Information Competency Skills for Maritime Students

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Abstract As more information technologies are infused into the maritime environment it is becoming vital for today's mariners be information competent. This paper "Information Competency Skills for Maritime Students" reviews the technological activities, classroom instruction and assessment process undertaken by the SUNY Maritime College Library to foster the development of students' information competency skills. As the technology for information access advances, the library keeps up to date by implementing state of the art tools to allow for students' experience and knowledge. Access to online catalog of maritime information resources, cross linking among maritime information databases and Google, web portal to publications for maritime agencies, digitized repositories of maritime documents, local area network of information resources onboard the training ship are all inclusive of the multitude of activities to ensure students are exposed to the technological tools for advancement of their information competency skills. In addition, the Library has established a comprehensive instructional program that is integrated across the maritime curriculum enhanced with various pedagogical tools such as hands on experience, online guides, and multimedia tutorials. This instructional program is designed to begin developing students' information competency skills from their freshman year and continue throughout their course of study, including Summer Sea Terms aboard the Training Ship. Also, with years of reviewing and generating feedback information through assessment activities of the information literacy program, SUNY Maritime Library has continuously revised and enhanced the program to ensure students are exposed to optimal instruction and tools for developing lifelong information competency skills.

Keyword: Information, Competency, Technology, Literacy, Assessment, Library, Instruction

1. Introduction

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 [1]. 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 thinking. The Association of College and Research Libraries [2] 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 [3].

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. Some of the key strategies used in the instruction program are librarian-faculty collaborations and student outreach. 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.
The Stephen B. Luce Library serves the academic information needs of the oldest maritime academy in United States, SUNY Maritime College, founded in 1874. The college is one of 64 colleges in the State University of New York system and offers 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. Maritime offers undergraduate and graduate degrees, 23 varsity athletic teams, summer training cruises to Europe, United States Coast Guard license and intern programs [4]. The Library 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 [5].

2. Technology

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.

2.1 Information Research and Delivery Tools

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 (except for periodical articles). All 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 contents, 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 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.

Ship's Library aboard Training Ship Empire State VI: 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 has 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 [6].

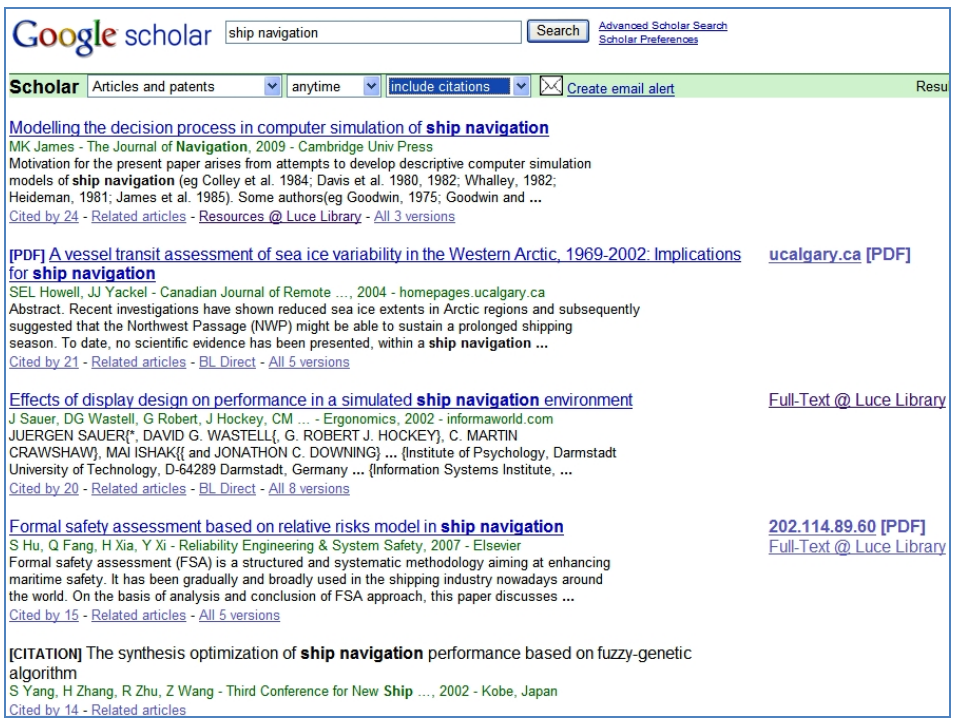

Fig. 1 Google Cross Link to Luce Library

2.2 Pedagogical tools

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.

