Enhancing the Maritime Curriculum With Online Education and Scholarly Resources

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ABSTRACT

The study "Enhancing the Maritime Curriculum with Online Education and Scholarly Resources" demonstrates how scholarly communication, library technology and information delivery support and enhance maritime teaching and learning at sea and ashore. Maritime College, of the State University of New York, prepares students for careers through a content-centered curriculum and a hands-on, team building approach to learning. The SUNY Maritime College student experience is complemented ashore and aboard the training *Ship Empire State VI* with instructional technology for teaching and learning in the classroom, in library, and virtually from anywhere in the world. The study describes the information technology used for delivering and accessing scholarly content, such as electronic journals, e-books, and online tutorials to distance students and faculty. In addition, the study describes how mobile technology accommodates a number of virtual library services to online/distances learning maritime community.

1. Introduction

The study "Enhancing the Maritime Curriculum with Online Education and Scholarly Resources" demonstrates how scholarly communication, library technology and information delivery support and enhance maritime teaching and learning at sea and ashore. Maritime College is one of the 64 colleges and universities of the Sate University of New York System (SUNY) and one of the six Maritime Academies in the United States granting United States Coast Guard licenses. SUNY Maritime College offers a solid academic program coupled with a structured cadet life in the regiment for both men and women. Maritime College prepares students for careers through a content-centered curriculum and a hands-on, team building approach to learning. The curriculum offers undergraduate and graduate degrees, and a European summer sea term of 90-days aboard the Training Ship Empire State VI, SUNY Maritime (SUNY Maritime College, 2009; González, Carbonell, Saorín, de la Torre, 2011).

The Maritime College Library, named after Admiral Stephen B. Luce, is accredited by professional organizations such as the Middle State Commission on Higher Education and it adheres to the standards and guidelines of the Association of the College and Research Libraries of the American Library Association, American Library Association (2009). The Luce Library collections, print and electronic, as well as the Library's instructional programs in information literacy, support the research requirements of the maritime disciplines in engineering, science, business, marine transportation, and the humanities.

1.1. Online Information Research

In recent years the maritime industry has seen a growing dependence on the use of information technology. New systems are constantly being implemented onboard to aid the seafarer in navigation, safety, and environmental awareness. Whereas our forefathers have used paper charts and sextants, today's mariner must be knowledgeable on use of radar, GPS, electronic charting, and various other electronic publications (Gudelj, Krcum, and Krcum, 2008). Consequently, maritime educators are recognizing the need for students to be trained in information technology.

In the mid 1990s as information evolved in many different formats, maritime libraries increased emphasis on library instruction programs and information literacy emerged as the instructional framework to develop students' competencies in analytical skills and critical think-

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ing. The Association of College and Research Libraries defined information literacy competency standards as "…a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." Information literacy, as defined, is the basis for lifelong learning because a student who graduate with the ability to locate, evaluate, and effectively use information can learn independently and address their own needs and questions in any area of life (Association of College and Research Libraries, 2009).

The information competent mariner is one who is able to apply information technology skills to be able to locate, evaluate, and use information effectively; in other words to be information literate. To train maritime cadets to become information competent, the Stephen B. Luce Library has interwoven a framework of technological tools, library instruction, and assessment activities to design a program that's infused in the Maritime curricula. The library facilitates access to a myriad of digital and print information sources along with some state of the art research tools such as enhance OPAC, federated searching, cross linking with Google, worldwide catalog, and more. Also, technology is incorporated into various pedagogical tools that are used to enhance cadets' training in information competency. In addition, with the tools in place, the Library designed a robust instruction program to integrate information competency in the curricula. Various assessment activities have been implemented to provide much needed feedback on the effectiveness of the information competency training. The Library uses the assessment data to continuously enhance the program. A key component for effective information competence training is to expose maritime cadets to some of the current technological tools. The Stephen B. Luce Library strives to stay abreast with technology developments in both pedagogy and information research and delivery.

1.2. Research Tools for Retrieving Information

OPAC: The online public access catalog (OPAC) is the main gateway to researching the Library's collection and cadets are well trained on its use. With a name of *the Sextant*, cadets easily associate the OPAC as a tool to navigate information. The librarians constantly incorporate new technology to enhance the OPAC as a one-search interface for all print and electronic resources. All electronic books (ebooks), electronic government publications, and other similar sources are fully searchable and are just a click away with embedded URLs in the OPAC. Detailed information on books such as summaries, table of con-

tents, and excerpts are accessible through the OPAC with cross-linking service to Google Books.

