



The Autonomous Learning in Supporting Communication on Board in 5.0 Era (A Study Case of Young Cadets' ELL at PIP Makassar)

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Abstract

This study investigates the role of tablet-assisted autonomous learning in improving Maritime English proficiency for on-board communication among young cadets at PIP Makassar in the 5.0 Era. It aims to measure young cadets' levels of autonomous learning, identify barriers, and explore applied strategies. A mixed-method design was employed, combining quantitative data from 141 young cadets collected using the Self-Directed Learning Readiness Scale (Fisher & King, 2010) with qualitative insights from semi-structured interviews. The results indicate that 98 (69.5%) of young cadets demonstrated a high level of autonomy and 43 (30.5%) a moderate level, with *desire for learning* emerging as the strongest factor, followed by *self-control* and *self-management*. Major barriers included limited tablet specifications, unstable campus Wi-Fi, and heavy academic schedules. Nevertheless, young cadets employed strategies such as reading e-books, listening to English songs, and reviewing materials during optimal times. These strategies primarily supported receptive skills (reading and listening), consistent with Krashen's Input Hypothesis. The findings contribute to maritime education literature by highlighting that while technology promotes learner autonomy, its effectiveness depends on institutional support through device enhancement, reliable internet access, and flexible study arrangements.

Keywords: *autonomous learning; communication on board; maritime English; Society 5.0; tablet-assisted learning*

Introduction

Maritime accidents and communication failures are often linked to language misunderstandings, highlighting that effective communication on board is vital for safety and operational efficiency in the maritime industry. For cadets at the Merchant Marine Polytechnic (PIP) Makassar, English proficiency is therefore as essential as technical competence. In the 5.0 Era characterized by human-centered technological integration, PIP Makassar has distributed tablets to young cadets to foster autonomous learning.

Autonomous learning, defined by Holec (1981) as the ability to take charge of one's own learning, involves identifying needs, setting goals, selecting learning resources, and evaluating progress independently. This approach nurtures adaptability, self-discipline, and critical thinking qualities essential for future maritime professionals.

According to Fukuyama (2018), *Society 5.0* envisions a "smart society" where technology enhances human capabilities and addresses societal challenges. In education, digital tools such as tablets, artificial intelligence, and interactive platforms can increase engagement and support personalized learning experiences. Knowles, as cited in Supe (2024), further explains that self-directed learning empowers individuals to take initiative in identifying their learning needs and implementing strategies to meet them.

Within the context of language acquisition, Krashen's Input Hypothesis emphasizes the importance of *receptive skills* (reading and listening) as foundational abilities through which learners acquire language naturally before developing productive skills such as speaking and writing. These receptive processes allow learners to internalize linguistic input necessary for effective communication.

Maritime English differs from general English in several important ways that affect teaching and learning. Examples include:

- **Specialized vocabulary and phraseology** (e.g., "berthing," "settle the berthing plan," "stand by to let go," "port/starboard," "astern/astern propulsion") that are specific to ship operations.
- **Formulaic and standardized communication** used in bridge and engine-room operations and in radio-telephony (e.g., Standard Marine Communication Phrases) where precision and brevity are critical.
- **Context-dependent meanings** where common words have technical senses (e.g., "draft" as ship immersion, "drafting" vs. general drafting).
- **High-stakes, procedural discourse** such as emergency protocols, checklists, and safety briefings that require exact comprehension and response under pressure.

These distinctions mean that pedagogical approaches effective for general English may not fully address the needs of maritime learners, who require domain-specific input, scenario-based practice, and familiarity with standardized maritime

communication protocols.

Despite the growing use of digital tools in education, most existing studies focus on general or tertiary education contexts, leaving limited evidence about how technology-supported autonomous learning functions in specialized fields such as maritime English. This research gap is particularly relevant to PIP Makassar, where cadets must not only master professional competencies but also learn to use technology effectively to enhance English communication for shipboard operations.

Accordingly, this study aims to: (a) assess the level of autonomous learning among PIP Makassar young cadets using tablets for English communication on board; (b) identify barriers in implementing autonomous learning; and (c) explore strategies for optimizing learning through digital tools. The contribution of this study lies in its focus on a specialized maritime education environment, offering practical implications for integrating technology into language training and expanding the understanding of how autonomous learning supports maritime communication competence.