Classroom Technology: All library instruction sessions are computer-assisted, utilizing state of the art equipment for effective multimedia instruction and hands-on experience.

Online Information Literacy Tutorial: A major pedagogical tool for information competency training is the Library's online information literacy tutorial. This full-scale, multi-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 (see Fig. 2).

Online Guides and Pathfinders: 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.

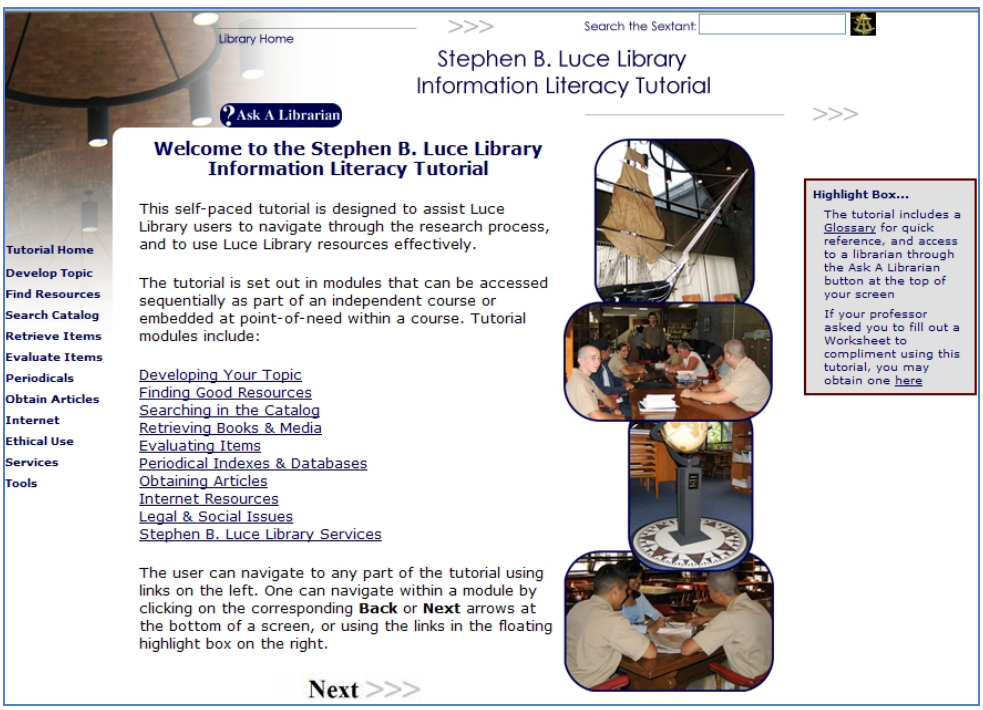

Fig. 2 Online Information Literacy Tutorial

3. Library Instruction Program

Having an array of information access tools in place is of no use if cadets are not properly trained on their use. The Library instruction program is woven into the maritime curriculum's content, structure, and sequence. The maritime curriculum has rigorous academic demands, including an unusually high number of degree credits, several semesters at sea, and license examinations. The Luce Library designed an equally rigorous and complimentary information literacy program to support the maritime core curriculum. The Library's instructional program systematically integrates information competency skills throughout the maritime curriculum to foster lifelong learning. As Ward stated, "Students do not achieve information literacy skills by attending one or more library sessions. Rather, students learn relevant information skills when they are systematically integrated and sequenced throughout the curriculum" [7].

The primary focus for developing information competency skills is to immerse library instruction with regular course work. Librarian-faculty collaboration and student outreach beyond the basic reference transaction are methods used to systematically develop cadets' information competency skills in the maritime curriculum.