Federated searching: Stephen B. Luce Library subscribes to over 70 information data banks with access to more than 47,000 titles of periodicals. With such an array of sources it is often a difficult task for cadets to search each information resource individually. To streamline this process the Library implemented a new information portal, called *the Beacon*, which uses federated search technology. This enables cadets to search multiple information databases through one search interface. Intense training on the use of the Beacon is done during library instruction sessions, where cadets are taught how to construct effective search strings to retrieve relevant results.

Partnering with Google: Today's generation of Maritime students are web savvy and very inclined to do all information research using Google only. It is a challenge for librarians to teach cadets on how to use Google competently and a significant part of library instruction dwells on evaluating web sources and suggests the use of academic versions of Google such as Google Scholar and Google Books. To facilitate the cadets' search habits, the Library has partnered with Google to make its collection searchable via Google search engine. So, as an example, a cadet searching Google Scholar for information on "Ship Navigation" will see results for Stephen B. Luce Library (see Fig. 1).

Access beyond Luce Library boundaries: The Stephen B. Luce Library makes every attempt to increase access to information resources for the Maritime College community. All subscribed electronic resources are accessible 24/7 and from anywhere via special server technology, called EZProxy. Also, through Luce Library membership to resource sharing consortiums, Maritime cadets have access
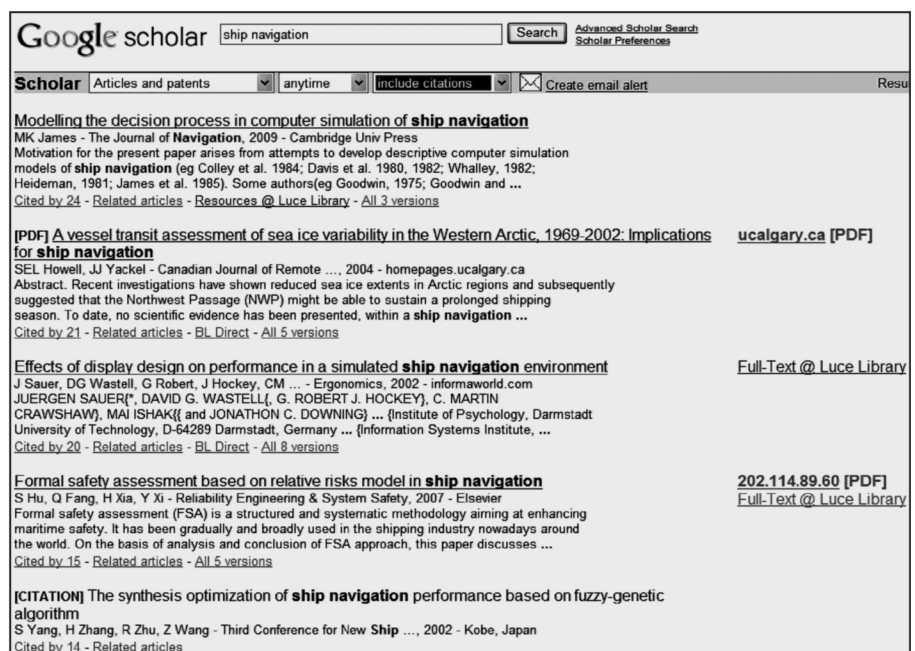

Figure 1: Google Cross Link to Luce Library.

to many more books and other information sources not available in the Library's collections. Using a worldwide OPAC, called Worldcat, cadets can search and request any items from libraries nationally and internationally. This process, referred to as interlibrary loan, is managed by a 24/7 online system with the capability to deliver materials electronically (Shafeek, 2010).

Scholarly Resources at the Stephen B. Luce Library: The scholarly resources are made available through consortium agreements that support university libraries at the State of New York and beyond. Some of these electronic databases are listed below:

