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The Effects of the Integrated Learning Environment on Student Performance at the Navy and Marine Corps Intelligence Training Center

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**The Effects of the Integrated Learning Environment on Student Performance at the
Navy and Marine Corps Intelligence Training Center**

**A Research Paper Presented to
the Graduate Faculty of the Department of
Occupational and Technical Studies
at Old Dominion University**

**In Partial Fulfillment of
the Requirements for the Degree of
Masters of Science**

By

Maria Therese Fox

July 2008

Approval Page

This research was conducted and prepared by Maria Therese Fox under the direction of Dr. John Ritz in OTED 636, Problems in Occupational and Technical Education. It was submitted as partial fulfillment of the requirements for the degree of Master of Science.

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Chapter I

Introduction

The Integrated Learning Environment (ILE), adopted by the United States Navy, is a federated group of automated systems that use information technology to streamline learning processes, automate learning management functions and deliver learning to Navy personnel at home, schoolhouse or deployed. The ILE encompasses all forms of training methods, including instructor led, facilitated and computer based instruction. Infrastructure is the hardware, software, communications information technologies and associated networks. ILE is a component of the strategic plan for transforming Department of Defense training, which calls for the full exploitation of technologies to support quality education and training (Integrated Learning Environment, About, Introduction and Overview, ¶ 1).

Since May 2003, the Center for Naval Intelligence ILE Development Team has transformed five courses at the Navy and Marine Corp Intelligence Training Center (NMITC), located at Dam Neck, Virginia, into the ILE format to include Basic Shipboard Intelligence Course, Intelligence Photography Course, Operational Intelligence Course, Intelligence Specialist “A” (IS “A”) Course and Intelligence Specialist Imagery Interpretation “C” Course (T. Copeland, Booz-Allen Hamilton contractor, ILE developer, personal communication, February 1, 2008).

Each course is comprised of Interactive Multimedia Instruction (IMI) lessons and Instructor Led Training (ILT) lessons. The design also includes practical application of skills, discussion of material and assessments. IMI lessons are web-based instructional

materials which include graphics, audio, video and animation, as needed, to enhance the learning experience.

The content of the topic and the complexity of each learning objective dictate the level of interactivity used. Media (Flash) objects will be Level II/III, as appropriate. An example of Level II media object would be a Flash “movie” that provides the learner an example of a process or procedure. A Level III media object would be a Flash media object the learner interacts with by making selections with a mouse/keyboard or by moving objects on the screen.

IMI instructional materials include these components:

- IMI Facilitator Module which provides the instructor the necessary tools and information on how to facilitate a blended learning approach. It contains the facilitator guides as well as any answer keys to assignments.
- IMI Lessons include the assigned avatar establishing the relevance of the material for the student, a list of Topics, a reference-glossary, a pre-test, a Summary and a Lesson Test that must be passed to continue to the next Lesson.
- IMI Units include an introductory media object that establishes the relevance of the material for the student, a listing of Lessons within the Unit and a link for the learner to access and download the student guide.
- IMI Topics include an Introduction object, Learn objects that describe the material, an Explore media object that expands upon the topic or provides an example to the learner and a Topic practice object (this may be practical exercises and/or practice test questions), used by the student for self assessment.
- A Student Guide is available to the students in electronic and hard copy format. It provides students with a course/lesson outline and notebook, which includes job sheets, information sheets and knowledge utilization questions that encourage students to utilize higher-level cognitive processes (T. Copeland, personal communication, February 1, 2008).

This study was undertaken to determine if there is a difference between the academic success of students completing the IS “A” course with solely traditional Instructor-led learning as compared to those who take the course using the ILE.

Statement of the Problem

The purpose of this study was to determine the effectiveness of the Integrated Learning Environment curriculum at the Navy and Marine Corp Intelligence Training Center.

Research Hypothesis

To find a solution to this problem, the following hypothesis was established:

H₁: Intelligence Specialist "A" course students who complete the curriculum using the Integrated Learning Environment will score higher as compared to those students who complete the course with solely instructor led instruction.

Background and Significance

The roadmap for the transformation of how the United States Navy operates is called Sea Power 21. Sea Warrior is the human resource component of the Sea Power 21 program of transforming the Navy. A key component of Sea Warrior is the Navy Integrated Learning Environment (ILE). The goal of the Integrated Learning Environment is to provide the framework and processes that will improve individual and mission performance by making knowledge available to sailors and the fleet when and where it is needed. An immediate goal of the ILE is to reduce time spent educating and training Sailors, reduce the cost of doing so and increase operational readiness.

In 2003, the Naval Education & Training Command established as a mechanism for transforming legacy training systems and business processes into a “system of systems” that would enable the changes needed to accomplish the Revolution in Training (RiT) goal and to provide the functions required to realize Sea Warrior. Sea Warrior is a web-based, information rich, human resource career management tool that will fully integrate the manpower, personnel and training functions of the Navy in a single IT environment (T. Copeland, personal communication, February 1, 2008).

