



AGUHON

A Philippine Maritime History Journal

Volume 4, Issue Number 1





MUSEO MARITIMO
ASIAN INSTITUTE OF MARITIME STUDIES

AGUHON
A PHILIPPINE MARITIME HISTORY
AND HERITAGE JOURNAL

THEMATIC ARTICLES
FROM THE MUSEO MARITIMO
INTERNSHIP PROGRAM

Volume 4, Issue No. 1

About the Journal

A. Objective of the Academic Journal

In line with the vision of the Asian Institute of Maritime Studies (AIMS) to become the “Home of Maritime, Engineering, and Heritage Knowledge Exchange” in the country, AIMS Museo Maritimo has established *Aguhon: A Philippine Maritime History and Heritage Journal*. *Aguhon* is a non-refereed journal that aims to provide a platform for research related to maritime history and heritage.

As a developing field within historical studies, maritime history remains a growing area of interest. *Aguhon* seeks to contribute to the ongoing discourse and body of literature on the subject. As a non-refereed journal, it prioritizes creating a space for initial discussions and assembling foundational works that may later evolve into peer-reviewed and specialized academic research.

This pioneering initiative reflects AIMS Museo Maritimo’s broader commitment to building a comprehensive repository of maritime knowledge—one that can support the nation-building efforts of a maritime Philippines.

Most importantly, *Aguhon* is a thematic journal whose content provides the contextual foundation for the exhibitions curated by AIMS Museo Maritimo.

B. Background of the Academic Journal

Aguhon is a Tagalog translation of a compass. Since the locus of (AIMS) Museo Maritimo is maritime heritage and history, the adoption of a compass to signify the academic journal complements the identity and story of the museum. A compass is a necessary instrument for navigation. It guided sailors through centuries. In conjunction to the purpose of a compass, the journal also intends to support and navigate maritime related studies in the Philippines.

Editor

The editor's responsibilities include both copy-editing and proofreading. In addition to these tasks, the editor oversees and manages the overall operations of the academic journal. The editor is also responsible for ensuring that the journal's thematic content aligns with the exhibitions of AIMS Museo Maritimo, with the journal serving as a contextual foundation for these exhibitions.

Head Editor: Mr. Daryl Lorence P. Abarca

Editor: Ms. Nina Ricci D. Racela

A Letter from the Editor

Dear Reader,

It is with great pride that we present the fourth volume of *Aguhon: A Philippine Maritime History and Heritage Journal*. In exploring the multifaceted identity of the Philippines, scholars have employed diverse interpretative frameworks—from class struggle and historical materialism to ecclesiastical influence and cultural hybridity. Yet, no single perspective can fully capture the richness and complexity of the Filipino experience.

At Museo Marítimo, our lens is anchored in the maritime heritage of the archipelago. We understand the Philippines as a nation shaped by the sea, where the lives, culture, economy, and identity of its people are inextricably linked to the maritime environment. This volume of *Aguhon* continues our commitment to this perspective by presenting scholarly, interdisciplinary articles that examine the Philippines as a maritime nation-state and explore the transformative role of museums in public engagement and education.

Volume V takes a distinctive curatorial approach by prioritizing educational programming before collections. Our process begins with identifying the most effective educational strategies for our primary audiences—students and museum visitors, predominantly at the high school and college levels. Only after determining the educational framework do we conceive the narrative, which then informs curatorial decisions,

including the selection of objects. This methodology contrasts with the traditional object-first approach, placing visitors at the center of the museum experience rather than the collection itself.

We extend our deepest gratitude to our authors, whose dedication and scholarly rigor have made this volume possible. Their research enriches the journal with diverse perspectives and thematic depth, reinforcing *Aguhon* as a vital platform for interdisciplinary discourse on Philippine maritime history and heritage.

We are equally thankful to our readers, whose engagement and support represent the highest form of recognition for our work. Your continued interest inspires us to delve deeper and strive further in preserving and sharing the maritime narrative of our nation.

This endeavor would not have been possible without the steadfast support of our Vice President for Student Services and Development, Dr. Lamberto G. Mindanao, whose guidance and encouragement have been instrumental in the journal's development. We also extend our sincere thanks to Mr. Juan Martin R. Guasch, whose direction and diligence were crucial to the journal's design and production.

Finally, we acknowledge the enduring support of the VPSS Office and the Polytechnic University of the Philippines Department of History. On behalf of the entire editorial team,

we thank you for joining us in this voyage through the maritime heritage of the Philippines. We hope that Aguhon continues to educate, inspire, and provoke thoughtful reflection on what it truly means to be a maritime nation.

Sincerely,

Mr. Daryl Lorence P. Abarca
Editor

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Preface

The Philippines is a nation defined by water. Its thousands of islands, scattered across the western Pacific, have made the sea both a connector and a shaper of its people, culture, and history. For millennia, the archipelago has stood at the crossroads of civilizations, drawing waves of migrants, traders, and colonizers from Austronesian, Indo-Malay, Chinese, Islamic, Hispanic, and Anglo-American worlds. The Filipino identity, resilient and ever-evolving, is the living synthesis of these diverse currents—a reflection of a people forged by both land and sea.

In this fourth volume of *Aguhon*, we cast our gaze upon the maritime industry in its full scope—from the intricacies of global shipping and shipbuilding to the operations of ports, customs, and the supply chains that bring goods from factory to home. Anchored in the educational and professional frameworks of the five schools of AIMS, this volume illuminates the contemporary Filipino role in a global maritime network, connecting historical heritage to present realities. It continues our pursuit of a central question: What does it mean for the Philippines to be a maritime nation-state?

Central to this volume is another question: How can museums make visitors—not objects—the heart of the story? Here, we experiment with a visitor-centered curatorial approach, beginning with educational programming to identify the most effective ways to engage students and general audiences. Only

after this framework is set do we craft narratives and select objects that support them. By reversing the traditional object-first methodology, museums become more than repositories of artifacts—they become immersive spaces where history, industry, and culture come alive.

Through gamification, participatory learning, and experiential storytelling, we invite visitors to step into the maritime world, to understand not only the mechanics of the industry but also the human stories it carries. This approach transforms the museum into a dynamic platform for exploration, where the richness of the Philippines' maritime past informs its present and inspires its future.

We invite readers to join us on this journey—not simply to witness history, but to engage with it. In understanding the maritime networks that connect the Philippines to the world, we gain a renewed appreciation for the enduring role of Filipinos in shaping global maritime culture and commerce.

Let us rediscover together how the archipelagic geography, deep maritime heritage, and enduring relationship with the sea continue to define the Filipino people, their culture, and their place in the world.

Maritime Connectivity: Interactive Learning Tools for Understanding Vessel Procedures

Karla Jane C. Cataluña

Abstract

Board, Decode, and Dock! is a gamified learning tool designed to help students master the steps and terminology of vessel entry and exit procedures. Using a crossword-style board, players solve definitions from cue cards, unscramble maritime terms, and strategically place them on the grid. The game promotes vocabulary retention, critical thinking, and procedural understanding, transforming complex port operations into an engaging and interactive challenge. By integrating teamwork and problem-solving, it creates a dynamic learning environment where students actively apply their knowledge rather than passively memorizing concepts. This innovative approach not only reinforces key maritime lessons but also demonstrates how gamification can make technical topics more accessible, memorable, and enjoyable for learners, preparing them for real-world applications in maritime operations.

Key Words: Crossword-style board, Gamification, Problem-solving, Teamwork

Introduction

In the dynamic field of maritime operations, every vessel's entry and exit from a port follows a structured series of steps. This process requires not only to secure the correct documents and meet the inspection requirements but to also follow a precise procedural sequence, ensuring that safety, efficiency, and compliance are met and regulated. While these concepts are traditionally taught through lectures or written materials. They can be challenging for students to fully absorb without interactive, hands-on learning.

Through this exhibit entitled, "Maritime

Connectivity." the AIMS Museo Maritimo, in collaboration with the interns from the Polytechnic University of the Philippines (PUP), introduces an educational word game that blends the challenge of a crossword puzzle with the strategy of a Scrabble. This activity was designed not only to entertain but to also strengthen the student's grasp of key maritime terms, particularly those involved in the vessel entry and exit process.

By solving clues, unscrambling words, and strategically placing letter tiles on a crossword-style board, students actively engage with technical vocabulary in a way that is both memorable and enjoyable. This approach transforms potentially

overwhelming terminology into an interactive challenge that promotes recollection, reinforces understanding, and encourages collaboration among participants.

Gamified Learning Approaches: Integrating Game-Based Strategies in Education

Gamification has been shown to positively influence student learning by enhancing both motivation and retention of knowledge. A systematic review by Surendeleg et al. (2024)¹ on gamified learning reported that more than half of the studies examined

documented significant improvements in motivation, engagement, collaboration, and autonomy among students exposed to game-based educational methods. Furthermore, approximately one-third of these studies observed measurable gains in cognitive performance and learning outcomes, suggesting that integrating elements such as challenges, rewards, and progress tracking into instruction not only makes lessons more engaging but also facilitates deeper understanding and retention of subject matter.

¹ Surendeleg, G., et al. (2024). Gamification in education: A systematic review of recent research. *Education Sciences*,

14(6), 639.
<https://doi.org/10.3390/educsci14060639>

These findings are further supported by a longitudinal study conducted by Armier et al. (2020)², which involved 617 students from both secondary and tertiary education levels. The research demonstrated that gamified workshops consistently resulted in higher knowledge retention compared to traditional teaching methods. Importantly, this effect was evident across different age groups and genders, indicating that gamified strategies have broad applicability and can effectively enhance learning regardless of demographic differences. Together, these studies underscore the

potential of gamification as a pedagogical tool capable of making lessons more memorable and impactful.

Board, Decode, and Dock: Connecting Maritime Terms through Play

The Maritime Connectivity exhibit features a unique educational activity designed to strengthen participants' understanding of vessel entry and exit procedures through a blend of puzzle-solving and strategic play.

This activity, *Board, Decode, and Dock!*, combines the mechanics of a crossword puzzle and the strategic

² Armier, D. D., Shepherd, C. E., & Skrabut, S. (2020). Using game elements to increase student engagement in course activities.

Computers in Human Behavior, 110, 106390.
<https://doi.org/10.1016/j.chb.2020.106390>

letter placement of Scrabble. Participants are presented with a crossword-style board where the first letter of each word is already provided. To complete the board, players draw Clue cards—each containing a definition of a function of a maritime term, along with a jumbled version of the answer as a secondary hint. Using letter tiles, they must unscramble the term and place it in its correct position on the board.

The game works as both a vocabulary builder and a procedural review, encouraging players to recognize essential maritime terms and understand their role in port operations. It also fosters collaboration,

communication, and problem-solving when played in teams. By turning technical terminology into an interactive challenge, Vessel Vocab Quest transforms what could be a daunting list of processes into a fun, engaging, and memorable learning experience.

Learning Objectives

The objective of this game is to successfully complete the crossword-style board by correctly identifying and placing maritime terms related to the vessel entry and exit process. Using only the definitions and scrambled terms provided on the cue cards, players must analyze each description, unscramble the letters, and strategically

arrange the words on the grid. This process encourages students to actively engage with maritime vocabulary, improving their ability to recognize and recall key terminology. Beyond vocabulary building, the game reinforces familiarity with the step-by-step procedures required for vessel clearance and port operations. When played in teams, it also promotes communication, teamwork, and collective problem-solving, making it a versatile educational activity that combines critical thinking, collaboration, and subject mastery in an engaging, interactive format.

Step-by-Step Instructions

1. Game Setup

- Place the crossword-style game board on the table.
- The first letter of each answer is already hinted at on the board.
- Shuffle the Clue cards and place them in a face-down pile.
- Prepare the letter tiles for players to use.

2. Understanding the Clue Cards

- Each Clue card contains:
 - A definition or function of a maritime term.

- A jumbled version of the term as a secondary hint.
- on the crossword board.

3. Player Turn Sequence

- On their turn, a player draws a Clue card.
- They read the definition aloud to the group.
- Using the jumbled letters as an extra hint, the player must identify the correct term.
- Once the term is guessed correctly (by the player or the group, depending on the instructor's discretion), the player uses the tiles to complete the corresponding space

4. Scoring Options (Instructor's discretion)

- Individual mode: The player who correctly solves and places the word earns points.
- Team mode: Teams collaborate to fill the board, earning points for each correct term.

5. End of the Game

- The game ends when the crossword board is fully completed or when a set time limit expires.
- Points are tallied, and the highest-scoring player or team is declared the winner.

Clue Cards

The cue cards are a core element of the game, designed to guide players through each step of solving the puzzle while reinforcing their understanding of maritime concepts. Each card features a concise definition or description of a term directly connected to the vessel entry and exit process, ensuring that participants are exposed to accurate and relevant industry terminology. To add a layer of difficulty and engagement, the correct answer is presented in a jumbled format, requiring players to unscramble the letters before placing the term onto the board. This dual challenge encourages learners to rely not only on memory but also on

reasoning, deduction, and vocabulary recognition. By decoding the term from the description and reordering the letters, students strengthen both their comprehension and problem-solving abilities. The cue cards provide the only source of clues in the game, making them central to gameplay and a valuable study tool for mastering key maritime procedures.

Crossword-inspired Board

The game board serves as the central playing field and primary visual guide for the activity, styled like a crossword puzzle to organize the placement of maritime terms. Each space on the board corresponds to a specific word connected to vessel entry and exit

processes, and players must use the information provided on the cue cards to determine the correct answers. Unlike traditional crossword puzzles, the board itself contains no written hints or clues; instead, it acts as a blank framework where players apply their knowledge by solving card-based prompts and placing the correct letters. This design shifts the focus away from guessing and emphasizes comprehension, interpretation, and problem-solving. The clean, structured layout helps participants visually connect related maritime terms, reinforcing their understanding through repetition and interaction. By relying solely on external cue cards for guidance, the

game encourages learners to engage deeply with each definition, ensuring a stronger grasp of terminology and its practical functions.

Reference Guide to Board, Decode, and Dock

This section provides a curated list of key maritime terms used in the vessel entry and exit process, along with their corresponding functions. These terms, featured on the game's cue cards, serve as essential reference points to help students connect definitions with real-world port operations and procedures.

