners outside the traditional educational setting) remains the same. New is the prevailing attitude toward distance learning and the plethora of electronic capabilities at the disposal of distance educators that facilitate "any time, anywhere, anyone" learning. In essence, the constraints of time, place, and person have been erased as technology-enhanced media have emerged and evolved. Moreover, technology is not just an additional means of enhancing communication, it is an essential component without which the emerging corpus of distance education would not be possible (Smith & Dillon, 1999).

It didn't take savvy educators long to realize that the burgeoning assortment of interactive capabilities of computer technology could be used to provide distance learners with a multitude of varied exercises designed to enhance their learning experiences. Even so, correspondence course students with their updated technology and CD-ROMs were for the most part still working in isolation, a serious disadvantage when their learning experiences were compared with those of their classroom-educated peers. The image of distance education was still that of the correspondence course being dispersed to geographically separated groups of individuals who experienced either slow or nonexistent reciprocal interaction between student and teacher (Ahern & Repman, 1994).

Then came the World Wide Web, after which nothing, and least of all distance education, has been the same. As Dodge (1996) said,

educators have been predicting a revolution in how people learn due to technology innovations for years, but it wasn't until the Web came into being that ground-breaking changes in teaching, training, and self-directed learning began to take place. Advanced telecommunications capabilities have reduced the differences in distance and local educational scenarios, and the Web has evolved to such a degree that the experiences of distance learners need not differ significantly in quality from those of their peers in traditional classrooms. One might even argue that the role generally afforded electronic communication in the online learning environment fosters even greater interaction between and among teachers and learners than is found in the traditional classroom. Of course, it must be conceded that the use of e-mail, chat rooms, and other forms of asynchronous and synchronous communication can also be incorporated into the traditional classroom. But isn't the goal of education to provide for equivalent learning outcomes whether in the traditional classroom or online?

Leigh (1999) described distributed learning as "the emerging paradigm that instructional designers are beginning to identify as two older learning modes, distance learning and collaborative learning, converge online." It is the Web-enabled, added dimension of online collaboration that will further defy the limitations of time and place and allow for the building of virtual learning communities that can provide learning experiences equivalent to those of on-site learners in traditional classrooms. Learners can meet synchronously or asynchronously, work in teams, build upon one another's knowledge and experience, and simulate "real-time interactive instruction" (Romiszowski, 1993). Indeed, according to Kearsley (1997), the most important factor in online education is interaction among participants. The ease with which the Internet allows for both distance and collaborative learning (i.e., distributed learning) in what Leigh (1999) described as a "seamless and simultaneous" manner is one of its greatest virtues as an instructional medium. So well suited is the Internet to distance learning that the term Web-based instruction has become synonymous with distance education over the Internet (Relan & Gilliani, 1997).

Constructivism is a driving influence in education at this time. Unlike positivist- and behaviorist-oriented modes of teaching which are teacher-centered and which work on the premise of the teacher dispensing knowledge to learners, constructivist-oriented modes of teaching encourage a learner-centered environment in which active participation and reflection on the part of learners are part of the knowledge-building process. Inherent in a constructivist, learner-centered approach is appreciation for the flexible, dynamic nature of knowledge. Social interaction, group-inquiry, and problem solving are cornerstones of this environment.

Online instructors tend to be predominantly student-centered in their philosophy and teaching style (Berge, 1997). The Web provides constructivist designers with a playground on which they can exhaust the Web's multimedia functionality to facilitate learners' sharing and construction of knowledge (Gay, 1997). Dede (1996) described this as an environment in which "emerging representational containers, such as hypermedia, enable a broader, more powerful repertoire of pedagogical strategies." There is no question that the Web can meet the criterion of creating a student-centered learning environment associated with a constructivist pedagogy. According to Spennemann (1995), the readily accessible and resource-rich learning options of the Web can be embedded in a navigational structure that enables and encourages learning.