The Center for Naval Intelligence develops curriculum and manages the delivery of instruction through both the Navy and Marine Corp Intelligence Training Center, located in Dam Neck, Virginia, and the Fleet Intelligence Training Center Pacific, located in San Diego, California. The Center for Naval Intelligence ILE Development team completed conversion of the Navy and Marine Corp Intelligence Training Center’s Intelligence Specialist “A” (IS “A”) school curriculum to ILE in late 2007. The pilot course for the IS “A” school began on January 14, 2008.

The IS “A” school is a 12-week course designed to provide selected U.S. Navy enlisted personnel with the knowledge, skills and abilities required to perform the duties and tasks of a Navy Intelligence Specialist. The IS “A” school prepares students for follow-on instruction in one of four Navy Enlisted Classification (NEC) awarding Intelligence Specialist “C” Schools: 3910 Imagery Interpreter, 3912 Expeditionary Warfare Analyst, 3923 Strike Warfare Analyst and 3924 Operational Intelligence Analyst.

IS “A” students receive training on the Department of Navy Information Security program, intelligence analysis and critical thinking, the Intelligence Community, the intelligence cycle, intelligence disciplines, intelligence collection and dissemination, intelligence briefing, maps, charts, geodesy, geopolitics, terrorism, threat platforms, order of battle analysis, intelligence preparation of the operating environment and intelligence support to Naval operations. Students apply the knowledge, skills and abilities covered throughout the course, culminating in a capstone exercise where students assume the duties of intelligence center analysts. The course is divided into the following units:

- Unit 1 – Course Introduction: Introduction to the Intelligence Specialist rating, how to take this course.
- Unit 2 – Administration and Security: Security, intelligence classification, classified material handling procedures and chain of command responsibilities.
- Unit 3 – Intelligence Dissemination: Intelligence briefing, intelligence messages and reporting.
- Unit 4 – Intelligence Fundamentals: Information and intelligence, the intelligence cycle, intelligence doctrine and intelligence organizations.
- Unit 5 – Analytic Skills: How the mind works, perception and bias, the analytic process, critical thinking, analytic tools and techniques.
- Unit 6 - Intelligence Collection Fundamentals: Introduction to intelligence collections, collection platforms and fundamental knowledge of imagery interpretation.
- Unit 7 – Geography: World geography.
- Unit 8 - Maps, Charts and Geodesy: Plotting basics and fundamentals, FalconView software application.
- Unit 9 – Geopolitical Studies: Culture, regional sources of conflict, terrorism fundamentals, analytical methodologies and intelligence support to anti-terrorism, counter-terrorism and force protection.
- Unit 10 – Platforms: Blue force and red force overview. Afloat intelligence mission and structure and intelligence support to Expeditionary/Carrier Strike Group operations.
- Unit 11 Order of Battle Analysis: Order of battle factors, order of battle management.

- Unit 12 – Intelligence Preparation of the Operating Environment (IPOE): Introduction to IPOE, define the operating environment, describe the operating environment effects, evaluate the threat and determine the threat course of action.
- Unit 13 – Intelligence Support to Naval Operations: Introduction to operational intelligence, C4I systems and architecture, composite warfare commanders, over the horizon targeting and maritime intercept operations.
- Unit 14 – Capstone Exercise: Performance exercise in which students complete the duties and tasks of Intelligence Specialists assigned as analysts in a Carrier Strike Group intelligence center, providing intelligence support to operations. Focus on Indication & Warning and mission planning support using all source analysis (C. Jones, LCDR, USN, Officer in charge of the IS “A” School, personal communication, February 8, 2008).

The IS “A” school course has approximately 25 students per class. In fiscal year 2007, 26 iterations of IS “A” school were taught with 684 students graduating. The projected throughput of IS “A” school for fiscal year 2008 is 34 classes with 850 students graduating. In fiscal year 2009, the school plans to teach 37 iterations of the course with 860 students graduating (C. Jones, personal communication, February 8, 2008).

Since 2001, the operational tempo of the Armed Services has made it imperative for Department of Defense learning institutions to develop agile methods to deliver instruction. In the broad picture, the ILE is focused on making training modularized and partially computer based in order to shorten training time and facilitate sharing of the curriculum with other schoolhouses. Since the high operational tempo often precludes students from leaving their units to take training in-residence, the ILE helps make more Navy training accessible to them at their place of station. In the case of IS “A” school, the ILE does not shorten the course because the students come to the schoolhouse straight from boot camp. Therefore NMITC cannot use any of the IMI modules as pre-requisites for the student to complete before starting the in-resident portion of IS “A” school. IS

“A” curriculum is too new to determine if students will learn faster using the IMI and therefore affect the course length. However, the ILE has other advantages which will benefit the staff and students of the IS “A” school.

An issue that the Navy schoolhouses must deal with is the deployment of many of their instructors for extended periods of time. In 2007, there was a period of time when there were only six ISA school instructors to cover 13 classes that were onboard (C. Jones, personal communication, February 13, 2008). This leaves the learning institution with not only fewer instructors to cover more students, but also little time for updating curriculum to meet the current training requirements of the Navy. Unfortunately it also leads to instruction that is not standardized and to instructors with superficial knowledge of their subjects. The ILE concept uses the IMI modules to help standardize the curriculum and gives the instructors time to focus on facilitation and instructor-led material which augments many of the IMI. Additionally, the NMITC staff used the conversion of curriculum to the ILE as a chance to update the courseware and add additional material.

