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ARTICLE

Computer-based Training (CBT) As Interactive Learning Media for English Maritime Course in Maritime Education and Training (MET)

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ABSTRACT

This study aims to examine the validity, practicality, and effectiveness of Computer-Based Training (CBT) for the English Maritime Course within Maritime Education and Training (MET). Additionally, it seeks to identify the target learners' needs and the appropriate learning materials for seafarer candidates enrolled in the Nautical Program at SMK Pelayaran Samudera Indonesia Medan. Employing a Research and Development (R&D) approach, the study followed six stages: needs analysis, syllabus development, material design, expert consultation, material try-out, and evaluation. The research involved eleventh-grade students from Nautical Program classes A and B as participants. Data were collected through questionnaires, interviews, and observation sheets, and were analyzed using both descriptive quantitative and qualitative methods. Findings indicate that CBT serves as an effective tutorial and assessment tool, offering an interactive learning medium that supports onboard training. CBT enables seafarer candidates to engage more actively in acquiring the knowledge and skills essential for their future professional roles. Despite certain limitations and challenges in implementing CBT, the research underscores its significant potential to enhance English language teaching and learning in maritime contexts. The study recommends that instructors and trainers familiarize themselves thoroughly with CBT's features to maximize its benefits in Maritime Education and Training. Overall, the integration of CBT contributes meaningfully to improving instructional practices and learner outcomes in English Maritime Courses for seafarer candidates at vocational schools.

Keywords: Computer-Based Training (CBT); English Maritime Course; Maritime Education and Training (MET)

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1. Introduction

The rapid expansion of information and technology is accepted as inevitable. Many facets of people's lives, particularly everyday ones like the economy, entertainment, education, and so forth, have made extensive use of technology. The advancement of ICT (information and computer technology) in education has a positive impact on classroom language teaching and learning strategies. Language classes today require a learning atmosphere that prioritizes students' active engagement. This idea is comparable to what is claimed, that active learning can increase the quality of the language learning experience as well as the learning process [1]. This experience can be obtained through the use of blended learning, which blends a variety of technology-based resources with an actual classroom environment.

The shipping industry is now much more productive because of technological advancements. We have seen many advanced equipment and technology continually equipped on vessels and numerous warships constantly outfitted with cutting-edge machinery and technology. To increase efficiency, the Maritime Education and Training (MET) sector has been sluggish to embrace technology. The consistent attempt to integrate technology into the entire spectrum of teaching and learning activities has only been made in the last thirty years. "There are numerous social, economic, and political facets of working and living in the era of information processing that have an impact on the conventional methods of teaching and training ship operators. When making plans for the future of computer technology use in the maritime community, these factors must also be considered [2].

Marine education and training (MET) uses a number of training technologies, some of which have certain characteristics. A few of them have been found to be the most successful training. The primary challenge facing Maritime Education and Training (MET) is how to balance the challenging financial budget with the growing demands. An ideal answer appears to be a methodical training program that incorporates Computer-based training (CBT). There will be breakthroughs in computer-based training (CBT) as long as technology keeps improving. Maritime Education and Training (MET) may eventually embrace this in its entirety. Computer-based training (CBT) for the English Maritime course is one example of how Maritime Education and Training (MET) uses technology to make learning more dynamic for students. Students are typically more motivated to learn when they use technology, such as computers and the internet, both within and outside of the classroom [3]. It is thought that by giving students more control, this new paradigm will improve their academic performance. According to Lee [4], teachers have a crucial role in encouraging and assisting students in problem-solving, decision-making, and progress evaluation. Computer-based training (CBT)'s program adaptability will also enable pupils to better prepare themselves without regard to time or location constraints. Because Computer-based training (CBT) can decrease training costs, maintain training standards and quality, and increase learning efficacy for crews and mariners, it will continue to grow in the maritime sector.

In the maritime sector, English has evolved into a customized language to meet unique requirements. It would be perfectly appropriate for the English for Specific Purposes category if people had proper training in it. The design for lesson plans in ESP courses must be tailored to the communication needs of the students [5]. The majority of ESP specialists and educators agree with certain philosophies to the degree that the standard must address the unique needs of the student. It will be necessary for seafarers to communicate in a common language in order to be able to sail safely and effectively in the oceans. Their linguistic requirements differ from those of a high school student or a restaurant manager who is setting up the menu. Depending on the job description, position, or role they are assigned to onboard, their language requirements are varied.

According to Demirel and Ziarati, a number of studies found that human error was responsible for the majority of maritime accidents. Many of which resulted from a lack of appropriate English language proficiency and communication issues [6]. This language barrier was especially prevalent among harbour officials and transnational employees, primarily in restricted waterways. To avoid uncomfortable situations in the marine industry, proper English use is crucial in worldwide maritime operations. It not only makes it possible for ships and seaports to communicate more effectively, but also makes it possible for a worldwide team to coordinate ship supervision and manoeuvres. The number of crafts with foreign employees is rapidly increasing, and this trend is predicted to get stronger in the future.

Communicating in Maritime English is essential to maintaining maritime safety. Seafarers of all ranks can handle crises, daily operations, ship-to-shore communication, health, safety, and security issues more successfully when they speak the same language. The emergence of numerous new industries, particularly in the maritime sector, tends to improve the discussion of Maritime English course as part of English for Specific Purposes (ESP). Since it prepares content for the target learners to use acceptable and proper English for a variety of purposes in the context of the learners' potential future and Maritime English course as part of ESP course plays a key role. The implementation of ESP is fraught with difficulties. Before starting an ESP course, students must become proficient in General English, or GE[7]. It will be challenging because, although being in higher education, most students in EFL nations like Indonesia are at a basic level. Most pupils feel surprised moreover get difficult and find that the English Maritime course is challenging when they are first exposed to it. The challenge arises from the fact that ESP differs from GE, which they have previously examined. The content's prominence and unfamiliarity to many teachers and students is where ESP differs from GE[8].

Even though there are obstacles and difficulties, developing ESP course becomes more fascinating. A learner's success in English for Specific Purposes courses is influenced by a number of elements, such as the social context, curriculum implementation, emotional factors, and metacognitive skill mastery[9]. One crucial factor is the traits of the kids. Adult learners have distinct traits that influence their methods of learning. Adults of TESL learners employ learning tactics that are appropriate for them as active learners and should be communicative in speaking[10]. The English language proficiency of the ship's crew is determined to be extremely low because communicative language training in the context of real-life circumstances at sea has rarely been included in any curriculum for training seafarers or navy commanders. Numerous accidents on board have been found to be primarily caused by this inadequate communication. This fact, in addition to the cultural differences among multinational ship crews, contributes to a significant contemporary issue.

Related to the requirement from the International Maritime Organization (IMO) on Maritime English Model Course (MEMC) 3.17, the students in Maritime education and Training (MET) should fulfill the competence of the English Maritime course that is contained in the Standard Training and Conventional and Watch keeping (STCW) Code. It is an order to meet the specific objective of English Maritime Course. Maritime education and Training (MET) are expected to create interesting English Maritime materials in developing their own program to cover the goal.

From the explanation of the introduction, the research problems that identify the specific inquiries of this study are as follows:

1) What is the validity of Computer-based Training (CBT) for English Maritime Course in Maritime Education and Training (MET)?
2) What is the practicality of Computer-based Training (CBT) for English Maritime Course in Maritime Education and Training (MET)?
3) What is the effectiveness of Computer-based Training (CBT) for English Maritime Course in Maritime Education and Training (MET)?

This article's primary goal is to provide the structure and layout of Computer-based Training (CBT) as a learning resource for English Maritime course at Vocational School (SMK) Pelayaran Samudera Indonesia Medan. Computer-based Training (CBT) program should be distinct from other maritime education and training in order to guarantee its validity, applicability, efficacy, and distinctive characteristics. This educational program is unique in that it prepares and builds the necessary learning resources for the English maritime course in a way that will allow maritime specialists to work in academic, professional, and administrative roles in the maritime industry in the future. A person's personal preferences or life circumstances (such as whether they will work onshore or at sea) will determine their future choice of activity (professional, academic, or administrative).

1.1. The History of Computer-Based Training (CBT)

For nearly four decades, educators and computer scientists have incorporated computers into instructional settings. Initially, computer use for education was largely confined to large universities, focusing mainly on text-based reading and typing[11]. The emergence of microcomputers in

the late 1970s dramatically accelerated the spread of computing in business, schools, and homes. These microcomputers evolved from simple text-input and printout devices to interactive systems supporting text, graphics, voice, and pointing devices[12]. Recent advances in microcomputer technology have introduced more powerful multimedia capabilities and the ability to network multiple computers to share resources[13].