Historically, the purpose of distance education has been to provide greater access to education rather than to enhance educational outcomes (Gay, 1997). However, it might well be argued that to ignore the potential of Web-based instruction to enhance educational outcomes would be to miss the opportunity to foster improved achievement of online learners.

A NEW THEORY FOR DISTANCE EDUCATION

If distance education is to be equivalent to traditional classroom learning, then what educators need is a theory of learning that applies equally to the two formats. Simonson et al. (1999) have generated a theory that does that. The theory is based on a definition of distance education with the following characteristics: formal, institutionally-based, separation of learner and teacher, use of two-way interactive synchronous and asynchronous telecommunication (Simonson, 1995).

Equivalency theory aligns the learning experiences of online learners with those of on-site learners and is consistent with the premise that the learning that takes place under either scenario should yield the same results. The responsibility for creating equivalent learning environments for online learners lies with the instructional designer and is in no way the responsibility of the student.

Equivalency theory consists of five concepts: equivalency, learning experience, appropriate application, students, and outcomes. Equivalency implies that even though the learning environments of on-site and distance learners differ, it is essential that the learning experiences be of equal value. Although experiences may vary, they must provide learning of equivalent value. Closely related to equivalency is the concept of learning experience. Although the mix of learning experiences may differ for students learning in different locations at different times, the outcomes must be the same. That is, no matter how the learning experiences differ in type or degree, it is critical that the sum of those experiences be of equal value for on-site and distance learners. The concept of appropriate application states that delivery of instruction should be designed to fit the facilities available for delivery in a proper and timely manner. If the facilities/equipment don't support an activity, another appropriate means of providing the instruction must be found. According to equivalency theory, enrollment in a course is what determines student status rather than where the student is located. Finally, equivalency theory allows for two kinds of outcomes: those determined by the instructor, which are goal oriented and require that students know something or be able to do something they could not do prior to the learning experience, and those which are learner-determined and relate to learners' more personal hopes and aspirations. Equivalency theory is consistent with the values associated with American education including "local control, small classes, rapport between teachers and students, and highly personalized instruction" (Simonson et al., 1999).

Simonson et al. (1999) predicted that distance learning will become mainstream in the United States if those involved in the educational process—including instructors, students, and the public at large—perceive the value derived from on-site and online learning to be the same. The application of rich and rapidly changing technology-driven interactive telecommunications can culminate in virtual, electronic learning environments that will erase the differences that exist between on-site and distance learning and fulfill the promise of equivalency theory.

BRINGING ON-SITE AND ONLINE LEARNING TOGETHER

A study funded by a grant from the AT&T Foundation in which Penn State, Lincoln, and Cheyney universities (Ragan, 1998) collaborated concluded that the same principles that apply to distance education apply equally to on-site education. Regardless of constraints of time and place associated with distance education, the goal of bringing about a change in student behavior is the primary goal of distance education just as it is in traditional education. Although the means invoked to accomplish this may vary, the goal of both distance and traditional education is to create an effective educational experience. Technology constitutes a strong support mechanism, especially

for distance education efforts, but it is only a tool.

In essence, the Naval War College's College of Continuing Education is looking to technology to provide a learning experience that matches the look and feel of what its on-site learners experience in the classroom. That this will be a different experience but one that is supposed to provide equivalent learning outcomes is entirely consistent with the theory of equivalency. The media recommendations and instructional strategies identified below were incorporated into the Joint Maritime Operations proof of concept developed by Intelligent Design Systems, Inc. to illustrate how this might best be accomplished.

