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ESP in the Digital Age: Development and Effectiveness Evaluation of an E-Module for English Communication

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ABSTRACT

This study investigates the development and initial evaluation of an e-module titled English for Communication, designed for fourth-semester students of Electronics Engineering Technology (Teknologi Rekayasa Elektronika/TRE) at Politeknik Negeri Batam, Indonesia. The module was developed to bridge the gap between general English instruction and the English for Specific Purposes (ESP) communicative needs of vocational engineering students. Comprising seven thematic units, only Units 1 (Basic Academic Communication) and 2 (Professional and Workplace Communication) were implemented and evaluated in this study. A questionnaire-based evaluation was administered to 84 students to assess content relevance, clarity, learning activities, unit-specific effectiveness, and impact on English communication confidence. Results show overwhelmingly positive responses, with 91.6%–98.9% of respondents rating the module favorably across all indicators. Qualitative feedback identified useful expressions, grammar focus sections, conversation models, and video-based activities as the most valued features. Suggested improvements include expanded grammar exercises, per-unit vocabulary development, subtitle additions to videos, and pronunciation guides. The study contributes to the literature on ESP e-module development for vocational engineering education in Indonesia and provides a formative evaluation basis for the continued development of the remaining five units.

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1. Introduction

English proficiency has become a critical competency for graduates of engineering programmes in Indonesia. As the country integrates into the global manufacturing ecosystem, demand has intensified for engineers who can communicate effectively in English within professional and technical contexts [1], [2]. This demand is particularly acute in Batam—an Indonesian free-trade zone hosting numerous multinational electronics companies—where graduates of Electrical Engineering Technology (Teknologi Rekayasa Elektronika/TRE) programmes face daily communicative challenges in multilingual, internationally oriented workplaces.

Despite this recognised importance, English language instruction in Indonesian polytechnic programmes has historically relied on general-purpose materials that fail to contextualise language within vocational realities [3], [4]. This misalignment between curriculum content and workplace communicative demands represents a significant educational gap that English for Specific Purposes (ESP)-oriented materials are well-positioned to address. ESP is broadly understood as an approach to language teaching in which all decisions about content and method are based on the learner's reason for learning [4]. Within engineering education, ESP

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has consistently demonstrated greater learning effectiveness than general English instruction [2], [4], and needs analysis studies have affirmed its relevance to Indonesian vocational higher education by identifying speaking, technical vocabulary, and professional communication as the most consistently prioritised skills for engineering students [4], [7]. Indonesian higher education policy has increasingly emphasised the alignment of English instruction with students' vocational and professional competencies, mandating that language courses be oriented towards authentic communicative needs in students' fields of study [3], [8].

The e-module—a digital, self-contained instructional unit for independent or blended learning—has become an increasingly prominent vehicle for ESP delivery in Indonesian higher education, particularly following the accelerated shift toward digital learning during the COVID-19 pandemic [3], [8]. The ADDIE instructional design model has emerged as the most widely applied framework for e-module development in Indonesian educational contexts [1], [9]. Research on e-module implementation in Indonesian EFL settings consistently finds that multimedia-rich, communicatively oriented e-modules enhance student engagement, support personalised learning, and produce meaningful improvements in language skills [3], [8], [10]. The English for Communication e-module in this study is theoretically grounded in Communicative Language Teaching (CLT) and Task-Based Language Teaching (TBLT), which prioritise authentic meaning-making over rote memorisation [11], [12]. Task-based and output-oriented activities have been shown to promote learner autonomy, improve speaking performance, and reduce foreign language anxiety—outcomes particularly important in the Indonesian EFL context, where speaking confidence remains a documented challenge [11], [12], [13].

The module design was further informed by a needs analysis drawing on occupational communication tasks typical of TRE graduates in Batam's electronics industry. Romadhon et al. [6] identified speaking, technical vocabulary, and professional communication as the highest-priority English skills for Indonesian vocational engineering students, findings corroborated across multiple polytechnic needs analysis studies [6], [14]. In response, an e-module titled English for Communication was developed for fourth-semester TRE students at Politeknik Negeri Batam, comprising seven thematic units spanning 14 weeks: Basic Academic Communication, Professional and Workplace Communication, Electronics Components and Technical Description, Describing Systems and Specifications, Describing Processes and Procedures, Job Interview Communication, and Technical Presentation Skills. The present study focuses on the implementation and formative evaluation of Units 1 and 2, reporting findings from a questionnaire administered to 84 students, and contributing to the literature on ESP e-module development for vocational engineering education in Indonesia [5], [6].