Early enthusiasm around instructional computing predicted significant educational improvements through computer-based instruction (CBI)[13]. Despite technological advances and broader access, improvements in instructional outcomes have been modest. The current instructional computing environment is fragmented by diverse hardware types and software incompatibility, limiting seamless implementation[12]. Other barriers include a shortage of skilled courseware developers and ongoing debate about optimal pedagogical uses of computers in education[13].

Educational computing began with a few large government-funded projects on mainframe and minicomputers. By the late 1960s, over a thousand computer-based learning programs had been developed in the United States[14]. In Europe, programmed learning research commenced in the mid-1960s, focusing on formalizing learning processes and cognitive activities[15]. In 1972, MITRE Corporation's TICCIT project introduced computer-based instruction using minicomputers, advancing instructional design theories[14].

The release of microcomputers in 1978, such as the Apple II, made personal computing more accessible to educational institutions, with early courseware developed specifically for these machines[15]. The introduction of the IBM Personal Computer (IBM-PC) in 1981 expanded computing into business and education sectors[12]. Apple's 1984 Macintosh introduced better integration of graphics, sound, and a graphical user interface controlled by a mouse, further enhancing instructional capabilities[13]. The 1989 release of the NeXT computer combined graphical interfaces with increased speed, storage, networking, and multitasking, pushing CBT to new heights[12].

With further technological development, multimedia was integrated into CBT, leveraging high-speed processing and storage. Multimedia authoring tools facilitated the creation of engaging courseware, drawing professionals from multiple fields to develop, evaluate, and use CBT materials. Consequently, CBT became widely adopted in universities, schools, workplace training, and individual learning environments[13,15].

Instructional computer programs have been known by various names, including Computer-Assisted Instruction (CAI), Computer-Based Education (CBE), Computer-Assisted Learning (CAL), and Computer-Based Training (CBT). This paper adopts the term Computer-Based Training (CBT) to emphasize its focus on training contexts[14].

1.2. Computer-Based Training (CBT)

The use of computer-based training (CBT) has been increasing over the past few decades. In that timespan, incredible advances have been made in computer technology, and its availability at relatively low prices has led the educational service to encourage the use of computers in the English Maritime course and at home. The rapid developments in programs allow interaction via text, graphics, voice and the most recent developments in microcomputer technology provide even greater power and ease of use through advanced visual and auditory devices[15].

In addition, the ability to combine a wide variety of multimedia content is a great advantage to increasing retention of new knowledge. Today's multimedia capable PCs allow developers to take advantage of the fact that people, as educational research indicates, learn 20% of what they see, 40% of what they see and hear, and 70% of what they see, hear, and do[2]. If that is the case, the combination of computers, networks, and multimedia capabilities is clearly a formidable educational tool. Thus, to create a complete multi-sensory learning program is to allow students to interact with the material, and to learn according to their own needs, pace, and learning styles.

The Nautical Institute has researched and debated the role of computer-based training (CBT) in in training and assessing seafarers, and defined computer-based training (CBT) as: "… a broad generic term to describe how computer-run software can be used in support of training applications. These may include initial training or for imparting or reinforcing underpinning knowledge". Furthermore, computer-based training (CBT) for mariners is courses which: 1) used by students without the need for support or assistance by instructors, 2) have built in assessment and produce records of the training time and the student iden-

tification, 3) interactive, 4) use multimedia technology, 5) run on standalone PCs, networked computers, the Internet, or corporate Intranets, 6) run aboard ship or at shore side locations[15].

Computer-Based Training (CBT) refers to the use of the computer as a tool to facilitate and improve training and instruction. A Computer-Based Training (CBT) is also a software programme, which is developed for individual training of personnel on personal computers (PC) and group training in the classroom. Computer-Based Training (CBT) program uses tutorials, drill and practice, simulation, and problem-solving approaches to present topics, and tests the student's understanding. These programs let students progress at their own pace, assisting them in learning the material. So, Computer-Based Training (CBT) is also suitable to the seafarers' on-board training and on - shore training. It is made available to employees on the company's in-house network system. Most of the CBTs include written information, photos, multimedia, video and animation. The subject matter taught through CBT can range from basic math facts to more complex concepts in science, engineering studies, and practical skills. Computer-Based Training enables education and training of personnel within a given topic by means of data - technology.

There are different types of Computer-Based Training (CBT) programs: tutorial, simulation, drill and practice, and problem solving. A tutorial's job in CBT is to tutor by interactive means, in other words, by having a dialogue with the student. The tutorial presents information, asks questions, and makes decisions based on the student's responses. Like a good teacher, the computer decides whether to move on to new material, review past information, or provide remedy. The computer tutorial is very efficient, because it gives the student who needs it individual attention. In addition, the student can progress at his or her own pace. Furthermore, a good tutorial is interesting, easy to follow, and enhances learning with sound and graphics.

In simulation programs, students take risks as if they were confronted with real-life situations without having to suffer the consequences of failure. Students can experiment with dangerous chemicals on the computer screen, for example, and not be in danger from the actual chemicals. Students can repeat experiments easily as often as they wish. In machinery simulators, there is no expensive machinery that is easy to damage by wrong operation, and students do not have to wait a long period of time for the effects of experimental conditions before they can observe the results. Simulations save time and money, reduce risks, and work well in decision–making simulations. Many educators feel that a well-designed simulation software affords students the opportunity to apply classroom knowledge in more realistic situations than can otherwise be set up in a classroom, which enhances students' learning.

The drill and practice programs differ from tutorial software in a key way: They help students remember and utilise skills they have previously been taught, whereas a tutorial teaches new material. Students must be familiar with certain concepts prior to working on drill and practice programs in order to understand the contents. The typical drill and practice program design is as follows: The computer screen displays a problem, the student responds, and the computer provides immediate feedback. The learner stayed with the problems until reaching a certain level of proficiency and then moved on to a more difficult level. This software frees the students and the teachers to do more creative work in the classroom. Many of these programs serve as diagnostic tools, giving the supervisor relevant data on how well the students are doing and on what work they need. They also provide immediate feedback for students, allowing them to progress at their own speed and motivating them to continue.

Problem-solving skills are necessary in a complex engineering world, and a good way to develop these skills is to practice solving problems. The critical thinking needed for problem-solving can be practised in any content area. Problem-solving programs emphasize co-operation and are suitable for small groups or individual students. Teachers like this type of software because it helps students with hypothesis testing and taking notes. Similar to simulation, problem-solving programs can easily be used with only one computer and as many as thirty students. The whole class can be involved in critical thinking and making inferences. This type of software gives students more freedom to explore than drill and practice software.

1.3. CBT (Computer-Based Training) Structure Models

Below are the five Computer-Based Training CBT structure Models (tutorials, drills, simulation, games, and

assessment), any of which could be used in training with standalone PCs.

a. Tutorials

Tutorials aim to deliver information, skills and guidelines through the initial use of information and skills [15]. **Figure 1** introduces the structure and sequence of a typical tutorial.

At this stage, a cycle begins by asking questions and seeking responses from the trainee, and then the program will judge the trainee's response and give feedback. Feedback may take many forms, including text messages and/or graphic illustrations. Its most common function is to inform the trainee about the appropriateness of the response. The cycle may be continued by moving to another phase of the training or it may be closed either at the end of the tutorial, or by the trainee. Usually there is a summary at the closing stage.

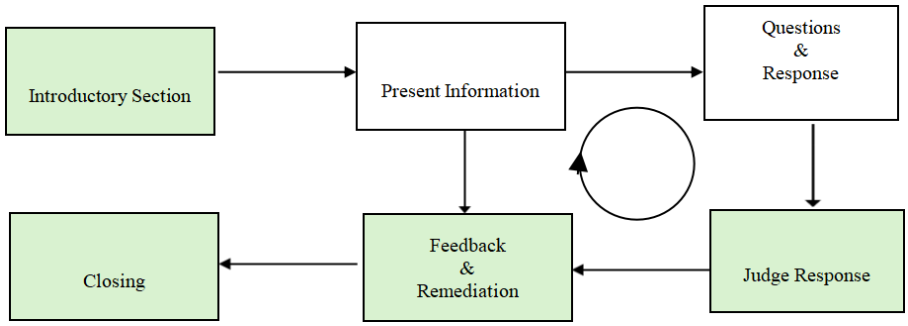

Figure 1. CBT Structure and Flow in Tutorial.

b. Drills

The computerized drill is a methodology used primarily for trainee practices for retention and fluency of the training process (**Figure 2**).

The introductory section, usually as the tutorial methodology, is followed by a cycle which commences by selecting an item; for example, spelling and English usage at which the trainee may select the tense or the degree of faculty, which could be random or in a specific order. Alessi & Trollip stated that: "some terminate the drills after a hundred items, some after thirty minutes, and some after students' performance reaches an acceptable level of quality" [15]. The cycle continues by seeking the response from the trainee to a given question, judges the response, gives feedback to the response and may give corrections to the wrong response. The process may continue to the end of the drill and then provide a summary and evaluation to the trainee, or the trainee may close it at any stage of the cycle. This structure assists a trainee to practice the subject, but it does not touch on new information.