Computer based curriculum may also be a better delivery method for the IS “A” school students. The average age of the ISA students is 20 years. These students have grown up using the computer in both the instructional environment and in play. Using web-based IMI modules may better match their learning styles than instructor led modules.

By comparing the final grades of students enrolled in the IS “A” course, it will be determined whether the students who were taught via the ILE receive the same or greater

quality of instruction than those students taught via ILT. If the ILE concept of a central repository of web-based curriculum in tandem with instructor-led instruction shows benefits to the students, its procedures could be adapted by other services facing the same training dilemmas.

Limitations

The limitations of this study were as follows:

1. This study was limited to the final grades awarded to students enrolled in the Intelligence Specialist Class “A” course offered by the NMITC.
2. This study compared the final grades of students who completed IS “A” course during 2007 and 2008.
3. This study was limited to students who completed the course at NMITC. It does not include students who failed to complete the course for academic or other reasons.
4. Approximately 20% of each IS “A” class are fleet returnees who are cross training into the intelligence field from other skill fields (C. Jones, personal communication, April 9, 2008). Their Navy experience can affect the group dynamics of a class. Although it is not likely that their non-intelligence experience will enhance the other students’ grades, it cannot be totally discounted.

Assumptions

In this study there were several assumptions. These were:

1. All students taking the course had received no previous intelligence training before taking this course.

2. Students of both computer based and instructor led classes were graded identically.
3. All students had the same materials, assignments, instructions and methods of evaluation.
4. All students enrolled in the courses were involved in the Department of Defense intelligence field.
5. The instructor led units were taught by several different teachers with varying teaching styles, but all were qualified instructors in the subject matter taught.

Procedures

This study compared the final grades of five classes of students, in 2007/2008, taking the IS “A” course with exclusively instructor-led instruction as contrasted to the final grades of the first five classes of students, in 2008, taught with a combination of instructor-led and interactive multimedia instruction. The final grades were evaluated to determine if there was a significant difference in the effectiveness of one instructional strategy over the other.

Definition of Terms

The following terms had special meaning to this study and are listed below to ensure reader understanding:

Asynchronous Training: Training which is available for students to access and complete at different times from different places. In this paper’s context it is referring to web-based asynchronous training presented to a group and is completed at the students own pace.

E-Learning: electronic learning; the process of learning online (same as on-line learning).

Integrated Learning Environment (ILE): A federated group of automated information systems that use information technology (IT) to streamline learning processes, automate learning management functions and deliver learning, using electronic means, to personnel at home, at the schoolhouse or deployed.

Intelligence Specialist Class “A” course (IS “A” school): The entry level course for Navy enlisted intelligence specialists. The school is located at Dam Neck, Virginia, at the Navy and Marine Corp Intelligence Training Center (NMITC).

Interactive Multimedia Instruction (IMI): Web-based courseware which incorporates graphics, audio, video and animation, as needed.

On-line Learning: learning with or through a computer (same as e-learning).

Synchronous training: Training which occurs at the same time but not necessarily at the same place. In this paper’s context it is referring to web-based synchronous training in which the students participate with the instructor in “real-time”, but not necessarily together in the same facility.

Traditional Instructor Led course: A classroom in which an instructor leads the lesson without the aid of web-based instructional materials.

Web-based courseware: Curriculum modules accessed and presented via a web-browser, such as Internet Explorer or Netscape, on a computer system.

Summary and Overview of Chapters

The purpose of this study was to determine the effectiveness of the Integrated Learning Environment by studying the academic success of students completing the Intelligence Specialist “A” school course, via the ILE, in comparison to those students who completed the curriculum with traditional training methods (exclusive teacher led training). Chapter I provided the foundation for the study, introduced the reader to the problem, identified limitations and assumptions that must be acknowledged when considering the study and discussed methods for retrieving the necessary data that was analyzed. Specific terms were also defined for clarity.

The following chapters of this study will include a review of literature relating to instructor led and computer based education. A methodology will also be provided describing how data were collected and what procedures were used in order to analyze the data. A summary of the findings, conclusions and recommendations for future studies will also be provided.

Chapter II

Review of Literature

The ILE developed by the US Navy serves as the technical backbone and host for the web-based learning built by the various Navy schoolhouses. The decision on how to use the web-based modules, IMI's, which are accessed through the ILE, remains with the individual course staffs. In the case of the IS "A" school, the staff decided on blending the traditional face-to-face instruction with the web-based instruction modules. Some portions of the curriculum, in their opinion, did not lend themselves to being transitioned to web-based content. In all cases they felt that instructors needed to facilitate and assess the learning. In short, they choose a method of "blended learning" to obtain the results they needed.