Method

This study employed a mixed-method approach to comprehensively examine tablet-assisted autonomous learning among young cadets at the Merchant Marine Polytechnic (PIP) Makassar. The quantitative analysis measured the levels of autonomous learning, while qualitative case study analysis explored the barriers and strategies experienced by young cadets in using distributed tablets for English communication on board.

The research was conducted over six months, from February to July 2025, ensuring sufficient time for data collection, analysis, and triangulation. The study received academic approval in December 2024, prior to data collection, ensuring methodological and ethical consistency across phases.

The study population comprised approximately 700 young cadets who had been provided with tablets by the institution. For the quantitative phase, 141 young cadets were selected through *random sampling*, two representative classes from each major study program (Nautical Science, Marine Engineering, and Port and Shipping Management). For the qualitative phase, *purposive sampling* was applied to identify young cadets representing three levels of autonomous learning (low, moderate, and high) based on their questionnaire scores. A total of nine young cadets were interviewed three from each level to capture diverse perspectives.

The quantitative instrument was a questionnaire adapted from Fisher and King's (2010) Self-Directed Learning Readiness Scale (SDLRS), consisting of 30 items covering three key aspects: (1) *self-management*, (2) *desire for learning*, and (3) *self-control*. Responses used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total scores were categorized as high (110–150), moderate (70–109), and low (30–69) levels of autonomy. The adapted scale's internal consistency was examined through Cronbach's Alpha ($\alpha = 0.89$), indicating

strong reliability, while content validity was confirmed through expert review by two Maritime English lecturers.

The qualitative data were obtained through semi-structured interviews conducted in small groups and individually. Each interview lasted 30–45 minutes and consisted of eight open-ended questions addressing young cadets' learning habits, technological barriers, and self-directed strategies. All sessions were recorded (with consent) and supported by field notes for contextual details.

Ethical approval and research permission were obtained from the Research and Community Service Committee of PIP Makassar. All participants were informed about the study's purpose, assured of confidentiality, and signed informed consent forms before participation.

The quantitative data were analyzed descriptively using frequency, percentage, mean, and standard deviation to determine levels of learner autonomy. Qualitative data were transcribed, coded, and thematically analyzed to identify recurring patterns related to barriers and strategies. Integration of both data types was achieved through a convergent parallel design, allowing cross-validation of findings where quantitative results identified general trends and qualitative insights explained the underlying reasons behind those trends.

This study acknowledges certain methodological limitations. The use of self-reported data may introduce subjective bias, and the relatively short duration of data collection limits long-term observation of learning behavior. Additionally, while purposive sampling provided rich insights, the small number of interview participants restricts generalization beyond the PIP Makassar context.

Results

Table 1 presents the levels of autonomous learning among 141 first-year cadets at PIP Makassar. The results show that **98 young cadets (69.5%)** demonstrated a **high level**, **43 young cadets (30.5%)** a **moderate level**, and none were categorized as low. This indicates that the majority of first-year cadets possess a strong readiness for self-directed learning.

Table 1. The Frequency of Young Cadets' Autonomous Learning

Scale	Category	Frequency	Percentage (%)
110-150	High	98	69.5
70-109	Medium	43	30.5
30-69	Low	0	0
Total		141	100

The overall mean score for autonomous learning was categorized as high, based on the distribution of total scores (69.5% high, 30.5% moderate). *Detailed descriptive statistics (mean, SD, and range) were not calculated because the study focused on categorical levels.*

All respondents were first-year cadets in their second semester. Table 2 summarizes their distribution across study programs.

Table 2. Demographic Profile of Participants

Study Program	Frequency	Percentage (%)
Nautical Science	52	36.9
Marine Engineering	46	32.6
Port & Shipping Management	43	30.5
Total	141	100

To determine which aspects contributed most to overall autonomy, mean scores were calculated for each dimension of the Self-Directed Learning Readiness Scale.

Table 3. Mean Scores by Dimension of Autonomous Learning

Dimension	No. of Items	Mean	Description
Desire for Learning	10	3.85	Highest (strongest factor)
Self-Control	10	3.81	Second strongest
Self-Management	10	3.78	Third (slightly lower)

Qualitative findings revealed several barriers faced by young cadets in implementing autonomous learning using tablets.