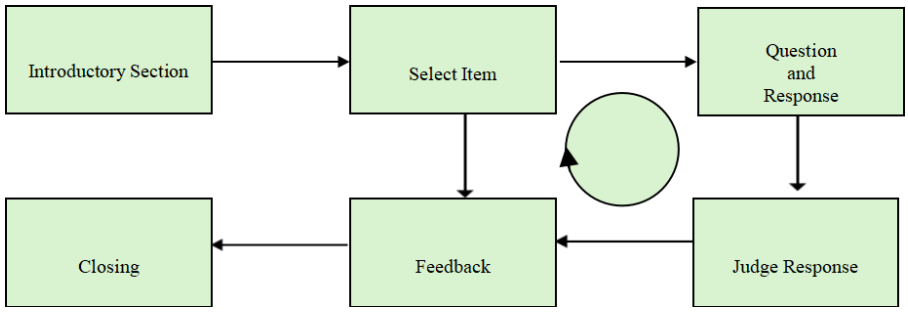

Figure 2. CBT Structure and Flow in Drills.

c. Simulation

As the trainee becomes increasingly competent in dealing with the simple case, the simulation then adds details to bring the trainee close to reality (**Figure 3**).

As in previous structures, it commences with the introductory section, followed by a cycle that begins with a

presentation scenario (e.g., briefing in a full mission simulator), which could be the demonstration of the task or just a textual explanation, depending upon the scenario. Then, an action is required from the trainee; for example, if the task is about the rules of the road, the required action could be to demonstrate usage of the appropriate rule to avoid collision in the current situation. According to the action taken by the trainee. The system will be updated, i.e., if the trainee uses the wrong rule, which may cause a collision, the system may stop.

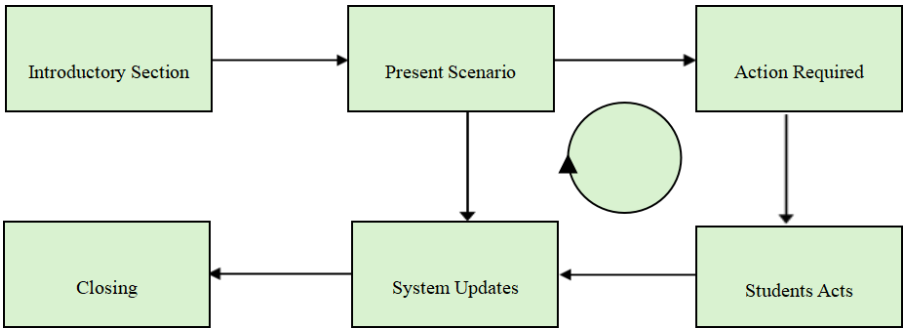

Figure 3. CBT Structure and Flow in Simulation.

It can be noticed that simulations have advantages over other structures such as the enhanced motivation of the trainees, better transfer of training (close to reality), and greater efficiency. However, there are some limitations for the simulation technology in that it is a part of reality reduced by the scenario designer, which is not an exact copy, even though an exact copy is not always required[16].

d. Games

Games are similar to simulations, to a great extent, as both provide an environment that facilitates training and the acquisition of skills. Moreover, their effectiveness is based on the fact that nothing is more relevant to the trainee than his/her own reactions, understanding, observations, and beliefs[17]. Hoyt encourages using games onboard vessels, as seafarers will enjoy the training and will not feel it is a drudgery interfering with their free time[17].

After the introductory section, a cycle commences (as simulation) by presenting a scenario and the required action (**Figure 4**). Then, another small cycle will be created depending upon the reaction of the trainee (player), until he/she gives the final response, from which the system will be updated to allow a move to the next step or to reach the end of the game. At the end of the game, it is recommended that the system display a message stating that the program is ending, because the trainee may wonder if the program has malfunctioned. Traditional games like crosswords and word jumbles, prepared with varying levels of difficulty, help in creating a better vocabulary and understanding of the English language for seafarers who do not have English as their primary language. The use of shipping terms and the standard communication phrases further helps in the training of seafarers[17].

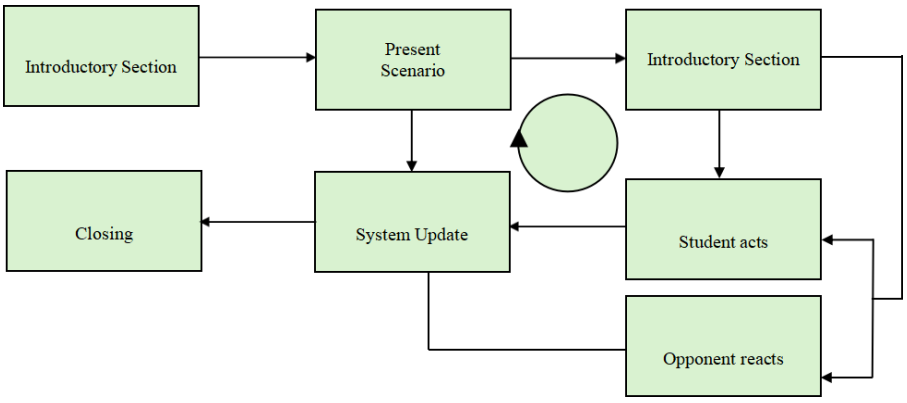

Figure 4. CBT structure and flow in Games.

e. Assessment

Assessment is used for many purposes, including the determination of a learner's knowledge (what he/she knows, and what he/she does not) (**Figure 5**), and ranks learners in order in terms of performance, language level and others. CBT is used for assessing individual performance against the agreed competency standard (the outcomes required in the workplace) in many countries, e.g., Australia and the United Kingdom [18].

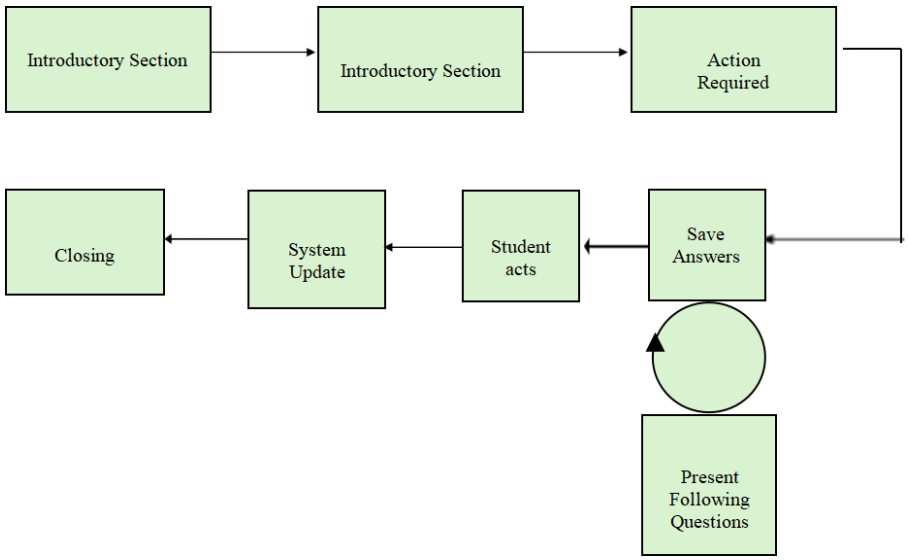

Figure 5. CBT Structure and Flow in Assessment.

At this cycle, instruction should be given to clarify the procedures to be followed by the learners' responses followed by presentation of the first question (or package of questions). Then the system will save the response (answer) and move to the following question, and so on. The program will close after the learner answers the last question. At the end, the system will judge the answer against a specific standard, and present the score (mark) to the administrator.

Thus, the use of computer-based assessment has an advantage for the administrator (instructor) to have a pool of answers, which he/she can use for evaluating the questions and improving them. However, this has disadvantage of limiting the questions in the short answer format, such as multiple choice or matching, with the difficulty of judging open-ended or extended test items. From the understanding of previous cycles, the basis of the successful use of CBT will depend upon choosing a correct structure for the subject to fulfill the objectives of the training. For example, when using CBT in principles of navigation for junior students, and the objectives of the subject are "the students will be able to explain the fundamental information of the coastal navigation and nautical publication, " a tutorial will be the best method to achieve the objective.

