

## Implementing Peer Teaching in Maritime Undergraduate Education to Improve Inclusivity and Student Engagement in The Classroom

Mehrdad Behforouzi<sup>1,\*</sup>

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### ABSTRACT

Maritime education in universities and colleges entails teaching various academic and practical courses, ranging from navigation and management modules to advanced courses such as firefighting and medical training. These modules are very compressed and must be completed within a set time frame, particularly for short courses. This study investigates the feasibility and usefulness of implementing peer teaching for those modules and whether it can be done for just a few courses or all of them. For this project, experimental peer teaching in the classroom and a qualitative method will be employed, including an online survey of approximately a hundred students studying in various phases at Warsash Maritime Academy (Solent University). The author studies the effectiveness of peer teaching by pre-selecting volunteer students and notifying them that they will teach their peers a portion of a particular module in the classroom, with at least two weeks to prepare. Later in the session, a JISC-prepared survey was distributed in the classroom using a QR code. The study explores the challenges, restrictions, benefits, and drawbacks of the peer teaching technique and its impact on ensuring appropriate training for deck cadets.

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## 1. Introduction.

### 1.1. Maritime Education and new generation Students.

Education is a means for addressing a variety of economic, social, cultural, and political issues. However, as modern societies become increasingly complex, more changes are expected through ongoing sociological, demographic, political, economic, and technological changes, which impose significant adaptation-related challenges on education systems. Attracting young talent is vital for the maritime industry to remain competitive in the face of global challenges. It ensures the industry's continuing innovation and demonstrates its resilience and capacity to adapt to changing situations. While the maritime industry historic culture is vital, it must also be adaptable to new and diverse ideas and approaches. It is especially crucial for attract-

ing a new generation with diverse work and life values (Bartuševičienė, Kitada and Valionienė 2023).

A study by Hester, Geegan and Parker (2022) argued that higher education institutions have been obliged to face the difficulty of attracting a new generation of students. Gen Z students, born between the mid-1990s and mid-2000s, are an entirely new breed of students with unique characteristics. Adapting to the peculiarities of Generation Z students is critical for the future of education. Perhaps it is predictable that, as our first generation of digital natives, Gen Z students prefer social learning environments incorporating technology, modelling (observing others before applying concepts), and hands-on, self-directed curricular engagement. As a result, universities have had to alter their engagement strategies to provide students with a more prosperous and meaningful educational experience.

Therefore, to recruit young cadets, maritime colleges must improve their teaching methods.

Maritime education is critical in developing competent seafarers and maritime professionals worldwide. It also seeks to develop skilled seafarers and maritime professionals, guiding

<sup>1</sup>Warsash Maritime School, Solent University, East Park Terrace, Southampton, UK.

\*Corresponding author: Capt. Mehrdad Behforouzi. E-mail Address: [mehrdad.behforouzi@solent.ac.uk](mailto:mehrdad.behforouzi@solent.ac.uk).

the industry towards international success. Understanding how well the program corresponds with worldwide standards and prepares cadets to face the difficulties of a dynamic marine environment is critical to the maritime institute's ongoing development and global relevance. Inclusivity (Pubra and Simanjuntak 2024).

## 1.2. Inclusivity.

The work of Haniko *et al.* (2024) shows educational structures have taken a uniform strategy, overlooking pupils' diverse cultural backgrounds and experiences. Although Culturally Responsive Teaching (CRT) is widely recognised, there is still a lack of understanding of the most effective implementation strategies. In today's diverse classrooms, implementing culturally responsive practices is crucial. CRT aims to establish solid relationships and a sense of belonging. Educators strive to foster positive relationships with their pupils through trust, respect, and empathy. To effectively engage the students, it's essential to understand their specific histories, interests, and strengths. Creating a sense of belonging in the classroom community fosters a safe and supportive learning environment for pupils. It requires using educational strategies that respect and validate students' cultural identities and ways of knowing. Educators can incorporate culturally relevant activities, such as storytelling, group discussions, and cooperative learning, into their lessons. By appreciating students' cultural knowledge and viewpoints, educators can foster a classroom environment that values and embraces diversity.