Coordinates	Terms	Description/Function
Down - 1	Notice	Announcement of Arrival filed before the vessel enters port
Down - 2	Crewlist	Document listing all crew members on board
Down - 3	Arrival	Time a ship officially enters the port for inspection
Down - 4	Boarder	Customs Boarding Officer who checks arriving vessels
Across - 4	Bonded	Refers to bonded store list of ship's supplies
Across - 5	Pre - Arrival	Filling of entry; Assignments of Customs Boarding Team; Submission of e-IFM
Down - 6	Export	Declaration needed when a vessel departs with goods
Down - 7	Stowage	Cargo stowage plan showing storage placement

Across - 8	Vessel	The ship undergoing entry or exit procedures
Down - 9	Exit	Submission of Required Documents and Permits; Loading and Stuffing of Cargoes
Across - 10	Harbour	Area where ships dock for clearance and unloading
Across - 11	Unload	Process of discharging cargo upon arrival
Down - 12	Permit	Authorization required before unloading cargo
Across - 12	Parcel	List of parcels carried aboard the vessel
Down - 13	Load	Process of placing cargo aboard for departure

Table 1

Educational Takeaways

This activity is designed to strengthen students' understanding and familiarity with essential maritime terminology, especially those related to the vessel entry and exit process, which is central to port operations. Through repeated engagement with these terms in a crossword-style format, learners move beyond simple memorization and begin to recognize and recall key concepts with ease. By interpreting clues, unscrambling words, and carefully placing them on the board, students actively process information, making connections between definitions and their applications in real-world maritime contexts.

This hands-on interaction helps build confidence and ensures that these critical concepts become part of their long-term knowledge.

The activity also emphasizes critical thinking. Participants are challenged to analyze clues, interpret terms, and determine the logical placement of answers within the grid, a process that mirrors real-world problem-solving scenarios. This integration of reasoning skills into vocabulary learning ensures that students not only know the words but also understand their significance in vessel entry and clearance procedures.

When played in groups, the game introduces a valuable social and collaborative

element to learning. Students must communicate effectively, share their perspectives, and work together to solve the puzzle, fostering teamwork and leadership skills that are equally important in maritime operations. The cooperative nature of the game promotes a supportive learning environment where students can exchange knowledge and build confidence while having fun.

Ultimately, this gamified activity transforms what could otherwise be a highly technical and overwhelming topic into a more approachable and memorable learning experience. By presenting port operations in an

engaging, puzzle-based format, students are more likely to retain information, participate actively, and appreciate the importance of accuracy and order in maritime work. This approach blends education and enjoyment, encouraging learners to apply their classroom knowledge in a creative and meaningful way.

Conclusion

By integrating strategic thinking, collaboration, and word-based problem-solving into the learning experience, the Maritime Connectivity exhibit offers a fresh and engaging way for students to internalize the steps and terminology associated with vessel entry and exit procedures. The

activity Board, Decode, and Dock! goes beyond a simple vocabulary exercise; it challenges learners to actively interpret clues, sequence maritime processes, and visualize how each step connects to larger port operations. This method shifts students from passive learning to active participation, encouraging them to take ownership of their understanding while reinforcing accuracy, order, and practical knowledge application.

The exhibit demonstrates that complex maritime concepts—such as customs clearance, port inspections, cargo documentation, and vessel movement—can be made approachable and memorable through thoughtful gamification. By combining play and

strategy, the activity breaks down intimidating technical terms into interactive challenges that students can solve collaboratively. In doing so, learners build familiarity not only with definitions but also with their real-world functions, making the transition from theoretical understanding to applied knowledge smoother and more meaningful. Beyond mastering content, the game nurtures critical soft skills vital to maritime professions, such as teamwork, problem-solving, and time management. Group dynamics mirror operational teamwork at ports, helping students prepare for collaborative environments where precision and communication are

essential. The balance of competition and cooperation creates an atmosphere where participants feel motivated, engaged, and supported as they develop both competence and confidence in maritime procedures.

Ultimately, this exhibit proves that education in maritime operations does not have to remain confined to traditional lectures or textbooks. By merging entertainment with rigorous learning objectives, Board, Decode, and Dock! stands as an innovative teaching tool, equipping students to approach the complexities of port operations with both enthusiasm and expertise

Documentation



Board, Decode, and Dock! is an educational, crossword-style puzzle game developed for Deck 6: Maritime Connectivity at AIMS Museo Maritimo. Designed to highlight the vessel entry and exit process, this gamified activity challenges

participants to solve clue cards, unscramble maritime terms, and strategically place them on a large board.

As an interactive exhibit piece, it adds a dynamic element to the museum experience, inviting visitors to engage with maritime concepts in a fun, memorable way. For students, it serves as a practical learning tool, reinforcing technical vocabulary and procedural knowledge while promoting teamwork, critical thinking, and active participation.



Connectivity theme for Deck 6, the game represents the intern's efforts to design a meaningful, engaging, and educational exhibit piece. This project reflects her research, creativity, and collaboration, showcasing how gamified activities can support both museum goals and maritime education. As a lasting contribution, the game enriches the museum's offerings while serving as an innovative teaching tool for students and educators alike.

Board, Decode, and Dock! was conceptualized and developed by Karla Jane C. Cataluña, an intern from the Polytechnic University of the Philippines (PUP) as part of the final output for her internship program at AIMS Museo Maritimo. Created under the *Maritime*

Mechanics for Playing

Step 1. Pick a clue card.



Select a card that provides a short definition or description of a maritime term related to vessel entry and exit.

Step 2. Find the letters that match the hint provided.



Gather the letter tiles needed to form the answer based on the jumbled hint on the card.

Step 3. Unscramble the letters and place the word in its respective coordinate.



Arrange the tiles in the correct order and position them on the designated spot on the crossword-style board.

References

Armier, D. D., Shepherd, C. E., & Skrabut, S. (2020). Using game elements to increase student engagement in course activities. *Computers in Human Behavior*, 110, 106390. <https://doi.org/10.1016/j.chb.2020.106390>

Surendeleg, G., et al. (2024). Gamification in education: A systematic review of recent research. *Education Sciences*, 14(6), 639. <https://doi.org/10.3390/educsci14060639>

From Exhibit to Experience: Gamifying the Maritime Museum in Pasay

Zildjian Rynne Fernandez

Abstract

This study examines how AIMS Museo Maritimo can strengthen Philippine maritime identity through an interactive breakout or mystery-room-style educational program. Responding to declining visitor engagement and the growing appeal of digital entertainment, the project adapts gamified learning—using QR codes, storytelling, and clue-based challenges—to transform the museum into a hybrid physical-digital learning space. Using a qualitative, practice-based approach, a three-level game prototype (Easy, Medium, Hard) was developed, guiding visitors through key exhibits while promoting problem-solving, historical awareness, and self-paced exploration. Drawing on global examples of museum gamification, the study shows that immersive, interactive programming can enhance visitor engagement and support Museo Maritimo’s mission to foster a deeper understanding of Philippine maritime heritage.

Key Words: Maritime Heritage, Museum Education, Gamification, Interactive Learning, & Visitor Engagement

Introduction

Composing of over 7,600 islands and boasting an irregular coastline ranking fourth globally, Philippines is widely recognized as the global center of marine biodiversity. A lot of people reside in coastal zones, making the ocean not only a source of livelihood but also prime to its cultural and historical activity.³ However, a lot of Filipinos from different generations do not have much awareness and knowledge when it comes to maritime. Therefore, what this research wants to explore is how museums, like the

AIMS Museo Maritimo can help reinforce a national maritime identity through educational programming such as an interactive breakout or mystery room – this is designed to enhance museum engagement and historical understanding. The activity will guide visitors across key exhibit areas in the Lighthouse building, starting from the museum proper while also covering decks 1-5 through clues rooted in historical artifacts, displays, and themes.

Museums and other cultural organizations find it difficult to stay relevant at a time when people's attention spans are getting shorter

³ Miguel De Castro, *An Archipelagic Mindset: The Case for Developing a National Maritime*

Identity in Pursuit of Archipelagic Security (ONSS StratJournal, 2021), 5.

and digital entertainment is taking over, particularly with younger audiences like Gen Z's. Many of them come primarily to snap pictures for social media (which is totally fine, but if they do not leave with something new or insightful to learn, it is a lost chance. If they could actually get the most out of their visit, it would be even better. Even though traditional exhibitions offer valuable historical information, some may not be able to give visitors an engaging and immersive experience. Museums all around the world (e.g., Sweden and Switzerland) have started incorporating educational programming that goes beyond passive viewing in order to close this gap. Interactive formats like escape rooms, puzzle trails,

and mystery-based learning have been adopted. By reimagining museum spaces, these strategies create a more engaging experience for visitors, sparking their curiosity and encouraging critical thinking.

What is AIMS Museo Maritimo all about?

The Asian Institute of Maritime Studies' Museo Maritimo celebrates the resilient spirit of Filipino mariners and is committed to promoting and conserving the Philippines' maritime heritage. From antiquity to the present, the museum's carefully chosen displays and artifacts document their key role in nation-building, creating a comprehensive account of

the nation's maritime heritage. In addition to preserving cultural history, Museo Maritimo operates as a "factory of knowledge" by actively fostering research, publishing, seminars, and educational engagement.⁴ This breakout room project will open new avenue for the whole AIMS community and also to casual museumgoers while promoting maritime consciousness.

Review of Related Literature

Museum as Educational Space

1. Museums as Informal Learning Environments

Learning isn't limited to formal education. People learn all the time, in all sorts of places, even after they've finished school. Modern museums are now more than just places with artifacts; they're becoming centers for relaxation, fun, and informal learning. Research shows that learning in museums is highly effective because it's based on personal, emotional experiences that people remember for a long time.⁵

⁴AIMS Museo Maritimo, "ABOUT MUSEO MARITIMO" <https://www.aimsmuseomaritimo.com/about>

⁵Marija Brajčić and Dubravka Kušćević, "Museum as a Place of

Informal Learning," *Revija za Elementarno Izobraževanje* 15, Special Issue (August 2022): 27–40, <https://doi.org/10.18690/rei.15.Special.Iss.27-40.2022>

2. Role in Nation-Building and Cultural Memory

Museums are crucial for maintaining cultural heritage, strengthening national identity, and advancing local communities. Through education, tourism, and cultural involvement, they foster socioeconomic progress and contribute to the formation of collective memory by preserving artifacts and narratives. Scholars emphasize that museums serve as both active agents and cultural repositories, preserving heritage and boosting a community's educational and cultural capital.⁶

3. Educational Programming and Gamification in Museums

Recent studies in museum education highlight a shift from traditional pedagogical approaches toward interactive and participatory learning models. Scholars note that integrating game-based mechanics can transform the museum visit from a passive encounter into an active exploration. These strategies, grounded in constructivist learning theory, are shown to increase retention, stimulate problem-solving, and encourage collaborative

⁶Oluwafemi Dayo Abiodun Femi et al., *The Role of Cultural Heritage Museums in Community*

Development (2020), accessed August 15, 2025, DOI: 10.13140/RG.2.2.15495.20640

engagement among diverse audiences.⁷

One example is *The Quest*, an interactive game staged at the Swedish National Museum of Technology. The activity drew inspiration from escape room mechanics but adapted them for an open museum environment. Instead of locking participants in a room, visitors freely explored the exhibition while solving clues to locate fictional treasures hidden by a turn-of-the-century explorer. The game's design encouraged physical

interaction with the displays and integrated a "passport" device for clue input. Its aim was to stimulate interest in STEM (Science, Technology, Engineering, and Mathematics) subjects by combining storytelling with hands-on engagement in a science center setting.⁸

Another case is *UnlockArt*, an augmented reality (AR) escape room at the Museo delle Culture in Lugano, Switzerland. This project demonstrated how AR can be used in cultural mediation to create immersive, interactive

⁷ Hui Li and Muzhi Zhang, "Museum Game-Based Learning: Innovative Approaches from a Constructivist Perspective," *Frontiers in Education* 10 (May 2025), <https://doi.org/10.3389/educ.2025.1576207>

⁸ Johan Lundin et al., "The Quest: An Escape Room Inspired Interactive Museum Exhibition," *Proceedings of the 13th European Conference on Games Based Learning, ECGBL 2019*, 420–428,

museum experiences under strict curatorial constraints. Visitors borrowed tablets equipped with the AR application, allowing them to solve puzzles embedded in real exhibition elements without disrupting other guests. The game followed a linear progression suitable for the museum's layout, while also fostering soft skills and subject-specific knowledge. Informal feedback from both visitors and staff indicated high satisfaction and demand for similar future experiences.⁹ These case studies show how technology-enhanced, game-like programs can turn trips to museums into fun, active learning experiences. Museums may

simultaneously accomplish instructional goals and appeal to younger audiences, especially Gen Z and millennials, by combining storytelling, interactivity, and digital resources.

Integration of Technology: Mobile Devices, QR Codes, and Web Applications

This educational programming incorporates mobile devices, QR codes, and web-based applications to improve visitor contact and expedite the game flow, acknowledging the essential role that technology plays in modern learning and cultural engagement. This method enables visitors to

⁹ Davide Zanda et al., "UnlockArt: Cultural Mediation through AR Escape Room," *Proceedings of the*

17th European Conference on Games Based Learning, ECGBL 2023, 44–51

interact with exhibitions both digitally and physically, which is in line with the expanding global trend of digital-physical hybrid museum experiences.¹⁰

Implementation Process:

Entry and Registration – Visitors enter through Gate 2 of AIMS, register at the designated counter, and proceed via the lighthouse building elevator to the sixth floor.

Museum Entry Point – At the entrance to the museum proper, visitors encounter a poster

containing a QR code. This QR code provides direct access to the game’s mechanics, storyline, and initial instructions via their mobile devices.

Device Use During Gameplay – Throughout the activity, players use their own mobile devices to scan QR codes, receive digital clues, and submit answers.

Connectivity Support – AIMS is working to ensure consistent internet access within the museum premises to enable uninterrupted gameplay for all participants.

¹⁰ Ahdab Najib Hijazi and Ahmad Hanif Ahmad Baharin, “The Effectiveness of Digital Technologies Used for the Visitor’s Experience in Digital Museums: A Systematic Literature

Review from the Last Two Decades,” *International Journal of Interactive Mobile Technologies* 16, no. 16 (August 2022): 142–59, <https://doi.org/10.3991/ijim.v16i16.31811>.

This integration of technology not only provides real-time interactivity but also facilitates self-paced exploration. Utilizing QR codes also lessens the need for printed materials, which supports a contemporary experience while also making museum operations more sustainable.

Methodology

Research Design

Using a qualitative, exploratory, and practice-based research approach, this study concentrated on creating and testing a museum-based breakout/mystery game as an interactive educational exercise. The strategy was based on developing a prototype (with the help of

the other interns), combining gamified clue-finding, narrative storytelling, and digital tracking enabled by QR codes to evaluate its potential for improving visitor engagement and scoreboard monitoring. This game is first and foremost intended for unguided tours. The intervention was inspired by educational escape room mechanisms, such as thematic immersion, sequential problem-solving, and clue finding, but modified for a museum setting. This design made sure it was completely in line

with the museum's mission to educate.¹¹

Game Metrics

The project produced a three-tiered difficulty system: Easy, Medium, and Hard with each grounded in a master storyline and unified by a maritime heritage theme to align with the institution's mission of promoting an archipelagic mindset.