No indicator of the difference between the NWC's seminar courses and correspondence courses points a finger more directly than that of attrition statistics. There is no question that attrition is significantly greater among distance education learners than among students enrolled in traditional on- site classes in general. However, attrition in the CCE's correspondence courses has been historically higher than that generally observed and it continues to be a concern to faculty at the NWC. Some of the attrition may be attributed to failure of the institution to systematically collect and define attrition data. Nonetheless, reports from faculty at the NWC also attribute some of the attrition to factors recognized in the distance education research literature in general. These include isolation (Garrison, 1990; Hill 1997; Meacham & Evans, as cited in Wood, 1996), lack of support from supervisors and/or family members (Hanson et al., 1997; Jegede & Kirkwood, 1994), inadequate feedback (Duning, Van Kekerix, & Zaborowski, as cited in Hanson et al., 1997; Egan, Sebastian, & Welch, 1991; Porter as cited in Sherry, 1996; Sheets, 1992; Smith & Dillon, 1999), lack of experience as a distance learner (Bridwell et al., 1996; Chyung, Winiecki, & Fenner, 1998; Rekkedal, 1983; Wood, 1996), and lack of the skills necessary to perform successfully as a distance learner (Bridwell, Bretz, DeVries, King, & White, 1996; Galusha, 1998; Schuemer, 1993). The current project at the NWC to convert correspondence courses to a technology-infused and Web-enhanced format is an effort to mitigate the negative impact of some of the factors contributing to attrition in those courses. It should be noted that the proof of concept is Web-enhanced rather than Web-based. Web-based learning is delivered and mediated exclusively via the Internet; Web-enhanced learning consists of a mix of media that includes the Internet. The multiple media recommended for distributed learning courses offered through the CCE include readings, CD-ROMs, Internet activities, audiotapes, and videotapes.

A Web-enhanced learning environment can enable transfer of positive attributes of the traditional classroom, such as collaboration and interaction, to an electronically facilitated environment while at the same time preserving the integrity of course materials. Students operating via cyberspace can read the same assignments their on-site counterparts read, discuss them either synchronously or asynchronously over the Internet as on-site learners do for in-class and after-class discussions, and work on group projects. Technology infusion and Web-enhanced delivery of correspondence course instruction are bringing distance education as close to the on-site classroom experience as is currently possible. In fact, the instructional strategies recommended for the CCE's Web-enhanced correspondence courses are the same strategies used in traditional seminar classes: enhanced collaboration, more interaction between and among students and instructors, creation of both active and passive student support structures, and active pursuit of activities that will reduce isolation and provide more feedback (Intelligent Decision Systems, Inc., 2000).

Characteristics generally attributed to on-site classes that have been missing in traditional correspondence courses are sources of the isolation, lack of feedback, lack of support, and second-rate learning experiences for which distance education is often criticized. They are also considered primary sources of

blame for the high attrition rates that characterize this mode of learning. A number of strategies suggested for the CCE's correspondence courses are intended to attack attrition head-on. These include pacing students, providing frequent and timely feedback, providing student support, engaging in frequent online communication between and among all parties, and incorporating cognitive and active learning strategies into instruction. Among the cognitive and active learning strategies are development of student-centered instruction designed to foster student responsibility and initiative, use of self-assessment tools that foster development of metacognitive skills and provide immediate feedback, presentation of content within authentic contexts (e.g., case studies), activities that provide for frequent collaboration, and strategies that reinforce and review prior learning (Intelligent Decision Systems, Inc., 2000). It goes almost without saying that these are the very things that take place in any well-taught traditional classroom. The difference with distance education is that these activities must be done from afar and often at a time convenient for the learner. But, as the Theory of Equivalency maintains, student status should be determined by enrollment, not location.

Everything mentioned above is consistent with Simonson et al.'s theory of equivalency: (1) learning experiences of distance learners can result in equivalent learning outcomes, (2) even though the learning experiences of on-site and distance learners may vary, they can be equally valuable in the learning process, (3) although learning experiences may differ, the sum of learning experiences should be the same for on-site and distance learners, (4) distance education should be delivered in a manner appropriate to the resources of the distance learner, (5) student status should be simply a function of enrollment rather than location, and (6) learning outcomes should be defined to meet the goals and objectives of the instructor as well as the individual. Applying the instructional strategies suggested for the CCE's correspondence courses using advanced technology applications can ensure that these criteria are met.