The Use of CRT has the following advantages:

- promotes inclusivity in heterogeneous settings.
- integrates students' cultural backgrounds, experiences, and viewpoints into learning.
- recognises classroom diversity and establishes inclusive learning settings where all students feel respected and encouraged.
- incorporate students' cultural references, customs, and languages into curriculum design and instructional strategies. Educators are critical in connecting students' actual experiences with academic knowledge, leading to increased engagement and learning results.
- emphasises developing solid relationships between instructors and students, cultivating mutual respect and trust, and instilling a sense of belonging in students from varied backgrounds.
- developing a curriculum that reflects students' diverse origins and includes culturally relevant topics and materials.
- can improve student engagement and academic performance. (by implementing culturally responsive instructional approaches, including cooperative learning, individualised education, and culturally relevant pedagogy)

- enable students to relate their cultural roots to their learning experiences, resulting in better knowledge and appreciation for other perspectives.

However, navigating varied cultural backgrounds in the classroom poses a problem when using CRT. Students come from diverse cultural, linguistic, and socioeconomic origins, each with unique experiences, values, and customs. Educators must accommodate varied student needs and opinions while promoting a sense of dignity and respect. It necessitates sensitivity, flexibility, and a readiness to modify teaching techniques to meet the requirements of a varied range of learners. Implementing CRT might be challenging due to systemic hurdles and institutional constraints.

CRT originates in more significant movements for intercultural education and educational justice. During the civil rights movement of the 1960s, educators and activists began to question the Eurocentric bias in American education, asking for the integration of various cultural viewpoints (Almazora and Alotaibi 2023).

Ashrafova (2024) has argued that adaptable teaching strategies that accommodate varied CRT are required to successfully involve all pupils. CRT is defined as instructional techniques that identify and use students' cultural origins as assets in the learning process.

- It entails drawing on students' cultural experiences, expertise, and views to make learning more relevant and successful.
- It highlights the necessity of building a learning environment that respects and values diversity while instilling a sense of belonging and involvement in all pupils.

The foundation of culturally responsive education is educators' self-reflective practices. Self-reflection is an essential process in which teachers analyse their cultural biases, assumptions, and beliefs to determine how these affect their teaching practices and student relationships. Recognising one's cultural biases is critical since it can help to prevent the spread of stereotypes and prejudices in the classroom. Journaling, conversations, and professional learning groups can help lecturers facilitate the process by sharing insights and barriers to cultural responsiveness. Conducting a classroom diversity audit is essential for instructors to understand their students' ethnic origins and needs. A diversity audit systematically studies the student population's artistic, linguistic, and socioeconomic features. Teachers can accomplish this using various methods, including questionnaires, interviews, and observations.

Collaborative curriculum design, where instructors exchange resources and ideas, can improve curricular diversity by combining diverse perspectives and expertise. One fundamental difficulty is the need for more excellent educational materials and training. Reflective techniques, such as journaling, peer observations, and professional learning communities, can assist instructors in critically evaluating their CRT implementation and making required changes. Furthermore, keeping up with current research and innovations in culturally responsive edu-

tion is critical for maintaining effective practices. The benefits of implementing CRT:

- can have a significant, long-lasting effect on education and society.
- as educators continue implementing and refining CRT approaches, students from various backgrounds will see immediate benefits in higher academic achievements, more self-esteem, and better social integration.
- in the longer term, it can revolutionise educational systems by encouraging equity and inclusivity, ultimately resolving systemic imbalances and creating a more just society.
- As students who have received culturally responsive instruction develop into adults, they will pass on the virtues of respect, empathy, and cultural competence, leading to a more peaceful and linked global community.
- a pivotal role that educators play in shaping a future where diversity is celebrated, and every individual can succeed and thrive.

Villegas and Lucas (2002) state that the culturally responsive teacher possesses six distinguishing features:

- they are sociocultural conscious, which enables them to recognise that perceptions of reality vary and are influenced by one's social context.
- they have supportive attitudes of students from varied backgrounds, viewing all pupils as learning resources rather than obstacles to overcome.
- they are both responsible for and competent in implementing educational change that will make schools more responsive to all students.
- they Understand how learners develop knowledge and can facilitate their knowledge construction.
- they Know about their students' lives.
- they use their knowledge of students' lives to provide training that builds on what they already know while taking them beyond the family.

Educators must commit to ongoing professional development to be effective at culturally sensitive teaching. Resources and training programs are intended to improve teachers' cultural competency and understanding. For example, workshops and seminars on cultural competence can provide educators with practical techniques for incorporating students' cultural backgrounds into instruction. Schools and districts can also establish professional learning communities focused on cultural responsiveness, in which educators work together to develop and share best practices. These networks promote a culture of constant growth and shared responsibility for serving the needs of different students (Almazora and Alotaibi 2023).