2. Method

2.1 Research Design

This study employed a descriptive evaluative research design to assess students' perceptions of the English for Communication e-module following engagement with Units 1 and 2. A questionnaire-based instrument gathered quantitative data on multiple evaluation dimensions, supplemented by open-ended qualitative responses. This design aligns with formative evaluation approaches commonly used in instructional materials development research [5], [15].

3.2 Participants

The study involved 84 students enrolled in the English for Communication course in the third semester of the TRE programme at Politeknik Negeri Batam. All participants were confirmed as bona fide third-semester TRE students through the first screening question of the questionnaire (100% confirmation rate). The sample represents the complete cohort of students exposed to Units 1 and 2 during the period of data collection.

3.3 Instrument

The evaluation questionnaire comprised two parts. Part 1 consisted of 14 closed-ended items rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), covering five evaluation dimensions: content relevance (2 items), clarity and organisation (2 items), learning activities (3 items), media and language features (3 items), unit-specific effectiveness (2 items), and overall impact (2 items). Part 2 consisted of two open-ended questions inviting students to identify the most helpful module components and aspects requiring improvement. The questionnaire was administered digitally via Google Forms following the completion of Unit 2 instruction.

3.4 Data Analysis

Quantitative Likert-scale data were analysed using descriptive statistics, reporting frequency distributions and percentages for each response option per item. Responses at scores 4 and 5 indicate agreement or strong agreement; score 3 indicates neutrality; scores 1–2 indicate disagreement. Qualitative open-ended responses were analysed thematically, with recurring themes identified, categorised, and reported to enrich quantitative findings [15].

3.5 E-Module Design and Framework

3.5.1 Overview and Rationale

The English for Communication e-module was developed using the ADDIE instructional design model [1], [9]. The Analysis phase involved a needs analysis of TRE graduates' communicative requirements in Batam's industrial context; the Design phase established the seven-unit thematic sequence and three-phase instructional cycle; the Development phase produced the digital flipbook-based e-module with integrated multimedia; the Implementation phase deployed the module in the third-semester English for Communication course; and the Evaluation phase, reported in this study, gathered student feedback through a structured questionnaire.

Three core design principles guided module development: (1) contextual relevance—all materials reflect authentic communicative contexts of electronics engineering students and graduates in Batam's industrial environment; (2) progressive skill development—units are sequenced from foundational academic communication to advanced technical presentation; and (3) multimodal learning—each unit integrates text, visual materials, interactive activities, and video-based content to support diverse learning styles and address documented needs for authentic communicative practice in Indonesian EFL contexts [3], [13].

3.5.2 Module Structure: Seven Thematic Units

The seven thematic units of the e-module, spanning 14 weeks of instruction, are summarised in Table 1.

Table 1. Structure of the English for Communication E-Module

Unit	Theme	Key Topics	Technical Integration	Meetings	Output Task
1	Basic Academic Communication	Self-introduction, classroom interaction, asking & giving opinions	IPA pronunciation, simple present tense, questioning strategies	1–2	Professional self-introduction video; picture talk task
2	Professional and Workplace Communication	Workplace interaction, teamwork discussion, professional communication	Discussion strategies, participation assessment	3	Group discussion task
3	Electronics Components and Technical Description	Component vocabulary, lab tools, datasheet reading	Technical vocabulary, describing components, functions & specs	4–5	Component description; mystery component activity
4	Describing Systems and Specifications	System description, technical parameters	Interpreting datasheets, technical explanation skills	6–7	Datasheet explanation task
5	Describing Processes and Procedures	Technical procedures, maintenance steps	Sequencing words, imperative and passive voice	8–9	Oral procedure explanation

Unit	Theme	Key Topics	Technical Integration	Meetings	Output Task
6	Job Interview Communication	Interview skills, professional background	Self-introduction, interview questions, verbal/non-verbal	10–11	Mock interview simulation
7	Technical Presentation Skills	Presenting systems/projects, explaining visuals	Presentation structure, explanation techniques	12–14	Technical presentation

3.5.3 Instructional Design Features

Each unit follows a consistent three-phase instructional cycle: a pre-activity phase (warm-up, brainstorming, or vocabulary introduction), a whilst-activity phase (core communicative practice), and a post-activity phase (reflection and consolidation). This structure reflects a Presentation–Practice–Production approach adapted for communicative purposes, ensuring new language is first contextualised, then practised in structured settings, and finally applied in freer communicative tasks.