A final note should be made regarding the status of distance education. McIsaac and Blocher (1998) state that "the literature in distance education has, historically, reflected rather than driven practice." The Institute for Higher Education Policy (1999) cites a "relative paucity of true, original research dedicated to explaining or predicting phenomena related to distance learning." Because of the rapid pace with which technology has driven distance education in the past two years, this criticism is perhaps most applicable to Web-based/enhanced distance education. Nonetheless, despite its newness and the lack of research to validate its current practices, Web-based/enhanced instruction holds great promise for educators and students alike. Intuitively, educators know that technology applications, including the Web, are highly flexible and can be manipulated to fit the needs of a wide array of learners with an even wider array of intellectual needs and preferences. How best to do this, however, is still open to discussion and speculation based on practicing educators' experiences. Materials espousing the advantages and possibilities of Web-based instruction and how-to manuals to guide practitioners are already readily in evidence despite the youth of the endeavor, but qualitative and quantitative research into the effectiveness and efficiency of Web-based instruction are for the most part still wanting. At best, what we have at this time is a repertoire of pedagogical strategies. As the field grows, those designing, developing, and delivering distributed learning should begin to cull from those pedagogical strategies the questions that will become the hypotheses for scientific investigation. In the meantime, the Theory of Equivalency provides educators dabbling or diving into the practices associated with distance education guidance to help them ensure that their students achieve desired learning outcomes.

REFERENCES

Ahern, T.C., & Repman, J. (1994). The effects of technology on online education. *Journal of Research on Computing in Education, 26*(4), 537-546.

Berge, Z.L. (1997). Characteristics of on-line teaching in post-secondary, formal education. *Educational Technology, 37*(3), 35-47.

Bridwell, C, Bretz, R, DeVries, H., King, J., & White, B. (1996). Instructional Design For Distance Education. In *Communicators handbook: Tools, techniques and technology* (3rd ed.). Maupin House. (retrieved from the Web 12/8/99; snow.utoronto.ca/Learn2/greg/dis2.html)

Chyung, Y., Winiecki, D.J., & Fenner, J. (1998). A case study: Increase enrollment by reducing dropout rates in adult distance education. (ERIC Document Reproduction No. 422 835)

Dede, D. (1996). The transformation of distance education to distributed learning (Retrieved from the Web 11/18/99; www.wiche.edu/telecom/resources/publications/dede.htm).

Dodge, B. (1996). Distance learning on the world wide web. In B. Brandon (Ed.) *Computer trainer's personal trainer's guide*. Indianapolis, IN: Que Education & Training. (Retrieved from the Web 12/7/99, edweb.sdsu.edu/people/bdodge/ctptg/ctptg.html).

Egan, M.W., Sebastian, J., & Welch, M. (1991). *Effective television teaching: Perceptions of those who count most...distance learners*. Proceedings of the Rural Education Symposium, Nashville, TN. (ERIC Document Reproduction No. ED 342 579)

Galusha, J.M. (1998). *Barriers to learning in distance education*. (ERIC Document Reproduction No. ED 416 377)

Garrison, D.R. (1990). An analysis and evaluation of audio teleconferencing to facilitate education at a distance. *The American Journal of Distance Education, 4*(3), 13-24.

Gay, G. (1997). Using research to design effective distance education. (Retrieved from the Web 11/15/99; snow.utoronto.ca/Learn2/greg/distance.htm).

Hanson, D., Maushak, N.J., Schlosser, C.A., Anderson, M.L., Sorensen, C., & Simonson, M. (1997). *Distance education: Review of the literature* (2nd ed.). Washington, DC: The Association for Educational Communications and Technology and The Research Institute for Studies in Education.