## 2. Literature Review.

### 2.1. Student engagement.

The classroom social environment serves a purpose in education because it influences many adaptive student learning perspectives and behaviours. It contains instructor support, mutual respect, task-related engagement, and accomplishment goals. It also covers students' perspectives on how they feel encouraged to engage with others.

Teachers must be supportive and encourage students' motivation and involvement. According to Gutierrez and Doronio (2024), students who believe their teachers are curious, dedicated, and have a solid academic self-concept can stick to classroom regulations and seek assistance when necessary. As a result, positive and supportive teacher-student cooperations lead to improved academic performance and student involvement.

Student engagement, defined as students' willingness and effort to participate in school activities, is critical for academic progress and future professional success. Ruzek *et al.* (2016) discovered that supportive emotional teacher-student interactions promote students' behavioural engagement and motivation.

Various factors, from personal dispositions to structural factors, determine student engagement. Dispositions such as future orientation, social support, and perceived family economic insecurity shape individuals' ability to engage in school effectively (Ansorg *et al.* 2019).

Maulana *et al.* (2023) found that perceived teacher behaviour had a major contribution to student engagement, with significant changes across educational environments.

Quin (2017) found that high-quality teacher-student relationships consistently correlate with higher student engagement and decreased disruptive conduct.

Cevikbas and Kaiser (2022) discovered that flipped learning, which encourages interaction and teamwork, improves student engagement in mathematics by providing diverse learning opportunities and creating a supportive social atmosphere.

Even after controlling for emotional and organisational support, instructional support is still essential in ensuring student engagement (Alrajeh and Shindel 2020).

Even emphasising and recognising the necessity of involvement, Acala (2024) argues that teachers notice that student disengagement is rising. Studies showed an increasing pattern of diminishing attendance and participation in lessons. Engagement is undoubtedly critical for academic performance, as research has shown a direct correlation between the two. As a result, with a shift in student attitudes towards learning, more immediate studies should be conducted.

Some pupils may solely participate in various curriculum activities to improve their grades on tests or assessments. It is the art of teachers to motivate students to achieve higher grades due to their involvement and realise the benefits of participating in their future careers and lives.

According to Miller and Mills (2019), students' impressions of teachers influence their willingness to work, class participation, and assessment of the teacher's credibility. Generational diversity in higher education provides obstacles to stu-

dent engagement and retention, as many undergraduates' general attitudes and tendencies differ from those expected by the faculty teaching their courses.

## 2.2. Peer Teaching.

Over the last half-century, studies have recommended a shift from a teacher-centred strategy to a student-centred approach in education. Active learning, particularly collaborative learning, is regarded as one of the most effective techniques for cognitive acquisition. The heart of education is not simply pupils getting knowledge from their professors but actively participating in their learning, a philosophy that motivates students and changes the educational environment (Zhang 2024).

Peer teaching, also known as reciprocal peer teaching, peer-led teaching, peer-assisted learning, and peer tutoring, refers to students teaching other students (Mackinnon, Haque and Stark 2009).

Peer teaching involves the learner and promotes higher order thought processes, which improves the observer's cognitive processing, inspiration, and task focus (Beseler 2023).

Adopting not only teaching and learning methods but also styles of communication between actors in the educational process, forms of information presentation, including the creation of new types of academic and methodological literature, and the active use of information and communication technologies is necessary to create a practical educational environment that will enable success in future careers (Miller and Mills 2019).

As discussed by (Tanveer *et al.* 2023) Peer teaching, described as "a person who is similar in age, social position, or has identical skills as individuals in the group," is widely employed in medical education at both undergraduate and post-graduate levels. According to studies, pupils learn just as much from their peers as from qualified educators. According to the studies, students who taught their peers in basic sciences performed better on written and practical examinations. However, for peer teaching to benefit the student-teacher, the literature emphasises the importance of teacher training and university assistance. Three researchers highlighted the following challenges and restrictions:

- Two of them discovered that student-teachers experienced a lack of control and authority.
- One of the three researchers discovered that student teachers were uncomfortable instructing their classmates due to a lack of requisite abilities.

The authors speculated that this was likely due to student-teachers not receiving adequate training before assuming the instructor role, a finding that prompts us to reconsider the current training methods.