EBSCO Databases	EBSCO includes 7 separate databases. They are Academic earch Elite, Business Source Premier, Clinical Reference Systems, alth Source Plus, USP DI Volume II Advice for the Patient, ewspaper Source and Alt-Health Watch. These databases feature full text for a wide range of publications.
FirstSearch	The OCLC FirstSearch service offers a variety of indexes, abstracts and full text databases.
Gale Databases	A collection of databases covering literature, current events, business and more. Includes newspaper, journal and encyclopedia articles, both cholarly and general, in arts and literature, social sciences, current social issues, financial research, and health information. Full text coverage and indexes from 1980 to date.
HarpWeek	The Civil War segment covers the years 1857-1865. HarpWeek is the full-text, full-image electronic version of Harpers Weekly for the nineteenth century.
Homeland Security Digital Library	The Homeland Security Digital Library (HSDL) is the nation's premier collection of documents related to homeland security policy, strategy, and organizational management.
JSTOR - Arts & Sciences I	This JSTOR collection includes full-text articles from the complete back runs of 118 journal titles in various disciplines, including many of the core research and society published journals in economics, history, political science, and sociology, as well as titles in the more science-oriented fields of ecology, mathematics, and statistics.
Lloyd's List	Lloyd's List is the leading daily publication for authoritative coverage on the shipping industry, including global shipping, logistics, global trade, marine insurance, and admiralty law.

Marine Technology Abstracts	The Marine Technology Abstracts database contains bibliographic information providing a reference and description for over 90,000 technical articles, reports, books, conference and transaction papers and other material on all aspects of maritime technology, dating back as far as 1940 and drawn from all major marine engineering publications, published worldwide in at least 10 languages.
Milestone Documents in American History	Salem History's *Milestone Documents in American History* is the first of five primary source resources from the Schlager Group and Salem Press. It combines 130 full-text primary source documents with expert analysis and commentary.
NetLibrary	529 medical and health-related eBooks and 125 new business titles with the original collection of 715 titles, SUNYConnect now provides 1369 purchased eBooks as well as the public (i.e., free) collection of 3823 titles.
ProQuest	**ABI/INFORM Global:** American Medical Association; Newspapers Periodicals; Peer Reviewed **ProQuest Newspapers:** National Newspapers (27); Barron's; The New York Times; Wall Street Journal
Science Direct	Contains 707 scholarly full-text scientific and medical journals. ScienceDirect offers full text access to over 700 Elsevier Science journal titles that cover areas including science, medicine and technology.
Springer Ebooks	A collection of about 17,000 titles of ebooks in 13 different subject areas, including Business & Economics, Chemistry & Material Science, Earth & Environmental Science, Engineering, Humanities, Law, Mathematics, Physics, and more.
TRID Database	TRID is the world's largest and most comprehensive bibliographic resource on transportation research information. It is produced and maintained by the Transportation Research Board. TRID covers all modes and disciplines of transportation and contains more than 900,000 records of published research. Over 64,000 records contain links to full-text documents.
UnCover Reveal/ Ingenta	UnCover Reveal is an automated alerting service that delivers the table of contents of your favorite periodicals to your email inbox.

Technology innovations have made it possible for the library to deliver scholarly content to the students and faculty by enabling delivery mechanisms such as electronic Interlibrary Loan that is initiated by the library user (Stephen B. Luce Library, 2009). Students and faculty are able to initiate borrowing transactions of books and journal material directly from the library's portal and borrow any item from a network of libraries.

Most important is the Library's effort to streamline all library resources in support the courses taught online for the SUNY Maritime College distance learning students. SUNY Maritime initiated its distance learning program in the spring of 2004. During the fall 2011 semester, there were 1,228 students enrolled in 80 blended and 29 online sections and 54 faculty involved across the 109 sections. Figure 2, demonstrates the Library's online module in support of a distance learning courses.

module tutorial is designed to assist cadets to navigate through the information research process at their own pace. It is also an important tool for distance learning students to learn about the information research process. Based on the demands of the curriculum, the Library continuously creates online pathfinders and online research modules (general and discipline-specific) to address the information needs of students. In addition, the library faculty liaisons collaborate with instructors to create course-specific research guides. Course-specific web tutorials serve to guide students in their research and to reinforce learning beyond the library instruction session. The library's research publications also serve an additional purpose - to provide the student with the choice and the flexibility to complete their assignments independently outside of the classroom teaching environment.

Figure 2: Research material in support of the courses on the "Angel" platform.

2. Education Aboard the Training Ship Empire State VI

As a part of the STCW requirements, the SUNY Maritime Cadets are required to participate on Summer Sea terms aboard the *Training Ship Empire State VI*, the largest training ship in the United States used for cadet training. The training ship is fitted with classroom space, computer rooms and a fully functioning research facility with access to the library's information systems and electronic resources. The paper "Electronic Access to Library Resources onboard the *Training Ship Empire State VI*: Enhancing the Learning Experience of Cadets at Sea" demonstrates how new technologies on the ship's library information systems support the maritime courses taught at sea.

