INCORPORATING CLIL-TECHNOLOGY IN TEACHING ELECTRONIC NAVIGATION INSTRUMENTS AND SYSTEMS OF SEA VESSELS

ВПРОВАДЖЕННЯ CLIL-ТЕХНОЛОГІЙ У НАВЧАННЯ ЕЛЕКТРОНАВІГАЦІЙНИХ ПРИЛАДІВ ТА СИСТЕМ МОРСЬКИХ СУДЕН

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The article explores the integration of Content and Language Integrated Learning (CLIL) technology into the teaching of electronic navigation instruments of sea vessels based on the subjects "Navigation Bridge Resource Management", "Electronic Navigational Instruments", "Global Maritime Search and Rescue Communications (GMDSS)". CLIL technology offers a novel approach to enhancing both navigational competency among maritime crews. By incorporating CLIL principles into electronic navigation training, maritime educators can provide interactive and language-rich learning experiences for crew members. This includes developing multilingual interfaces for navigation equipment, integrating interactive training modules focused on navigation terminology and procedures, and offering real-time language support features such as voice recognition and translation capabilities. Furthermore, CLIL technology can facilitate language immersion simulations, customizable language profiles, and language-based navigation alerts within navigation equipment. These features not only enhance crew members' language skills but also improve their understanding of maritime regulations, navigational practices, and cross-cultural communication in diverse maritime environments. The article emphasizes the importance of CLIL technology in promoting effective communication, cultural understanding, and navigational safety at sea. By embracing CLIL principles in electronic navigation training, maritime operators can equip their crews with the necessary skills and competencies to navigate safely and proficiently while fostering collaboration and mutual respect in international waters. Prospects of further research consists in incorporating artificial intelligence (AI) in professional maritime training.

Key words: *electronic navigation equipment, CLIL-technologies, vessel safety, maritime global communication, maritime professionals.*

У статті досліджується інтеграція CLIL-технології (Content and Language Integrated Learning) у навчання електронних навігаційних приладів і систем морських суден на прикладі дисциплін «Управління ресурсами навігаційного містка», «Електронавігаційні прилади», «Глобальний морський зв'язок для пошуку та рятування(GMDSS)». Технологія CLIL пропонує новий підхід до підвищення навігаційної компетентності серед морських екіпажів. Впроваджуючи принципи CLIL у підготовку з навігації, викладачі можуть надати членам екіпажу інтерактивний та мовний досвід навчання. Це включає в себе розробку багатомовних інтерфейсів для навігаційного обладнання, інтеграцію інтерактивних навчальних модулів, зосереджених на термінології та процедурах навігації, а також пропонування функцій підтримки мови в реальному часі, таких як розпізнавання голосу та можливості перекладу. Крім того, технологія CLIL може створити симуляції мовного занурення, навігаційні мовні профілі та навігаційні сповіщення на основі мови в електронавігаційному обладнанні. Ці функції не тільки покращують мовні навички членів екіпажу, але й підвищують рівень розуміння морських правил, навігаційних практик і міжкультурного спілкування в різноманітних морських середовищах. У статті підкреслюється важливість CLIL-технології для сприяння ефективній комунікації, культурному взаєморозумінню та навігаційній безпеці на морі. Використовуючи принципи CLIL у навчанні електронавігаційних приладів, морські оператори можуть озброїти свої екіпажі необхідними навичками та компетенціями для безпечної та вмілої навігації, одночасно сприяючи співпраці та взаємній повазі під час плавання. Перспективи подальших досліджень полягають у навчанні полягають у впровадженні штучного інтелекту (ШІ) у професійну морську підготовку.