1.4. Changing Trends in Computer-Based Training (CBT)

The advancements in technology and changes of learner preferences are leading to changes in the future of Computer-Based Training (CBT) [15]:

1) Mobile Learning: In the era of smartphones and tablets, mobile learning has become increasingly popular. Computer-Based Training programs are now being designed to be accessible on mobile devices, allowing learners to access training materials anytime, anywhere. Many organizations have adopted SincX Learn mobile learning app to improve their employee training process.
2) Artificial Intelligence (AI) and Adaptive Learning: AI is transforming Computer-Based Training by enabling the creation of adaptive learning systems that tailor content to individual learners' needs. These systems use data analytics to identify knowledge gaps and provide personalized recommendations, enhancing the

effectiveness of the training.

3) Gamification: Incorporating game elements into Computer-Based Training program is a growing trend. Gamification techniques, such as points, badges and leaderboards, can increase motivation and engagement by making learning more fun and competitive.
4) Virtual and Augmented Reality (VR/AR): VR and AR technologies are being integrated into Computer-Based Trainings to create immersive learning experiences. These technologies are particularly beneficial for simulation-based training, providing realistic and interactive environments for learners to practice skills.
5) Social Learning: Social learning platforms are becoming an integral part of Computer-Based Trainings. These platforms facilitate collaboration and knowledge sharing among learners through forums, chat rooms and social media integration. This trend reflects the increasing recognition of the importance of peer learning and support in the educational process.

1.5. The Advantages of Using Computer-Based Training (CBT)

There are some benefits of using Computer-based Training as the medium of the teaching and learning process in the English Maritime Course [18]. They are:

1) CBT programs with built-in training and assessment sections enable shipping operators to comply with keeping training records. Such records will give the seafarer and the vessel the required evidence that the training has been performed. Moreover, keeping such records supports, under the ISM Code, the Safety Management System (SMS), which ensures that such training is provided for all the personnel concerned. In addition, training records ensure that each ship is manned with qualified and certified seafarers in accordance with the national and international requirements.
2) CBT is ideal where the processes to be mastered are hazardous, for example, the handling of explosives and dangerous cargoes, in general, where training on the real equipment is prohibitive. An example of such a program is presented in using the onboard computer-based Liquefied Natural Gas (LNG) as an interactive training program. This program was developed by a ship operator and teaching institution for crews of LNG ships in Australia. This program allows crewmembers to gain the required skills and procedures to deal with the cargo carried onboard without any risk for the cargo operations or ship's safety.
3) CBT programs supported by distance education via satellite overcome the lack of access at sea of education and training by mariners. Moreover, the development of satellite communications gives the opportunity to update the CBT programs frequently, which provides the marine industry with an option to pursue the goals of improved quality and standards of training.
4) CBT can be available at any time of the day or night; it is possible to make the training material available round the clock for different watches. For example, the chief mate who is looking for promotion, and the time is limited due to the workload, can get the required training in ship handling PC- based simulation in his free time.
5) There is a lack of formal training in personnel management in marine science, which is a major part of the master's job. Thus, masters are depending upon their personnel skills, which may be improved by experience.

The researchers agree with this; indeed, the CBT courses in management either for crowd management on board Roll-On / Roll-Off (Ro/Ro) passenger vessels, or crew management in emergency situations, are able to provide them with the required experience, in addition to their experience in command, to act also as a manager of the ship. In short, shipping companies and seafarers can benefit when they correctly implement and monitor computer/based training and assessment in many areas.

1.6. The Disadvantages of Using Computer-Based Training (CBT)

Besides the benefits of using Computer-based Training as the medium of teaching and learning process in English Maritime Course, there are some limitations or disadvantages of using Computer-Based Training (CBT) [18]. They are:

1) CBT is the need for technical support of the relevant hardware. This is logical when different ships with

varying knowledge and experience contain CBT programs on computers with a number of different configurations, as there will be technical problems, and the ship will need support. Even if all the programs are based on the same programming platform, or only require a web browser, some computers will need to be supported because of the nature of computers today. Moreover, this support should be quick and reliable, and must be performed without detaining the ship.

2) CBT is not reality but is just a part of it; reality is much more complex and far more unpredictable than a simulated world can ever be[16]. He adds, "It is important, however, to be aware of the degree of fidelity of the simulation and how it influences results, un-particular when safety margins are small". Indeed, the author agrees with this opinion, but there is an advantage from using CBT onboard as the trainee will be able to implement whatever he/she learns from such a program practically onboard.
3) Most CBT programs start with an introductory section, which usually requires reading skills. The common language used in most programs is English, which is not the language for the majority of crewmembers, especially ratings. Thus, they will not be able to read the instructions; indeed, they will need an interpreter (usually a certified officer) to explain how to run the program.
4) CBT cannot deliver experience; seafaring cadets and crewmembers must still seek experience from senior sea staff.
5) CBT contains over-impressive graphics and animations, which may distract trainees from achieving the specified learning objectives. For example, a ship handling course in approaching port may draw the attention of the trainees to the port facilities, rather than concentrating on the manoeuvring procedures.

1.7. Maritime English Course

Maritime English is a specific language. People mainly use it in the Maritime field. It is an active language in the shipment business, and it has particular terminology. Mercado, Rafa, Sarmiento & Jalbuena (2013) say that Maritime English (ME) develops students' ability to use English at least to intermediate language level. Maritime English is an applied course in which the seafarers have to contact with the foreigners. However, Maritime English not only assists communication at sea but is also used in various professional roles[19].

Maritime English is very important for maritime industry communication. Maritime English takes a role in navigational and safety communication. It is used not only among the crew, but it is also used from ship to shore and vice versa, ship to ship and on-board ship. The use of Maritime English must be simple to avoid ambiguity that will lead to misunderstanding[20]. According to Dirgeyasa maritime accidents happened 80% is caused by human error[20]. In this case, it happened because the crews did not use a common language in communication, which impacted the effectiveness of communication. Hence, the seafarers should be able to understand and even master the language in both spoken and written forms.

However, maritime English, as a part of ESP, is different from general English and from any other branches of ESP English, such as English for Journalism (EJ) or English for Business (EB), English for Medical (EM), etc[20]. Furthermore, based on IMO, maritime English has its own standard which is known as SMCP (Standard Maritime Communication Phrases). Naturally, the differences are included in some parts including vocabulary usages, grammatical patterns and spelling systems. It is almost different from general English.

By its name, Maritime English (ME) has its own various terms such as English for maritime, language of the sea, and or sea speak. It is the most typical one among other branches of English for Specific Purposes (ESP) such as English for Tourism (ET) or English for Journalism (EJ) or English for Business (EB), or English Law, etc. Like its name, its definition is also relatively diverse and various among other experts. By its name, it seems that simply Maritime English can be defined as the English for maritime industry and maritime world. It is the language of the seafarers which has its own standards, rules and conventions.

In a more contextual and comprehensive definition, it is stated that Maritime English is a navigational and safety communication from ship to shore and vice versa, ship to ship, and on-board ships. It must be precise, simple and unambiguous, so as to avoid confusion and error; there is a need to standardize the language used[21]. In addition, IMO declares that Maritime English is the language used to

communicate in all maritime-specific situations, on-board, ship to ship, and ship to shore [22]. It is also stated that it includes maritime-specific terminology – navigation, on-board operations, roles and responsibilities, health and safety, emergencies so that it must be simplified, modified and codified. It is done in order to minimize and avoid misunderstanding and miscommunication among seafarers who have different languages and cultural backgrounds. As a result, they can communicate effectively with each other. It is a fact that it is generally known that the accident of sea will cause the loss of human beings, properties, and the sea environment as well.

Indonesian seafarers still have low competence in using Maritime English as a language for communication [20]. In addition, adds that the phenomenon does not only happen to the students of Maritime training school but it also happens to the Alumni of Maritime Training School. The use of code switching even code mixing is becoming their choice. However, it is not always effective because it sometimes can raise misunderstanding between the speaker and listener so that the condition at the ship will be unconducive. Moreover, it will be a big problem if the instruction is also given in English, which affects the on-board process.

In addition, IMO in terms of function, declares that the Maritime English the language which is used to 1) to assist in the greater safety navigation and of the conduct of the ship, 2) to assist maritime training institutions in meeting the objectives mentioned, and 3) to standardize the language used in communication for navigation at sea and in port and 3) to standardize the language used in communication for navigation at sea, in port approaches, waterways and harbour, and on board vessel with multilingual crews from different countries and cultural backgrounds [23].

1.8. Maritime Educational and Training (MET)

Maritime Education and Training (MET) is one of the pillars of an effective, sustainable maritime industry. A highly trained, competent, and skilled workforce across business and operational domains is required for a successful and sustainable industry capable of responding effectively to the dynamic demands of global trade and the shipping industry [24]. Global dynamics in the international marine domain have prompted rapid shifts in MET approaches and policies, including integrating innovative technologies into MET policies [25,26]. Effective MET is imperative for overcoming underlying workforce challenges to keep up with the rapid and dynamic changes in the industry. The recent COVID-19 pandemic, for instance, prompted the rapid, unplanned adaptation of highly novel organizational and technological solutions to several maritime domains, especially in the education and training of officers [27].