Difficulty levels and core mechanics

Easy Level: "Tides of Destiny: The Search for Captain Reyes"

This introductory level targets casual museumgoers

and younger visitors. Participants are cast as junior crew members on a rescue mission to locate a missing captain. The activity directs visitors to key exhibits representing maritime safety, historical figures, and navigational tools. Each station provides a puzzle whose solution corresponds to a letter in the final destination ("BALER"). Visitors must collect 5 letters.

¹¹ Panagiotis Fotaris and Theodoros Mastoras, "Room2Educ8: A Framework for Creating Educational Escape Rooms Based on Design Thinking

Principles," *Education Sciences* 12, no. 11 (October 2022): 768, <https://doi.org/10.3390/educsci12110768>

Learning Objectives:

- Understand basic maritime safety protocols and navigation tools.
- Engage in sequential problem-solving through artifact interaction.

Example Mechanics:

- Enrique of Malacca → 3rd letter extraction.
- Maritime Smoke Signals → identifying letters from artifact names.
- Life vest and barometer → first-letter identification from descriptions.

Time Limit: 30 minutes

At the end of the mission, participants are directed back to the museum proper (Deck 6) where the storyline

concludes with the rescue of Captain Reyes. As an optional extension, visitors are encouraged to try the museum’s Ship Simulator, selecting Cruise 11: Chase the Bandits & Sink Them. This task has no time limit but allows players to simulate a maritime chase, reinforcing both the rescue narrative and the museum’s educational resources in a playful, interactive way.

Medium Level: “The Voyage’s Last Signal”

Designed for participants with prior exposure or a stronger interest in history, this level focuses on the historical evolution of Philippine maritime activity. Players follow a trail of clues across six museum decks, uncovering letters to spell a



secret destination linked to early navigation and global trade. The storyline emphasizes problem-solving within historical context and critical interpretation of exhibit content.

Learning Objectives:

- Identify key milestones in Philippine maritime history, from early seafaring to modern trade.
- Apply analytical reasoning to sequence letters and reconstruct hidden messages.

Example Mechanics:

- Lighting receptacle → first letter of artifact.
- Manila → extracting letters from historical text descriptions.

- Bonus challenges and historical interpretation for additional letters.

Time Limit: 45 minutes

Upon entering the answer in the mobile application, a congratulatory message appears, followed by an optional extension task/game which reinforces the storyline while providing visitors with a hands-on interactive experience. By linking the LIGHTHOUSE code to the Titanic game, participants are reminded of the global lessons that shaped maritime safety protocols.

Hard Level: “The Lost Voyage”

This advanced level simulates a maritime whodunit in which participants uncover the

truth behind a captain's death in 1898. Clues are dispersed across museum exhibits, and participants must decode 18 letters to reveal the location of a hidden chest. This level emphasizes historical reasoning, inferential thinking, and attention to detail.

Learning Objectives:

- Synthesize maritime history with narrative problem-solving.
- Develop deductive reasoning skills through artifact-based clues.
- Engage in immersive storytelling to foster emotional and cognitive learning.

Example Mechanics:

- Tabon Cave exhibit → vowel extraction from artifact names.
- Murillo Velarde map → letter extraction from historical titles.
- Maritime Nation-State panel → sequential decoding of text-based clues.
- Bonus letters integrated across decks for enhanced engagement.

Time Limit: 2-4 hours

While the Hard level adopts the form of a fictionalized murder mystery, it remains firmly anchored in the Philippine maritime narrative. The story of Captain Pineda's death aboard the Santa Arnaiz is not intended as historical fact but as a narrative device

that engages players with maritime heritage in an interactive manner. Each clue is drawn directly from the museum’s exhibits—ranging from precolonial navigation and transpacific trade to naval history and contemporary maritime safety—which ensures that participants continue to learn about the Philippines as a maritime nation-state. The dramatic tension of solving a crime at sea highlights the timeless importance of navigation, safety, and seafaring ethics, culminating in the symbolic “red lantern” that underscores maritime safety protocols. In this way, the ystery format does not detract from the educational mission but instead reinforces it by providing an innovative,

experiential pathway to understanding Philippine maritime identity.



Figure 1: Presenting the game’s introduction on the website



Figure 2: Demonstrating the use of mobile QR-based.



Figure 3: Presenting the registration poste and photo-op poster.

Site Description

The AIMS Museo Maritimo is organized into thematic decks, each housing specific collections relevant to Philippine maritime heritage. The breakout/mystery game's design strategically incorporated these spatial divisions, ensuring that each level's puzzles were directly linked to the artifacts and narratives present in that section.

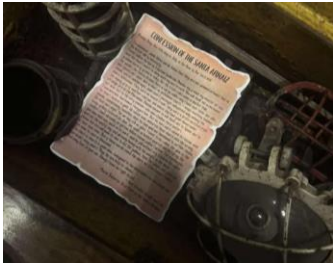


Figure 4: Hard Level Props



Figure 5: Registration posters

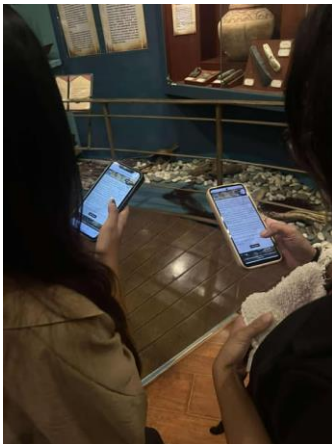
Gamification Features:

- Online leaderboard for team names and completion times

- Photo wall with museum hashtag for social sharing

Data Collection

During the initial pilot run, two interns provided feedback on the online escape room. According to them, the level of difficulty was appropriate for Gen Z participants—challenging enough to stimulate critical thinking, but not too difficult to discourage them from completing the activity. They also observed that the design of the clues encouraged participants to move around the museum, which not only made the activity more engaging but also maximized the use of the entire building and its exhibits.



Figures 6 and 7: Dry run conducted by the interns

Conclusion

To close, the easy, medium, and hard versions of these Maritime Mystery present a tiered learning journey where difficulty reflects depth of engagement with Philippine maritime identity. From straightforward factual clues to optional global linkages like the Titanic, and finally to the hard mode's dramatic twist in Captain Pineda's story, each level reinforces that the Philippines is a maritime nation-state whose history, labor force, and safety standards continue to shape its present. The final word "LIGHTHOUSE" on the medium version becomes a unifying symbol: a beacon of guidance, safety, and enduring maritime heritage that ties together the

nation's past, present, and future.

The design and testing demonstrated that escape room mechanics can be effectively adapted to the museum setting to engage the Gen Z and millennial audiences. By structuring puzzles into three difficulty levels, the activity caters to a wide range of visitors, from casual learners to those seeking more immersive challenges. The integration of maritime history, national identity, and contemporary issues such as OFWs and seafaring highlights the museum's core narrative while maintaining interactivity. Visitors are not only entertained but are also prompted to reflect on the historical and cultural

significance of the Philippines as a maritime nation-state.

Possibilities for Improvement, Scalability, or Institutional Use

For future development, the platform can be made more visually creative and interactive. For instance, adding animations, interactive graphics, or gamified elements on the website would further enhance user engagement. This can help sustain interest, especially among younger audiences who are accustomed to digital media. Moreover, the game can be scaled for institutional use by customizing the content for specific audiences—such as students on educational

tours, museum visitors of different age groups, or even maritime professionals seeking heritage-based training. With further refinement, the activity has the potential to become a permanent museum feature that highlights maritime history while keeping the learning process fun and memorable.

References

- Abiodun Femi, Oluwafemi Dayo, et al. *The Role of Cultural Heritage Museums in Community Development*. 2020. Accessed August 15, 2025. DOI: 10.13140/RG.2.2.15495.20640.
- AIMS Museo Maritimo. "ABOUT MUSEO MARITIMO." <https://www.aimsmuseomaritimo.com/about>.
- Brajcic, Marija, and Dubravka Kušević. "Museum as a Place of Informal Learning." *Revija za Elementarno Izobraževanje* 15, Special Issue (August 2022): 27–40. <https://doi.org/10.18690/rei.15.Spec.Iss.27-40.2022>.
- De Castro, Miguel. *An Archipelagic Mindset: The Case for Developing a National Maritime Identity in Pursuit of Archipelagic Security*. ONSS StratJournal, 2021. <http://onsssm.navy.mil.ph/news/SJ%20Volume%209%20Issue%201.pdf>
- Fotaris, Panagiotis, and Theodoros Mastoras. "Room2Educ8: A Framework for Creating Educational Escape Rooms Based on Design Thinking Principles." *Education Sciences* 12, no. 11 (October 2022): 768. <https://doi.org/10.3390/educsci12110768>.
- Hijazi, Ahdab Najib, and Ahmad Hanif Ahmad Baharin. "The Effectiveness of Digital Technologies Used for the Visitor's Experience in Digital Museums: A Systematic Literature Review from the Last Two Decades." *International Journal of Interactive Mobile*

Technologies 16, no. 16 (August 2022): 142–59.

<https://doi.org/10.3991/ijim.v16i16.31811>.

Li, Hui, and Muzhi Zhang. “Museum Game-Based Learning: Innovative Approaches from a Constructivist Perspective.” *Frontiers in Education* 10 (May 2025).

<https://doi.org/10.3389/feduc.2025.1576207>.

Lundin, Johan, et al. “The Quest: An Escape Room Inspired Interactive Museum Exhibition.” In *Proceedings of the 13th European Conference on Games Based Learning, ECGBL 2019*, 420–428.

Zanda, Davide, et al. “UnlockArt: Cultural Mediation through AR Escape Room.” In *Proceedings of the 17th European Conference on Games Based Learning, ECGBL 2023*, 44–51.

What's on Your Horizon?

Kristine Mae L. Jacla

Abstract

This paper presents the Career Canvas Map, a student-centered framework designed to guide the students of Asian Institute of Maritime Studies (AIMS) in planning and building their careers with purpose and direction after graduation. Anchored on the MARINA MIDP project and the institution's mission to contribute to the development of highly skilled and competitive Filipino seafarers globally, the canvas map offers a simplified yet purposeful approach to career-building. The canvas map consists of three major parts: setting a purpose-driven end goal, charting relevant career opportunities in the maritime industry, and outlining practical steps to reach one's goals. By integrating career resources, industry standards, and various interactive tools including a user-friendly website, and an online activity form, the canvas map enables students to actively craft and plan a meaningful career path. Lastly, the paper stands as a guide, not only for individual career planning but for a goal-oriented career path that encourages growth and collective contribution to the future of the industry.

Key Words: Canvas, Career, MARINA, MIDP, and Opportunities

Introduction

The Asian Institute of Maritime Studies (AIMS) is an educational institution in the Philippines dedicated to individuals pursuing careers in the maritime industry. Established in 1993 by Capt. Wilijado P. Abuid, AIMS was founded to respond to the growing demand for maritime-related Higher Education Institutions (HEIs). This is due to the fact that Filipino seafarers started to gain prominence in the 1990s. AIMS envisions itself as the “Home of Maritime, Engineering, and Heritage Knowledge Exchange”, hence, has the potential to further contribute to the globalization of the maritime industry. The

institution offers a variety of degree programs that are intended to equip students with necessary skills for the maritime industry. All five schools including; (1) School of Maritime Affairs (SMA), (2) School of Engineering and Architecture (SEA), (3) School of Heritage Education (SHE), (4) the School of Graduate Studies (SGS) and lastly, (5) the School of Merchant Marine (SMM) are designed to meet the on- and off-shore requirements and operations inside the maritime industry. AIMS play a crucial role in directly supporting and enhancing the Philippines’ standing as a top supplier of competent and highly skilled maritime workforce globally. As one of the top

suppliers of seafarers worldwide, AIMS greatly contributes to the Maritime Industry Development Plan (MIDP) developed by the Maritime Industry Authority (MARINA), particularly on its core program, the “Promotion of Highly Skilled and Competitive Filipino Maritime Workforce”. The program’s objective is to increase the reservoir of qualified and competent maritime human resources. Through the help of different strategies such as “broadening maritime career entry and sustaining upgrading of

competences”, “enhancing systems and infrastructure”, “strengthening maritime education, training, and research centers”, and “strengthening research and development”, AIMS continue to contribute in maintaining and improving the country’s prominent role in the international maritime sector¹².

This paper is intended to help the students build their careers after graduation. The program utilizes a framework called the **“Career Canvas Map”**. Similar to a business model canvas which is a one-page

¹² Joannah L. Manuba, “To be a Seafarer is One Thing, To Be a Good Seafarer is Another: How to Build a Globally Competitive Filipino Maritime Workforce,”

Aguhon: A Philippine Maritime History and Heritage Journal 3, no.2 (n.d) 80-95, <https://doi.org/10.6084>

strategic tool that helps visualize and assess a business idea, this career map seeks to lead the students in the process of visualizing and building their career. The goal is to provide them with a deconstructed and noncomplex approach to career planning. The career canvas map includes setting a purpose-driven end goal, charting opportunities, and outlining practical steps such as job searching, building financial portfolio, creating networks, and setting milestones. Through this map, the initiative to contribute to producing highly skilled and competitive Filipino maritime workers continues.

Career Constellation Canvas Map

Setting an End Goal

Setting a purpose-driven end goal is the first and foremost step in the canvas map. This represents the foundational “why” or the main purpose of all the subsequent decisions in your career. Contrary to simply aiming for a job title or a high-paying job, a purpose-driven goal connects determination and motivation to one’s core values, passions, and long-term goals. This provides a deep sense of commitment and ambition that is crucial for navigating the complexities of starting your career journey.

For AIMS students, as example, this step may help them go beyond just wanting to be a “seafarer”. It may prompt them to consider a more purposeful end goal, such as contributing to the sustainability and improvement of the maritime industry, or becoming a significant leader in maritime innovation. By defining this “why”, students can make more intentional decisions throughout their education and career-building, which they can use to align their efforts with what they truly find as meaningful and fulfilling.

Charting Opportunities

After setting an end goal, students can now proceed

on charting opportunities that await them in order to find and explore more sectors and industries related to their career goals. Numerous employment options are available in the maritime industry, all of which are vital to the global economy. The Global Industry Classification Standard was created by S&P Dow Jones Indices, an independent global provider of financial data and investment services. It was developed in response to the demand for accurate, complete, and standard industry definitions from the international financial community. The GICS framework consists of 11 sectors, 24 industry groups, 69 industries, and 158 sub-industries. The structure is

considered to be universal, flexible, reliable, and evolving. The GICS is a widely accepted and commonly used industry analysis framework for asset allocation, investment research, and portfolio management.