3.1 Student Outreach

The Stephen B. Luce Library information literacy program is designed to develop students' skills at various levels of their college careers. An extensive library orientation program provides all new students with an introduction to the information competency concept. Working closely with the Dean of students, the faculty and program coordinator of graduate studies, and the leadership of the Regiment, all incoming students, undergraduate and graduate alike, receive their first library orientation session.

The goals of the first library orientation session are to familiarize the students with the library facility, the physical environment and locations of resources, the history of the library, to remove barriers such as anonymity and introduce familiarity of library personnel. The objective of the first orientation session is to transfer ownership of the library to the students. Phrases such as "your library" and "you belong in the library and the library belongs to you" become the constant refrain during orientation sessions [8].

The concepts of transferring the library's ownership to the students are reiterated during the followed weeks of students' assimilation to the college and campus life. Subsequent to the first library orientation session, the first and second semester freshman students receive a general information literacy course integrated session. Most common courses during the first and second semester freshman year are introductory English, History, Science, Engineering and International Trade and Transportation courses. Upper level students receive a more discipline-specific information literacy session; information literacy sessions are taught for English composition courses, American History and American Civilization, Introduction to Business and Economics, General Science, Marine Biology, Oceanography, Computer Science and General Engineering. Graduate level students receive in-depth sessions for various courses, including preparation for the graduate capstone course.

In addition, the Library's Research Assistance program, a one-on-one information literacy consultation session, is available to all students at all levels. The Library's Research Assistance program is widely promoted to students through the library's web portal and campus announcements. (see Fig. 3).

The Library's instructional activities continue during cadets' Summer Sea Term training aboard the Training Ship Empire State VI. With the appropriate technology tools, and an array of print and electronic information sources in the Ship's Library, the travelling Librarian actively engages cadets in information competency skills development.

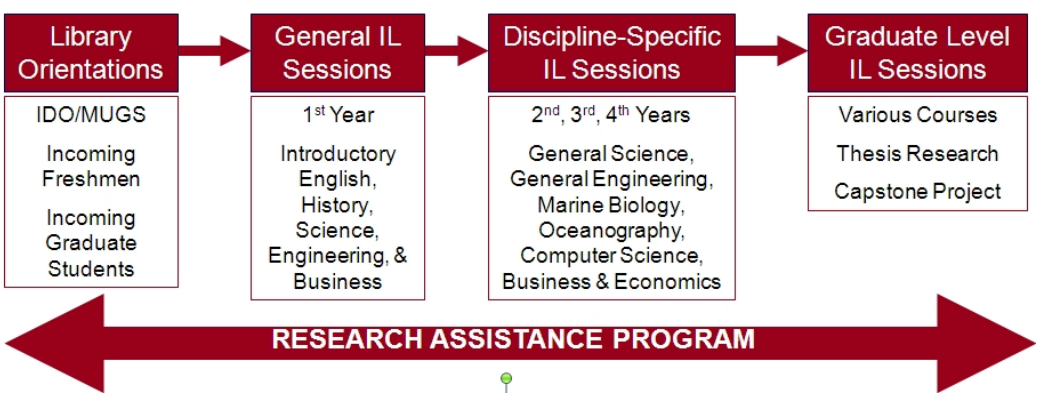

Fig. 3 Library Instruction Program

3.2 Partnerships in Pedagogy: Librarian – teaching faculty collaboration

The core methodology for integrating library instruction through course-integrated lectures involves close collaboration between librarians and teaching faculty to design the lectures and to develop assignments that stress critical thinking as well as information competency skills development. The literature stresses that such librarian and teaching faculty collaborations are critical to developing

effective library instruction. Mackey and Jacobson refer to librarian-faculty collaboration as "teaching alliances" that involves working together in course planning, classroom instruction, and assessment [9]. Librarians at Stephen B. Luce Library hold dual advanced academic degrees and are well positioned to liaison with other academic departments. Collaborative activities include information literacy meetings to conduct syllabi analysis and create appropriate assignments for course-integrated library instruction. Librarians hold meetings with instructors prior to the library instruction sessions to discuss lesson plans and assignments. During the librarian's lecture it is common practice for instructors to be present in the classroom to further stress to students the course-related importance of the information competency concept. Course integrated assignments are designed to develop information competence as well as to meet the teaching faculty's instructional goals.