Maritime Education and Training (MET) is accountable to ministries and is mainly guided by the law about higher education and various IMO conventions and documents. Its structure should comprise the subdivisions responsible for the following fields: 1) Educational process and the assessment of students at MET. 2) Material and technical basis. 3) Administration and Quality Management System (QMS).

Maritime education and training also have a crucial role in the process of creating the required skills and competencies of seafarers, enabling them to carry out their tasks efficiently [24,28,29]. The International Maritime Organization (IMO) adopted the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) in 1978, by which the competencies of the seafarers were put forward at the international level.

As the modern maritime world lacks officers, it would be expedient for maritime countries to be oriented toward producing officers. The supply of seafarers to the international maritime labour market depends on the quality of education received at MET of the country. One of the most important criteria for the success of maritime education is the internationalization of educational programs of maritime nations and raising the percentage of employment of MET alumni. This in turn depends on the organization of educational processes at MET, the curricula according to which educational processes are conducted, the qualifications of lecturers, and the equipment of laboratories and Maritime Training Centres (MTC), where the practical part of training is delivered.

The System of Maritime Education and Training (MET) of the country is very important. As stated by Mukherjee in his book Farthing on International Shipping: "Proficiency and Competence can only be achieved through proper Maritime Education and Training (MET)". Each Maritime Education and Training (MET) should work out a strategic plan of development for the next 5 years, which should be followed by those who become heads of Maritime Education and training Institutions (METs). The plan should be updated every

5 years or more often upon necessity caused by changes in national legislation or major amendments to maritime conventions. This should be fulfilled in close cooperation with the Maritime Administration (MA).

All Maritime Education and Training institutions state the purpose of designing an efficient curriculum that would guarantee the production of highly qualified staff for the maritime industry. Seafarer is a main product of Maritime Education and Training (MET) and for Maritime Administration (MA). Seafarers are a potential future profession who will have to pass certain training courses at Maritime Training Centres (MTC) and receive corresponding after seagoing practice.

2. Method

Borg and Gall used a research and development strategy to create the learning materials for the seafarer candidates' English Maritime Course that combined computer-based training (CBT). The main goal of research and development was to create a product that could be used in classrooms, not to formulate or test. The goal of research and development is to create useful products that can be utilized in teaching and learning activities, not just to create or test theories [30]. Galle et al. conducted research and development in 10 steps; however, this study was divided into six stages [31].

The first stage is research and information gathering, also known as the "define stage," which is connected to development requirements. At this point, the researcher examines the curriculum, the objective state of the Maritime English (ME) learning process, and the learning requirements of the seafarer candidates. The researcher creates lesson plans and a draft of the Maritime English course for the seafarer candidates' teaching materials during the second stage of planning, which can help the teachers and students in the classroom with the teaching and learning process of the English Maritime course. The third phase is evolving. At this point, the researcher is creating the development product or the standard for the learning media that will be created. Expert validation is the fourth step. At this point, the researcher verifies the product with a few professionals in the maritime industry who are validators. Revision is the fifth step. At this point, the researcher conducts a number of experiments to evaluate the efficacy, feasibility, and validity of the product. Product testing is the sixth step. The researcher is now marketing a product that has been created to be embraced by other users, whether they be individuals or groups.

The research and development process can be used to create instructional materials or learning aids. Nevertheless, in the implementation of some educational research, the researchers can modify the ten steps into simpler steps due to the need and context of their research [32]. The stages of Research and Development by Borg and Gall can be seen in **Figure 6**.

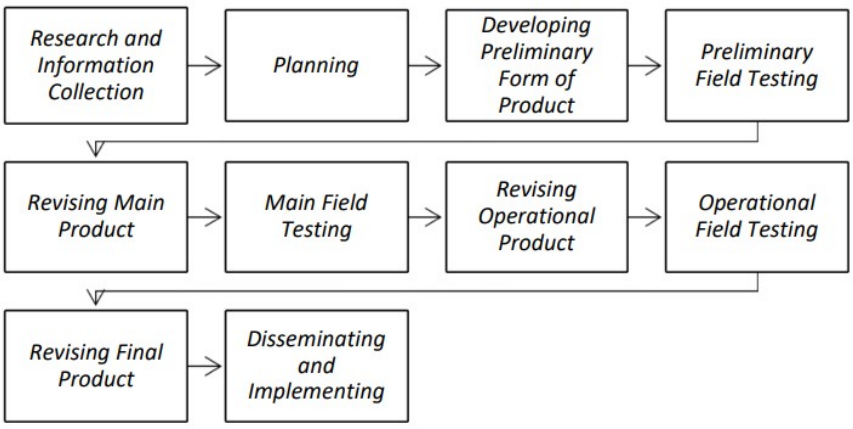

Figure 6. Development Research Model.

The researchers gather information from the results of the validity, practicality, and effectiveness tests because the goal of this study is to ascertain the efficacy, practicality, and validity of computer-based training (CBT) as an interactive

learning medium for the English Maritime Course in Marine education and training (MET), particularly for seafarer candidates at Vocational School (SMK) Pelayaran Samudera Indonesia Medan. Validation sheets pertaining to three areas namely content/material, language, and medium (design) to make up the validity test instruments. This validity test has a validator, which indicates that the validator's job is to validate the instrument. A questionnaire is used as the practicality test tool. Both teachers and seafarer candidates or training participants are given the questionnaire, which is used to analyse their answers about the usage of learning media. Then, a test (multiple choice) is used to determine the product's efficacy. The pre-test is administered via computer-based training (CBT) prior to teaching and learning activities, and the post-test is administered following teaching and learning activities. The pre-test and post-test results are compared to determine a product's efficacy.

2.1. Participant (Subject) Characteristics

This study was conducted in Vocational School (SMK) Pelayaran Samudera Indonesia Medan. There were 164 students in eleventh grade of Vocational School (SMK) Pelayaran Samudera Indonesia Medan who come from Nautical program class A and B and Engineering program class A and B. But in this study the researchers only took 50 students as the subjects or participants of the study. They were nautical program classes A and B. Two English teachers also participated as the sample. Simple Random Sampling was used as data collection. The students had to show the result of their individual competencies, achievements, and learning after using this software.

The subject of this research was seafarer candidates or training participants from the nautical program of vocational school (SMK) Pelayaran Samudera Indonesia Medan. There are two (2) classes in the nautical study program at academic year 2024–2025, namely Nautical class A and B. The sampling technique used in this research is purposive sampling. The researchers only chose the nautical program classes A and B as the subjects of the research. The researchers chose the Nautical program classes A and B as the samples of the research for several reasons. First, the number of seafarer candidates or training participants in the nautical classes A and B had already represented the ideal samples in this study. There were 27 seafarer candidates or training participants in Nautical program class A and 23 students in Nautical program class B. Second, the background knowledge of seafarer candidates or training participants in Nautical classes A and B to apply Computer-based Training (CBT) as learning media for the English Maritime course is the same, which means the samples were suitable for using Computer-based Training (CBT) in the English Maritime course.

The researchers chose Vocational School (SMK) Pelayaran Samudera Indonesia Medan as the place or location of the research for some reasons: 1) the condition of the maritime school was in accordance with research needs, 2) there was no sufficient of computer application as learning media and Maritime English Course textbook for seafarer candidates or training participants that had been implemented at this school, 3) vocational school (SMK) Pelayaran Samudera Indonesia Medan was willing to accept renewal in terms of learning media to improve the quality of education for seafarer candidates and training participants, 4) vocational school (SMK) Pelayaran Samudera Indonesia Medan is the closest and strategic place for the researchers to conduct a research, as well as the place where one of the researchers taught English Maritime course.

2.2. Sampling Procedures

Three main components make up the research tools used in this study: media effectiveness tools, practicality tools, and validation tools. Every element is essential to guaranteeing the legitimacy and dependability of the results. First, the validation tools consist of validation sheets created especially for media experts, language experts, and material experts. These worksheets provide a thorough means of assessing the linguistic accuracy, design, and content of English maritime learning materials that are included into a computer-based training (CBT) application. In order to make sure that the content satisfies the educational standards and objectives, material experts evaluate its accuracy and relevance. Media specialists assess the technical and design elements of the educational resources, such as the layout, visual aids, and general usability. To guarantee the appropriateness, coherence, and clarity of the language used in English maritime course learning materials that incorporate computer-based training (CBT) as a learning medium, language specialists examine the language components. The learning materials' high-quality standards and suitability for their intended pur-

pose are guaranteed by this multifaceted validation process.