One effective learning strategy is peer teaching, also known as student-led instruction, in which students instruct their peers by performing the role of teachers. By enhancing comprehension of medical subjects, boosting self-assurance in public speaking, and honing precise handover techniques, this collaborative teaching approach helps medical students become more prepared for their futures as medical professionals (Nazari *et al.*

2024). Peer instruction in the learning environment must be meticulously organized and supervised by the educator to ensure proper material delivery. According to their study, the advantages of peer teaching are:

- It improves conceptual knowledge and facilitates the development of problem-solving abilities and communication abilities.
- Pupils gain more efficiently from peer teachers because they are more likely to understand the student's present knowledge, pinpoint areas of challenge, and develop creative educational solutions.
- It creates a casual community classroom where students can freely talk and exchange thoughts, bringing fresh insights and experiences to the curriculum.
- Allows students to take responsibility for their educational growth, which is necessary for further education.
- Encourages pupils to use a constructional and comprehensive methodology for learning, recognising and filling knowledge gaps.
- To supplement conventional instructional techniques and foster an engaging and participatory educational atmosphere for all students participating.
- It establishes an interactive classroom where students respond positively to each other's educational needs, facilitating the transition from teacher-centred to student-centred learning.
- As students engage in teaching responsibilities, they deconstruct complex concepts, enhancing their comprehension and increasing retention.

## 3. Methodology.

### 3.1. Action research approach.

In the maritime institutes, the teachers face a bit of pressure in completing the subjects in a relatively short time whilst, in the meantime, have to ensure that the students have gathered enough knowledge from the lessons as well as all other rules, regulations, codes and conventions to pass the exams, both in the college and in the administration, and also ready to face reality in their future carrier. Therefore, the teachers mainly teach themselves to the students using various methods, including reviewing case studies and conducting practical classes, to reach their goals and ensure that all the subjects in a particular module are covered within the available time.

However, to increase inclusivity, make students feel more welcomed and respectful in the classroom, and increase their activity and engagement, the author proposes using the peer teaching technique more in the classrooms. This approach may foster a more inclusive learning environment and enhance student engagement and understanding, not only in theoretical classes but also in practical modules such as Chartwork and Tides.

Therefore, the author has undertaken a comprehensive research project investigating the feasibility of implementing peer teaching in practical modules. This research tries to examine the potential benefits and challenges, as well as the best practices for incorporating peer teaching into maritime curriculum.

### 3.2. Methods of data collection.

The author's methodology, a fusion of quantitative and qualitative methods, is implemented through four classroom teaching experiments. This practical application inspires maritime students from different phases and provides them with hands-on teaching experience. The students taught various modules, including Chartwork for Phase One, Tides for Phase Three, and Cargo Operation in Phase 5 (Officer of the Watch- OOW). For the peer teaching experiment, the author identified volunteer students willing to take on the role of a teacher for their peers, provided them with the necessary subjects and materials, and reassured them that they had the teacher's full support in preparing them. The author chose volunteer students and allowed them two weeks to organise themselves, knowing they had a robust support system. The students prepared themselves whilst also creating a PowerPoint, enabling them to teach others better with a good standard (Figures 1 and 2). The questionnaire, designed on the JISC website (Solent University approved) and comprising fifteen questions, was presented to the students via a QR code in the classroom where the peer teachers conducted their experiments. A total of one hundred and seven students participated into the survey.

The author aimed to design questions to ensure they were inclusive to all the students.

Figure 1: Phase one students - Chart work.



Source: Author.

### 3.3. Sample of participants.

Figure 3 shows one hundred and seven students participated in the survey.

Fifty-eight per cent of the respondents were studying in Phase 1, 17 per cent were in Phase 3, and 25 per cent belonged to Phase 5 students (Figure 4).

Figure 2: Phase five students - Cargo operation.



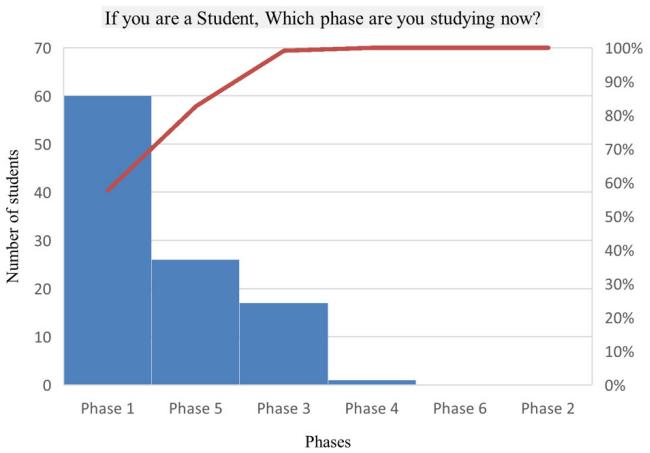
Source: Author.