For course-integrated library instruction it is essential that the program articulate well with the maritime curriculum. Therefore, the collaboration between teaching faculty and library faculty remains critical in enhancing the design and development of the maritime curriculum as it relates to information competency. Each librarian serves as liaison to academic departments to provide advice and assistance for course-integrated library instruction, collection development, and information literacy component for the design of new courses or programs and/or revision of pre-existing courses or programs. In addition, the library takes a proactive role in the college-wide curriculum committee to ensure that the library's resources could support the demands of the courses and that information literacy is included in appropriate courses and programs.

Continuing library instruction beyond the classroom on a one-on-one level is the underline objective of the Library's Research Assistance program. Optional and available to students on an appointment basis, this program seeks to engage the individual in interactive and hands-on instruction to fulfill research needs for a specific course assignment. This particular instruction method epitomizes the concept that instruction in information retrieval is most effective if it is course-integrated and delivered at the time of need.

4. Assessment

4.1 Outcomes Assessment

Assessment of student learning outcomes is essential to evaluating library instruction programs. Are students really developing the information competency skills necessary to become lifelong learners? Libraries have been conducting information literacy assessment practices since the mid 1990s and, as Lindauer stresses, "assessment of library performance should be defined and shaped by its connections and contributions to institutional goals and the desired educational outcomes." [10]. These outcomes-based assessment can be conducted either as an independent library-only project or integrated into a campus-wide assessment project such as general education program.

Stephen B. Luce Library instruction program focuses on developing students' information competency skills in the maritime curriculum and assessment of this program provides a quantitative means of documenting progress towards the College's educational goals. The Library's instructional program is structured in a way that all efforts are concentrated to contributing to program accreditation and program outcomes.

In 2004, the Stephen B. Luce Library began assessing its instruction program to measure how well maritime students are developing information competency skills. This process was part of a campus-wide activity on general education assessment and was scheduled to repeat on a three year cycle. The Library established two measuring objectives which correlate with the national standards for information competency:

- Understand and use basic research techniques
- Locate, evaluate and synthesize information from a variety of sources

A standardized test, comprising of short answers and yes/no questions, was the measuring instrument used to gather data. This test assessed maritime students' abilities to locate and evaluate information

from a variety of sources and formats, including how well they can conduct basic and advanced searches in the Library online public access catalog and research databases, search for print information using indexes and periodicals, and locate and evaluate web sources. Assessment scale was set for exceeds expectations (90-100%), meets expectations (70-89%), approaches expectations (60-69%), and not meeting expectations (0-59%). The standardized test was distributed to students at the end of each session with a given due time of one week for completion. When completed, the tests were reviewed, graded, and assessed by librarians and the results forwarded to instructors for extra credits. The arrangement of giving extra credit for the assignments demonstrated to students the serious nature of the assignment and encouraged them to learn the information competency concepts [11]. Collected data for 2004, 2007, and 2008 are shown in Fig. 4.