Second, the practicality tools are intended to collect opinions on the usefulness of computer-based training (CBT) as a learning tool for English maritime course from both instructors or teachers and seafarer candidates or training participants. Data on the instructors' or teachers' opinions was gathered through the instructors or teachers' response surveys, which concentrated on how simple computer-based training (CBT) is implement in a classroom setting and how well it produces the desired learning results. On the other hand, the responses to the questionnaires given to seafarer candidates or training participants reveal the students' opinions regarding to the usefulness and applicability of computer-based training (CBT) in their educational journey. This action guarantees a comprehensive grasp of Computer-based Training's (CBT) practical implementation in an educational setting by integrating comments from both teachers and seafarer candidates or training participants.

Third, the effectiveness tool is a multiple-choice exam that includes content from the English Maritime course for seafarer candidates or training participants. The purpose of this test is to evaluate how well computer-based training (CBT) as an interactive learning tool, improves seafarer candidates' or training participants' comprehension and competency in English maritime courses. This action can ascertain how effectively the learning materials have met their instructional objectives by assessing the students' performance on this test. The multiple-choice test's results offer quantifiable information to back up the overall evaluation of the learning resources' efficacy as a learning aid in Computer-based Training (CBT) program.

Both qualitative and quantitative analysis techniques are used to analyze the data. The researchers do a number of topic analyses in qualitative data analysis, including curriculum analysis, learning needs analysis for seafarer candidates or training participants, and characteristics analysis of research participants. When analysing quantitative data, the researchers test the product in a number of ways, including validity, usefulness, and efficacy. Validation sheets from material validators, media validators, and language validators are analysed in order to perform the statistical test. Additionally, practicality test sheets from 50 research participants to English maritime courses at Vocational School (SMK) Pelayaran Samudera Indonesia Medan were analysed. The effectiveness of the computer-based training (CBT) application as an interactive learning media for English Maritime course of the seafarer candidates or training participants in Maritime Education and Training (MET) was then assessed by administering an English maritime test both before and after learning (pre-test & post-test).

Because the research and development must integrate both methods to provide a reliable study result and a useful product, the researchers used both qualitative and quantitative analysis techniques. Subsequently, the research questions and objectives have been addressed by the chosen analysis approaches, which include evaluating the validity, practicality and effectiveness of computer-based training (CBT) as an interactive learning tool for English Maritime courses of seafarer candidates or training participants in Maritime Education and Training (MET).

3. Results

3.1. The Validity of Computer-Based Training (CBT) for English Maritime Course in Maritime Education and Training (MET)

The output of this study is a product: the use of learning media, specifically computer-based training (CBT), as an interactive medium for English maritime courses of the seafarer candidates or training participants. English Maritime course for seafarer candidates outlines a few themes or topics as the study materials. The researcher explains other key points in the learning application for each unit after choosing the themes or topics. These include: 1) competence, 2) training outcomes, 3) required performance, 4) indicators, 5) content materials, 6) summary, 7) activities, and 8) formative assessment for each learning unit. Pictures that match the content covered in class during the teaching and learning process are included in the learning materials for English Maritime course of the seafarer candidates or training participants (**Figure 7**).

The researchers do a number of topic analyses in qualitative data analysis, including curriculum analysis, learning needs analysis for seafarer applicants, and characteristics analysis of research participants. Examining the themes, subthemes, topics, and sub-topics in English maritime courses in line with the International Maritime Organization's (IMO) Model Course 3.17 curriculum as the goal of curriculum

analysis. The purpose of curriculum analysis is also to find out the learning objectives that are outlined in the lesson plan as well as the suitable media to employ in learning activities based on the learning materials and the prior skills of seafarer candidates or training participants. It is one of the other goals of curriculum analysis.

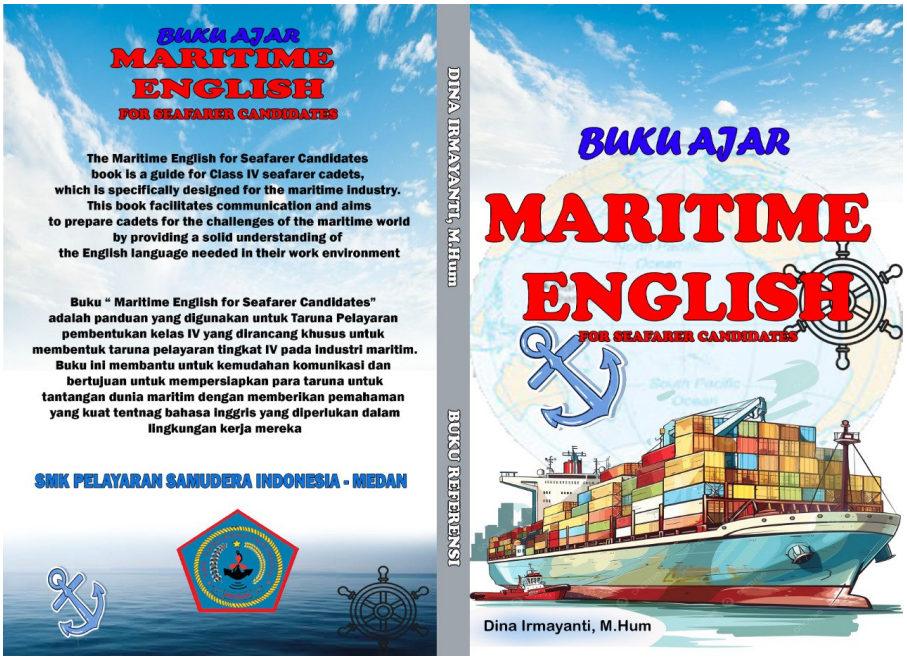

Figure 7. Textbook Cover for English Maritime Course Integrated with Computer-Based Training (CBT).

A needs analysis is conducted following the completion of the curriculum analysis. Finding the reasons for the need to create educational resources for the English Maritime course of the seafarer candidates or training participants to serve as one of the learning resources for them in Maritime Education and Training (MET) at Vocational School (SMK) Pelayaran Samudera Indonesia Medan is the aim of the needs analysis. Maritime English professors and the head of the study program are observed and interviewed regarding the learning activities that have occurred so far in order to conduct a needs analysis. The media and learning strategies that are frequently employed by instructors or teachers, seafarer candidates or training participants are the main subjects of observations and interviews. According to the findings of the observations and interviews, developing educational resources for the English Maritime course that incorporate computer-based training (CBT) as an interactive learning tool is thought to be a successful and efficient approach to resolving the aforementioned issues.

Thus, it is believed that the creation of educational resources for English Maritime course of the seafarer candidates or training participants in Maritime Education and Training (MET) is a breakthrough in the teaching and learning process that can address the learning challenges faced by the seafarer candidates or training participants. Aside from that, Vocational school (SMK) Pelayaran Samudera Indonesia Medan has never used computer-based training (CBT) as an interactive learning tool for the seafarer candidates or training participants. It is the first time that English maritime teachers have created learning materials that incorporated computer-based training (CBT) as the learning Media. The benefit of creating computer-based training (CBT) application as learning resource for English maritime courses of the seafarer candidates or training participants is that it is created in compliance with the IMO Model Course Curriculum 3.17 as the English Maritime curriculum.

Additionally, examining seafarer candidates or training participants' prospects involves examining their personal traits, knowledge, attitudes toward education, and aptitude for completing English Maritime Course. Learning style traits are part of the analysis of seafarer candidates or training participants. This examination is necessary to determine how well seafarer candidates or training participants can understand English maritime courses. The attitudes and motivation

of seafarer candidates or training participants regarding the utilized learning media are the subject of the following analysis. The lesson plan and the learning materials for English Maritime course were prepared with this analysis in mind, giving an appearance/design, language, and material/content that is appropriate for the materials covered by the seafarer candidates or training participants.

All the seafarer candidates or training participants have abilities below the Minimum Completeness Criteria (Kriteria Ketuntasan Minimum/KKM), according to an analysis of their proficiency in learning English maritime courses. The pre-test results for the seafarer applicants demonstrate this, since every student in both classes received a low score of less than 75. This is more evidence that English maritime skills of the seafarer candidates or training participants are still lacking and need to be improved in order to improve their English communication abilities. Nonetheless, it is seen to be essential to create educational materials that can acquaint the seafarer candidates or training participants with learning resources and help them become proficient in English maritime abilities. Additionally, since Computer-based Training (CBT) is a new learning medium for the seafarer candidates or training participants, the creation of learning materials that are integrated into Computer-based training (CBT) application for English maritime course of the seafarer candidates or training participants is deemed significant. Computer-based training (CBT), which combines simplicity with useful resources, is a simple and enjoyable learning tool. When analysing quantitative data, the researchers test the product in a number of ways, including validity, usefulness, and efficacy.

The purpose of the validity test is to determine whether learning materials are legitimate in terms of language, content, and appearance/design. According to **Table 1**, the validity sheet has been verified by three validators who have authorities in their domains.