Recurring features embedded across all units include: Useful Expressions sections providing ready-to-use language chunks for specific communicative functions; Grammar Focus sections highlighting key structures contextualised within unit topics; conversation models demonstrating target language in realistic exchanges; and video-based activities exposing students to natural English usage. The 'Your Turn!' sections present communicative production tasks—video recordings, group discussions, or structured oral tasks—serving as formative assessments and building communicative confidence through authentic practice [11], [12].

3.5.4 Units 1 and 2: Implemented Units

Unit 1: Basic Academic Communication introduces foundational English communication skills in academic settings, including self-introduction, classroom interaction, and expressing and responding to opinions. The unit integrates International Phonetic Alphabet (IPA) pronunciation training—a dimension of direct practical importance given documented challenges Indonesian students face in English pronunciation [2]. The output task requires students to record a professional self-introduction video and complete a picture talk activity describing a technical image in English.

Unit 2: Professional and Workplace Communication shifts the communicative context to the workplace. Key content includes workplace interaction strategies, teamwork discussion, and professional communication. Students engage in group discussion tasks simulating team meetings and collaborative problem-solving, with assessment focusing on participation quality and communicative effectiveness—mirroring the demands of the electronics manufacturing workplaces in Batam's industrial zone.

4 Results and Discussion

4.1 Content Relevance and Alignment

On the item assessing appropriateness of content for TRE students' communication needs, 56% scored 5 (strongly agree) and 42.9% scored 4, yielding a combined favourable rate of 98.9%—the highest across all items. For workplace communication relevance, 56% scored 5 and 40.5% scored 4 (combined 96.5%). These high ratings validate the needs-analysis basis of the module's design and confirm that ESP materials grounded in learners' actual communicative purposes produce stronger perceived relevance than general English instruction [2], [3].

4.2 Clarity and Structural Organisation

For clarity of explanations, 61.9% scored 5 and 34.5% scored 4 (combined 96.4%), with only 3.6% at score 3. For systematic organisation, 58.3% scored 5 and 40.5% scored 4 (combined 98.8%). These results indicate that the three-phase instructional cycle contributes effectively to students' perception of logical progression. Qualitative feedback corroborated these findings, with one student noting that explanations accompanied by examples in image and video form help in understanding, consistent with the broader e-module literature on multimodal design in Indonesian higher education [3], [8].

4.3 Learning Activities and Interactive Features

For speaking practice activities, 60.7% scored 5 and 36.9% scored 4 (combined 97.6%). For active engagement, 58.3% scored 5, 38.1% scored 4, 2.4% scored 3, and 1.2% scored 2. On useful expressions for speaking confidence, 52.4% scored 5, 40.5% scored 4, 6% scored 3, and 1.2% scored 2—the slightly more varied responses likely reflecting differences in prior proficiency and ability to deploy fixed expressions fluently. Nonetheless, useful expressions were among the most frequently cited helpful features in qualitative feedback, consistent with research on formulaic language in ESP showing that pre-packaged expression sets reduce cognitive load and build communicative confidence [11].

The 'Your Turn!' productive tasks were highlighted by multiple students as particularly valuable, aligning with CLT and TBLT research showing that output-based tasks in digital environments improve speaking confidence and reduce foreign language anxiety [12], [13].