Ключові слова: *електронавігаційні прилади, CLIL-технології, безпека судноплавства, морський глобальний зв'язок, морські фахівці.*

Problem statement. In today's fast-changing world, professional training of specialists requires constant review and updating of content. The study of the state of higher professional maritime education and the generalization of trends affecting educational processes in the field of training maritime specialists determine the main directions of reforming the system of this training. The experience of professional training of future specialists in maritime higher education institutions has the specifics of complicated modeling and design of the marine environment outside of real life conditions, which indicates the need for research on pedagogical design of models that strengthen the personal development of students in the intellectual and creative directions of integration with the real experience of seafaring, which contributes to more responsible and optimal actions of real conditions of professional activity [4]. Technical factors such as ship design, navigation equipment, communication systems, propulsion systems, safety equipment, weather monitoring, maneuverability, maintenance practices, crew training, and regulatory compliance collectively influence the safety of vessel navigation at sea. So, more and more research requires complex approach to teaching subjects taking into account not only technical issues but also language factor. Integrating CLIL-technology (Content and Language Integrated Learning) principles into navigation equipment for sea vessels presents an innovative approach to enhance both navigational safety and crew competency. CLIL technology could be efficiently incorporated into teaching navigation equipment and systems of vessels.

Analysis of recent research and publications. Different aspects of maritime professional training were studied by many scholars, such as: educational models of navigators' training (S. Voloshinov, A. Gaydarzhi, S. Glikman, V. Zhelyaskov, Ya. Korol, Ya. Lipshyts, M. Musorina, D. Osadchuk, G. Popova, I. Sokol, M. Soter); L. O. Timofeeva, O. Frolova, A. Yurzhenko studied socio-communicative issues of maritime training.

The theoretical basis of the ecological problem in the training of future navigators is presented in the scientific works of O. Bayramova, O. Gurenkova, V. Zhuryan, A. Svarychevska. V. Pozdniakova, B. Popkov. Scientists focus particular attention on the professional orientation of education in the process of language training of maritime specialists – S. Barsuk, Yu. Buzovska, E. Bondarenko, I. Dragomyretskyi, N. Doroshkevich, R. Zaitseva, V. Zykova, I. Krasnovska, L. Lipshyts, L. Novik, V. Smelikova, I. Yaremchuk. In foreign works some aspects of navigational training are presented (L. Tetley and D. Calcutt). Being an innovative teaching method CLIL-technology is represented in the works of N. Kononenko, O. Khodakovska, Yu. Sobol, O. Frolova, S. Barsuk, B. Popkov, V. Molodtsova, M. Tsinova and others.

V. Molodtsova, M. Tsinova focus on the concept of CLIL which includes: teaching a subject and acquiring knowledge of the subject in a certain field on the basis of interconnected implementation of two languages (native and non-native) as a means of educational activity; teaching a foreign language in the process of acquiring certain subject knowledge by the students through the interconnected use of two languages and learning a foreign language as a means of an educational activity. The content of training on a CLIL basis can be structured in the form of thematic blocks based on selected topics included in the programs of other subjects. Learning this content consists in acquiring both specialized knowledge in particular subjects, comprehending a certain set of concepts, memorizinga terminology along with other language material, and the sociocultural specific knowledge [2, p. 86].

Researching the implementation of the CLIL methodology in the training of navigators, O. Frolova and S. Barsuk share their own professional experience and clearly demonstrate the interdisciplinary integration of disciplines: the modules "Types of Cargoes" / "Types of Sea Vessels" Types of Ships") are integrated with the discipline "Theory of Ship Arrangement"; modules "Navigation Challenges integrated with the discipline "Navigation"; modules "Personal Skills and Qualities in Crew Management", "Communication and Briefings", "Human Factor" are integrated with the discipline "Maritime Resource Management", etc. [3].

The purpose of the article. The purpose of the article is to demonstrate how CLIL-technology may be incorporated in study process based on professional technical subjects – "Navigation Bridge Management", "Electronic Navigational Instruments", "Global Maritime Search and Rescue Communications (GMDSS)". To achieve this goal, we used learning platform Quizzlet in order to make the teaching process more interesting, interactive and digitalized.

Presentation of the main material. Electronic navigation systems play a crucial role in enhancing the safety of navigation at sea. In present research we focus on integration of the technical subjects "Navigation Bridge Management", "Electronic Navigational Instruments", "Global Maritime Search and Rescue Communications (GMDSS)" with CLIL-technology of language training.