Figure 3: Number of participants.



Source: Author.

Figure 4: Number of participants.



Source: Author.

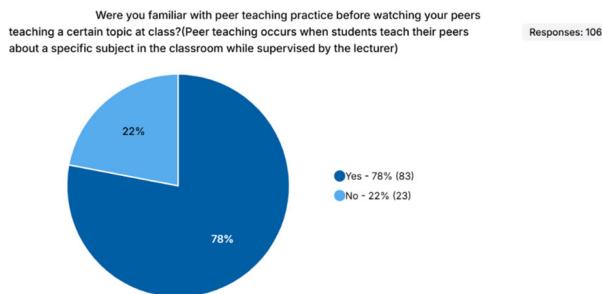
### 3.4. Approaches to ethics.

The ethics approval was taken from Solent University by complying with their rules and requirements.

## 4. Results and Discussion.

The findings, interpretations, and discussions are based on the responses that the author obtained from 104 participants through surveys after four peer teaching sessions.

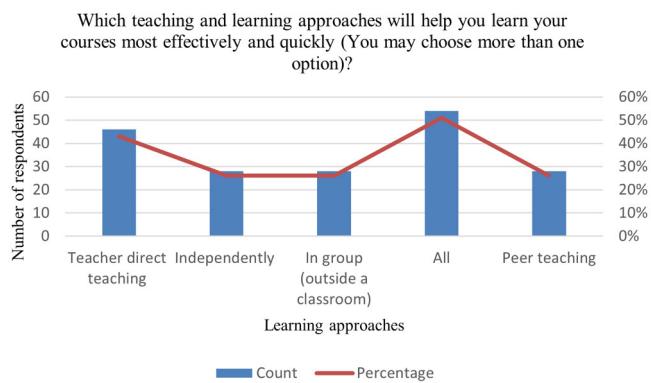
Figure 5: Students previous experience with Peer teaching.



Source: Author.

As shown in Figure 5, a small number of students (most probably in higher phases) are familiar with the peer teaching techniques, which seems not substantial.

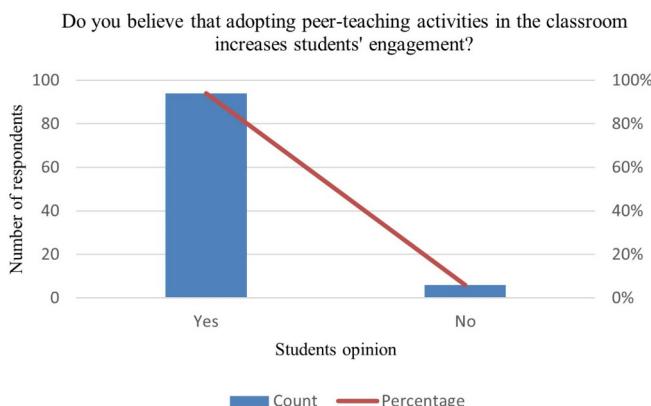
Figure 6: Students preferable teaching methods.



Source: Author.

The students mostly prefer teacher direct teaching in the class, which shows they still doubt and mistrust the effectiveness of the other techniques. However, it is interesting that students choose a combination of teaching methods during their education (Figure 6).

Figure 7: Peer teaching role in the students' engagement.

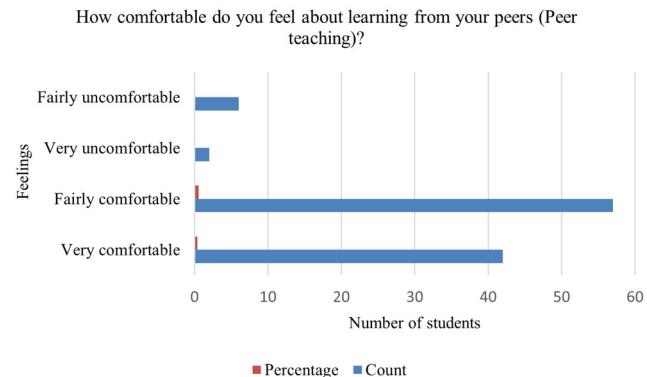


Source: Author.

According to Figure 7, students are concerned about their

ability to engage in the classroom, which they experience during the session when their classmates teach them.