4.4 Video and Dialogue-Based Features

For learning videos, 45.2% scored 5, 46.4% scored 4, and 7.1% scored 3, with 1.2% at score 2 (combined 91.6%)—the lowest across all items. Qualitative feedback confirmed that videos without subtitles were a barrier for some students, consistent with EFL listening research identifying lack of visual support as a challenge for lower-proficiency learners [3]. For dialogue models, 57.1% scored 5 and 39.3% scored 4 (combined 96.4%), the joint-highest score. Multiple students in qualitative responses cited conversation examples and professional dialogue models as among the most helpful features, consistent with ESP literature on genre-based dialogue instruction [4], [6].

4.5 Grammar Focus

For grammar focus sections, 54.8% scored 5 and 40.5% scored 4 (combined 95.3%), with 4.8% at score 3. Despite strong overall positive ratings, grammar was the dimension most frequently identified in qualitative feedback as requiring further development. Students requested more detailed grammar explanations, additional practice exercises, and simpler language for beginners. This productive tension—positive perception but insufficient practice depth—is consistent with communicative grammar research indicating that learners value contextualised explicit grammar teaching integrated meaningfully within communicative tasks [12].

4.6 Unit-Specific and Overall Evaluations

For Unit 1 effectiveness, 56% scored 5, 40.5% scored 4, and 3.6% scored 3 (combined 96.5%). For Unit 2 effectiveness, 53.6% scored 5, 41.7% scored 4, 3.6% scored 3, and

1.2% scored 1 (combined 95.3%). The slightly lower combined score for Unit 2 may reflect the greater abstractness of professional communication scenarios for students in the early stages of their academic programme. This suggests Unit 2 could benefit from additional scaffolding and more worked examples, consistent with qualitative case study findings on ESP implementation in vocational contexts [5].

For overall improvement in communication skills, 54.8% scored 5 and 40.5% scored 4 (combined 95.3%). For overall increase in English-use confidence, 45.2% scored 5 and 48.8% scored 4, with 4.8% at score 3 and 1.2% at score 1 (combined 94%). The slightly lower proportion of score-5 responses on the confidence item is consistent with EFL research documenting that skill improvement and speaking confidence do not always develop in parallel [13]. The 94% combined confidence rating nonetheless validates the module's design philosophy of prioritising authentic, low-anxiety communicative practice.

Table 2 presents a summary of quantitative evaluation results across all 14 items.

Table 2. Summary of Student Evaluation Scores (n = 84)

Evaluation Item	Score 1	Score 2	Score 3	Score 4	Score 5	% Favourable (4+5)
Content relevance to engineering communication	0%	0%	1.2%	42.9%	56%	98.9%
Relevance to workplace communication	0%	0%	3.6%	40.5%	56%	96.5%
Clarity of explanations	0%	0%	3.6%	34.5%	61.9%	96.4%
Systematic structure	0%	0%	1.2%	40.5%	58.3%	98.8%
Speaking practice activities	0%	0%	2.4%	36.9%	60.7%	97.6%
Active learning engagement	0%	1.2%	2.4%	38.1%	58.3%	96.4%
Useful expressions for speaking confidence	0%	1.2%	6%	40.5%	52.4%	92.9%
Learning videos for real-situation understanding	0%	1.2%	7.1%	46.4%	45.2%	91.6%
Dialogue models for professional communication	0%	0%	3.6%	39.3%	57.1%	96.4%
Grammar focus for sentence accuracy	0%	0%	4.8%	40.5%	54.8%	95.3%
Unit 1: Academic communication effectiveness	0%	0%	3.6%	40.5%	56%	96.5%
Unit 2: Professional communication effectiveness	1.2%	0%	3.6%	41.7%	53.6%	95.3%
Overall improvement in communication skills	0%	0%	4.8%	40.5%	54.8%	95.3%
Overall increase in English-use confidence	1.2%	0%	4.8%	48.8%	45.2%	94%

4.7 Qualitative Findings

Open-ended responses from 84 students yielded rich qualitative data across two questions: (1) which module components they found most helpful, and (2) which aspects they felt needed improvement. Thematic analysis identified five major themes: (a) the value of multimodal and example-rich explanations, (b) the centrality of useful expressions and conversation models, (c) the communicative productivity of 'Your Turn!' tasks and group discussion activities, (d) the positive reception of grammar focus sections alongside a desire for deeper practice, and (e) practical accessibility concerns related to video subtitles, vocabulary range, and pronunciation guidance. Selected

student responses are presented below to illustrate each theme, followed by interpretive commentary.