The validity test's objective is to attest to the creation of learning materials for the seafarer candidates or training participants in English maritime course that incorporate with computer-based training (CBT) application as interactive learning tools. **Table 2** displays the findings of three validators' evaluations of the material/content, language, and media appearance/design:

Table 1. Instruments Validators.

No.	Assessment Aspects	Validators' Initial	Description
1	Material/Content	V1	English lecturer at Academy Maritime Indonesia (AMI) of North Sumatera
2	Language	V2	ESP Lecturer at The State University of Medan (UNIMED)
3	Media (appearance/design)	V3	The Dean of Engineering Faculty of The State University of Medan (UNIMED)

Table 2. The Validation Assessment Results.

No.	Assessment Criteria	Validity	Category
1	Material/Content	85.41%	Very Valid
2	Language	97.00%	Very Valid
3	Media(appearance/design)	88.71%	Very Valid
	Average	90.37%	Very Valid

The data above shows that the learning materials that are integrated with Computer-based Training (CBT) for English Maritime course of the seafarer candidates or training participants have an average validity assessment score of 90.37% with a very valid assessment category. Therefore, the seafarer candidates or training participants can use the learning materials that are integrated with Computer-based Training (CBT) for English Maritime course for the seafarer candidates or training participants in their learning activities.

3.2. The Practicality of Computer-Based Training (CBT) for English Maritime Course in Maritime Education and Training (MET)

Media practicality tools serve as a guide for the questionnaire used to analyse the replies of English maritime teachers and the seafarer candidates or training participants. The head of the nautical study program at Vocational School (SMK) Pelayaran Samudera Indonesia Medan and the cur-

riculum coordinator at Vocational School (SMK) Pelayaran Samudera Indonesia Medan who first validated the media practicality instrument sheet. The validation results are appropriate for use without revision. Two instructors who taught Maritime English course. They have completed the questionnaires used to analyze the teachers' responses. In the meantime, the students of Nautical program Class A and B at Vocational School (SMK) Pelayaran Samudera Indonesia Medan provided the analysis of the responses from the seafarer candidates or training participants.

It is exceedingly practical, as indicated by the 92.47% practicality rate based on the instructor or teachers' questionnaire responses (**Table 3**). Twenty-seven (27) members of Nautical program Class A and twenty-three (23) members of Nautical program Class B have completed the seafarer candidates' or training participant's response questionnaire. According to the seafarer candidates' or training participants' questionnaire responses, 92.75% of them said that they were extremely practical. The average practicality percentage was 92.61%, which falls into the very practical category, according to the answers to the questionnaires given to the instructors or teachers and the seafarer candidates or training participants. For this reason, the use of computer-based training (CBT) as a learning tool for English maritime course of the seafarer candidates or training participants in Maritime Education and Training (MET) at Vocational School (SMK) Pelayaran Samudera Indonesia Medan is convenient for the seafarer candidates or training participants and practicable for the instructors or teachers.

Table 3. The Practicality Assessment Results.

No.	Assessment Criteria	Practicality	Category
1	The lecturer's response questionnaire	92.47%	Very practical
2	The seafarer candidate's response questionnaire	92.75%	Very practical
	Average	92.61%	Very practical

3.3. The Effectiveness of Computer-Based Training (CBT) for English Maritime Course in Maritime Education and Training (MET)

To examine the outcomes of the seafarer candidates' or training participants' English Maritime proficiency, the pre-test and post-test were administered on learning process in the classroom to know the efficacy of Computer-based Training (CBT) as an interactive learning medium for English Maritime course in Marime Education and Training (MET) especially at Vocational School (SMK) Pelayaran Samudera Indonesia Medan. Prior to learning through Computer-based Training (CBT) in English Maritime course, the pre-test is administered to the seafarer candidates or training participants. Eight (8) meetings had been administered in teaching and learning process by using Computer-based Training (CBT) program for English maritime course of the seafarer candidates or training participants to get the final result. The pre-test and post-test results of the seafarer candidates or training participants showed the English Maritime language proficiency of the seafarer candidates or training participants before and after they used Computer-based Training (CBT) in English maritime course.

According to the pre-test statistics, the average learning completion for the training participants or seafarer candidates was 68.14% (**Table 4**), placing them in the incomplete category. In contrast, the post-test results for the seafarer candidates or training participants showed an average learning completeness of 92%, placing them in the complete category. The development and improvement of the seafarer candidates or training participants' maritime English proficiency can thus be achieved through the use of Computer-based Training (CBT) as an interactive learning medium for English maritime course in Maritime Education and Training (MET) at Vocational School (SMK) Pelayaran Samudera Indonesia Medan.

Table 4. The Effectiveness Assessment Results.

No.	Assessment Criteria	Test	Effectiveness	Category
1	Learning completion	Pre-test	68.14%	Ineffective
2	Learning completion	Post-test	92%	effective

4. Discussion

One form of R&D study is the creation of Computer-based Training (CBT) for the English Maritime course taken by seafarer candidates or training Participants in Maritime Education and Training (MET). Research and development study is frequently described as a process or set of actions to create a new product or enhance an existing one [33]. The researchers used a research and development approach by Borg and Gall to create the learning materials for the seafarer candidates' English Maritime Course that combined computer-based training (CBT). The main goal of research and development was to create a product that could be used in classrooms, not to formulate or test. Borg and Gall carried out their study and development in ten steps. They are: 1) Information gathering and research, 2) planning and design, 3) early product development, 4) expert validation, 5) product revision, 6) Early Trial, 7) Second Revision, 8) Field Test, 9) Final Product Revision, and 10) Dissemination are the following steps [34]. Nevertheless, this study was restricted only to six phases.

The first analysis of development research is the research and information gathering or definition stage, which aims to identify and ascertain the fundamental issues that or teachers and students encounter during the learning process [34]. The second step in the preparation and construction of educational learning media is planning and designing, which includes everything from tool and material selection to final media [35]. The third step in creating the standards for a learning media that will be created or manufactured in the early product development stage is called the early product development stage. The fourth step is expert validation, which involves submitting the product to a few validators or experts in their fields to verify its design, contents, and languages. It also tests the media's usefulness and efficacy to ensure that it is appropriate for use by all the seafarer candidates in other Maritime Education and Training (MET) programs [36]. The fifth step in a series of tests to evaluate the product's validity, practicality and effectiveness is revision. The last or sixth step in development research is product distribution. In order to observe how students of the same age, level, and field as the research sample utilize the learning media, the researcher will now market a created product to a wider sample [37].

The learning media that were devised in this research are Computer-based Training (CBT) for English Maritime course in Maritime Education and Training (MET). One of the learning media in the guise of an application for English Maritime Course is Computer-based Training (CBT). English Maritime course is a form of English language instruction that is specifically designed for the study of maritime science. It can also be defined as the teaching of maritime science materials using English as an instructional language [38]. Dirgeyasa asserted that the International Maritime Organization (IMO) has codified English Maritime for use in Higher Education or Vocational High Schools, with the IMO Model Course Curriculum 3.17 being one such example [20]. English Maritime elements in IMO Model Course 3.17 comprise General Maritime English (GME) and Specialized Maritime English (SME). English Maritime for the seafarer candidates or training participants is a part of Specialized Maritime English (SME).

The purpose of computer-based training (CBT) program is to serve as an interactive learning tool for those enrolled in Maritime Education and Training (MET). Computer-based training (CBT) is one of the learning resources required for students enrolled in English marine courses [39]. Because seafarer candidates or training participants are trained to comprehend, remember, and match vocabularies or phrases with pictures or maritime terms, this application is highly suitable for applying theoretical materials, such as the introduction of basic terms and commands on board ships.

The process of developing computer-based training (CBT) begins with the basic problem definition stage, when needs, curriculum, and student analyses are conducted. "Needs analysis is the first step in R&D as preliminary research with the aim of looking at learning needs so that a product is developed to address these needs [40]. According to Bhuttah curriculum analysis was done by examining the IMO Model Course 3.17 learning curriculum for the nautical program in compliance with English Maritime Curriculum [41]. Student analysis examines the issues, challenges, and progress of students' learning in order to determine the need for creating a product, specifically learning media that would help these seafarer candidates or training participants get beyond their challenges [42].

Computer-based training (CBT) was planned and designed as an interactive learning tool for the English maritime

course in Maritime Education and Training (MET) in the second stage. This phase begins with material selection, followed by layout and sketch creation, appearance design, language usage, and media content creation until the final product became a complete media that aligns with the learning themes. By creating a media design in line with the learning objectives of the intended development aspect, Plomp clarified that the media design stage serves as the foundation for the subsequent step, namely the media development stage [43].