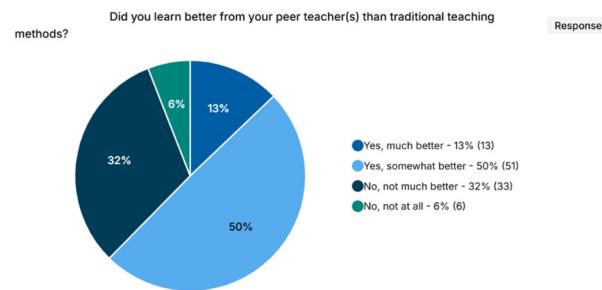
Figure 8: Students ease of comfort and Peer teaching.



Source: Author.

Only eight per cent of the students felt fairly or very uncomfortable during the peer teaching session. On the other hand, ninety per cent of the students felt comfortable sitting in the classroom and listening to the lecture their classmates prepared and conducted. These findings are further supported by Figure 8, which shows the student's ability to do various tasks, such as peer teaching and preparing exciting PowerPoint when assigned by their lecturers. This additional evidence should instil confidence in the validity of our research.

Figure 9: Students learning improvement with Peer teaching.



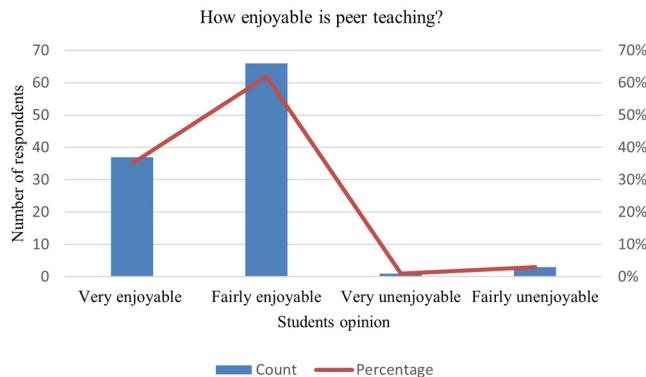
Source: Author.

According to Figure nine, 63% of students found peer teaching more effective than traditional methods when introducing a new subject. This is a clear indication of peer teaching's power and advantages, making it a promising approach in education.

Figure 10 shows the results of implementing peer teaching in classrooms, which provide additional evidence of its usefulness, student engagement and inclusivity. More than 96% of peers expressed delight when witnessing their classmates teach them.

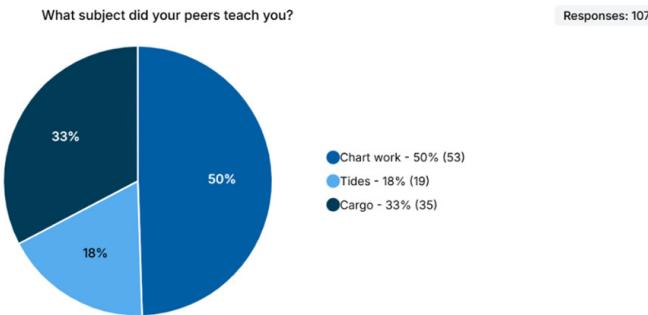
As the title suggests, the author has methodically designed a curriculum that ideally blends academic and practical courses (Figure 11). This comprehensive approach is intended to give students a well-rounded grasp of marine subjects and ensure that they are properly prepared to face the industry's difficulties. The Chartwork and Tides module is not just a theoreti-

Figure 10: Students ease of learning.



Source: Author.

Figure 11: Modules taught by Peer teachers.

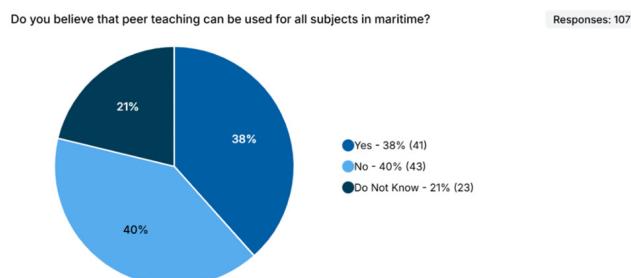


Source: Author.

cal exercise but a highly practical one. It actively involves students in planning their intended passage using charts and various position-fixing methods. This hands-on approach ensures they can calculate the height of the tide, a crucial skill for safe navigation under bridges and power cables, making their learning experience engaging and active.

