

The Effect of Self-Efficacy on Engine Cadets' Language Anxiety and Speaking Accuracy in Maritime Radio Communication

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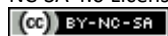
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Abstract

Radio communication plays a vital role in engine room operations, where accurate delivery of technical information is essential for ship safety and efficiency. However, engine cadets often experience communication anxiety when reporting machinery conditions through radio systems, particularly under operational pressure. This study aims to examine the effect of communication anxiety on radio communication accuracy among engine cadets, with self-efficacy serving as a mediating variable. This study employed a quantitative explanatory research design involving approximately 100 engine cadets. Data were collected using structured questionnaires to measure communication anxiety and self-efficacy, as well as performance-based assessments of radio communication accuracy conducted through simulated normal and emergency engine room scenarios. The data were analyzed using mediation analysis through regression procedures. The findings reveal that communication anxiety has a significant negative effect on self-efficacy and radio communication accuracy. Self-efficacy demonstrates a significant positive influence on communication accuracy and partially mediates the relationship between communication anxiety and communication accuracy. These results indicate that psychological readiness plays a crucial role in technical radio communication performance among engine cadets. This study contributes to maritime education by emphasizing the importance of integrating psychological factors, particularly self-efficacy development, into engine cadets' radio communication training to enhance accuracy and operational safety.

Keywords: *Communication language anxiety, Self-efficacy, Engine cadets, Radio communication*

Introduction

Effective communication is a fundamental requirement in maritime operations, particularly in engine room environments where technical information must be conveyed accurately and promptly to ensure ship safety and operational efficiency (Chen & Zhao, 2018). Engine cadets are required to report machinery conditions, system abnormalities, and emergency situations through radio communication, often under time pressure and high responsibility. These conditions may trigger communication anxiety, which can negatively affect message clarity and accuracy.

Previous studies on communication anxiety have primarily focused on general educational contexts and language learning environments. For example, Rafada and Madini (2017) examined speaking anxiety among EFL learners, highlighting psychological factors that hinder oral

communication performance. In maritime education, Brown et al. (2019) identified communication challenges faced by maritime students, noting that radio communication is particularly stressful due to its technical nature and safety implications.

Despite these contributions, existing research tends to treat maritime cadets as a homogeneous group without distinguishing between deck and engine disciplines. In reality, engine cadets face unique communication challenges due to the technical complexity of engine room operations and the need to deliver precise mechanical information. Moreover, most prior studies have focused on identifying anxiety levels rather than explaining how psychological factors influence communication performance outcomes.

Self-efficacy has been widely recognized as an important psychological factor influencing performance in various professional settings. However, its role as a mediating variable between communication anxiety and radio communication accuracy among engine cadets has received limited empirical attention. Understanding this mechanism is essential for designing effective communication training programs. Therefore, this study aims to investigate the effect of communication anxiety on radio communication accuracy among engine cadets, with self-efficacy examined as a mediating variable.

Method

This study employed a quantitative explanatory research design to examine the relationships among communication anxiety, self-efficacy, and radio communication accuracy among engine cadets. The research design was chosen to explain the causal mechanisms underlying communication performance in engine room radio communication contexts.

The participants of this study consisted of approximately 100 engine cadets enrolled in a maritime education institution. The sample was selected using purposive sampling with the criteria that participants had received prior training in radio communication and had experience participating in engine room communication simulations.

Data were collected using three main instruments. Communication anxiety was measured using a structured questionnaire based on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), adapted to the context of engine room radio communication. Self-efficacy was measured using a questionnaire assessing cadets' confidence in delivering technical engine-related information through radio communication.

Radio communication accuracy was assessed through performance-based evaluation during simulated normal and emergency engine room scenarios. The assessment employed a rubric covering technical accuracy, clarity of message, correct use of terminology, and adherence to radio communication procedures. Two engine instructors independently evaluated the performances to ensure objectivity.

Data analysis was conducted using regression-based mediation analysis. The analysis examined the direct effect of communication anxiety on radio communication accuracy, the effect

of communication anxiety on self-efficacy, and the mediating role of self-efficacy in the relationship between communication anxiety and communication accuracy.

Results

This study investigated the relationships among communication anxiety, self-efficacy, and radio communication accuracy in the context of English radio communication among engine cadets. The data were analyzed using descriptive statistics, correlation analysis, and mediation analysis to examine both direct and indirect effects among the variables.