Similar to Maritime College Library ashore, the Ship's research facility is equipped with the appropriate technology to accommodate cadets' mode of learning and information research. In addition, a faculty member of the library staff performs the duties of the Ship's Librarian. The Ship's Librarian, conducts research sessions on the information needs of all the shipboard community. The Luce Library afloat is the main resource and research facility for all cadets taking courses during the ninety-day summer sea term.

SUNY Maritime education and training continues at sea onboard the 565-foot training ship *Empire State VI*. The educational objectives of the summer sea term are, SUNY Maritime.

1. To provide an understanding of shipboard organization, administration, facilities and functions of the various departments of a merchant vessel.

2. To develop a full appreciation of the principles of

1.3. Online Pedagogical Tools

In addition to making electronic resources available to students and faculty, the Stephen B. Luce library has adopted pedagogical tools and methodologies to assist the academic community with using information technology. The new generation of learners arrives to our campuses far more prepared in computer skills, far more skillful in multi-tasking and far more experimental. The students are also far more demanding in their expectations for instantaneous access to information. To acknowledge the students' new mode of learning the Stephen B. Luce Library set forth to bridge the generation gap by ensuring the information and formats through which it is conveyed to students remains relevant. As is the case with other types of instruction, the Library is committed to teaching information competency using various pedagogical techniques to achieve positive student learning outcomes.

All library instruction sessions are computer-assisted, utilizing state of the art equipment for effective multimedia instruction and hands-on experience. A major pedagogical tool for information competency training is the Library's online information literacy tutorial. This full-scale, multi-

command, to train Cadets in the duties and responsibilities of watch officers and other supervisory personnel, and to promote a complete understanding of the duties and responsibilities of personnel in general.

3. To supplement ashore classroom instruction in professional subjects through practical application aboard the training ship at sea.

4. To promote an understanding, through practical experience, of the leadership, teamwork, techniques, and technical skills required to manage and operate a vessel efficiently, safely and economically.

5. To enhance cultural and professional backgrounds through as many contacts with the geography, history, and national distinctions of other countries and peoples, as the limited time allows.

Cadets pursuing a professional license as a United States Merchant Marine Officer are required to take a minimum of three Summer Sea Terms. Cadets aiming to qualify as a mate undergo extensive (basic, intermediate, and advanced) training in ship operation and management. While onboard the "deckies" are exposed to rigorous training in the areas of communications, navigation, ship handling, ship operations, safety, and meteorology. Under the supervision of the Chief Engineer and the Senior Engineering Training Officer, Cadets qualifying as assistant engineers receive in-depth training in the ship's organization, interrelationship of the components of an operating engine room, and safety of person and ship. Each cadet must take and pass intensive oral and written examinations, SUNY Maritime College.

2.1. Stephen B. Luce Library Aboard the Training Ship Empire State VI

The Library on Training Ship *Empire State VI* is located on deck four and it occupies approximately 2500 square feet. It has a reading room with seating capacity for 55 people and shelving that holds approximately 7,000 books. Electronic resources are made accessible through several networked computer terminals. Similar to the SUNY Maritime College Library ashore, the Ship's Library is furnished with the latest technology to facilitate the teaching and learning objectives of the SUNY Maritime cadets at sea.

2.2. Library Technology Aboard

Technology is a major mode of learning for the new generation of cadets. Cadets are far more technology oriented and thus far more demanding for instantaneous access to information. The decision making process at sea is subject to instantaneous access to information; prime example is electronic navigation, electronic weather reports, electronic communication with other vessels and electronic access to important documents and resources.

Similar to Maritime College Library ashore, the Ship's Library afloat is equipped with the appropriate technology to accommodate cadets' mode of learning and information

researching. The Ship's Library is furnished with several computer workstations networked on its local area network, (LAN).

The Library's LAN is networked to the Ship's intranet which is connected the Ship's satellite communication system. All library computers provide access to electronic publications, information on the Library operations and staff, image and data banks, various training software, and the Library's OPAC. Management of library operations is done using LibrarySoft, an integrated library management system. Cataloging of books, circulation, patron record maintenance, statistics and report generation are all managed by LibrarySoft Constantinou & Fazal (2007).