Blended Learning

The term "blended learning" is a buzzword that has different meanings to different people. For example, mixing lecture with a video and/or using a practical exercise in a course would be considered blending learning in the most basic sense. Driskoll (2002) identifies four different 'concepts' denoted by the term blended learning:

1. Combining or mixing web-based technology to accomplish an educational goal;
2. Combining pedagogical approaches (e.g., constructivism, behaviorism, cognitivism) to produce an optimal learning outcome with or without instructional technology;
3. Combining any form of instructional technology with face-to-face instructor-led training; and
4. Combining instructional technology with actual job tasks (Driskoll, 2002).

A more precise, but similar, explanation offered by Hofmann (2001, ¶1), is that “the idea behind blended learning is that instructional designers review a learning program, chunk it into modules and determine the best medium to deliver those modules to the learner”.

Valiathan (2002) describes blended learning in terms of the *focus* for learning or ‘intended’ learning. It included:

1. Skill-driven learning, which combines self-paced learning with instructor or facilitator support to develop specific knowledge and skills;
2. Attitude-driven learning, which mixes various events and delivery media to develop specific behaviors; and
3. Competency-driven learning, which blends performance support tools with knowledge management resources and mentoring to develop workplace competencies.

Based on the variety of definitions discussed above, it becomes clearer that blended learning is a multi-faceted concept. In the NMITC IS “A” school, the staff made a conscious decision to blend the e-learning (web-based modules), provided by the IMI’s and the traditional classroom instructor presentation/facilitation. They chunked the material into modules, as Hofmann (2001) suggests and then decided which material was appropriate for web-based learning, which could be blended and which needed instructors interaction the entire time. While ILE’s goal for these IMI modules is to facilitate sharing of content among Navy training entities and making the training easier to download and complete for those outside the schoolhouses, Hoffman sees chunking information into modules as beneficial to the Instructional System Design team. IS “A”’s blended approach matches Driskoll’s third blended learning definition which is

combining instructional technology with face-to-face instructor training as well as Valiathan's blended learning concept of using instructors and web-based learning to teach specific job knowledge, as they do in Navy "A" schools. In contrast to the IS "A" school, other schools within NMITC decided to only offer the web-based modules, without supplemental instructor teaching or facilitation.

Benefits of Face-to-Face Instruction and E-learning

The benefits of both face-to face instruction and digital media are well recorded in literature. The benefits of e-learning to individuals and instructors have been identified as:

- Lowers costs: cuts travel expenses, reduces the time it takes to train people and reduces the need for a classroom/instructor infrastructure (Rosenberg, 2001).
- Enhances responsiveness: e-learning can reach an unlimited number of people virtually simultaneously and is available 24/7. This can be critical when practices and capabilities change so quickly (Rosenberg, 2001).
- Increases accessibility: learners and e-moderators can access content at any place (McVay-Lynch, 2002).
- Respects differences in learning style and pace (McVay-Lynch, 2002).
- Provides consistent and customized messages, depending on need. Everyone gets the same content, presented in the same way, yet they can also be customized for different learning needs or groups of people (Rosenberg, 2001). Consistent learning material compared to human interaction (Voci & Young, 2001).
- Supplies content in a timely and dependable manner: e-learning can be updated more easily and instantaneously, making the information more accurate and useful for a longer period of time (Rosenberg, 2001; Joliffe, Ritter, & Stevens, 2001).
- Fosters a greater degree of communication and closeness among students and e-moderators: people can come together to share knowledge and insight long after a training program ends (Rosenberg, 2001; Joliffe, Ritter, & Stevens, 2001).
- Standardizes presentation: Concerns over differences in platforms and operating systems is rapidly fading. Everyone on the web can receive virtually the same material. Most people are comfortable with browser technology so there is little training needed (Rosenberg, 2001).

- Offers privacy: the computer is non-judgemental; adult students do not like others to know about their academic deficiencies (Osei, 2001).
- Provides immediate feedback: Students like to see results of their quizzes immediately, no waiting on the teacher to correct the paper (Osei, 2001).
- Grants students control of their learning since they can control the pace and repeat lessons at will (often called learner-centered learning) (Osei, 2001).
- Offers students time to reflect: In asynchronous training, a student has time to reflect on the material, check references and take any amount of time to comment (McVay-Lynch, 2004).

By contrast the advantages of the traditional classroom include:

- Provides the social interaction that human beings need and enjoy by the direct exchange of ideas (Voci & Young, 2001).
- Offers a familiar and comfortable method that learners are used to from their previous education experiences (Voci & Young, 2001).
- Creates an interactive learning environment in which learners can test their own attitudes, choices and reaction against peer and their tutor (Voci & Young, 2001).
- Enables instructors to guide, correct and answer questions on the spot.
- Provides tacit learning in which students share their experiences with each other. These experiences are often relevant to the curriculum and enhance the material.
- Affords the instructors the ability to read non-verbal student communication to assess the comprehension of materials.
- Provides greater flexibility as course content can be updated and/or changed or the course schedule altered to adapt to the student requirements.