Hill, J.R. (1997). DL environments via the World Wide Web. In B.H. Khan (Ed.), *Web-based instruction* (2nd ed., pp. 75-80). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Holmberg, B. (1985). *The feasibility of a theory of teaching for distance education and a proposed theory*. ZIFF Papiere 60. (ERIC Document Reproduction No. ED 290 013).

The Institute for Higher Education Policy. (1999). *Executive summary: What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education*. Prepared for American Federation of Teachers and National Education Association. (retrieved from the Web 12/8/99; www.ihep.com/difference.pdf)

Intelligent Decision Systems, Inc. (2000, May). *Program Analysis of the Naval War College's College of Continuing Education Correspondence Courses*. (Subcontract # 991000177). Fairfax, VA: Martin, M.S., Owens, E., Menaker, E., Murawski, M.

Jegede, O.J., & Kirkwood, J. (1994). Students' anxiety in learning through distance education. *The American Journal of Distance Education, 15*(2), 279- 290.

Kearsley, G. (1997). A guide to on-line education. (Retrieved from the Web 11/21/99; www.fcae.nova.edu/~kearsley/on-line.htm).

Leigh, D. (1999). *The Internet and distributed learning: Instructional designer's medium and tool*. (Retrieved from the Web 11/16/99; mailer.fsu.edu/~dleigh/superflux/words/dleigh/NetDistLearn.html) .

McIsaac, M.S. (1998). Distance learning: The U.S. version. *Performance Improvement Quarterly, 12*(2), 21-35.

McIsaac, M.S., & Blocher, J.M. (1998). How research in distance education can affect practice. *Educational Media International, 34*(1), 43-47.

Merisotis, J.P., & Phipps, R.A. (1999). What's the difference? Outcomes of distance vs. traditional classroom-based learning. *Change, 31*(3), 13-17.

Ragan, L.C. (1998). Good teaching is good teaching: An emerging set of guiding principles and practices for the design and development of distance education. *DEOSNEWS, 8*(12). (Retrieved from the Web 2/7/00; www.ed/psu/edu/ACSDE/deosnews/deosnews8_12.asp).

Rekkedal, T. (1983). Enhancing student progress in Norway. *Distance, 23*, 19-24.

Relan, A., & Gilliani, B.B. (1997). Web-based instruction and the traditional classroom: Similarities and differences. In B.H. Khan (Ed.), *Web-based instruction* (2nd ed., pp. 41-6). Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Romiszowski, A. (1993). *Telecommunications and distance education*. (ERIC Document Reproduction No. ED 358 841).

Schuemer, R. (1993). *Some psychological aspects of distance education*. Hagen, Germany: Institute for Research into Distance Education (ERIC Document Reproduction No. ED 357 266)

Sheets, M. (1992). Characteristics of adult education students and factors which determine course completion: A review. *New Horizons in Adult Education, 6*(1). (retrieved from the Web 11/27/99; www2.nu.edu/nuri/llconf/conf1995/rezabek.html)

Sherry, L. (1996). Issues in Distance Learning. *International Journal of Educational Telecommunications, 1*(4), 337-365.

Simonson, M. 1995. Does anyone really want to learn at a distance? *Tech Trends, 40*(5), 12.

Simonson, M., Schlosser, C., & Hanson, D. 1999. Theory and distance education: A new discussion. *The American Journal of Distance Education, 13*(1), 60-75.

Smith, P.L., & Dillon, C.L. (1999). Comparing distance learning and classroom learning: Conceptual considerations. *The American Journal of Distance Education, 13*(2), 6-23.

Spennemann, D.H.R. (1995). *On-line study packages for distance education: Some considerations of conceptual parameters*. (Retrieved from the Web 11/15/99 www.csu.edu.au/division/oli/olird/paper1.htm).

Wood, H. (1996). Designing study materials for distance students. (Retrieved from the Web 11/15/99; www.csu.edu.au/division/oli/olird/occpap17/design.htm)