According to the GICS framework, there are two (2) marine-related industries—Marine and Transportation Infrastructure—under the Industrial sector. Under these two industries are two sub-industry where maritime graduates can explore and look for careers. First is the marine industry, where companies are providing goods or

passenger maritime transportation. Secondly, the Marine Ports & Services which include owners and operators of marine ports and related services. These sub-industries may be looked upon by students who are aiming to get either an on- or off-shore job opportunity.¹³

Aside from the industries mentioned on the GICS framework, there are more job positions that the students may be interested in, aside from the usual seafaring jobs. Other career paths available in the maritime industry are as follows; Deck Officers—Officers (Chief, Second, Third), Boatswain, Seamen,

¹³ Global Industry Classification Standard, S&P Global, <https://www.spglobal.com/mark>

[etintelligence/en/documents/gics-mapbook-brochure.pdf](https://www.spglobal.com/marketing/en/documents/gics-mapbook-brochure.pdf)

Deck Cadet, Steward, Cook, Baker, Waiter, Barman, Engineering positions, Oiler, Utilityman, Pumpman, Motorman, Machinist, Electrician, Tankerman, Purser, Medical Staff (Doctor, Nurse, Physician), Draftsman, Fitter, Safety Officer, Estimator, and etc.¹⁴

On the other hand, for those who may not be interested in working onboard, careers in fields such as accounting, marine law, public relations, marine education, marine biology and more can play

valuable roles for marine companies and institutions.¹⁵

This demonstrates how versatile the maritime industry is, having opportunities to offer not only for those interested to have their careers sailing at sea, but also for those who wish to build theirs on land.

Outlining Practical Steps

The last part of the Career Constellation Canvas Map, following the setting of end-goal, and charting opportunities, is to outline the practical steps for

¹⁴ "Maritime Careers / shipboard positions," *MarineLink*, last modified August 15, 2025, <https://www.marinelink.com/articles/maritime/maritime-careers-shipboard-positions-100149>

¹⁵ "Maritime Apprenticeship and Career Guide," *Maritime Institute of Technology and Graduate Studies (MITAGS)*, last modified August 15, 2025, <https://www.mitags.org/maritime-apprenticeship-guide/>

turning ambitions into reality. This section focuses on how they can continue building their career and includes five key steps:

1. Search Jobs

This particular step instructs students how to effectively look for job opportunities. This includes using various online job search platforms, applications, and sites, identifying keywords from job descriptions to efficiently highlight applications, and as well as tailoring resumes.

For job search platforms, aside from the usual and common sites, the students can look into the following:

- ▶ **Seamanjobsite.com (WorkAbroad.ph)**
<https://seamanjobsite.workabroad.ph/search-jobs>
- ▶ **PhilJobNet**
<https://philjobnet.gov.ph/>
- ▶ **GrabJobs**
<https://grabjobs.co/philippines>

Keywords may include anything specific for the position they are applying to (e.g. chief engineer, seaman, steward/stewardess, oiler, pumpman, electrician, machinist, motorman, fitter, cook, mechanical technician, and operator).

An effective resume is one of the most important tools in this process of outlining the practical steps. It is a

powerful tool that presents and emphasizes your strongest asset, skills, and achievement in a clear and compelling way. Tailor your resume specific to the kind of job you are applying for. Although not all of your experiences need to be directly related, your resume should highlight the kinds of abilities the company would find valuable. In creating resumes, one of the most effective templates is the Harvard Resume Template. It is known to help job searchers, especially those with limited experiences, highlight their accomplishments in an organized and clearly

readable format that most recruiters prefer. It is ideal for students and early-career professionals because of its emphasis on precise formatting.

To guide students on tailoring your respective resumes, you may look into these 'Resume Tips' provided by the Mignone Center for Career Success of Harvard University:¹⁶

Resume language should be:

- Specific
- Active rather than passive
- Written to express
- Articulate
- Fact-based

¹⁶ "Create a strong resume," *Harvard FAS | Mignone Center for Career Success*, last modified August 15, 2025,

<https://careerservices.fas.harvard.edu/resources/create-a-strong-resume/>

Do's and Don'ts:

- Be consistent in format and content
- Make it easy to read and follow
- List headings (i.e., Experiences) in order of importance
- Within headings, list information in reverse chronological order (most recent first)
- Avoid information gaps
- Do not use abbreviations
- Do not use slangs or colloquialisms
- Do not include a photo

2. Create a Financial Portfolio

This next step guides the students on managing their finances. To be able to maintain a stable finances,

one should know about the importance of not just saving up but managing your finances effectively. This financial portfolio includes; (1) Emergency Fund Calculator, which an individual can utilize to have an idea regarding the cash reserve that should be specifically set aside for unplanned or emergency expenses. This should be able to cover at least three to six months' worth of your current living expenses, (2) Retirement Fund Calculator, can be utilized to have an overview of a savings plan specifically designed to provide income during retirement years, and lastly, (3) Educational Fund Calculator which is a savings, insurance, and investment plan that can

help parents save funds for their child's college education. Overall, this financial portfolio may help understand salary expectations, budget management, and savings for future goals.

3. Build Relationships

This step focuses on the importance of professional networking. This may help students understand the significance of networks and connections with alumni, industry professionals, and potential employers. Building professional relationships may include attendance on different industry events, programs, seminars, job festivals, exhibitions, forums, and conferences. This

highlights the essentiality of building a strong network as it helps discover more opportunities and gain essential career advice.

4. Create Indicators

This second to the last step helps students set measurable indicators to track their career progress. This may involve both short-term (e.g. accomplishing a specific certification) and long-term goals (e.g. getting a promotion). By setting clear and specific indicators, students may stay motivated and committed to consistently assess if they are still on track of achieving their career end goals.

5. Building Institutions

This final step is about building institutions to empower students on thinking beyond shaping their individual careers and taking a role on improving and advancing the maritime industry. This step encourages individuals to look on a long-term perspective, where individual success is integrated to a larger impact on the society. Students may be introduced to the idea of creating new organizations, and improving existing institutions for the betterment of the maritime industry. This may involve, for instance, starting their own business, building a maritime-related

company, establishing a foundation supporting the welfare of seafarers, and creating an organization advocating for greater support of seafarers. This step will help students understand how their 'purpose-driven end goal' may progress and develop into something larger, beneficial, and purposeful, not only for their individual careers but for the industry as well.

To bring the ideas of this paper to life, students are encouraged to complete the "*All Aboard: Your Maritime Career Adventure!*" online form, a simplified yet purposeful tool that mirrors the Career Canvas Map. This interactive online form allows students to ponder

on their career goals, explore diverse opportunities, and outline practical steps that may guide them towards their future. By simply fulfilling the worksheet, students do not solely read about the basics of what a career building is, they also get to experience planning it firsthand, crafting a map that is uniquely anchored to their personal growth, purpose, and ambition. In addition, a shortened and more interactive version of this educational program may also be accessed and explored on an interactive website linked and found through the AIMS Museo Maritimo’s official website.

Online System Content

“All Aboard: Your Maritime Career Adventure!”

Welcome aboard, future seafarer! Use this fun map to chart your exciting journey toward a fulfilling maritime career. Get creative, be honest, and most importantly—have fun!

— *Section 1.*

Data Privacy Act

The AIMS Museo Maritimo respects and values the privacy and security of your personal information in compliance with the Republic Act (R.A.) No. 10173, otherwise known as the Data Privacy Act (DPA) of 2012 and its

Implementing Rules and Regulations (IRR).

By signing this consent form, you grant free, voluntary, and unconditional consent to the collection and processing of your personal data, which may include sharing to our partners and stakeholders. Further, any photos taken during this event may be used by the AIMS-Museo Maritimo for promotion and collaterals, without permission and compensation of the subjects.

— *Section 2.*

Student Profile

- *Name*
- *Email*
- *Sex*

- *Age*
- *School (Multiple Choice)*
 - *School of Merchant Marine*
 - *School of Heritage Education*
 - *School of Maritime Business*
 - *School of Engineering & Architecture*
 - *School of Graduate Studies*

- *Program and Year*

— *Section 3*

Part 1. My North Star

Your North Star is your big "why."

It's the dream that guides your journey — your

ultimate goal in the maritime world. Where are you headed, Captain?

Question: If your future career is a destination, where would you be sailing to?

— *Section 4*

Part 2. Possible Routes

There's more than one way to reach your dream! Map out 2–3 exciting roles or career paths that can help you sail toward your North Star.

Question: List 2-3 exciting jobs or roles you'd like to explore to reach your dream!

— *Section 5*

Part 3. Pack Your Ship

Every great journey needs the right tools! Choose the first steps you'll take—skills, actions, or habits—that will prepare you for the voyage ahead.

Question: Check off what you'll do next to get closer to your dream!

- ✓ Search for job
- ✓ Attend a maritime event
- ✓ Create your resume
- ✓ Talk to a mentor or professor
- ✓ Start budgeting or saving
- ✓ Learn a new skill or certification

— *Section 6*

Part 4: Message in a Bottle

Scan this code and write a message to your future self. Think big, be bold, and sign it like you're sealing it in a bottle to open one day at sea!

Write about what you hope to achieve in 5 years.

(Do not forget to check and confirm your email address after writing a letter to ensure that you'll receive your letters in the future!)

May all that you have written become a reality in the future!

After sending your future self a letter, write one promise you'll make for the future you.

"I promise to sail toward my dreams and never lose sight of my North Star!"

In a world that is constantly changing, the Career Canvas Map serves more than just a simple tool for outlining a career path; it also serves as a compass for your life-long career journey. The map aims to guide and empower the students in taking control of their own professional destiny and legacy. It seeks to transform one's passion and ambition into a journey of self-discovery and understanding reality. Ultimately, the map's objective is to inspire incoming professionals to not only focus on navigating their journey towards success, but to also become a compass

and a beacon of light that illuminates the route for others. Find your horizon, sail towards success with one another, and help build the future of the maritime industry, one sail at a time.

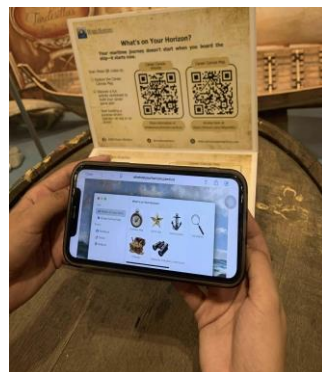
Documentation



Deck 5 Exhibit - What's on Your Horizon?



First Step: Align your phone to the exhibit label and scan the first (left side) QR code.



Second Step: After successfully scanning the

code, a website will appear on your screens, and present the various components of the canvas map. To view the information of each component, you may click the corresponding image and scroll down a little bit. (If another photo is present in the content, you may also click them to view the attached corresponding file.)

Third Step: After going through the content of the website, you may proceed and scan the second (right side) QR code. This will automatically link to an online activity form that must be completed and submitted.



References

Harvard FAS | Mignone Center for Career Success. "Create a strong resume." Last modified August 15, 2025.
<https://careerservices.fas.harvard.edu/resources/create-a-strong-resume/>

Manuba, Joannah. "To be a Seafarer is One Thing, To Be a Good Seafarer is Another: How to Build a Globally Competitive Filipino Maritime Workforce." *Aguhon: A Philippine Maritime History and Heritage Journal* 3, no.2 (n.d): 80-95. <https://doi.org/10.6084>

Maritime Institute of Technology and Graduate Studies (MITAGS). "Maritime Apprenticeship and Career Guide." Last Modified August 15, 2025.
<https://www.mitags.org/maritime-apprenticeship-guide/>

MarineLink. "Maritime Careers / shipboard positions." Last Modified August 15, 2025.
<https://www.marinelink.com/articles/maritime/maritime-careers--shipboard-positions-100149>

S&P Global. Global Industry Classification Standard.
<https://www.spglobal.com/marketintelligence/en/documents/gics-mapbook-brochure.pdf>

Exploring the Engine Room Department Maritime Safety in the Philippines: The Evolution and Impact of Barometric Technology on Typhoon Forecasting and Navigational Resilience

Errold John A. Lim

Abstract

This module introduces a media-based educational approach designed to simplify the highly technical concepts of a ship's engine department. By integrating visual aids, a color-wheel application, and curated imagery, the program enhances student comprehension and engagement. To reinforce the importance of teamwork and coordination in engine operations, the interactive group activity Build Me Up, Plastic Cup simulates the precise collaboration required during a ship's arrival and departure. Together, these methods demonstrate how multimedia instruction and hands-on exhibits can effectively support learning about the engine room—an essential area that demands accuracy, communication, and best practices for safe and efficient vessel operations.

Key Words: Media-Based Learning, Engine Department, Interactive Activity, & Team Coordination

Introduction

The Philippines being an archipelago relies on the shipping industry to utilize its surrounding waters. Because of its nature, it requires efficient maritime services i.e., ports, safety aids and systems. However, because of the vastness of the seas, maritime accidents are inevitable. Multiple records of sea disasters (some are dubbed as the worst in peacetime) occurred in the Philippine waters. Engine failure has been one of the main reasons for these maritime accidents that resulted in the loss of lives and environmental damages.

The engine room is a vital area of a ship where heavy

machinery and equipment are located. Defined as the heart of the ship, it is responsible for the process of converting burning fuel into useful energy i.e., developing thermal energy and transforming it into mechanical energy significant in the operation of the ship.

The engine room is managed and maintained by the engineering team with the supervision of the chief engineer who is responsible for the mechanical propulsion, the operation and maintenance of the mechanical and electrical installations.

Regarded as the most vital part of the ship, this area, always, requires a well-

coordinated team and a system that promotes support and best practices along with effective command, control, communication, and management because it is the starting point of a safe operation. Moreover, because of the crucial work, the engine room must have strict adherence to ensure the safety of the operation especially upon the arrival and departure of the ship to the port. Failure to accomplish necessary duties might lead to hindrances in sailing and maneuvering.

At its core, this study focuses on the importance of the operation in the ship's engine department during the departure and upon arrival at the port. In

line with this, the paper highlights three different cases of maritime accidents that occurred in the country because of failure performing the necessary duties in the engine area. Moreover, this paper will delve into the integration of media-based education programming and utilization of exhibit as a third learning modality in maritime education. The purpose of this education programming is to have an engaging and interactive teaching method despite the technicalities of the engine area.

The Role of Port

As defined by Rodrigue and Notteboom (n.d.), port comes from the Latin term “portus” which means

“gate” or “gateway”. It is vital as it serves as a point of convergence of land and maritime domains and a harbor area serving as a marine terminal facility for transferring cargo and passengers between land and ships. In history, port plays a vital role because it is a point of origin of a region. Moreover, it is a major economic area where trades of different products occur.

The End of a Long Voyage

The ship’s arrival at port marks the end of a long voyage. In the maritime industry, there are important procedures that need to be done to maintain smooth maneuvering of a ship while it is in the dock. While

the ship is resting, the team inside the engine operates procedures that must be done in preparation for another long voyage.