The first phases of developing a new educational product or refining an existing one are referred to as the early product development stage, which is the third stage. Research, planning, and creating a prototype of the product are the main objectives of this phase. It's a methodical procedure that includes a number of crucial elements, including planning, literature evaluation, need analysis, and producing an initial product.

The fourth step is expert validation. It is the stage for getting input and viewpoints from subject-matter specialists in order to evaluate the quality and applicability of a research tool, like a survey or questionnaire. This procedure aids in guaranteeing that the questions are appropriate, pertinent, and clear in relation to the study setting, as well as that the instrument measures what it is supposed to measure. The expert validation process is a method of gathering data that calls for a professional to act as an expert and thoroughly examine the instrument to evaluate each item or proposal's coherence, relevance, independence, and impact before rendering a judgment or opinion that may include acceptance, modification, or rejection of the item. The ability to gather comprehensive and in-depth information on the study object and the quality of experts' responses are two benefits of using expert validation as an evaluation technique [44].

The expert validation test was carried out by validating the media by education experts in English language field or subject [45]. These experts included linguistic experts, media display/design experts, and media material/content experts. Responses from teachers and seafarer candidates or training participants about the practicality of utilizing computer-based training (CBT) for English maritime courses in Maritime Education and Training (MET) served as the practicality test for this study. The Head of the Study Program first validates the responses to the questionnaires from the instructors or teachers, the seafarer candidates or training participants. Any of the stakeholders at the research institution, including the head of the study program, curriculum coordinator, deputy director for education, and course instructors, may validate the practicality sheets [46]. A post-test on the seafarer candidates or training participants' skills in the development aspects which targeted at the learning media is conducted as part of the effectiveness test [46]. When students' skills improve as a result of prior learning, learning materials are deemed effective.

The fifth stage, revision, is where a product is changed in response to input from preliminary or major field testing. It is iterative, which meant it may entail several rounds of revision, with the aim of fixing flaws and enhancing the product's efficacy. Using the data acquired, the preliminary or trial product is revised. The frequency of revisions will depend on the trial product's outcomes. The final step, distribution or dissemination, entails disseminating the created educational product to the general public, particularly within the education sector, using a variety of techniques such as publications, seminars, or stakeholder presentations. The media dissemination step involves distributing developed media to educational institutions that are comparable to or at the same level as the research sample [46]. The goal of this distribution stage is to guarantee that additional students pursuing the same major at Vocational Education schools can benefit from the media. One method of giving seafarer candidates or training participants educational and learning stimulus is through the development of this media. As a result, it is crucial that educational materials that encourage learning be available to all students.

Because the seafarer candidates or training participants can study independently outside of class without a teaching trainee, Computer-based Training (CBT), has been shown to help the seafarer candidates or training participants' English language proficiency. The purpose of computer-based training (CBT) for students is to allow them to learn for their own reasons and goals without being dependent on the teacher or required to participate in social situations [47]. Students' learning will be more meaningful when they study independently since they can hone their skills in accordance with their preferred learning method and the subjects they wish to learn first [48].

Additionally, the Computer-based Training (CBT) ap-

plication as an interactive learning medium for the English Maritime Course in Maritime Education and Training (MET) can be said to be an appropriate learning medium because it can facilitate English Maritime learning objectives at Vocational School (SMK) Pelayaran Samudera Indonesia Medan. The goal of studying English maritime is to encompass communication on board ships as well as a variety of academic and professional domains [49]. For English Maritime Course in Maritime Education and Training (MET), Computer-based Training (CBT) program serves as an interactive learning tool that explains onboard communications and other resources that teach a ship's professional responsibilities and guard tasks.

The International Maritime Organization (IMO), the global maritime policy regulator, has published a curriculum and handbook for maritime teachers or lecturers. Therefore, it is the next task of each teacher or instructor to create teaching materials in accordance with the curriculum and handbook. Learning Maritime English in maritime higher education is mandatory and important [50]. Computer-based Training (CBT) application, as an interactive learning medium for English Maritime Course in Maritime Education and Training (MET), provides a complementary teaching material for Maritime English teachers and a necessity for providing teaching materials for the seafarer candidates.

A number of earlier studies have been conducted on learning Maritime English. First, Temerbek & Mariupol proved that an essential component of teaching and learning activities is the creation of learning materials for English maritime courses that use computer-based training (CBT) for the seafaring students [51]. Second, a study by Sari & Sari explained why computer-based training (CBT) is regarded as a crucial component of the English maritime course teaching and learning process [52]. Third, a study by Ahmmed reveals that the most fundamental skills that seafarer candidates as training participants need to learn are the Maritime English Course by using simulation and drills [53]. Teachers must so carefully plan the curriculum, instructional resources, and learning exercises.

Teaching materials, textbooks, modules, or learning books are very crucial for the seafarer candidates or training participants, particularly in English Maritime Course. The first reason for this is that the availability of Computer-based Training (CBT) as a learning medium can assist seafarer candidates or training participants in learning on their own, giving them resources and prior knowledge before they study in a lab with teachers or instructors. Second, because they have study-friendly textbooks. The seafarer candidates or training participants can receive good training in English maritime vocabulary, which serves as the basis for their speaking and writing abilities. Based on earlier research, it has been established that no English Maritime learning materials for seafarer candidates or training participants have been developed that integrate with Computer-based Training (CBT) as a learning medium in Maritime Education and Training (MET). Therefore, this study, titled Computer-based Training (CBT) as an interactive learning media for English Maritime Course in Maritime education and training (MET), is necessary for shipping crews, particularly the nautical study program. The creation of these learning resources and materials is a novel aspect of this study since computer-based training (CBT), as an interactive learning tool for English Maritime Course, has not been adequately utilized by the seafarer candidates or training participants to acquire and master English Maritime skills.

The consequences of this study are intended for a number of stakeholders, including the institution, other vocational schools, English maritime teachers, and the seafarer candidates or training participants. The output of this study is Computer-based Training (CBT) application will be utilized by the seafarer candidates or training participants as a learning tool to enhance their communication and English proficiency. Computer-based Training (CBT) application will be utilized by the teachers or instructors as one of the teaching tools for English Maritime course. This study will serve as a reference for future research on English maritime course learning materials at Maritime Education and Training (MET) institutions, particularly for the Vocational School (SMK) Pelayaran Samudera Indonesia Medan. The creation of learning resources for English maritime courses that use a Computer-based Training (CBT) application can serve as helpful information and learning sources for marine English courses for other vocational schools.

Future researchers might suggest potential enhancements and research topics for the development of this study. In order for the subsequent researchers to build the remaining five components, it should be noted that Computer-based Training (CBT) application is only one of six components

of Specialized Maritime English in IMO Model Course 3.17. Second, to test the efficacy of Computer-based Training (CBT) application in a different sample area, future researchers can carry out experimental research or other kinds of research. Third, the research that comes from the use of Computer-based Training (CBT) as a learning medium can be developed further in teaching and learning activities.

5. Conclusions

Based on the findings presented, several conclusions can be drawn from this study. First, the development of Computer-Based Training (CBT) as an engaging instructional tool for the English Maritime Course in Maritime Education and Training (MET) was guided by the research and development framework proposed by Borg and Gall. Second, the effectiveness of CBT was assessed across the dimensions of content, design, and language, all of which were rated highly valid. Specifically, the validity of the material/content was 85.41%, the media design achieved 88.71%, and the language aspect reached an exceptional 97.00%.

Third, the use of CBT as an interactive learning tool for English Maritime instruction proved highly effective. This conclusion is supported by teachers' feedback, with an average score of 92.47%, and by the responses of seafarer candidates and training participants, who reported an average score of 92.75%. Fourth, the effectiveness of CBT was further demonstrated by the post-test results, indicating that 92% of the seafarer candidates met the established mastery criteria.

Overall, the study concludes that Computer-Based Training (CBT) serves as an effective and interactive medium for teaching English Maritime courses within the MET framework and contributes significantly to enhancing the English proficiency of seafarer candidates at SMK Pelayaran Samudera Indonesia Medan.

Nonetheless, this research has certain limitations. The CBT developed in this study addresses only a limited scope of Specialized Maritime English content. Additionally, the data collection methods employed were relatively basic and lacked depth, resulting in data analysis that relied primarily on simple calculations. Future research should consider expanding the content coverage and applying more advanced data collection and analysis techniques.

Author Contributions

Conceptualization, D.I.H.; methodology, D.I.H. and S.; software, D.I.H.; validation, S. and R.H.; formal analysis, D.I.H.; investigation, D.I.H; resources, S. and R.H.; data curation, D.I.H., S. and R.H.; writing—original draft preparation, D.I.H; writing—review and editing, D.I.H., S. and R.H.; visualization, D.I.H.; supervision, S. and R.H.; project administration, D.I.H.; funding acquisition, D.I.H., S. and R.H. All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement

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Data Availability Statement

No new data were created.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

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