Theme 1: Multimodal Explanations and Example-Rich Presentation

The most substantive qualitative responses converged on the value of combining visual, textual, and video-based explanations within a single instructional sequence. One student described the benefit comprehensively, noting that explanations accompanied by examples in both image and video form helped them understand the material, and that the sequential presentation of content made it easier to follow the flow of learning. Another student articulated a similar perception, stating that all content that was presented with examples—whether in images or videos—helped them grasp the conceptual material, and that the orderly sequencing facilitated their engagement with the learning progression. A third student, responding more concisely, identified the explanation sections as the most helpful component precisely because they were easy to understand.

These responses confirm that the three-phase instructional cycle—pre-activity, whilst-activity, post-activity—was experienced by students as a coherent and navigable learning progression, not merely as a formal design convention. The consistent mention of both visual and video elements as complementary supports aligns with multimodal learning theory and corroborates quantitative findings showing high satisfaction with clarity of explanations (96.4% favourable) and systematic structure (98.8% favourable).

Theme 2: Useful Expressions and Conversation Models as Communicative Scaffolds

Useful expressions and conversation models emerged as the single most frequently cited helpful component across all open-ended responses. Students cited not only the presence of these features but their practical communicative function. One student identified useful expressions and their examples of application as the most beneficial component, foregrounding the transfer value of ready-to-use language chunks. Another student specifically highlighted the conversation sections covering everyday situations, explaining that they helped clarify how to use English directly in communication, and noting that the dialogue examples made the material easier to understand and practise. A third student, writing in English, stated that what helped them most was the professional workspace and workplace communication content, particularly the grammar focus and 'Your Turn' tasks within it, indicating that the combination of modelled language and productive application was experienced as mutually reinforcing. One student also recommended enriching the Useful Expressions sections by providing both formal and informal variants of target expressions, suggesting that the current provision, while valued, could be expanded to reflect the full register range students encounter in professional engineering contexts. This finding is consistent with ESP research on formulaic language acquisition, which shows that pre-packaged expression sets reduce cognitive load during production and enable learners to participate in communicative events before they have achieved full linguistic control [11].

Theme 3: Communicative Confidence and the Role of 'Your Turn!' Tasks

Multiple students identified the 'Your Turn!' video practice tasks and the group discussion activities as particularly beneficial for developing communicative confidence. One student highlighted the 'Your Turn!' section in which students create video practice of their conversation as especially valuable, explicitly connecting the task format to the opportunity to rehearse communication in a low-stakes environment. Another student indicated that the module helped them increase their confidence when communicating in English, linking this outcome directly to the communicative practice activities rather than to the declarative content alone. A third student described the module comprehensively, stating that all sections worked together in complementary ways to improve English communication ability—for both academic needs and

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preparation for the professional world—and concluded that the module supported their development in communicating more effectively and confidently.

These responses are significant because they indicate that students perceived communicative growth not only in terms of language knowledge but as an affective outcome—the development of confidence to act as communicators. This aligns with CLT and TBLT principles emphasising the centrality of authentic, output-oriented tasks in reducing foreign language anxiety and building self-efficacy [12], [13], and corroborates the 94% favourable rate on the overall confidence item in the quantitative data.

Theme 4: Grammar Focus—Valued but Insufficient in Depth

Grammar focus sections generated the most pronounced productive tension in the qualitative data: students rated them positively in the quantitative items (95.3% favourable) while simultaneously identifying them as the dimension most in need of further development. Specific student suggestions illustrate this clearly. One student noted that the grammar sections still lacked sufficient detail and that the practice examples were limited, and recommended adding more exercise items and simpler explanations to improve accessibility for beginners. Another student described a similar concern, remarking that their grammar learning still felt insufficient and requesting an expansion of grammar-related content. A third student offered a more comprehensive suggestion, stating that the module was already sufficiently clear and engaging, but that increasing the variety of practice exercises or questions in certain sections would help students better understand the concepts and apply them directly.