One hour before arrival, the duty engineer that supervises the engine room must coordinate with the bridge department. Chief engineers must be informed regarding the arrival. The bridge then starts decreasing the speed. At this point, additional generators must be running in parallel, steam turbine and shaft generators must stop and the power for deck machinery and bow thrusters must be available. The bridge then starts an additional steering gear unit. Engineers must then take a

round of steering gear room and check oil level linkages and motor current. The boiler must now start to raise the pressure if the exhaust gas boiler was running previously. The dumpers must be closed for the exhausted gas boilers and bypasses must be opened. At this point, the freshwater generator must be closed, and the sewage direct overboard must be discharged, moreover sewage plant or open valve for sewage holding tank must start. The sea chest valve of the side of the ship facing the berth must also be closed. The high sea suction must then be changed over low sea suction. The air receivers must then be drained. After these procedures, the

engine is tested ahead and the eastern direction from the bridge. Moreover, the steering gear must be tested for full rudder angle and when maneuvering ends, the calculation of sea passage flow meter counter for oil consumption from full away up to the end of sea passage.

Finally, after the procedures before the final dock. The engine is given from bridge control to engine room control. The additional running generators must be stopped and the main air starting valve must be closed. The indicator cock and turbo charger drain valve must now be opened. Afterwards, the turning gears and turn engine must

be engaged for ten minutes and the vent must be open for the exhaust gas boiler. The arrival program must now be activated to stop the lube oil pump, cross head pump, shaft bearing and stern tube bearing pumps— manual procedures are done in a manned engine room. Manual stopping of pumps 30 minutes after arrival must be done in a manned engine room. At this point, the heating for the jacket water of the main engine must be opened and finally, one last round of engine room checks before informing the bridge for a handover to the next duty engineer.

The Start of a New Journey

The procedures for departure of the ship are as equally important as its arrival. In preparation for a long voyage, the operation in the engine room must be inspected thoroughly to avoid encountering technical problems during the sail.

To ensure safety, the notice prior to the departure is divided into six periods: 24 hours prior, 6 hours prior, 1 hour prior, 15 minutes prior, when the engine is running, and when the ship is full away.

Twenty-four hours before the departure, the oil level and the bunker tanks must be checked to make sure the temperature is

maintained to 40 degrees. In addition to that, the jacket water header tank must also be filled before starting the jacket water circulating pumps. The jacket water temperature must be monitored to about 60 degrees.

At six hours' notice period, the oil level in the main engine sump and turbocharger tank must be checked. The engineer on duty then starts lubricating the oil pump, cross head pump and turbocharger pump and monitors its pressure. The oil flow will then be checked through the sight glass of the turbo charger outlet. The shaft bearing pumps will begin after checking the level of the header tank. In unmanned machinery

systems, there is a program for starting all these pumps.

At one hour notice period, the chief engineer rounds and reports the situation of the engine room. Oil level, head tank level, cylinder oil daily tank level, pressure of fuel oil pump, booster pump, lube oil pump, sump oil level in air compressor will be checked next. Then, the air bottles must be drained for any water inside. An additional generator for an additional power supply for the winches and thrusters will be opened. At this point, the gas boiler water that circular pump will be opened. After these procedures, the telegraph and emergency telephones will then be checked if it is

functioning. Finally, after making sure that the engine is all working properly, the chief engineer will make one last round and the ship is ready to go. The listed procedures are necessary to avoid encountering accidents related to mismanagement of the engine.

Maritime disasters caused by Engine Failure

Case 1

In Mindoro, the MT Princess Empress carrying 800,000 liters of industrial fuel oil sank off on February 28, 2023. A supposed voyage from Iloilo to Limay Bataan was interrupted by tanker engine trouble. According to the findings

released by the Department of Justice, the MT Princess is a 50-year-old rebuilt scrap ship and not a purpose-built tanker. The reports of the investigators show that there have been issues with compliance of Certificate of Public convenience (CPC) or the domestic maritime operating license to RDC Reield Marine Services, the Philippine-based operator of the ship. This incident caused environmental damage as oil spread 40km across Oriental Mindoro affecting at least 18 thousand fishermen who rely on sea for food and livelihood.

Case 2

In Cebu, passenger ship MV St. Jhudiel collided with cargo ship LCT Poseidon 23 en route from Mandaue City to Ormoc City Leyte on May 21, 2023. The MV St. Jhudiel carries 197 passengers, 25 of those suffered minor injuries while on board LCT Poseidon are 17 rolling cargoes and 20 drivers/cargo helpers. The Philippine Coast Guard has an immediate response by deploying floating assets, a land vehicle, and an ambulance, while the coast guard marine environmental protection force assesses for any possible oil leaks. After the incident, the master reported that the ship experienced steering

casualties and engine failure.

Case 3

In Zamboanga Del Norte, the cargo ship MV Star Sabang carrying 170 tons of cement travelling from Cebu city to Zamboanga city sank due to engine failure. Fortunately, there were brave fishermen of Bayangan on standby who risked their lives amidst strong winds and high waves to help save the crew of MV Star Sabang. The Provincial Disaster Risk Reduction Management (PDRRMO) called for an emergency meeting to assess the threat of oil spill due to the remaining 4700 remaining diesel fuel and hydraulic fluid left on the ship that sank 172 feet

under the sea. The MV Star Sabang was originally built in Japan in 1987 and was acquired by Cebu-based Roble SG incorporated in 2015.

Media Based Education Programming

The engine area is highly technical; thus, an effective teaching method must be applied to ensure proper learning. Visual imagery is one of the most effective techniques to deliver a lecture. The use of visual aids is significant in capturing the attention of the students. Moreover, the senses can be a bridge to relate quickly especially in the discussion of complex ideas. With the objective of capturing the attention of the students, a

color wheel application will be utilized along with a portfolio of images to visualize the engine department.

“Build me up, Plastic cup” Exhibit

At its core, the work in the engine area is crucial thus, the engineering team must have close coordination to maintain smooth voyage. Moreover, adherence and best practice must be applied to ensure safety of the operation especially upon the arrival and departure to the port because failure to do so might compromise the safety of each passenger. With this, the assessment of the lecture must expound the meaning of “close coordination”.

The “Build me Up, Plastic cup” is a group game consisting of 3 players. The cup represents the “engine” while the players represent the “engineering team” that facilitates it, and the station where the cup will be transported represents the “port”.

Using strings of thread tied in a rubber band, the players must carefully transport a cup from one station to another. Careful pulling of thread to avoid dropping the cup and breaking the rubber band must be taken into consideration. This game satisfies the role of “close coordination” of the engineering team in the engine department upon the departure and arrival of

the ship to the port (see fig. 1).

Conclusion

The engine department is the most vital part of the ship thus it requires a well-coordinated team. With its high technicalities, the instructor must include an effective teaching method to deliver the lecture and build an interaction with students to capture their attention. Hence, the inclusion of media-based education programming and interactive exhibits for the assessment as third learning modality can promote proper learning. The engine room as the “heart of the ship” is a crucial area that requires best practices to maintain smooth operation.

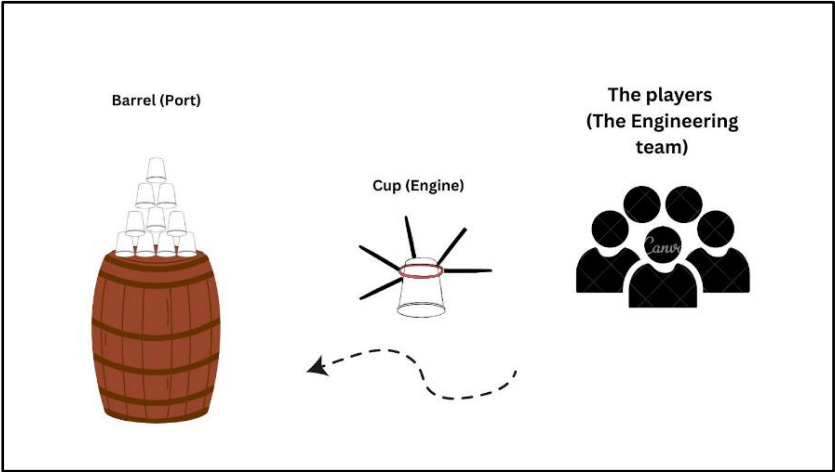


Figure 1. “Build me up, plastic cup”

References

- Asia Pacific Foundation of Canada. 2023. "The Black Tide: Philippines' Oil Spill Causes Ecological Disaster, Loss of Livelihoods." Asia Pacific Foundation of Canada. March 22, 2023. <https://www.asiapacific.ca/publication/black-tide-philippines-oil-spill-causes-ecological-disaster>.
- Dimailig, Orlando S., Jae-Yong Jeong, and Chol-Seung Kim. 2011. "Marine Transportation in the Philippines: The Maritime Accidents and Their Causes." *Journal of Navigation and Port Research* 35 (4): 289–97. <https://doi.org/10.5394/kinpr.2011.35.4.289>.
- Guest. 2020. "ICS - Engine Room Procedures Guide - 1st Edition 2020 - PDFCOFFEE.COM." Pdfcoffee.com. PDFCOFFEE.COM. 2020. <https://pdfcoffee.com/ics-engine-room-procedures-guide-1st-edition-2020-pdf-free.html>.
- G, Herbie. 2024. "Fishermen Save Crew as Cargo Ship Sinks near Zamboanga Del Norte." RAPPLER. January 18, 2024. <https://www.rappler.com/philippines/mindanao/fishermen-save-crew-cargo-ship-sinks-near-zamboanga-del-norte-january-2024/>.
- Hiteshk. (2021, April 2). *Ship Arrival Checklist for Engine Department: What to Do When a Ship is About to Arrive at a Port?* Marine Insight.

<https://www.marineinsight.com/guidelines/ship-arrival-checklist-for-engine-department-what-to-do-when-a-ship-is-about-to-arrive-at-a-port/>

“1.1 – Defining Seaports | Port Economics, Management and Policy.” 2020. November 11, 2020.

<https://porteconomicsmanagement.org/pemp/content/introduction/defining-seaports/>.

Kypriotaki, Anastasia. 2023. “Vessel Collision in Philippines Results in Many Injured.” SAFETY4SEA. May 22, 2023. <https://safety4sea.com/vessel-collision-in-philippines-results-in-many-injured/>.

“Literary Techniques: Imagery | Learn How to Discuss Imagery.” 2017. Matrix Education. September 19, 2017. <https://www.matrix.edu.au/literary-techniques-imagery/>.

Marine Engines - an overview | ScienceDirect Topics. (n.d.). www.sciencedirect.com.

<https://www.sciencedirect.com/topics/engineering/marine-engines>

Mohit. 2019. “Ship Departure Checklist for Engine Department: What to Do When a Ship Leaves a Port?” Marine Insight. September 2, 2019.

<https://www.marineinsight.com/guidelines/ship-departure-checklist-for-engine-department-what-to-do-when-a-ship-leaves-a-port/>.

Raunek. (2019, May 22). *How Ship's Engine Works?* Marine Insight. <https://www.marineinsight.com/main-engine/how-ships-engine-works/>

Anchoring Who's Aboard? Gamifying Bridge Procedures at a Maritime Museum

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Abstract

This module presents Who's Aboard?, an interactive museum exhibit that teaches deck procedures and STCW-defined roles through a reimagined version of the classic Guess Who? game. Designed to address gaps in students' early exposure to bridge hierarchy and responsibilities, the activity requires players to identify deck crew members using yes/no questions grounded in actual duties rather than physical traits. By blending deductive gameplay with accurate maritime role classifications, the exhibit reinforces procedural knowledge, strengthens reasoning skills, and provides an engaging alternative to traditional lectures or simulator-based instruction. The result is an accessible, memorable learning tool that supports students' understanding of deck hierarchy and navigational watch responsibilities.

Key Words: Deck Procedures, STCW Roles, Interactive Learning, & Maritime Hierarchy

Introduction

Bridge or deck procedures govern the safe operation of a ship's navigational bridge by defining clear rules, communication protocols, and the chain of command for officers. Similarly, the deck department includes the personnel behind such procedures. While the Standards of Training, Certification, and Watchkeeping (STCW) Convention, on the other hand, defines the knowledge, skills, and responsibilities of the department. In practice,

maritime education must teach students not only technical procedures, but also the ship's hierarchical structure. Nikitakos et al. pointed out, for example, that the STCW framework "requires specific levels of knowledge, understanding, and skills for all seafarers at each level of responsibility."¹⁷ However, students' prior exposure to this material is often limited until vocational training. One pedagogical challenge is how to engage students in procedural and hierarchical concepts in a museum setting without relying solely on simulators or lectures.

¹⁷ Nikitakos, N., I. Sarris, D. Dalaklis, D. Papachristos, and V. D. Tsoukalas. "Game-based Learning for Maritime Education and Training: The Case of Trader

of the World." *WMU Journal of Maritime Affairs* 16, no. 2 (November 28, 2016). <https://doi.org/10.1007/s13437-016-0119-3>.

The *Who's Aboard?* exhibit takes a novel approach, reimagining the classic *Guess Who?* board game for a maritime museum setting. In this game, players ask yes/no questions to identify the opponent's chosen deck crew member through deduction and elimination. Crucially, all questions and answers are based on STCW-defined duties (e.g., "Does this crew member oversee cargo watch?"), not physical attributes, so success is dependent on understanding roles and responsibilities. The exhibit's characters include both deck officers and deck ratings, and the game board is theatrically mounted atop a ship's wooden barrel to provide a tactile, thematic

experience (see Fig. 1). The objectives are multifaceted: to engage college-level maritime students in an informal setting; to improve deductive reasoning and pattern recognition skills through game mechanics; to reinforce STCW knowledge related to deck careers; and to illuminate the deck hierarchy (who outranks whom). Importantly, the *Who's Aboard?* game is not intended to replace formal simulator training, but rather to supplement it by allowing students to explore concepts in an interactive and memorable way.



Fig. 1. Whols Aboard? mounted on a barrel.

In the pages that follow, I begin by situating the exhibit within relevant museum education and game-based learning theories. I then talk about how gamification can engage maritime students and help them develop logical inference skills. Next, I look at how the game content reinforces

STCW-defined roles in the deck department. I also demonstrate how the play experience helps learners internalize the ship's chain of command. A detailed instructional module is integrated into the main text to help facilitators introduce the game, explain the rules and mechanics, and lead a post-game debrief on hierarchy and STCW. This exhibit seeks to break new ground by combining play with professional maritime content, enriching deck procedural training in an informal museum setting.

Charting New Territories

Gamified exhibits can attract and engage learners who would not normally be interested in museum

content, particularly vocational students in maritime fields. According to Kotsifakos et al., vocational (VET) students' needs are "rarely addressed by museums," but when those students first visit a relevant museum and then interact with a gamified activity, the "gamified environment will work both as a learning tool and as a reminder of the information they accumulated".¹⁸ Museums frequently strive to entertain visitors as well as

educate them, and studies show that incorporating gamified elements can improve the enjoyment and effectiveness of museum exhibits. Çetin and Erbay, for example, found that gamification "provides a fun time and an effective experience in museums for visitors," by delivering educational content in an enjoyable manner.¹⁹ Gamification enables museums to "stay attractive" and compete with other leisure activities.