Technologies have greatly developed for the last 20 years. L.Tetley and D. Calcutt mention that computerization and continuing development of large-scale integration (LSI) technology have been directly responsible for most of the changes. The large-scale manufacture of microchips has enabled the production of low-cost equipment with capabilities that could only have been dreamed about a decade ago. This reduction in size and cost has also brought sophisticated navigation equipment within reach of small-boat owners [5]. The role of navigation systems is great. Some of the electronic navigation systems include: Radar and Automatic Identification Systems (AIS), GPS (Global Positioning System), Chart Display and Information Systems (ECDIS), inertial navigation systems (INS).

Electronic navigation systems such as GPS (Global Positioning System) provide precise positioning information to vessels, allowing them to determine their exact location on the Earth's surface. Accurate positioning helps vessels to navigate safely and avoid hazards such as rocks, reefs, and shallow waters. In the event of equipment failure or loss of GPS signal, electronic navigation systems often have backup capabilities, such as inertial navigation systems (INS) or manual plotting tools, to enable vessels to maintain safe navigation and reach their intended destinations.

Radar and Automatic Identification Systems (AIS) are electronic navigation aids that help vessels detect and track other ships in their vicinity. By providing information about the position, course, and speed of nearby vessels, these systems enable ship operators to take evasive action to avoid collisions, thereby enhancing safety at sea.

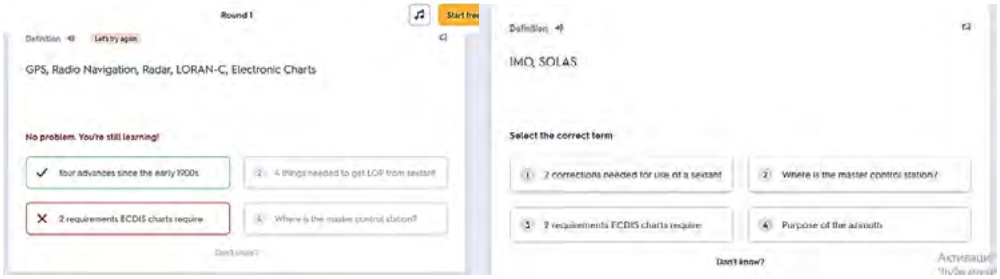
ECDIS (Chart Display and Information Systems) is a computer-based navigation system that displays electronic navigational charts (ENCs) and additional information such as ship's position, heading, speed, and route planning data. ECDIS improves situational awareness for navigators by presenting a clear and up-to-date picture of the vessel's surroundings, reducing the risk of navigational errors and groundings.

Electronic navigation systems are often integrated with other onboard systems, such as autopilots,

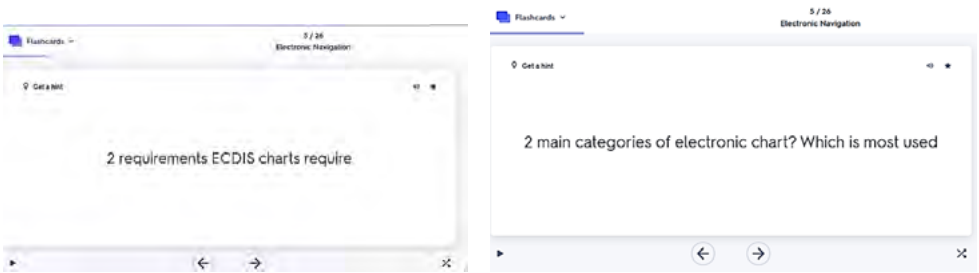
depth sounders, and gyrocompasses. This integration improves the efficiency and accuracy of navigation tasks, reducing the workload on crew members and minimizing the risk of navigational errors. Electronic navigation systems provide real-time weather information to vessels, including forecasts of wind, waves, and atmospheric conditions. This allows ship operators to make informed decisions about route planning and timing to avoid adverse weather and sea conditions, thereby enhancing the safety of navigation. Also, many electronic navigation systems have the capability to record and store navigational data, including the vessel's track, speed, and other relevant parameters. This data can be analyzed later to assess the vessel's performance, identify potential safety issues, and improve navigational practices.