Bersin's research has found that instructor led training (ILT) is often the only

solution in the following situations:

- Learners are being introduced to brand new material and have no prior experience with the topics.
- Culture building needs are high. When the program must create relationships and introduce company culture, ILT is often the best method. An example would be new hire training.
- Experts and celebrities are available. People remember appearance by experts and celebrities.
- Direct interaction and discussion with peers and discussion is primary to the learning process. In many programs, the need to interact with other learners is part of the learning experience itself. Case studies and sample sales team building are good examples (Bersin, 2004, pp. 144-145).

Drawbacks

The easy part is describing the many advantages of e-learning and face-to-face instruction. The difficult part of blended learning is deciding how to chunk the pieces of the curriculum, how to present it and how to pull the pieces into a cohesive whole. This difficult part is the heart of blended learning. Blended learning is a curriculum design strategy. After the content is identified, the designers need to get a general idea of the format and media needed to teach the content. Only then can the designer begin to discern which medium would be advantageous for the material.

A criticism often heard of instructor led training is its lack of learner-centered strategies which discourages addressing individual learning differences. E-learning can better adapt to the students pace and accommodates various learning styles better than an instructor. A counter-argument is that online instructional courses are often presented in a dry, page-turner format, with point-and-click quizzes and have little relevance for the student. Both of these concerns show the importance of the instructional design phase for curriculum.

A clear disadvantage of web-based training is the substantial technical infrastructure required to run programs. In addition to developing educationally effective training programs, designers must contend with computer system requirements, network capacity and network access. Web-based training is labor intensive, requiring broad-range skills. The design team should include graphic designers, network managers, server installers, end-user support personnel and programmers (Driscoll & Carliner, 2005).

Changing Role of the Instructor

When e-learning hit the Internet in the late 1990s, many of its strongest proponents suggested that classroom learning was going to decline or disappear altogether (Driscoll & Carliner, 2005). They were essentially saying that classroom instructors had become obsolete. Many instructors became resistant to e-learning, even though signs indicated that, after nearly three decades of “experimental” status, e-learning would finally become a significant part of corporate training and higher education. Blended learning offers a comfortable middle ground. Blended learning left a significant and meaningful role for classroom learning. Rather than addressing feelings of being displaced by computers, instructors could focus on meaningful ways to blend the learning experience, appropriately integrating computers where they make sense and providing classroom experiences when they felt computers could not appropriately teach the content (Driscoll & Carliner, 2005).

Both traditional and online education have changed the role of the teacher from one of distributing information to one of facilitation and mentorship. In the online education environment, this is even more pronounced. Technology provides an overwhelming amount of information to the student which makes it essential for the teacher to be present to guide and advise (McVay-Lynch, 2004). A two-year Thompson Learning study found that when students were working open-ended problems that challenged their ability to apply what they were learning, not just recalling feature names, they found that having access to mentors for assistance was essential to success (Barbian,

2002). It is important for any blended course, to clarify to the student how the e-learning activities are connected to the face-to-face learning, what outcomes are expected and how the end products are evaluated. Students, in general, need feedback on their progress and the instructor/facilitator can provide this to them. In terms of good practice for blended learning Frank, Kurtz and Levin (2002) recommend that the facilitator meet face-to-face with the students at the beginning, middle and end of the course.

According to a 2000 survey by the Masie Center, 88 percent of learners and 91 percent of managers recommend that the trainer or facilitator be an active part of the online training program. Survey respondents placed a high value on having the trainer monitor progress and contact the learner, evaluate online project work, build and facilitate an online community for the course participants and be available via email or threaded discussion to respond to content questions. It is clear that combining self-paced learning with facilitator support keeps the learner from feeling isolated, which assists in the successful completion of the self-paced modules (Valiathan, 2002).

It is important for any new blended learning program to obtain “buy-in” from the instructors. If the classroom teachers do not agree with the underlying philosophy of innovative technology curriculum, it is very unlikely that they are ready to embrace technology integration across the curriculum (Barnes, 2005). Clear guidance and training for their new roles as facilitators, which is often in addition to their traditional roles as instructors, is essential for the success of the blended program. The instructors must understand that e-learning is an *extension* of the face-to-face instruction, not necessarily a replacement.

Studies on the Effectiveness of Blended Learning

There is a body of evidence supporting successful blended e-learning. Dean, Stahl, Sylwester and Peat (2001) identified cost and time savings and a 10% improvement in learning outcomes in their study of MBA students. Instruction was delivered using a combination of face-to-face instruction, asynchronous web-modules and synchronous cyber classes. The results of their study showed that multiple modes of learning do increase the amount learned. A mixed mode of delivery does enhance the quality of learning.

Kiser (2002) reported on a 2-year study by Thompson Learning of 128 respondents investigating the effectiveness of blended learning in comparison with a pure online course based on the teaching of Microsoft Excel. The study found that a blended e-learning group performed their tasks with 30% more accuracy than the online group and 41% faster. The Thompson Learning study identified five core elements contributing to the success of a blended e-learning program:

- Use of scenario based exercises to teach a subject
- Integration of learning objects with realistic scenarios
- Early use of the knowledge or skills
- Access to live mentors during the online portion of the training
- Assessments designed to mimic real world tasks

Lead researcher Byle said:

The biggest surprise was the fact that the learners who were exposed to the blended curriculum were able to save so much time performing the tasks. What it

really means is that those who had the blended learning were able to work more efficiently (Kiser, 2002, p. 10).