¹⁸ Dimitrios Kotsifakos et al., "A Web Gamification Platform Inspired by the Maritime Tradition Museum in Perama, Greece, for Students in the Sector of Maritime Professions in Vocational Education and Training," *European Journal of Engineering and Technology Research*, December 29, 2022, 52,

<https://doi.org/10.24018/ejeng.2022.1.cie.2963>.

¹⁹ Özgül Çetin and Fethiye Erbay, "Gamification Practices in Museums," *Journal of Tourismology* 7, no. 2 (December 27, 2021): 274, <https://doi.org/10.26650/jot.2021.7.2.1017009>.

The Who's Aboard? exhibit capitalizes on this by transforming abstract bridge procedures into a playful scenario. The use of an age-old board game format is instantly familiar, which relaxes students and piques their interest. Even students who would otherwise skip a boring lecture on watchkeeping are drawn in by the opportunity to play. As others have pointed out, games can encourage visitors to take an active role in learning, transforming them from passive observers to participants.²⁰ Importantly for maritime students,

playing on a barrel and handling physical game pieces provides a multisensory experience. Engaging visitors' bodies and providing multisensory stimuli improves learning and enjoyment.²¹ By literally "anchoring" the board game on a ship's barrel, the exhibit takes advantage of this principle: learners feel the maritime theme under their hands, which helps them become emotionally and cognitively engaged.

Thus, Who's Aboard? goes beyond traditional classroom methods and even high-fidelity

²⁰ Ibid.

²¹ Wentao Chen, Ti Li, and Yaqi Zhang, "Embodied cognition model for museum gamification cultural heritage communication

a grounded theory study," *Heritage Science* 13, no. 1 (June 6, 2025), <https://doi.org/10.1038/s40494-025-01821-9>.

simulators, providing a low-tech but highly engaging activity. By exploring this new territory of museum play for maritime majors, the exhibit draws unexpected visitors into the learning loop and prepares them for deeper engagement with bridge procedures. This engaging game enhances traditional instruction by capturing students' attention and reinforcing content in an entertaining manner.

Signals and Deductions

Who's Aboard?'s question-and-answer format also promotes deductive reasoning skills. By asking strategic yes/no questions and eliminating characters one at a time, players must employ process-of-

elimination logic and pattern recognition, both of which are fundamental to deduction. For example, if a player asks "Is this person certified to take the watch at sea (deck officer)" and receives a "no" response, all deck ratings are eliminated, narrowing possibilities and revealing structure.

Every turn in Who's Aboard tests players' ability to deduce hidden information from cumulative clues. A player may notice that certain roles have specific responsibilities mandated by the STCW convention (e.g., cargo safety, navigation watch), and then frame questions to exploit those known patterns. This allows them to determine which

characters remain viable. The game thus transforms abstract rule memorization into a logic puzzle, requiring students to mentally track which roles do or do not match the clues, reinforcing their conceptual understanding of duties. By repeatedly practicing deductive elimination, players improve their ability to structure queries and draw inferences, which is directly transferable to real-world bridge scenarios (for example, inferring a situation from limited signals). Importantly, using STCW-defined responsibilities as questions grounds reasoning in relevant content, allowing students to learn both logic and professional material.

As a result, the game's question-and-answer format functions as an informal logic laboratory. Each session reinforces the idea that answering structured questions leads to new information, similar to how officers interpret navigational signals or emergency codes on a ship. Participants typically develop greater mental flexibility in applying rules by the end of play. *Who's Aboard?* purposefully employs game mechanics to foster the deductive reasoning that bridge officers rely on, far exceeding what a lecture could accomplish.

Mapping Careers

On top of these, *Who's Aboard?* directly reinforces

knowledge of STCW-defined careers and duties on board ship. As previously stated, the STCW Convention formalizes what each rank and rating must know and do. Nikitakos et al. emphasized that conventions such as STCW place "significant performance demands on crews," necessitating specialized knowledge for both officers and ratings²². The *Who's Aboard?* game takes advantage of this structure by having each character's possible answers correspond to actual STCW

responsibilities. In other words, the game's yes/no questions are worded as tasks (for example, "Does this person supervise the deck maintenance routine?"). This approach ensures that playing serves as an active review of STCW content. Furthermore, Pruyn claims that well-designed educational games can improve learners' comprehension and knowledge retention.²³ In a maritime context where regulatory knowledge retention is critical, incorporating STCW roles into play can

²² Nikitakos et al., "Game-Based Learning for Maritime Education and Training: The Case of *Trader of the World*."

²³ Jeroen Pruyn, "The Use of Digital Games in Academic Maritime Education: A

Theoretical Framework and Practical Applications," *Maritime Policy & Management* 51, no. 4 (February 6, 2023): 558–71, <https://doi.org/10.1080/03088839.2023.2174608>.

help improve memory of those roles.

During game play, students may ask questions such as "Is this person certified to take watch in restricted waters" or "Does this person report to the Captain?" The answers immediately tie back to specific STCW roles, as only certain positions meet those criteria. By framing the clues as STCW-defined responsibilities rather than physical attributes, the game forces players to recall each role's duties. After eliminating characters over successive questions, a player may discover, for example, that only an Able Seaman matches all of the previous clues, thereby learning or confirming the rating's

niche. This mechanism turns rote STCW lists into useful problem-solving hints. Importantly, this method includes both deck officers (e.g., Third Officer, Chief Mate) and deck ratings (e.g., Bosun, Ordinary Seaman), ensuring a comprehensive understanding of students' prospective careers. In effect, the board game serves as a low-stakes quiz, with each game outcome reinforcing students' mental maps of who does what on a ship. When game content is aligned with curriculum goals (as it is here), students are more satisfied and perform better.

Students are more likely to internalize STCW responsibilities if they are

exposed to them in play on a regular basis rather than just through lectures. Importantly, I cannot emphasize it enough that Who's Aboard? supplements simulator training and classroom instruction; it is not a substitute. Indeed, Aylward et al. recommend that new virtual or gamified methods "not replace simulators; [simulators] are a necessary part of the process"²⁴. In the same vein, the barrel-top Who's Aboard game adds a new dimension: it allows players to revisit STCW content. The game's design ensures that each correct elimination or victory

reinforces the knowledge required for future deck careers, as stipulated in the STCW Convention.

Internalizing Hierarchy

The Who's Aboard? game also highlights the ship's command structure and hierarchy among deck personnel. Understanding hierarchy is essential on ships, where clear lines of authority ensure safety and efficiency. Maritime training emphasizes this; for example, Nikitakos et al. state that comprehensive training must benefit "both ratings and ship officers," demonstrating the interdependence of all

²⁴ Katie Aylward et al., "Using Operational Scenarios in a Virtual Reality Enhanced Design Process," *Education Sciences* 11,

no. 8 (August 21, 2021): 14, <https://doi.org/10.3390/educsci11080448>.

ranks.²⁵ In the gamified exhibit, characters are both officers (Captain, First Mate, etc.) and ratings (Boatswain, Able Seaman, etc.). The types of questions that are answered with "yes" or "no" frequently depend on rank. For example, a question could be, "Can this person authorize cargo operations?" Only the Captain or Chief Officer might, while ratings would say no. Thus, through elimination, players can see firsthand who outperforms whom when it comes to task completion.

By sorting through the characters, players implicitly learn hierarchy through the logic of the

clues. If after several questions, only an officer-type card remains, players recognize that person bears more responsibility than ratings. Furthermore, during group play, the instructor can emphasize that each role has a distinct place in the manifest. The game boards themselves feature caricatures labeled with position titles providing a visual cue for rank differences. During the final discussion, students compare the characteristics that drew them to each character, which naturally leads to a discussion about chains of command. Here, the narrative is "Who's in charge of this duty," which

²⁵ Nikitakos et al., "Game-Based Learning for Maritime Education

and Training: The Case of Trader of the World."

mirrors the real-life structure aboard ship.

Who's Aboard? incorporates both officers and ratings into the game, making the deck hierarchy a built-in learning goal. Each question-and-answer session reinforces the fact that certain jobs require specific levels of authority, so students leave with a better understanding of who "reports to" whom. This is consistent with the educational goal of integrating professional shore-based learning with clearly defined roles. The game thus enhances students' understanding of maritime organizational culture and teamwork. In conjunction with the debrief, the exhibit aids in the translation of the

abstract concept of hierarchy into concrete reasoning during play.

Captain's Briefing

Instructors should start by explaining the game's context: Who's Aboard is a museum exhibit that builds on what students have already learned about maritime careers. Emphasize how the game board uses ship-themed imagery (including a barrel table) to create an immersive atmosphere. Emphasize that the goal is to practice procedure knowledge and deductive reasoning in a fun way, not to test memory on minor details. Clarify roles: each playing card represents a deck officer or rating, complete with roles and

responsibilities (as per STCW).

Next, explain the gameplay mechanics in detail. Describe the basics of Guess Who: two players take turns asking yes-or-no questions to eliminate cards and reveal the opponent's hidden character. In contrast to the commercial version, questions here must focus on roles and responsibilities rather than appearance. Provide an example: an instructor can stand behind a board and select "an unseen character" from a deck of cards, while a student asks sample yes-or-no questions. Demonstrate how the board pieces on the student's side are turned face-down as

certain members of the deck are ruled out, zeroing in on the instructor's selected card or character and vice versa (see Fig. 2). Allow students to handle the cards and familiarize themselves with the images and titles.



Fig. 2. Sample game of Who's Aboard, which mimics or adapts Guess Who? mechanics.

After explaining the rules, supervisors divide students into small groups (ideally in

pairs). Allow them to play three to four rounds. Encourage strategic questioning and collaboration by reminding them that working together (e.g., a group question) can be enlightening and reflect true bridge teamwork. If students struggle with question design, remind them of which STCW duties correspond to each rank. This enables them to formulate targeted questions. The instructor's goal is to help them link each characteristic to the right person using reasoning, rather than guessing at random. After the play, have a debriefing session. Begin by asking, "What questions brought you closer to a certain character?" Help

students articulate how each successful yes/no eliminated a set of ranks. Use this to emphasize ship hierarchy; for example, if the final card was an officer, explain why ratings were removed. Compare officers and ratings, and ask them to list one of each's duties as learned from the game. Relate these responsibilities to STCW terminology (for example, "Deck maintenance falls under ratings' training, whereas navigation watch is an officer responsibility"). Encourage reflection on how game strategy simulates real-world decision-making on the bridge: each question is like gathering information about a situation. Finally, emphasize that this board

game experience is in addition to their simulator exercises and coursework; it is a fun way to reinforce the same material. Instructors should explicitly state that simulation training and classroom learning will remain the primary focus, with the game serving as a diversifier.

Conclusion: Harboring Insights

The Who's Aboard? exhibit shows how purposeful gamification can transform a museum space into an effective learning environment for a specialized audience, such as maritime students. By

providing a playful context, the game "activates [students'] bodily experiences" and creates a multi-sensory setting, which is essential for engaging visitors.

²⁶According to Çetin and Erbay, "gamification can be used in museums to enhance the visitor experience," provided it is aligned with the institution's goals.²⁷ In this case, the goal is not only to provide enjoyment for visitors, but also to transfer knowledge of bridge procedures and hierarchy.

It is important to note, however, that Who's Aboard? does not replace

²⁶ Chen, Li, and Zhang, "Embodied Cognition Model for Museum Gamification Cultural

Heritage Communication a Grounded Theory Study."

²⁷ Çetin and Erbay, "Gamification Practices in Museums," 274.

formal bridge simulators. Instead, it functions as an innovative supplement. Serious games can improve motivation and retention, but the best results come when gamified activities are combined with traditional instruction. The exhibit provides an additional avenue for practice: if a student forgets who does what for whom and when, the game forces recall; if they remember correctly, the game cements the link between theory and practice. Repetition in play can make such connections stronger than a single lecture.

The Who's Aboard exhibit combines a recognizable game format with genuine maritime scenarios,

offering a dynamic educational resource for museum educators. It engages maritime students with content that would otherwise appear dry, strengthens their logical reasoning through inquiry, and emphasizes the real-life career and hierarchy concepts they will need at sea. This approach exemplifies the best of museum education: it combines theoretical knowledge with active, situated learning. It paves the way for future innovations in museum pedagogy, reminding educators that even traditional knowledge can be conveyed in unexpected, gamified ways.

References

Aylward, Katie, Joakim Dahlman, Kjetil Nordby, and Monica Lundh. "Using Operational Scenarios in a Virtual Reality Enhanced Design Process." *Education Sciences* 11, no. 8 (August 21, 2021): 448.

<https://doi.org/10.3390/educsci11080448>.

Çetin, Özgül, and Fethiye Erbay. "Gamification Practices in Museums." *Journal of Tourismology* 7, no. 2 (December 27, 2021): 265–76.

<https://doi.org/10.26650/jot.2021.7.2.1017009>.

Chen, Wentao, Ti Li, and Yaqi Zhang. "Embodied cognition model for museum gamification cultural heritage communication a grounded theory study." *Heritage Science* 13, no. 1 (June 6, 2025).

<https://doi.org/10.1038/s40494-025-01821-9>.

Kotsifakos, Dimitrios, Maria-Gerasimoula Karali, Eirini Katzola, Achillia Kravvari, and Christos Douligeris. "A Web Gamification Platform Inspired by the Maritime Tradition Museum in Perama, Greece, for Students in the Sector of Maritime Professions in Vocational Education and Training." *European Journal of Engineering and Technology Research*, December 29, 2022, 49–52.

<https://doi.org/10.24018/ejeng.2022.1.cie.2963>.

Nikitakos, N., I. Sirris, D. Dalaklis, D. Papachristos, and V. D. Tsoukalas. "Game-based Learning for Maritime

Education and Training: The Case of Trader of the World.” *WMU Journal of Maritime Affairs* 16, no. 2 (November 28, 2016): 265–91.

<https://doi.org/10.1007/s13437-016-0119-3>.

Pruyn, Jeroen. “The Use of Digital Games in Academic Maritime Education: A Theoretical Framework and Practical Applications.” *Maritime Policy & Management* 51, no. 4 (February 6, 2023): 558–71.
<https://doi.org/10.1080/03088839.2023.2174608>.

Anchoring the Shipyard's Challenge: An Interactive Guide to the Shipbuilding Process

Allysa Jean V. Timbad

Abstract

The Shipyard's Challenge: An Interactive Guide to the Shipbuilding Process introduces a gamified learning module developed for Museo Maritimo's expanded educational efforts at the AIMS Tower. The program, *Are Your Designs Seaworthy?*, uses puzzles and Q&A challenges to transform shipbuilding concepts and maritime history into an engaging, hands-on learning experience. Supported by research on the effectiveness of gamification, the module enhances student participation, recall, and collaboration. This initiative demonstrates how interactive museum-based activities can strengthen maritime education and deepen students' appreciation of the Philippines' nautical heritage.