Table 4. The Typical Barriers of PIP Makassar Young Cadets

Category	Description
Technical Limitations	Some tablets had limited storage and slow processing speed, reducing access to interactive learning materials.
Connectivity Issues	Unstable campus Wi-Fi frequently interrupted access to online content and learning platforms.
Time Constraints	Busy academic schedules and extracurricular duties limited young cadets' study time.

Despite these challenges, young cadets employed several strategies to enhance their autonomous learning.

Table 5. The Strategies of PIP Makassar Young Cadets in Using Tablet for Learning

Category	Description
Receptive Learning Activities	Reading e-books, listening to English songs, and reviewing lecture notes to strengthen comprehension.
Self-Evaluation	Assessing personal progress and identifying weak areas for improvement.
Physical Readiness and Timing	Getting physical exercise and choosing optimal study hours, such as early mornings.

These strategies primarily supported receptive skills (reading and listening), which are essential for understanding shipboard communication, consistent with Krashen's Input Hypothesis.

Discussion

The Level of Autonomous Learning

The study revealed that most first-year cadets (69.5%) demonstrated a high level of autonomous learning using distributed tablets, while 30.5% were at a moderate level and none at a low level. This finding indicates that the integration of tablet-based learning successfully encouraged independent engagement with English learning materials. Among the three dimensions of autonomous learning, desire for learning achieved the highest mean score ($M = 3.85$), followed by self-control ($M = 3.81$) and self-management ($M = 3.78$).

These results suggest that young cadets possessed strong intrinsic motivation to learn but required further development in organizing and evaluating their learning progress. This pattern is consistent with findings by Mentz (2017) and Fikroni (2020), who observed that vocational learners often exhibit enthusiasm for learning but need structured guidance to manage their learning strategies effectively. Similarly, Rohmiyati (2022) emphasized that in the Society 5.0 Era, technology facilitates human-centered learning by enabling flexibility and personalization. However, in the context of maritime education, the autonomy demonstrated by young cadets appeared more reactive driven by access to tablets than proactive, reflecting deeper self-initiated learning behavior.

The Role of Input and Limited Development of Productive Skills

Cadets' preference for receptive learning strategies such as reading e-books, listening to songs, and watching English videos demonstrates the influence of Krashen's Input Hypothesis (1982). Krashen argues that language acquisition occurs through exposure to meaningful and comprehensible input, primarily via listening and reading activities.

In this study, such input-based learning enhanced young cadets' comprehension and vocabulary. However, opportunities to develop productive skills (speaking and writing) remained limited due to the absence of interactive speaking applications, insufficient Wi-Fi access, and the lack of peer communication opportunities. As Ellis (2015) notes, this pattern creates "input-heavy but output-weak" learning where learners can understand English but struggle to produce it fluently.

This imbalance poses a concern for maritime communication, where verbal precision and clarity are vital for safety operations. Without sufficient speaking practice, cadets risk miscommunication on board becomes a factor that could compromise operational safety.

Barriers and Contradictions

Despite demonstrating strong motivation, young cadets faced substantial technical, infrastructural, and time-related barriers. Many tablets had limited battery life, low storage capacity, and outdated operating systems, restricting access to advanced learning applications. Wi-Fi connectivity across the campus was inconsistent, and the regimented training schedules of young cadets allowed little time for self-paced study.

This contradiction between high autonomy and systemic barriers mirrors revealed even self-directed learners cannot sustain autonomy without institutional support. Hence, the high autonomy observed in this study may reflect perceived autonomy driven by motivation rather than a fully supportive environment.

Comparing High and Moderate Autonomy Young Cadets

The qualitative analysis showed clear differences between high- and moderate-autonomy young cadets.

- High-autonomy young cadets maintained consistent study routines, downloaded offline materials, and used multiple resources to overcome connectivity issues.
- Moderate-autonomy young cadets, on the other hand, depended more heavily on instructor guidance and were easily discouraged by technical challenges.

This finding aligns with Fajrah (2023), who categorized moderate self-directed learners as those capable of independent learning but struggling to set and follow clear learning plans when external support is lacking. The difference suggests that strategic adaptability which the ability to sustain learning despite barriers is a distinguishing trait of highly autonomous cadets.