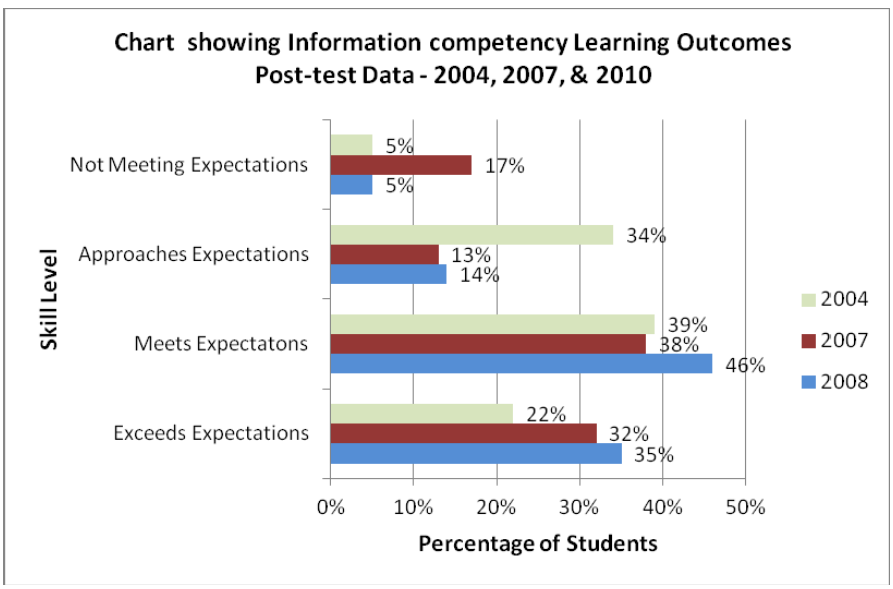

Fig. 4 Learning Outcomes Data

4.2 Closing the Loop: Enhancing the Library Instruction Program with Assessment Data

Prior assessment process and results were used to improve the Library instruction program as well as revise the assessment process itself. This is termed "Closing the Loop" as defined by SUNY's General Education Assessment Review Group. For an initial effort at "Closing the Loop", a new process using a pre-test tool was added to the Library instruction program assessment methodology. This revised methodology, complete with pre-test and post-test activities, provided key data to assess effectiveness of Library instruction techniques i.e. how well are students learning research skills given the Library instruction received. The underlining process is to compare information competency skills of incoming freshmen without providing any library instruction to the skills acquired by these freshmen after experiencing a library instruction session. The measuring instrument remained the same, and was distributed to all Maritime freshmen in LEAD 101 (the freshmen orientation course) as a pre-test and was then repeated in other freshman courses such as English and History as a post-test. Administering the pre and post-test in separate courses was done purposely in order to minimize skewed results. As Emmett and Emde discusses, when administering identical pre and post-test students are prepared for the post-test by the pre-test itself, especially when the tests are give within a time frame of minutes or hours apart [12]. The findings for pre-test and post-test learning outcomes data are shown in Fig. 5. As anticipated, the results show almost a reverse in skill levels from pre-test to post-test. Only 34% of incoming freshmen meet or exceed expectations but after taking a Library instruction session and completing the post-test this jumped to 81%.

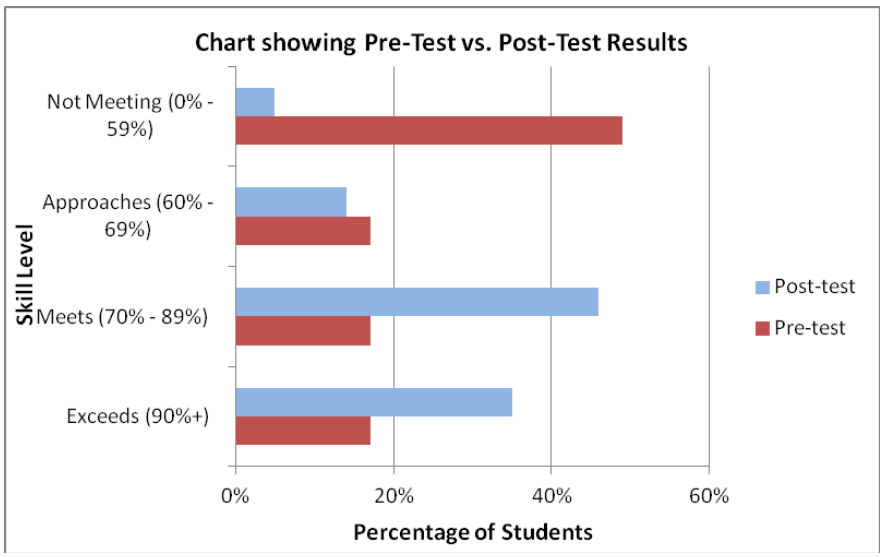

Fig. 5 Pre-test versus post-test

5. Conclusion

Graduating information competent mariners is critical to meeting the demands of the maritime industry. The responsible role of education is to produce seafarers with the talents, ideas, and abilities to meet the challenge of modern maritime development. Stephen B. Luce Library of Maritime College embraces this responsibility to train Maritime cadets to be information competent and hence be lifelong learners. Providing the right tools for training greatly encourages learning. Similar to the idea of exposing maritime students to simulator training, the Luce Library strives to provide access to various information technology tools to foster the development of students' information competency skills.