Key Words: Gamified Learning, Shipbuilding Process, Museum Education, Interactive Exhibits, & Maritime Heritage

Overview

The first ever maritime-themed museum in the Philippines, Museo Maritimo, was launched in 2012. It can be found in the Asian Institute of Maritime Studies, an educational campus located in Pasay. To further engage the students to the museum's activities, an on-campus temporary exhibits have been implemented which follows a storyline that begins on the top floor—6th deck all the way to the 1st deck. The museum intends to extend this reach on the AIMS Tower to make its content even more accessible to the academic community. Furthermore, the professors and faculties could utilize such initiative

in their educational settings. Accordingly, this module details how the project was designed and will be put into practice, specifically focusing on the 9th deck, wherein the shipbuilding process will be its central topic.

Nowadays, museum education has undergone a significant turn, from a mere passive experience of looking at objects into an active process of learning. Rather than simply observing and looking at various artifacts, modern museums are now focusing on creating immersive learning environments that resonate with diverse audiences. This shift is driven by a desire to make history, science, and culture more relatable and

engaging, particularly for students. By moving beyond traditional tours and lectures, museums can transform their spaces into interactive classrooms where visitors can learn by participating.

This new approach utilizes gamification, hands-on activities, and multimedia to facilitate a deeper understanding of the content. Instead of just memorizing information, learners are encouraged to solve problems, interact with their peers, and experience first-hand what the exhibit showcases. The Mind Museum, for example, is a science

museum located at Taguig City, Philippines, which comprises of more than 250 interactive exhibits which are all interconnected by five galleries, namely: Atom, Life, Earth, Universe, and Technology Gallery.²⁸ Furthermore, an international museum like the National Museums Scotland has made its museum tour much more interesting after partnering with a game company in order to launch an app. The said application features a game called “*Capture the Museum*”, which is inspired by classic board games like *Risk and Trivial Pursuit*. The mechanics of the game is simple: two teams have to

²⁸ Bonifacio Art Foundation, Inc., “Galleries,” The Mind Museum, accessed August 16, 2025,

<https://www.themindmuseum.org/exhibits/galleries>.

run around the museum, competing to “claim” different sections of the building as their own.²⁹ These examples clearly illustrate the changes in museum towards engaging visitors through dynamic, interactive experiences.

This method aligns perfectly with the goal of an educational institution like the Asian Institute of Maritime Studies (AIMS), where the knowledge being taught from classrooms can be reinforced with enjoyable, memorable experiences. The Museo Maritimo's

expansion to the AIMS Tower, therefore, is not just about making content more accessible, but also about adopting a strategy that meets the modern learner where they are and enhances their learning through active participation.

Rationale

Gamified initiatives in museums have shown remarkable results on enhancing visitor engagement. Such an approach also showed promising results in educational settings,

²⁹ B. Templeton, “Making a Museum Game That’s More Than Just a Tour of the Building,” *The Guardian*, June 14, 2013, [https://www.theguardian.com/culture-professionals-](https://www.theguardian.com/culture-professionals-network/culture-professionals-)

[blog/2013/jun/14/capture-museum-game-audience-experience#:~:text=In%20a%20bid%20to%20support,also%20packed%20with%20vibrant%20stories.](https://www.theguardian.com/culture-professionals-network/culture-professionals-blog/2013/jun/14/capture-museum-game-audience-experience#:~:text=In%20a%20bid%20to%20support,also%20packed%20with%20vibrant%20stories.)

wherein it significantly improve students' engagement and learning. In Philippine context, it appears that through various online interactive platforms like Quipper, Kahoot!, and Quizizz has significantly increased engagement, module completion, and grades among Grade 7 students.³⁰ Similarly, internationally, a study was conducted to assess the impact of gamification on students' learning. The analysis concluded that gamified learning consistently outperformed both online

and traditional methods in terms of engagement, academic performance, and retention among higher education students.³¹ Together, these findings strengthen the importance of interactive and game-based approaches in education.

With that being said, data regarding gamified museum approach and provide strong evidence for integrating interactive, game-based elements into the Museo Maritimo's extended reach towards the academic community

³⁰ J. F. Barba, "Gamified E-Learning Platforms as Strategy to Increase Student Engagement," E-Saliksik: The DepEd Research Portal, 2021.

³¹ G. Lampropoulos and A. Sidiropoulos, "Impact of Gamification on Students'

Learning Outcomes and Academic Performance: A Longitudinal Study Comparing Online, Traditional, and Gamified Learning," *Education Sciences* 14, no. 4 (2024): 367, <https://doi.org/10.3390/educsci14040367>.

through educational programs. By adopting such approaches, both the museum and educational institution can create more memorable learning experiences, foster active participation, and strengthen students' connection to maritime heritage.

Learning Objectives

The educational program, "*Are Your Designs Seaworthy?*" aims to review course concepts, particularly the shipbuilding process (e.g. steps of designing and construction of ships) through a fast-paced puzzle and Q&A challenge that encourages teamwork, quick thinking, and active participation

from the students.

Mechanics of the Educational Program

Step-by-Step Instructions

1. Divide the class into four groups.
2. Select a representative from each group for the first round. (A new representative will be chosen each round)
3. The moderator/professor randomly picks a card and reads the question on the back aloud.
4. Groups have an opportunity to brainstorm the answer to the question quietly for 30–45 seconds, in pursuit of helping their representatives.

5. When time is up, the moderator hands puzzle pieces to the representatives and shows the image on the front of the card. (allowed for one attempt only).
6. Representatives race to complete their puzzle according to the revealed image.
7. The first representative to finish must ring the bell to earn the chance to answer.
8. The representative gives the group's answer:
 - Correct answer: +2 points for their group.
 - Incorrect answer: The next finished team may attempt a steal for +1 point
9. The moderator gives the correct answer if all attempts are incorrect.
 - The answer key is located on the back of the card, below the question. The moderator is also responsible for updating the scoreboard after each round.
10. For every round, each group nominates a new representative.

or answering).

Scoring System

- Correct answer: +2 points
- Successful steal: +1 point
- No correct answer: 0 points
- Final tally: Highest total wins. Bonus points can be applied to exams/quizzes per professor's policy.

Participation Rules

- A different representative must play each round so all students participate.
- Groups may coach only during brainstorming time (no shouting answers during puzzle assembly

Captain's Question Log

This section provides the complete set of questions and answers for the educational program—*Are Your Designs Seaworthy?* It is arranged in a table format in order to easily access the contents. To keep the activity engaging, the questions are divided into different types—Identification, Definition, Fill-in-the-Blank, and some have jumbled letters that could serve as a clue, revealing the appropriate answer if solve correctly—that all revolve around the central theme of the shipbuilding process, which includes the historical background of maritime

tradition, the detailed steps of ship design and construction, and some key technical terminology. Several cards does not contain any questions, rewarding the students to be exempted from the challenge; earning them additional points automatically. The questions are randomized across the deck numbers, in that way, each round feels unpredictable while still covering a balanced range of topics.

Legend:

Deck → Question Number

Captain's Challenge → The Question

Correct Course → Answer Key

Deck	Captain's Challenge	Correct Course
1	What is the name of the sailboat that brought the early inhabitants of the Philippines to the islands?	Balangay
2	What are the wooden supports that help the launching cradle hold up the hull? (P E T O P P S)	Poppets
3	According to archival evidence, what material was used to build the Galleon ships to protect them from ship worms?	Best tropical hardwoods
4	This is the final assessment stage for the finished ship.	Trials
5	What is the primary purpose of a "builder's trial"?	To be a preliminary test before formal sea trials

6	What is a “measured course” used for during sea trials?	To fulfill contract requirements for speed
7	The group of people who arrived on the boat “balangay” were later called what in Philippine society?	Baranggay
8	What is a “General Arrangement Plan?”	A drawing that shows the overall layout of a ship and its spaces.
9	A booklet with measurements for a hull’s curved lines. (O F S T E F)	Offset
10	What is the “Inclining Experiment” used for?	To assess the weight of the finished ship and check its stability.
11	What are the initial tests of main and auxiliary machinery that happen before formal sea	Dockside trials

	trials?	
12	What is the name of the process for moving a ship from a construction site to a body of water?	Launching
13	What is the primary goal of the “Basic Design” stage in ship design?	To create a baseline concept that satisfies the ship owner’s requirements and complies with rules/regulations.
14	This drawing shows the position and data of all ship tanks using special codes to avoid misunderstanding.	Tank Plan
15	What are “dockside trials” for?	The initial testing of main and auxiliary machinery before formal sea trials.
	What is the name of the burial	

16	jar found in Palawan that has a boat and two human figures on its lid?	Manunggul jar
17	What is the purpose of “sea trials?”	To test the ship’s performance, particularly its speed, to fulfill contract requirements.
18	What historical trade made Manila one of the biggest ports in the world?	The Manila-Acapulco Galleon trade
19	What is the difference between “hydrokinetics” and “hydrostatics?”	Hydrokinetics is the study of fluids in motion, while hydrostatics is the study of fluids at rest.
20	This ship design stage is presented prior to construction. (C B I S A)	Basic

21	Simply enumerate the steps of ship construction.	Fabrication and Assembly Launching Outfitting Trials
22	This procedure moves a completed ship from its construction site to the water.	Launching
23	This step of ship construction is where the ship is berthed to finish. (O G I T F I T U N)	Outfitting
24	What is the main characteristic of a country that offers “flags of convenience”?	Lenient regulations and weak labor laws
25	This final design step contains all the drawings and calculations needed after the contract is signed with the shipyard.	Technical / Detail Design
		Basic Design

26	Enumerate the steps of ship design.	Contract Design Technical Design
27	What is the last stage of ship construction before a builder's trial?	Dockside trials
28	After launching, where is the ship berthed to finish its construction and add the final equipment?	A fitting-out basin
29	What is an inclining experiment used to check during the trials stage?	The ship's weight and center of gravity
30	This is the name for the study of fluids in motion.	Hydrokinetics
31	The Manila-Acapulco Galleon trade served as a crossroads for trade between which two regions?	China and Europe
32	What modern joining process replaced rivets in ship construction in the 1930s?	Welding

33	In what specific shipyard were the Galleon ships built using the best tropical hardwoods?	Cavite
34	What is the first thing that is done in the modern method of ship construction?	Fabrication and Assembly
35	This is the stage where the weight of the finished ship is assessed for stability. (R I L S T A)	Trials
36	This is the very first step in modern ship construction, where the concept of the new vessel is created.	Basic Design
37	This is the final step of ship design, which contains all the documents for production. (T E L A C H I N C)	Technical
38	This drawing precisely details the arrangement of decks, compartments, machinery, tanks, and accommodation	General Arrangement Plan

	spaces to avoid misunderstanding.	
39	What Philippine city was home to the shipyard where the Galleon ships were built? (A V I C E T)	Cavite
40	What is the purpose of “drag chains” during a ship launching?	To retard or slow the vessel’s movement
41	What is the production stage of ship construction, where skilled workers carry out the physical design of the ship?	Fabrication and Assembly
42	In traditional shipbuilding (before the 1930s), what was used to hold the ship’s framed structure together instead of welding?	Rivets
43	What are the stationary structures made of concrete and wooden blocks that support the ship during	Ways

	construction and launching?	
44	What is the main goal of the Technical/Detail Design stage?	To create the final drawings for the shipyard's production units
45	The _____ Plan shows the overall layout of the ship's compartments, decks, machinery, and spaces.	General Arrangement
46	What stage comes after Basic Design and is used to create specific contract plans and specifications to estimate a vessel's cost?	Contract Design
47	Define "outfitting" in the context of ship construction.	The stage after launching where the main machinery, equipment, and other amenities are installed to complete the ship.

48	This science involves the study of fluids at rest. (S C R O H S A D Y T I T)	Hydrostatics
49	The final assessment stage, which includes dockside and sea trials, is called _____.	Trials
50	After signing the contract with the shipyard, the process proceeds to the _____ design, which contains all the drawings and calculations for production.	Technical / Detail

Conclusion

The educational program, “*Are Your Designs Seaworthy?*” has been designed to reinforce a comprehensive understanding of the shipbuilding process. Through interactive puzzle and question-and-answer format, participants were provided a stimulating activity to recall and apply key concepts that are related to ship design, construction, and maritime history.

Upon the successful completion of this educational program, the students are expected to demonstrate proficiency in identifying and defining the stages of shipbuilding. This

activity also highlights the importance of collaborative problem-solving and critical thinking. The insights that students could gain from this exercise serve as a foundational element for further study and appreciation of maritime engineering and the Philippines’ rich naval heritage.

This module not only outlines a fun, interactive way to learn about shipbuilding but also serves as a strong case on how modern museums and educational institutions can work together. By moving beyond passive exhibits and embracing gamified, hands-on learning, we can create more memorable and

effective learning experiences for students. The Museo Maritimo's initiative is a prime example of this progressive approach, showing how a museum can become a vital and essential part of a student's academic journey and inspire the next generation of maritime professionals.

Documentation



Step 1: Pick a random card.



Step 2: Read the question.



Step 3: The students then use the image on the front of the card as a guide, assembling the provided puzzle pieces to match.



Step 4: Once the puzzle is solved, the players ring the bell to signal they have finished and are ready to answer the question.

References

- Barba, J. F. "Gamified E-Learning Platforms as Strategy to Increase Student Engagement." E-Saliksik: The DepEd Research Portal. 2021.
- Bonifacio Art Foundation, Inc. "Galleries." The Mind Museum. <https://www.themindmuseum.org/exhibits/galleries>.
- Lampropoulos, G., and A. Sidiropoulos. "Impact of Gamification on Students' Learning Outcomes and Academic Performance: A Longitudinal Study Comparing Online, Traditional, and Gamified Learning." *Education Sciences* 14, no. 4 (2024): 367. <https://doi.org/10.3390/educsci14040367>.
- Templeton, B. "Making a Museum Game That's More Than Just a Tour of the Building." *The Guardian*, June 14, 2013. <https://www.theguardian.com/culture-professionals-network/culture-professionals-blog/2013/jun/14/capture-museum-game-audience-experience#:~:text=In%20a%20bid%20to%20support,also%20packed%20with%20vibrant%20stories>.

The Global Maritime Industry

Genevie Marie B. Vasallo

Abstract

The Shipyard's Challenge: An Interactive Guide to the Shipbuilding Process introduces a gamified learning module developed for Museo Maritimo's expanded educational efforts at the AIMS Tower. The program, *Are Your Designs Seaworthy?*, uses puzzles and Q&A challenges to transform shipbuilding concepts and maritime history into an engaging, hands-on learning experience. Supported by research on the effectiveness of gamification, the module enhances student participation, recall, and collaboration. This initiative demonstrates how interactive museum-based activities can strengthen maritime education and deepen students' appreciation of the Philippines' nautical heritage.