Integrating Content and Language Integrated Learning (CLIL) principles into navigation equipment for sea vessels presents an innovative approach to enhance both navigational safety and crew competency. We use Quizzlet platform to create learning material and incorporate it in study process. It integrates interactive CLIL training modules directly into navigation equipment, providing crew members with on-the-spot language learning opportunities while familiarizing themselves with the equipment. These modules could include multimedia content, simulations, quizzes, terms matching and tests focused on navigation terminology and procedures in various languages. The Quizzlet platform is flexible and contents can be customizable. We suggest the following scheme on Quizzlet platform – learning of the terms, doing flashcards, matching and final test. The overall activity takes about 30 min. It should be born in mind that Quizlet can be used as additional means to training. Below there are some examples of CLIL-technology incorporated in learning technical subjects.

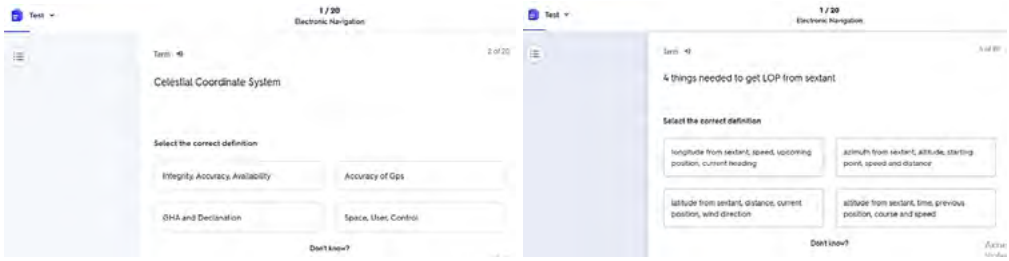
1. Subject "Electronic Navigational Instruments":
https://quizlet.com/455936505/learn



https://quizlet.com/455936505/flashcards



https://quizlet.com/455936505/test



2. Global Maritime Search and Rescue Communications (GMDSS)

https://quizlet.com/199199539/match

https://quizlet.com/199199539/test

https://quizlet.com/199199539/flashcards

3. Navigation Bridge Resource Management

https://quizlet.com/191619674/learn

https://quizlet.com/191619674/flashcards

https://quizlet.com/191619674/match

https://quizlet.com/191619674/test?answerTermSides=2&promptTermSides=6&questionCount=11&questionTypes=4&showImages=true

What is more, Quizlet may be used for creating new materials and customizing it to your particular needs and context integration. For example, based on lecture material we worked out some revision questions on the platform Quizlet on the topic *"Global Maritime Search and Rescue Communications (GMDSS)":*

1 State the four designed areas of the GMDSS radio net and explain the difference between areas A3 and A4.

2 What are the major differences between the Inmarsat and COSPAS/SARSAT satellite systems?

3 All vessels must carry two independent methods of distress alerting. Explain the alternative systems that are available for a vessel trading in area A3.

4 What information should the initial distress alert message contain?

5 If a disaster overwhelms a vessel before a manual distress alert can be transmitted, how is an automatic alert activated?

6 How may this alert message be acknowledged by a shore-based station?

7 What is a SART and how does it provide position information to rescue vessels?

8 How may vessels in a specific ocean region be alerted of a casualty by a shore station?

9 NAVTEX provides navigational and other information for shipping. Over what range would you expect to receive NAVTEX signals? [5].

Conclusions and perspectives. So, electronic navigation systems significantly influence the safety of navigation at sea by accurate positioning, facilitating collision avoidance, improving situational awareness, monitoring weather conditions, enabling emergency navigation, integrating with other onboard systems, and recording navigational data for analysis and improvement. These systems enhance situational awareness, reduce the risk of accidents, and contribute to safer and more efficient maritime operations. To learn the terms and definitions more efficiently CLIL technology could be incorporated into navigation equipment and systems learning. In the article we provide how this technology works on the subjects "Navigation Bridge Resource Management", "Electronic Navigational Instruments", "Global Maritime Search and Rescue Communications (GMDSS)". For this purpose, we used Quizlet platform which incorporates context into navigation equipment interactive training modules by providing information about maritime terms, definitions, regulations, navigational practices, abbreviations, etc. Further research consists in incorporating artificial intelligence (AI) in professional subjects.

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