2.3. Access to Maritime Electronic Resources

The Ship's Library technology infrastructure is built on a local area network (LAN). Several computer workstations are networked to the Ship's intranet which is connected to the Ship's satellite communication system. Cadets and crew can access the electronic publications and research material through an image and data banks of various training software. The most updated editions of various official government publications are transferred in electronic format and made available on the library's computers. These publications are on subjects such as ocean conditions, navigations, federal regulations; and several sources on countries/cultures information and ports guide to support travelling to various ports of call. (see Fig. 3).

Figure 3.

Cadets and crew have electronic access to titles such as *Bowditch Practical Navigator, List of Lights, International Code of Signals, Code of Federal Regulations, Pilot Charts, Sailing Directions, Radio and Radar Navigation,* and *Sight Reduction Tables, Countries and their Cultures, CIA World Factbook,* and *Encyclopedia of Food and Cultures.* Addi-

tionally, access to email enhances the delivery of electronic information to the Ship's Library. The email system is set up to work with the Ship's data satellite service. The Ship's Librarian remains in constant communication with the librarians at the main library ashore. Whenever there is a need for access to additional electronic materials, the librarians are able to transmit the latest information via email to the ship's library.

3. Maritime Specific Electronic Resources

Cadets studying navigation, use one of the leading reference works for marine navigation, the *Bowditch Practical Navigator* (Bowditch Online, 2009). The electronic reference work encompasses thirty-eight chapters, on marine navigation, piloting, electronic and celestial navigation, navigation mathematics, navigation safety, oceanography and marine meteorology. The electronic format of the *Bowditch Practical Navigator* is the digital version of the print book which includes charts, drawings, and mathematical formulas as they appeared in the print version. The *List of Lights* is made available electronically by the Navigation Center of the United States Homeland Security, Coast Guard department (The List of Lights website, 2010). The resource includes the most up-to-date information on the list of lights presented in a PDF format. Electronic access to the *International Code of Signals,* provides the cadets with an overview of the history of the international code of signals and a detailed list with colored pictures of all signal flags.

The *Code of Federal Regulations, (CFR)* is published by the United States Government Printing Office (GPO). The CFR is the codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the United States Federal Government, CFR (Code of Federal Regulations website, 2010). The most popular sections of the CFR used by the cadets for their studies are CFR-50 *Wildlife and Fisheries; CFR-49 Transportation; CFR-46 Shipping; CFR-40 Protection of Environment, CFR- 35 Panama Canal, CFR-33 Navigation and Navigable Waters. Pilot Charts,* and *Sailing Directions,* provide electronic access to most up-to-date navigation charts. The *Sight Reduction Tables,* are used by all cadets for charting their course during navigation classes (Sight Reduction Tables, 2009).

In addition to the course-specific electronic resources the cadets are required to use during their studies at sea, the library also makes other related non-course-specific resources available through its networked stations. During the ninety days at sea, the Training Ship *Empire State VI* visits five to six European ports. The SUNY Maritime College Cadets have the opportunity to be exposed to other countries, languages, customs, cultures and civilizations. Exposure to other countries customs and ethnic identities is a valuable lesson learned in an international discipline such as the maritime studies.

Electronic access to resources such as *Countries and their Cultures* (Countries and Culture website, 2009), *CIA World Factbook,* (CIA Fact Book website, 2009), and *Encyclopedia of Food and Cultures* (Encyclopedia of Food and Culture, 2009) provide invaluable information on other countries. *Countries and their Cultures* is a searchable database with images and maps with emphasis on the local and ethnic culture of each country. The *CIA World Factbook,* is published and made available by the Central Intelligence Agency of the United States government. It is one of the most comprehensive and current databases on factual country information about the history, government, communication, transportation, population etc. The *Encyclopedia of Food and Cultures* is an electronic book format made available through the library's Gale databases subscriptions.

Conclusion

Traditionally and throughout history young mariners learned how to read and write and received their education from book they read at sea. Advancements in technology have revolutionized maritime studies in the areas of navigation, engineering and communication. All decisions made aboard vessels are based on access to information systems and technology. SUNY Maritime College educates and trains cadets to work under the most technologically advanced environments. Work is underway to develop a complete online information literacy module and library services for mobile technology to incorporate into online courses for the distance learning program. In addition, the library remains diligent in conducting assessment programs and measuring the learning outcomes of our student success.

The SUNY Maritime College Library plays a critical role in providing the academic community ashore and at sea with the most relevant up-to-date information. One of the most important objectives of educating mariners at sea is learning to appreciate and understand access to information as a critical component to decision making.

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