Descriptive Statistics

The descriptive results indicate that engine cadets experienced varying levels of communication anxiety during radio communication tasks. A notable proportion of participants reported moderate to high anxiety when delivering technical information in English, particularly during simulated operational scenarios. Self-efficacy scores also showed considerable variation, reflecting differences in cadets' confidence in managing spoken radio communication tasks. In terms of performance, radio communication accuracy scores suggest that not all cadets were able to convey technical messages clearly and accurately, especially under conditions requiring prompt and precise communication.

Relationships among Communication Anxiety, Self-Efficacy, and Radio Communication Accuracy

The correlation and regression analyses revealed a significant negative relationship between communication anxiety and self-efficacy. Cadets who reported higher anxiety levels tended to have lower confidence in their ability to perform radio communication tasks in English. In addition, self-efficacy was found to have a significant positive relationship with radio communication accuracy, indicating that higher confidence was associated with clearer and more accurate spoken message delivery.

Communication anxiety also demonstrated a significant negative direct effect on radio communication accuracy (Evans. R, 2020). This finding suggests that anxiety not only influences psychological readiness but also directly interferes with cadets' spoken language performance during radio communication.

Mediation Analysis

The mediation analysis confirmed that self-efficacy partially mediates the relationship between communication anxiety and radio communication accuracy (Bandura, A, 2006). When self-efficacy was included in the model, the direct effect of communication anxiety on communication accuracy was reduced, while self-efficacy remained a significant predictor of performance. This result indicates that communication anxiety affects radio communication accuracy both directly and indirectly by diminishing cadets' confidence in their spoken English abilities.

Illustrative Raw Data from Selected Participants

To enhance the transparency of the quantitative findings, selected raw data from five representative participants are presented in Table 1 as illustrative examples.

Table 1. Sample Raw Data of Engine Cadets' Responses (n = 5)

Participant	Anxiety Score	Self-Efficacy Score	Communication Accuracy Score
P12	4.3	2.1	2
P27	3.9	2.5	2
P41	2.8	3.7	3
P56	2.1	4.2	4
P88	1.9	4.5	4

The selected data reflect the general pattern observed in the full dataset. Participants with higher anxiety levels tended to demonstrate lower self-efficacy and reduced communication accuracy, while those with lower anxiety levels showed stronger confidence and more accurate radio communication performance. All participant data were anonymized to ensure confidentiality.

Discussion

The results of this study demonstrate that communication anxiety is a key factor influencing engine cadets' spoken English performance in maritime radio communication. The negative association between communication anxiety and self-efficacy indicates that anxiety undermines cadets' confidence in handling radio communication tasks, particularly in technically demanding and time-sensitive engine room contexts.

The mediating role of self-efficacy provides important insight into the mechanism through which anxiety affects radio communication accuracy. Rather than influencing performance solely through direct emotional pressure, communication anxiety reduces cadets' belief in their communicative competence, which in turn leads to less accurate spoken message delivery. This relationship is clearly illustrated by the selected raw data. For example, participants with higher anxiety scores, such as P12 and P27, exhibited low self-efficacy and poor communication accuracy. In contrast, participants with lower anxiety levels, such as P56 and P88, demonstrated higher confidence and more accurate radio communication performance. These individual patterns support the statistical findings and strengthen the interpretation of the mediation effect.

These findings are consistent with self-efficacy theory, which posits that individuals' beliefs in their capabilities play a crucial role in determining performance outcomes. In the context of English for Maritime Purposes, engine cadets are required to process technical information and deliver spoken messages clearly and accurately under operational pressure. When anxiety interferes with self-efficacy, cadets may hesitate, misuse technical terminology, or structure messages less effectively, resulting in decreased communication accuracy.

From an applied linguistics perspective, the findings emphasize that spoken language performance in professional and technical contexts is influenced not only by linguistic knowledge but also by psychological factors. Effective radio communication in maritime settings requires

confidence in using spoken English as much as it requires mastery of technical content. Therefore, addressing communication anxiety and fostering self-efficacy should be integral components of maritime English instruction and radio communication training for engine cadets.

Overall, the integration of quantitative results with illustrative raw data enhances the robustness of this study and highlights the critical role of psychological readiness in shaping spoken communication performance in maritime operational environments.

Conclusion

This study concludes that communication anxiety significantly affects radio communication accuracy among engine cadets. Self-efficacy plays a crucial mediating role in this relationship, indicating that psychological confidence is an important mechanism through which anxiety influences communication performance. By focusing on engine cadets as a distinct group, this study extends existing maritime communication research and highlights the need for discipline-specific communication training approaches.

Future research is recommended to explore longitudinal designs and experimental interventions to further examine strategies for reducing communication anxiety and enhancing self-efficacy in real operational settings.

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