Utilizing the information technology tools, the Luce Library instructional program is carefully designed to systematically integrate information competency sessions in the maritime curricula. Librarians are serving as partners in the classroom, collaborating with teaching faculty in a variety of ways to ensure the progressive development of students' information competency skills. In addition, librarians' efforts reach beyond the classroom as exemplified by the Library's Research Assistance program, a one-to-one instruction session that is clearly an effective follow up to class sessions to reinforce the techniques of information researching.

As the Library instruction program focuses on integrating effective information literacy into the maritime curriculum, assessment of the program provides a quantitative means of documenting progress towards the College's educational goals. The assessment data have clearly indicate that the Library's instruction program is effective and is moving in the right direction to continue graduating lifelong learners in the maritime industry. Also, the data gives the necessary feedback to continuously revise, redesign, and enhance the instruction program to expose maritime students to the most effective training possible with the appropriate tools and instruction sessions.

The Library's mission to instruct and train cadets continues at sea onboard the Training Ship Empire State VI. The Ship's Library is equipped with the computer technology and electronic resources to provide for cadets' continuous mode of development from ashore to sea. A Librarian travels with the Training Ship at all times to continue the instructional activities to integrate information competency in the maritime curriculum.

References

[1] Gudelj, A., Krcum, M and Krcum, P., "The role of information technology in Maritime education for hazard avoidance", *International Journal of Emergency Management*, Vol.5, No. 3-4, (2008), pp 219-234.

[2] Association of College and Research Libraries, "Information literacy competency standards for higher education", *American Library Association*, (2000), available at: www.ala.org/acrl/ilcomstan.html (accessed 30 March, 2009).

[3] Breivik, P., "Information Literacy and lifelong learning: the magical partnership", a paper presented at the *International Lifelong Learning Conference*, Central Queensland University, Queensland, Australia, (2000). Available at http://lifelonglearning.cqu.edu.au/2000/keynote/Breivik.doc (accessed 31 March, 2009).

[4] SUNY Maritime College, "SUNY Maritime College web portal," available at http://www.sunymaritime.edu, *SUNY Maritime College*, (2010).

[5] American Library Association, "Association of College and Research Libraries Standards and Guidelines," available at http://www.ala.org/ala/mgrps/divs/acrl/standards/index.cfm, *American Library Association*, (2010).

[6] Constantinou, C. and Fazal, S., "Library afloat: educating maritime students at sea through library services", *International Association of Maritime Universities, Annual General Assembly 10*, (2009).

[7] Ward, D., "Revisioning Information literacy for lifelong meaning", *Journal of Academic Librarianship*, Vol. 32, (2006), pp 396-402.

[8] Constantinou, C. and Fazal, S., "Integrating information literacy in the maritime curriculum: strategy and pedagogy", *International Association of Maritime Universities, Annual General Assembly 8*, (2007).

[9] Mackey, T.P. and Jacobson, T.E., "Information literacy: a collaborative endeavor", *College Teaching*, Vol. 53, No. 4, (2005), pp. 140-4.

[10] Lindauer, "Defining and measuring the library's impact on campus-wide outcomes", *College and Research Libraries*, No. 59, (1998), p. 547.

[11] Williams, B., Blowers, P., and Goldberg, J., "Integrating information literacy skills into engineering courses to produce lifelong learners", *Proceedings of the 2004 American Society for Engineering Education Annual Conference & Exposition*, (2004), Available at http://www.asee.org/acPapers/2004-2405_final.pdf (accessed March 31, 2009).

[12] Emmett, A. and Emde, J., "Assessing Information Literacy Skills Using the ACRL Standards as a Guide", *Reference Services Review*, Vol. 35 No. 2, (2007), pp. 210.