The cargo work module is not just about practical skills but also about stimulating theoretical exploration. Students delve into books, rules, and regulations to learn about loading and unloading different types of cargo. They also learn to manage the stresses and loads on the ship's structure, providing a challenging intellectual exercise that will keep them engaged and stimulated.

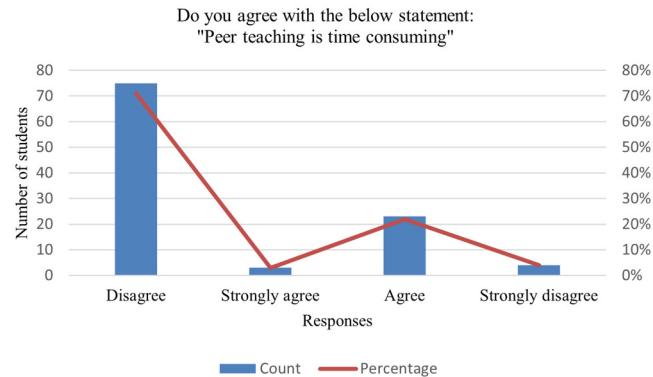
Figure 12: Expanding Peer teaching to all modules.



Source: Author.

By observing their first experience with the peer teaching method, only %38 of them agree that peer teaching can be used for lecturing all the modules in the maritime department, including practical and theoretical lessons. However, this is just the beginning. With effective and frequent use of peer teaching by teachers, there is a potential for this percentage to change, as opinions may shift towards the benefits of this practice. This potential for change should be viewed as an opportunity for growth and improvement in maritime education. It is the teacher's responsibility to practice this technique as it certainly increases the student engagement and inclusivity (Figure 12).

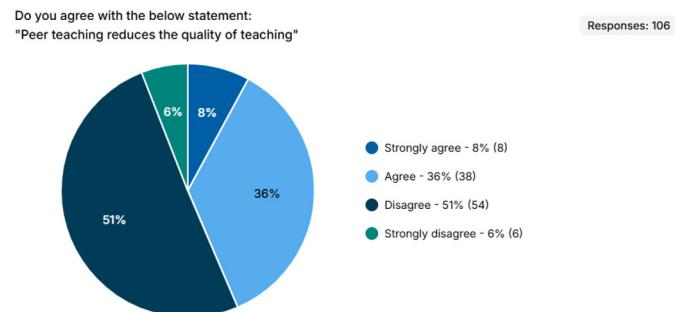
Figure 13: Peer teaching and available timing.



Source: Author.

The majority of students believe that peer teaching is not time-consuming and, in fact, beneficial. Throughout all four experiments, it was discovered that students prefer to listen to their peer teachers and learn from someone other than their teachers (Figure 13).

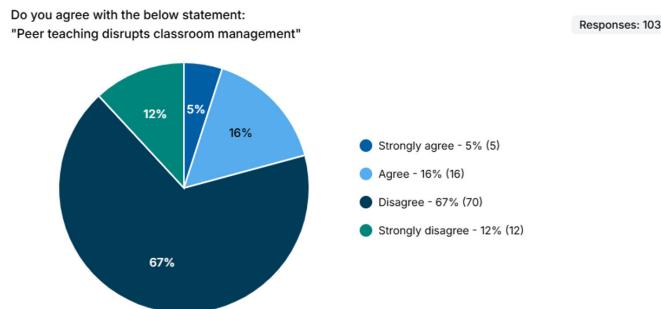
Figure 14: Peer teaching and available timing.



Source: Author.

As shown in Figure 14, nearly sixty percent of the students found peer teaching to not reduce the quality of teaching a particular subject. Considering it as their first experiment, this is a perfect sign. It proves that peer teachers performed their role well in teaching. To increase the quality of teaching, it is wise to provide sufficient time for the peer teachers to prepare exciting materials such as PowerPoint presentations. In addition, the teacher can select peer teachers from the stronger students in the classroom.

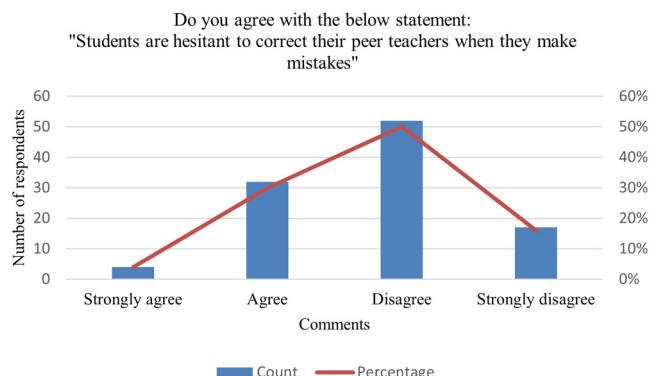
Figure 15: Class management.