This productive tension between approval and aspiration is characteristic of learners who are genuinely engaged with the instructional content: rather than dismissing grammar instruction, they are requesting more of it. This is consistent with communicative grammar research demonstrating that learners value explicit grammar teaching when it is embedded within meaningful communicative tasks rather than taught in isolation [12]. The implication for module revision is clear: grammar practice should be expanded in quantity and scaffolded in complexity, with worked examples proceeding from simpler to more challenging structures.

Theme 5: Accessibility Concerns—Video Subtitles, Vocabulary, and Pronunciation

A recurring cluster of improvement suggestions centred on practical accessibility barriers that prevent full engagement with the module—particularly for students at lower proficiency levels. Regarding videos, one student explicitly identified learning videos without subtitles as a specific barrier, while another suggested adding animated video content to make learning more engaging. On vocabulary, one student requested the addition of new vocabulary items in every unit meeting so that students could expand their word knowledge progressively, and expressed appreciation for the lecturer's existing instruction on how to spell English words correctly, noting that this had been very helpful. Another student made a closely related suggestion, recommending the inclusion of more work-related vocabulary per unit to enable students to build the domain-specific lexical resources required for speaking in professional contexts.

On pronunciation, one student noted that it would be beneficial to have pronunciation guides embedded within the relevant page of each unit, explaining that they still sometimes mispronounced English sentences and that in-context guidance would help address this. Another student, confirming the navigability concern raised by multiple respondents, suggested adding page numbers to the module to make it easier to locate specific material. These practical accessibility concerns—subtitles, vocabulary enrichment, pronunciation support, and navigation aids—are largely additive in nature and do not challenge the module's fundamental design; rather, they reflect students' desire for a more complete and independently navigable learning resource. Their specificity and actionability make them valuable inputs for the module revision process, consistent with established e-module improvement principles in Indonesian EFL contexts [3], [8].

4.8 Implications

The evaluation findings confirm that the English for Communication e-module is perceived by the majority of TRE students as relevant, clear, well-structured, and effective in supporting English communication development. Consistently high favourable response rates across all dimensions (91.6%–98.9%) suggest that the module's ESP and CLT-informed design successfully meets documented learner needs and institutional communicative objectives.

Several design decisions appear particularly consequential in generating positive responses. The contextual grounding of all content in electronics engineering and professional communication scenarios relevant to Batam's industrial environment has evidently resonated with students' sense of relevance and purpose—validating the ESP principle that materials designed around learners' actual communicative needs produce stronger engagement than general English instruction [2], [3]. The multi-feature design—combining useful expressions, grammar focus, dialogue models, and video activities within a structured three-phase cycle—provides multiple entry points for learners with different strengths.

Four priority improvements emerge from the evaluation: video subtitle addition, grammar practice expansion, per-unit vocabulary sections, and in-page pronunciation guides. These are achievable improvements that do not require fundamental redesign. The qualitative finding that students actively requested more communicative practice—despite already rating the module highly on these dimensions—indicates a strong appetite for communicative engagement that, if sustained through Units 3–7, presents a significant opportunity to develop deep communicative competence across the full range of skills TRE graduates require [6], [4].

The study also contributes to a small but growing body of research on ESP e-module development specifically for Indonesian polytechnic engineering programmes, providing a replicable model for similar development efforts at other institutions [3], [8].

5 Conclusion

This study documented the design framework of a seven-unit English for Communication e-module for TRE students at Politeknik Negeri Batam and reported formative evaluation findings from the first two implemented units. Based on questionnaire responses from 84 students, the module is perceived as highly relevant, clear, well-structured, and effective in supporting English communication development and building communicative confidence among electronics engineering students.

Content relevance, structural clarity, speaking practice activities, and dialogue-based features received the highest positive ratings, while grammar depth, vocabulary range, video accessibility, and pronunciation guidance were identified as priorities for further development. These findings provide actionable guidance for revising Units 1 and 2 and for designing Units 3–7.

The study has several limitations: findings derive from a single cohort at one institution, generalisability is limited, and the evaluation covers only two of seven units. Future research should evaluate the complete seven-unit module, employ pre–post designs to measure learning gains, include instructor perspectives, and conduct comparative studies across multiple polytechnic programmes. Notwithstanding these limitations, the study offers a meaningful, evaluated framework for purpose-built, digitally mediated ESP instruction for engineering students in Indonesian vocational higher education.

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