In 2003, Rochester Institute of Technology (RIT) Online Learning Department initiated a Blended Learning Pilot Project. In its first year, the Blended Pilot included 26 courses taught by 25 faculty members; approximately 550 students were enrolled in these courses. RIT's definition of "blended learning" in a course is "A Blended course is any course in which approximately 25%-50% of the face-to-face classroom activities are replaced by instructor guided on-line learning activities" (RIT, 2004, p. 1). The major findings included the following:

- Nearly 75% of all students in the pilot indicate they like the Blended Learning format and feel just as strongly that other students should be able to take a Blended course.
- Course completion is excellent—less than 5% withdrew or failed the courses.
- Students perceive they have both a greater amount of interaction and a greater quality of interaction with other students.
- Survey comments reveal that students were excited by the relatively large number of instructional strategies used in Blended courses.
- Faculty participants say they are energized, even renewed, by the creative process of redesigning and teaching their courses in a new format.
- Students would like to know ahead of time that a course is being offered as a Blended course (RIT, 2004, p. 1).

According to a review of all individual course grades in the RIT Pilot, the overwhelming majority of the students did well in a blended course. If the measure of course success is defined as completion for those receiving “Cs or above” grades, then 95% of the students in the Pilot succeeded. If “Ds” are excluded, then 96% of all students succeeded. A total of 87% of all students received “As” and “Bs.” Students in the Blended courses received more “As” than students in Distance courses. Students in the Blended courses received the same percentage of “Bs” and a lower number of “Cs”, “Ds,” and “Fs.” (RIT, 2004, p. 5). Their analysis showed that students in blended courses succeeded better in their grade performance and completion of the course than students in distance courses.

Summary

Studies show that blended learning experiences are positive overall and have resulted in the achievement of higher learning outcomes and student satisfaction compared to solely instructor-led training programs. Blended instruction encourages asynchronous learning, which allows students more time on task, accommodates different learning styles and maintains quality faculty-student interaction in the classroom at the same time (Dukes, Waring, & Koorland, 2006). Successful practices identified within the blended learning case studies included making the learner the central focus of the course, ensuring a continual process of development and feedback and making certain flexibility, variety and adaptability are present in the structure of the program (Khine & Lourdusamy, 2003).

However, there are challenges with blended learning. Technology is the problem most people associate with blended learning because of the computers, networks and technical support involved. These issues are becoming less problematic and now more attention can be placed on the design phase of blended learning. Deciding on which portions of the content are conducive to the e-learning and/or the instructor-led environment is decidedly the hardest part. With the number of e-learning training programs and designing software available and with the prevalence of computers at everyone's desk, it is not hard to understand that there is a propensity for companies to use technology for technology's sake (Trasler, 2002).

The many benefits of e-learning such as standardization of curriculum and student-centered content are easy to see. However, the real value of blended learning comes when we incorporate these benefits into the traditional classroom; using them as an extension of the classroom, with the instructor/facilitator augmenting online learning. Online training fails when a company or academic institution fails to get the mixture right. The question is not if we should blend, but rather, the question is what are the ingredients?

Chapter III of this study will analyze and discuss the methods and procedures used to determine if there is a significant difference between the final grades received by students enrolled in the IS "A" school using only the traditional method of instructor led training and those students taking the same course with ILE computer module training blended with instructor led training.

Chapter III

Methods and Procedures

This experimental study sought to determine if students attending the basic Navy intelligence specialist training course using the ILE's interactive multimedia instruction combined with instructor led or facilitated instruction was more effective than curriculum taught using only traditional face-to-face instruction. The effectiveness of the curriculum was measured by comparing the academic success of the students completing the intelligence specialist training course through the different instructional strategies. This chapter will describe the research methods and statistical procedures used to collect and analyze the data. Included in Chapter III are the population that was studied, the instrument design that was used, a statistical analysis of the collected data and a summary of the covered material.

Population

For the purposes of this study there were a total of 238 final grades collected from students who completed the IS "A" course between November 2007 through May 2008. The final grades were collected from ten classes, each with approximately 23 students per class. The five classes using only instructor led curriculum were taught between November 2007 and March 2008. The second group of five classes was taught between January 2008 and May 2008 and used interactive media instruction blended with instructor led teaching and facilitation.

These students attended the Intelligence Specialist class "A" school which is a 12-week course designed to provide selected U.S. Navy enlisted personnel with the

knowledge, skills and abilities required to perform the duties and tasks of a Navy Intelligence Specialist. The students had either just completed Navy basic training or were cross-training to intelligence from another Navy rating.

Research Variables

The hypothesis is as follows:

H₁: Intelligence Specialist "A" course students who complete the curriculum using the Integrated Learning Environment will score higher as compared to those students who complete the course with solely instructor led instruction.