Gender and Program-Specific Differences

Although gender differences were not a central variable, observations indicated that female young cadets tended to exhibit stronger organization and consistency in their learning routines, while male young cadets were more exploratory, experimenting with different apps and activities. This tendency aligns with Sari and Wicaksono (2022), who found that female learners often demonstrate higher levels of learning discipline in technical programs.

Program-wise, deck young cadets whose training emphasizes communication showed greater initiative in using tablets for English-related activities. In contrast, engine young cadets prioritized technical materials, demonstrating strong time management but limited engagement with communicative English. This pattern echoes Ally (2019), who observed that autonomy in professional education often aligns with occupational relevance.

Theoretical Integration

The findings can be interpreted through the Adult Learner (Knowles, Holton, and Swanson, 2014) and the Technology Acceptance Model (Davis, 1989). According to Knowles, adult learners are self-directed when they perceive learning as immediately relevant to their goals. In this study, young cadets recognized English proficiency as vital for their future maritime careers, which enhanced their motivation.

However, under the Technology Acceptance Model, while young cadets found tablets useful, ease of use was hindered by technical and infrastructural issues. This reduced their engagement and learning satisfaction, suggesting that technological facilitation must be matched with institutional reliability to sustain self-directed learning in professional settings.

Implications for Maritime Safety and Communication

Maritime communication relies heavily on clear, accurate, and timely English exchanges. While tablets enhanced cadets' vocabulary and comprehension, the lack of speaking and writing practice presents potential safety risks. Miscommunication during navigation or emergency coordination can have severe consequences.

To address this, task-based and simulation-based learning modules should be integrated into the tablet system. Embedding Standard Marine Communication Phrases (SMCP) and interactive speaking tools can bridge the gap between receptive learning and operational communication competence. Developing balanced bilingual competence in both receptive and productive skills is essential for cadets to perform effectively and safely on board.

Evaluating the Tablet Program: Achievement and Value

The tablet program at PIP Makassar achieved partial success. It fostered motivation and improved access to learning resources, aligning with Society 5.0 goals. However, persistent technical and infrastructural challenges limited its overall impact.

From a cost-benefit perspective, the initiative increased accessibility but imposed ongoing maintenance, upgrade, and connectivity costs. The return on investment will depend on whether future improvements such as stronger Wi-Fi, updated devices, and content integration are implemented.

Sustainability will require a hybrid model that combines institutional support, teacher facilitation, and learner autonomy rather than relying solely on self-directed tablet use.

Practical Implications

Based on the findings, several practical recommendations are proposed:

1. Curriculum Integration: Embed tablet-based autonomous learning into English communication courses with structured guidance and assessment.
2. Technical Upgrades: Provide regular software and hardware updates to ensure compatibility and functionality.
3. Wi-Fi Expansion: Extend internet coverage to dormitories and outdoor areas to support flexible learning.
4. Interactive Content: Develop speaking and writing modules aligned with SMCP and real onboard communication contexts.
5. Instructor Training: Train lecturers to mentor autonomous learning using digital tools effectively.
6. Monitoring System: Establish digital analytics to track learning progress and engagement.

These measures will enhance both learning autonomy and communicative competence, contributing to maritime safety and professional readiness.

Limitations and Future Research

This study has several limitations. First, it focused only on first-year cadets at PIP Makassar; therefore, the findings may not generalize to more senior or non-maritime students. Second, the qualitative data relied on self-reported perceptions, which may not fully capture actual language proficiency improvement. Third, gender and program differences were observed qualitatively but not statistically analysed. Future studies should:

- Conduct longitudinal research to measure changes in autonomy and proficiency over time.
- Employ mixed methods with performance-based assessments to link self-reports with real outcomes.

- Investigate technology acceptance quantitatively using TAM or UTAUT frameworks.
- Compare different maritime academies or training levels to identify institutional best practices.

Such research would deepen understanding of how digital tools can sustainably enhance autonomous learning and communicative competence in maritime education.

Conclusion

This study confirmed that tablet-assisted learning supports young cadets' autonomy in developing Maritime English, with most showing high readiness, especially in their desire for learning. Nevertheless, technical limitations, unstable internet, and tight schedules restricted optimal use. The young cadets responded by adopting strategies such as reading e-books, listening to English songs, and self-evaluation, which mainly strengthened receptive skills. The study is limited to one institution and focused only on tablet-based learning, which reduces the generalizability of its findings.

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