Source: Author.

The author clearly saw that peer teachers could effectively control and manage the classroom environment during the experiment. Figure 15 illustrates that students shared this sentiment, with about 80% disagreeing that peer teaching disrupts the classroom environment.

Figure 16: Students attention.



Source: Author.

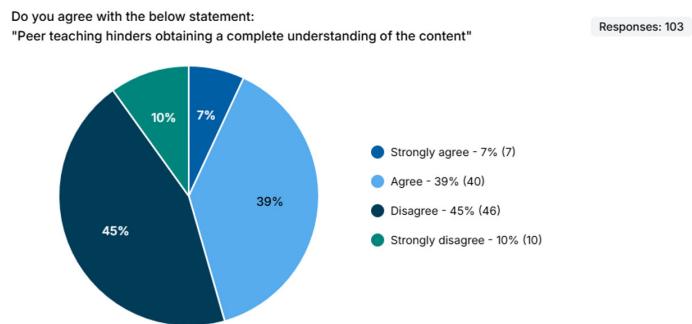
At the same time, it was evident that the students were not only paying full attention to their peer teachers but also actively participating in the learning process. In two or three cases, the students tried to correct their peers when they made small errors in the calculations or when showing a figure that was not related to what the teachers were talking about. This could be seen easily in Figure 16, as only 34% of the students felt hesitant to correct their peers.

The students actively evaluated whether peer teaching led to a comprehensive understanding of the lesson. Figure 17 demonstrates that a larger number of students favour this approach (while considering goal attainment and inclusivity). The teacher's role is crucial in deciding which part of the module should be assigned to peer teachers and which section should be taught through direct teacher-led instruction.

#### 4.1. Limitations.

Due to time constraints, the author could not discuss the outcomes and findings with his participants. The author would like to conduct another qualitative method (interview) with the

Figure 17: Students thorough comprehension.



Source: Author.

lecturers; however, it was impossible due to colleagues' high workloads.

## Conclusions.

- The peer teachers were very excited and employed interesting methods to attract the attention of their peers, including preparing attractive PowerPoints and keeping the class environment happy with a favourable climate.
- The peers were visibly delighted, actively engaging with the peer teachers and eagerly asking questions. This not only demonstrated their enthusiasm for the subject but also their respect for their peers' knowledge and teaching abilities.

## Recommendations.

- Implementing peer teaching is highly beneficial for revealing and discovering students' hidden abilities, such as teaching, which increases student engagement and inclusivity.
- To better understand and implement peer teaching, the author suggests lecturers provide specific guidelines to peer teachers, enabling them to prepare themselves more efficiently. The guideline shall also show the goals of the module and the specific subject. Emphasis that the job must be done as a teamwork and all of them shall have equal time for presentation.
- Before starting the peer presentations, promote the culture of respect and that everyone can make the mistake. Encourage the students to politely correct their peers in case of any error or mistake in their presentation.
- The teacher must always be ready to intervene to avoid creating doubts or leading students in the wrong direction.
- The lecturer's strategic positioning, allowing them to maintain control over the peer teachers and the rest of the students, is crucial.

- At the end of the peer teaching, encourage the other students to ask questions from their peers. Once again, it encourages class activity and engagement in addition to inclusivity.
- In addition, the lecturer can prepare several questions or a case study as an assignment that will be provided to the students after each peer teaching session is completed. This will assist the students in understanding the topic more in-depth.
- The lecturer may repeat teaching the whole subject as a review and to make sure that even the weaker students understood it properly.
- While peer teaching is beneficial, it can become problematic for students if all teachers in a department adopt the same technique. It could lead to an increased daily / weekly workload for students and a potential decline in the method's effectiveness, a situation that should be avoided. Therefore, educators must establish a coordinated schedule that all teachers agree upon, ensuring students are not overburdened.
- Educational institutes, colleges, and universities play crucial roles in lecturers' professional growth. They demonstrate their dedication to supporting and respecting their educators by providing various training options, including formal coursework, conferences, workshops, seminars, and other informal learning events.

The author will certainly use this technique more in his teaching sessions (theoretical and practical) and motivate his colleagues to do the same, as its effectiveness is evident.

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