The independent variable was the method of presentation of the IS "A" school curriculum. In one group, the curriculum was presented by an instructor, while in the second group, curriculum was presented with interactive multimedia instruction blended with instructor led training and/or facilitation. The dependent variable was the students' final grade for the 12-week course. The dependent variable changed depending on the effectiveness of the mode of instruction used by the IS "A" school.

Instrument Use

The final grades of the IS "A" students were the instruments used to prove or disprove the hypothesis. The final grade for each student was computed by the IS "A" school staff by averaging the grades from the final tests for fourteen units of instruction. The course final grade was a true measure of knowledge of the subject matter taught in the course.

Classroom Procedures

The IS “A” school instruction took place in classrooms in the Navy and Marine Corp Intelligence Training Center at Dam Neck, Virginia. Both groups of students were taught in the same classroom environment. Students also had the same access to course materials and resources and had the same attendance requirements.

Methods of Data Collection

LCDR Chris Jones, USN, Officer in Charge of the IS “A” school provided to this author the data required for the study. LCDR Jones provided two Microsoft Excel spreadsheets, one for the five classes using instructor led training only and the other for the five classes using interactive multimedia instruction. Each spreadsheet was subdivided into five sheets, one for each class. Each student was represented by a number followed by his/her final grade for the IS “A” course. No other identification, such as a name or social security number, was included. Staff interviews were also incorporated into this study.

Statistical Analysis

The final grades of 238 students that completed the course work were compared in order to determine if there was a significant difference between the grades earned by those taught only by traditional instructor led curriculum and those using the ILE. A one-tailed t-test was used to analyze the data. The overall difference between the final grades of the two groups was compared.

Summary

Chapter III of this study described the methods of data collection and the statistical procedures used to compare the final grades of IS “A” student’s that completed described coursework. This chapter identified the population that was studied and the instrument used to analyze the data. Also included in this section of the study were the classroom procedures and statistical analysis of the data that was collected. The results of this study will determine whether one mode of instruction was more effective than the other in enhancing student’s learning and raising their final grade for the course. The findings of this statistical analysis will be discussed in Chapter IV.

Chapter IV

Findings

The purpose of this study was to determine the effectiveness of the ILE by comparing the final grades of students completing IS “A” curriculum with instructor led only instruction to those who used the ILE. This chapter presents relevant data that were collected and will provide a statistical analysis comparing the sample means in order to test the hypothesis.

Data

Collected data included the number of classes, number of students and distribution of grades received. Five classes, with an average number of 25 students per course, completed the IS “A” school curriculum using only instructor led instruction during the November 2007 to March 2008 timeframe. The majority of the students achieved final grades between 80 and 89.9%. See Table 1 for an itemization of the class student numbers and distribution of the final grades for the 127 IS “A” students completing curriculum using only instructor-led training.

Table 1. Instructor-led Instruction

127 Students Final Grades	59 grades of 90% and above
Class 08054: 29 students Class 08050: 23 students Class 08045: 25 students Class 08065: 21 students Class 08046: 29 students	67 grades between 80% and 89.9%
	1 grade between 70% and 79.9%

The second group of students completed the IS “A” school curriculum using the Integrated Learning Environment. The five classes, with an average number of 22 students per course, completed the IS “A” school curriculum using the Integrated Learning Environment, which is comprised of interactive multimedia instruction with instructor facilitation, during the January to May 2008 timeframe. The majority of the students achieved final grades above 90%. See Table 2 for the listing of class student numbers and distribution of the final grades for the 111 IS “A” students completing curriculum using the Integrated Learning Environment.

Table 2. ILE Instruction

<p><i>111 Students</i></p> <p><i>Final Grades</i></p> <p><i>Class 08070: 25 students</i></p> <p><i>Class 08080: 23 students</i></p> <p><i>Class 08091: 19 students</i></p> <p><i>Class 08085: 21 students</i></p> <p><i>Class 08090: 23 students</i></p>	<p><i>69 grades of 90% and above</i></p> <p><i>42 grades between 80% and 89.9%</i></p>
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Results

The sample means of 127 instructor-led and 111 ILE final grades were collected and calculated using a one-tailed t-test to determine statistical significance. The average final grade for the instructor-led instruction (M1) was 88.8, while the ILE instruction (M2) had the mean of 91.1. With a degree of freedom of 236 at the .01 level of confidence, the calculated t-test results of 4.43 did exceed the critical t-value of 2.32. See Table 3.

Table 3. Comparison of Sample Means at the .01 Level of Significance
(One-Tailed t-Test)

	Sample Size	Mean	t-value	Critical t-value
Instructor –led instruction (M1)	127	88.8	4.43	2.32
ILE instruction (M2)	111	91.1		

Summary

This chapter presented the collected data and calculated results in order to determine if there was a significant difference between the final grades of students instructed by means of Instructor Led Training as compared to those students taught using the Integrated Learning Environment. The sample means were compared and subjected to t-test in order to determine statistical significance. In Chapter V, conclusions will be given based on statistical analysis of the findings and recommendations for the future will be given.