Key Words: Gamified Learning, Shipbuilding Process, Museum Education, Interactive Exhibits, & Maritime Heritage

Introduction

In the vast expanse of the world's oceans, a silent yet powerful network operates, connecting producers and consumers across continents. This network is the global maritime industry, a critical component of international trade.³² Over 80% of the volume of international trade in goods is carried by sea, underscoring the sector's pivotal role in the global economy. Central to this system is container shipping, a method that

has transformed how goods are transported, stored, and delivered.³³

The process of containerization began in the mid-20th century and has since become the standard for global shipping. By using standardized containers, goods can be efficiently loaded, transported, and unloaded across various modes of transport without the need for repackaging. This innovation has led to significant reductions in shipping costs and time, fostering the growth of

³² "How Container Shipping Works — World Shipping Council," World Shipping Council, n.d., <https://www.worldshipping.org/how-container-shipping-works>.

³³ "Review of Maritime Transport 2024," (UN Trade and Development, 2024), accessed August 30, 2025, <https://unctad.org/publication/review-maritime-transport-2024>.

global trade.³⁴ However, despite its importance, the complexities of the maritime industry and container shipping processes remain largely invisible to the public. Traditional educational approaches often fail to convey the scale and intricacies of these systems. This gap in understanding can lead to misconceptions and a lack of appreciation for the industry's role in daily life.

This paper argues that translating the complex processes of global trade and container shipping into interactive, participatory exhibits can close public

knowledge gaps, strengthen maritime education, and connect global systems to the Philippine context in ways that static academic approaches cannot. By creating tangible representations of these processes, individuals can gain a clearer understanding of how goods move from production to final delivery, the roles of key actors involved, and the significance of maritime transport in global commerce.

³⁴ "Containerization of Shipping Containers: Definition, Types, and Process - Inbound Logistics,"

Inbound Logistics, April 5, 2024, <https://www.inboundlogistics.com/articles/containerized-cargo/>.

The Global Maritime Industry in Perspective

The maritime industry has evolved into a highly complex and interconnected system, where shipping lines, ports, regulators, and logistics providers operate in a tightly coordinated network. Today's global trade relies on more than just moving goods from point A to point B; it depends on the seamless integration of infrastructure, technology, and human expertise.³⁵ Efficiency gains achieved through containerization, port automation, and

advanced tracking systems have transformed the speed and scale at which goods circulate, creating opportunities for nations and businesses to participate in global value chains like never before. Key trends are reshaping the maritime landscape. The rise of mega-ships allows companies to achieve economies of scale, but these vessels also demand deeper, better-equipped ports and sophisticated logistics management.

Digitalization has introduced real-time visibility across supply chains, yet it also exposes

³⁵ "Chapter 6.1 – Ports and Container Shipping | Port Economics, Management and Policy," Port Economics, Management and Policy | a

Comprehensive Analysis of the Port Industry, July 13, 2025, <https://porteconomicsmanagement.org/pemp/contents/part6/ports-and-container-shiping/>.

vulnerabilities to cyber threats and system failures. Environmental pressures, including stricter emissions regulations and concerns over marine ecosystems, further complicate operational planning.³⁶

Within this global network, the Philippines occupies a unique but challenging position. Its geographic location makes it a natural maritime crossroads, yet infrastructure limitations, fragmented port operations, and exposure to extreme weather events often hinder the country's ability to fully capitalize on this advantage. These conditions highlight the

importance of understanding not just the mechanics of shipping, but also the strategic and operational decisions that sustain trade flows.

By examining the global maritime industry through the lenses of trends, operational realities, and emerging challenges, stakeholders can better grasp the forces shaping international trade. Such understanding is essential for identifying where efficiencies can be gained, how misconceptions can be corrected, and how the Philippines can strengthen its role in global supply chains.

³⁶ Zeeshan Raza et al., "Digital transformation of maritime logistics: Exploring trends in the liner shipping segment,"

Computers in Industry 145 (n.d.): 103811, <https://doi.org/10.1016/j.compind.2022.103811>.

Container Shipping

Container shipping is a cornerstone of global trade, and in the Philippines, it is integral to the economy. However, the journey of a container—from the factory to the consumer—is fraught with challenges unique to the archipelago.

Port Congestion and Infrastructure Limitations.

The Port of Manila, the primary gateway for imports and exports, often operates beyond its capacity. In December 2024, Manila South Harbor had a daily average yard utilization rate of 59%, and Manila International Container Terminal (MICT) registered 71%, indicating

efficient operations. However, the Philippine Ports Authority (PPA) has been implementing strategic measures to ensure Philippine ports remain competitive and resilient, including modernization and expansion efforts.

Regardless of these initiatives, the Port of Manila has experienced severe congestion because of a lack of infrastructure and capacity for growth to manage the increasing number of shipments, which has resulted in long vessel wait times. Delays, higher expenses, and difficulties sustaining the supply chain's efficiency are the outcomes of this

congestion.³⁷ *Regulatory and Customs Challenges.* Customs procedures in the Philippines can be time-consuming. The Philippine Ports Authority has been tightening rules to curb storage abuse and address long-standing issues related to port usage and importation delays. However, inefficiencies in customs clearance processes continue to contribute to delays in the movement of goods.³⁸

Environmental Factors. The Philippines' susceptibility to natural disasters like typhoons and earthquakes poses significant risks to container shipping. These events can disrupt port operations, damage infrastructure, and delay shipments, highlighting the need for resilient logistics systems.³⁹

Technological Advancements. To address these challenges, the Philippine maritime sector

³⁷ "Real-time Port Congestion Updates for 2024-2025: Key Factors and Solutions," Sinay, October 15, 2024, <https://sinay.ai/en/real-time-port-congestion-updates-for-2024-2025/>.

³⁸ Liz Lagniton, "Philippine Ports Authority tightens rules to curb storage abuse," *Maritime Fairtrade*, October 12, 2024, accessed August 30, 2025,

<https://maritimefairtrade.org/philippine-ports-authority-tightens-rules-to-curb-storage-abuse>.

³⁹ J. Verschuur, E.E. Koks, and J.W. Hall, "Port Disruptions Due to Natural Disasters: Insights Into Port and Logistics Resilience," *Transportation Research Part D Transport and Environment* 85 (May 28, 2020): 102393, <https://doi.org/10.1016/j.trd.2020.102393>.

is embracing digitalization and technological advancements. The Philippine Ports Authority is implementing modernization and expansion efforts to enhance port operations and improve efficiency. Additionally, the adoption of smart port technologies and digital platforms can streamline operations, reduce delays, and enhance the overall efficiency of container shipping in the country.⁴⁰

Educational and Interpretive Applications

Public awareness and education play a crucial role in understanding the

complexities of global trade and container shipping. Traditional educational methods often fail to convey the intricacies of these systems. Interactive exhibits, such as 3D dioramas, offer an engaging way to visualize the journey of goods from production to delivery. These exhibits can illustrate the roles of various stakeholders, the processes involved, and the challenges faced at each stage. By making these systems tangible, learners can gain a deeper appreciation of the maritime industry's significance.

⁴⁰ Raza et al., "Digital Transformation of Maritime

Logistics: Exploring Trends in the Liner Shipping Segment."

For maritime students, experiential learning through such exhibits can complement theoretical knowledge, providing practical insights into the industry's operations. This approach can also inspire interest in maritime careers, addressing the need for skilled professionals in the sector.

Bridging Knowledge Gaps through a 3D Diorama Exhibit

To make the complex processes of global trade and container shipping tangible, a three-dimensional diorama serves as an effective interpretive and educational tool. This physical model visually

represents the entire supply chain—from production and port handling to ocean transport and final delivery—allowing learners to see and engage with the movement of goods in real time. By including miniature ships, ports, trucks, cranes, and containers, the diorama illustrates the interactions of key factors such as shipping lines, port authorities, customs officials, and freight forwarders.

The exhibit addresses common learning gaps by making abstract concepts concrete. For example, learners can visualize how port congestion slows cargo flow, how containers are transferred between

ships and trucks, and how global supply chains rely on coordinated logistics. Interactive elements, such as moving parts or role-play activities, further enhance understanding, enabling participants to experience operational challenges like security inspections or environmental compliance procedures.

In the Philippine context, the diorama can highlight local maritime realities, such as the unique challenges of archipelagic logistics, port capacity limitations, and weather-related disruptions. By connecting global processes to local examples, learners gain a comprehensive view of how international maritime

trade operates and its relevance to the Philippines. Beyond educational institutions, this exhibit can be used in museums, public seminars, and maritime awareness campaigns, promoting broader understanding and appreciation of the maritime industry.

Fifty Shades of Crate: Understanding Global Shipping through a Diorama

The educational diorama is a scaled, physical model that visually represents the entire journey of goods in the global maritime industry, from their point of origin to their final destination. It is designed to simplify complex trade

and shipping processes into a step-by-step, interactive display, making it easier for students and professionals to grasp the industry's scope and challenges.



Image 1. Fifty Shades of Crate Exhibit

The diorama uses realistic miniatures, labeled process points, and directional flow indicators to guide viewers through the journey. Blending visual cues with

tactile elements helps learners understand how each stage is interconnected, why timing and coordination are critical, and where bottlenecks or inefficiencies may occur.

The Diorama

Diorama Base

A board base designed as a world trade map with continents, major sea lanes, and labeled ports.

Directional arrows indicate cargo flow from production to delivery.

Process points are marked for each step of container shipping:

1. Manufacturing and Bulk Order
 2. Stuffing the Container
 3. Inland Transport to Port
 4. Loading onto the Ship
 5. Ocean Voyage
 6. Pre-Arrival Notice
 7. Unloading and Customs
 8. Inland Distribution
- B. Props and Papercuts

Participants will receive pre-printed, cut-out templates to fold and assemble, such as:

Paper-Cut Miniatures (for assembly)

1. Shipping Containers – box-shaped, printed with doors and logos; stackable
2. Container Ships –

folded side-view model with visible container slots.

3. Delivery Trucks – simple cab and cargo design for inland transport.
4. Warehouses – rectangular building with printed loading bays.



Image 2. Diorama

Ready-Made Props (no assembly)

1. Map Base
2. Route Markers

Instructions

Step 1. Grouping

Divide the participants into small teams.

Step 2. Assembly

Each team is assigned one or two paper-cut miniatures to fold and assemble. Only selected items will be paper cuts (e.g., shipping containers, delivery trucks, warehouses, factories, customs buildings, container ships).

Ready-made props will be

used for complex items (e.g., cranes, docks, base map, directional arrows). These do not need to be assembled.

Step 3. Placement

Teams place their miniatures on the corresponding process point on the diorama map. Ready-made props will already be positioned before the activity begins.

Step 4. Story Simulation

The facilitator narrates the journey of a specific cargo. As the story progresses, participants move their miniature along the directional arrows to simulate the cargo's movements.

Sample Journey Story:

Step 1 – Manufacturing & Bulk Order

Narration: “In the lush plantations of Davao, farmers harvest thousands of bananas. A Japanese supermarket chain has placed a bulk order for these tropical fruits.”

Step 2 – Stuffing the Container

Narration: “At a local packing facility, workers clean, pack, and seal the bananas into cartons, which are loaded into a refrigerated container to keep them fresh.”

Step 3 – Inland Transport to Port

Narration: “A truck carries

the refrigerated container from Davao to the Port of Davao for export.”

Step 4 – Loading onto Ship

Narration: “At the port, a giant crane lifts the container onto a container ship bound for Japan.”

Step 5 – Ocean Voyage

Narration: “The ship sails across the Philippine Sea, navigating through weather patterns and busy shipping lanes.”

Step 6 – Pre-arrival Notice

Narration: “Two days before arrival, the ship’s captain sends documents to Tokyo customs, including the cargo manifest and health certificates for the

bananas.”

Step 7 – Unloading & Customs

Narration: “At Tokyo Port, the container is unloaded. Customs officers check the paperwork and inspect a sample of the bananas before approving entry.”

Step 8 – Inland Distribution

Narration: “A truck delivers the bananas to the supermarket’s distribution center. Within 48 hours, they are on display in Tokyo stores, ready for customers to enjoy.”

Step 5. Recap and Discussion

The facilitator will review all eight steps of container shipping and connect them

to real-world maritime operations.

Conclusion

The modern global economy relies on a complex but efficient maritime system where containerization and standardized trade processes play a central role. From the sourcing of raw materials to the final delivery of goods, every step—from documentation, port handling, to ocean transit—has been optimized through decades of innovation in international shipping.

By understanding how goods move through the steps of global trade and how containers journey

across the world, we gain a clearer view of the invisible yet vital processes that power global commerce. This knowledge not only deepens our appreciation for maritime logistics but

also prepares us to navigate, manage, and improve the systems that keep international trade flowing.

References

Inbound Logistics. "Containerization of Shipping Containers: Definition, Types, and Process - Inbound Logistics," April 5, 2024.
<https://www.inboundlogistics.com/articles/containerized-cargo/>.

Interconnected Economies. OECD eBooks, 2013.
<https://doi.org/10.1787/9789264189560-en>.

Lagniton, Liz. "Philippine Ports Authority tightens rules to curb storage abuse." *Maritime Fairtrade*, October 12, 2024. Accessed August 30, 2025.
<https://maritimefairtrade.org/philippine-ports-authority-tightens-rules-to-curb-storage-abuse/#:~:text=By%20Liz%20Lagniton,to%20save%20on%20storage%20costs>.

Port Economics, Management and Policy | a Comprehensive Analysis of the Port Industry. "Chapter 6.1 – Ports and Container Shipping | Port Economics, Management and Policy," July 13, 2025.
<https://porteconomicsmanagement.org/pemp/contents/part6/ports-and-container-shipping/>.

Raza, Zeeshan, Johan Woxenius, Ceren Altuntas Vural, and Mikael Lind. "Digital transformation of maritime logistics: Exploring trends in the liner shipping segment." *Computers in Industry* 145 (n.d.): 103811.
<https://doi.org/10.1016/j.compind.2022.103811>.

“Review of Maritime Transport 2024.”

<https://unctad.org/Publication/Review-Maritime-Transport-2024>. UN Trade and Development, 2024. Accessed August 30, 2025.
<https://unctad.org/publication/review-maritime-transport-2024>.

Sinay. “Real-time Port Congestion Updates for 2024-2025: Key Factors and Solutions,” October 15, 2024.
<https://sinay.ai/en/real-time-port-congestion-updates-for-2024-2025/>.

Verschuur, J., E.E. Koks, and J.W. Hall. “Port Disruptions Due to Natural Disasters: Insights Into Port and Logistics Resilience.” *Transportation Research Part D Transport and Environment* 85 (May 28, 2020): 102393.
<https://doi.org/10.1016/j.trd.2020.102393>.

World Shipping Council. “How Container Shipping Works — World Shipping Council,” n.d.
<https://www.worldshipping.org/how-container-shipping-works>.

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