Chapter V

Summary, Conclusion and Recommendations

The purpose of this study was to determine the effectiveness of the Integrated Learning Environment (ILE) by comparing the final grades of students completing IS “A” curriculum with instructor led only instruction to those who used the ILE. This chapter summarizes the study, draws conclusions based on the findings and offers recommendations.

Summary

The U.S. Navy has implemented the ILE throughout the Navy to streamline learning processes and automate learning management. Since May, 2003, the Navy and Marine Corp Intelligence Training Center (NMITC) has transformed five courses into the ILE format. The Intelligence Specialist “A” (IS “A”) school began using the ILE curriculum in January, 2008.

Each ILE course was comprised of Interactive Multimedia Instruction (IMI) lessons and Instructor-led training (ILT) lessons. In contrast to Level 1 web-based instruction, which was a familiarization lesson used to introduce an idea, and was provided in a linear format (one idea after another), Level II and III interactivity was used throughout IMI’s. These levels presented more complex information and allowed the student an increased level of control over the lesson scenario. IMI instructional materials included a facilitator guide, a Lesson, a Unit and a Student Guide.

The Navy’s goal for the ILE was to reduce training time, reduce the expense and increase the accessibility of the training to the sailors. While NMITC strived to use the

ILE to meet these goals, they had additional reasons to use the ILE to supplement their traditional instructor-led training. The number of staff at the IS "A" school was small, while the number of classes of students was increasing. The knowledge and background of the instructors assigned to the IS "A" school varied greatly. The ILE process had standardized the curriculum, ensuring all sailors graduating from IS "A" school had been taught the same material and to the same level of understanding. The ILE had lessened the instructional burden on the staff and allowed them time to update courseware and focus their face-to-face instruction on topics not suitable for instruction via web-based modules.

This study was undertaken to determine if there was a significant difference in the effectiveness of learning between the IS "A" students who completed the training with solely instructor led training and those who completed the course using the ILE instruction. The final grades of 127 students taught with the traditional teaching method were collected from five classes taught between November 2007 and March 2008. The final grades of 111 students from the courses using the ILE were collected from five classes taught between January 2008 and May 2008. The grades collected were subjected to a t-test in order to compare the sample means at the $p > .01$ level of confidence.

Conclusion

This study was based on the following hypothesis:

H₁: Intelligence Specialist "A" course students who complete the curriculum using the Integrated Learning Environment will score higher as compared to those students who complete the course with solely instructor led instruction.

The t-value was calculated at 4.43. This value did exceed the value of 2.32 obtained from the table of critical values at the .01 confidence level. As a result of the obtained t-value being greater than the critical value, the hypothesis was accepted. The final grades of the students who completed the IS “A” course using the ILE were significantly higher than the final grades of students who completed the course with the solely instructor led instruction. Therefore the conclusion from this sampling was that the IS “A” course curriculum was taught more effectively with the ILE than using the solely instructor led instruction.

Recommendations

The results of this study were significant in that they showed that a shift from solely instructor-led training to web-based training with facilitation can enhance learning. Other service schoolhouses encountered the same challenges with staff manning, with curriculum standardization and updating and with the need to *push* training out to the active duty serviceman, and these results demonstrated that effective solutions were available.

These results were based solely on the final grades of the students completing a 12 week training course. Additional studies, as outlined below, should be considered to further clarify the effectiveness of this type of instruction for the NMITC IS “A” student population.

- Student reaction to the course content: Were the web-based courses engaging?
How did they interpret the instructors’ “facilitation” role in the Integrated Learning Environment?

- Post-course six-month assessment by the fleet: Did the IS “A” school curriculum prepare the sailor for his/her job adequately? Was the knowledge gained from the ILE curriculum easily transferable to their jobs or was some on-the-job training still required? What, if any, gaps in knowledge does the curriculum need to address?
- Does the minimization of tacit learning, such as having some experienced Navy instructors adding “sea stories” to the learning experience, have a detrimental effect on student understanding of the relevance of the curriculum to their naval career?
- Are the tests measuring the course’s learning objectives? The fact that 69% of the 111 ILE students attained 90% or above as a final score suggests that the tests could be too easy. The assessments may only be testing lower level skills and not the complex, critical thinking demanded in the intelligence profession. Perhaps the tests accurately address the learning objectives, and the fault lies with the learning objectives for not adequately reflecting the required skills.

Before implementation of the structured web-based IMI’s into the curriculum, it is recommended that senior staff obtain the “buy-in” of the instructors and supporting staff for the ILE concept. Research shows that web-based learning can be effective; however, instructor facilitation increases the efficacy. Leaders need to take the time to teach the instructors the importance of their participation in the curriculum, which includes mentorship of the young students. Training needs to be provided to instructors on how to use the facilitation modules which were created to *accompany* the web-based

training. If the instructors feel that the web-based modules, on their own, can cover the curriculum in its entirety, it is human nature to move on to the next task. It is imperative that the instructors believe in and understand their roles as catalysts for not only the IMI's but the entire program. Leaving students to guide themselves through web-based modules without the guidance and assessments of an instructor is somewhat like leaving a seaman without a rudder and a risk to the future of fleet intelligence.

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