Development of M.E.G.A: A self-assessment expert system to improve English correspondence skills for job-seeking university students

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Abstract. This study highlights the low English writing and speaking skills of students of the Information Systems Study Program at Nurdin Hamzah University. To address this challenge, a rule-based expert system application named M.E.G.A for Job Seekers was developed using the ADDIE model approach (Analysis, Design, Development, Implementation, and Evaluation). This application functions as a self-assessment tool to improve students' professional communication readiness, especially in compiling CVs, job application letters, and interview preparation. The sampling technique used was purposive sampling, with subjects consisting of language experts, instructional media experts, and educational technology experts to validate the product. Meanwhile, 100 second-semester students of the Information Systems Study Program at Nurdin Hamzah University were used as the sample for testing the practicality, attractiveness, and effectiveness of the application. This study used quantitative data from questionnaires and tests, as well as qualitative data from open-ended responses by experts and students. The quantitative data were analyzed descriptively, while the qualitative data were validated through triangulation and content analysis to support the development of the application. The results showed high scores in the aspects of functionality, attractiveness of appearance, and improvement of learning outcomes. Pre-test and post-test analysis showed significant improvements, while statistical analysis supported the pedagogical reliability of this system. The application has proven effective in supporting independent learning that is relevant to the needs of the world of work and has the potential to be adopted by other study programs. This study contributes to the development of digital learning through the integration of AI-based expert systems for the development of 21st-century skills.

Introduction

English proficiency has become a fundamental skill in various aspects of life, particularly in higher education and the increasingly digitized and differentiated global job market. The development of information and communication technology, along with globalization demands, positions English not merely as an additional subject but as a primary means of conveying scientific ideas, establishing professional relationships across countries, and accessing knowledge sources that are predominantly available in that language (Widana et al. (2023). In this context, mastery of productive skills such as writing and speaking in English becomes an important indicator of students' readiness to face the working world. English has become a highly important skill in both

academic and professional contexts. Scientific resources, research materials, and professional communication are largely conducted in this language (Getie, 2020).

Nevertheless, Indonesian students' English proficiency remains at a concerning level. The English report shows that Indonesia only ranks 34th out of 44 surveyed countries, indicating low English competence among students and university students. Karami et al. (2018a) also underscore that the gap between the need for English communication competence in the industrial world and the actual capabilities of Indonesian university graduates remains quite wide. This challenge becomes increasingly complex in non-language study programs, such as Information Systems, where English learning is not the primary focus of the curriculum.

The factors causing weak English proficiency are quite diverse. Among them are the limited allocation of English courses in the curriculum (usually only 2-4 credits), low student interest and motivation in learning foreign languages, and the influence of social media that tends to distort formal writing conventions. Asafo-adjie R, (2023) noted that informal digital content significantly affects students' writing structure and style, thereby reducing the quality of academic writing. On the other hand, the development of digital technology opens great opportunities for developing more adaptive, efficient, and contextual language learning and evaluation models.

Specifically, the English course in the Information Systems Study Program at Nurdin Hamzah University is designed to equip students with communication skills in professional contexts. One of the main focuses is English Correspondence, particularly in the aspect of composing job application letters and business communication. Unfortunately, the conventional learning approach that is still widely used is considered less suitable for the characteristics of today's generation of learners, namely Generation Z, who are more interested in visual, interactive, and technology-based approaches.

Several approaches have been developed in efforts to improve students' writing and speaking skills in English. One of them is the use of portfolios and e-portfolios. Karami et al. (2018)Jaya et al. (2025) show that e-portfolio implementation can encourage significant improvement in EFL students' writing abilities in Iran. Furthermore, this method also supports self-reflection processes and continuous learning. Takarroucht, (2022) supports this finding by emphasizing that self-assessment can improve students' self-efficacy in writing skills, which in turn strengthens learning independence. However, this approach still has limitations, especially in terms of personalization and assessment automation. It can be concluded that the previous studies were more general and focused on e-portfolios or AI in the context of academic purposes. In contrast, this study presents a novelty by developing a rule-based expert system for self-assessment of professional English skills (writing and speaking) among Information Systems students, using the ADDIE approach adapted to the characteristics of Generation Z and the demands of the professional world.

To address these challenges, expert systems based on artificial intelligence (AI) have become a highly promising approach. Expert systems enable assessment processes to be conducted automatically, consistently, and personally according to each student's needs. Masruria W (2021) explains that expert systems can provide specific learning recommendations based on user response patterns, as well as provide constructive feedback in real-time. In recent developments, Mohammadi et al. (2025) introduced a deep learning-based assessment system that combines BERT and wav2vec 2.0 technologies to evaluate speaking and writing skills with high accuracy. Meanwhile, Wang et al. (2023) designed ChatPRCS, a reading comprehension learning support system that utilizes ChatGPT models and the zone of proximal development (ZPD) concept to adjust material difficulty levels to the user's cognitive capacity.

Although various initiatives have produced significant progress, the implementation of expert systems in the context of English for Job Seekers is still very limited, especially among Information Technology study program students. Roe et al. (2024) & Widana (2020) state that AI system adaptation in English for Academic Purposes (EAP) needs to be directed toward personalized assessment that aligns with user characteristics and learning objectives. On the other hand, (Tripathi, 2011) emphasizes that expert systems have great potential for application in professional learning domains that require fast, accurate, and data-based assessment.

This study has two main variables: the independent variable is the development of M.E.G.A., an expert self-assessment system designed to support students in independent learning. The dependent variable is the English correspondence skills of job-seeking students, particularly in writing and speaking. The M.E.G.A system is expected to enhance these skills through technology-based evaluation and practice. In this context, this research focuses on developing an expert system based on a rule-based expert system using the ADDIE approach as a development framework. The purpose of this study is to assist students of the Information Systems program in improving their professional English writing and speaking skills, particularly in the context of job-related correspondence.

The ADDIE model is considered relevant because it presents systematic development stages, from needs analysis to final evaluation, which allows integration between pedagogical and technological aspects. The development of this system is expected not only to improve the quality of assessment of students' English language skills but also to contribute to the development of technology-based adaptive learning models that suit 21st-century needs. Considering the urgency of improving Information Systems students' English competence in professional contexts and the great potential of AI-based expert systems, the main question in this research is: How to design an effective self-assessment-based expert system to improve writing and speaking skills in professional English for Information Systems students?

Method

This research applies a Research and Development (R&D) approach by adopting the ADDIE model (Analysis, Design, Development, Implementation, Evaluation) as the main foundation in the self-assessment expert system development process. The selection of the ADDIE model is based on its systematic and flexible stage structure and its ability to produce effective digital learning media, as supported by findings from (Spatioti, 2024) and (Feng, 2023) Compared to other models such as Dick & Carey or Borg & Gall, ADDIE is superior in ease of integration between instructional design and technology applications, making it suitable for system development in higher education contexts.

This research combines quantitative and qualitative approaches to obtain comprehensive data. The initial stage, Analysis, involves observing English curricula in Information Systems study programs at four private universities and distributing questionnaires to Study Program Heads, students, and expert validators to identify needs and assess system feasibility. In the Design stage, a forward-chaining method-based system design was developed to produce a system that can provide adaptive responses to user input. Furthermore, the Development phase includes implementation of grammar, vocabulary, and writing evaluation features based on self-assessment, as well as validity testing by experts with professor and doctor qualifications who have expertise in their fields.

The population of this study consists of second-semester students of the Information Systems Study Program at Nurdin Hamzah University. The sampling technique used is purposive sampling, with the validity test subjects consisting of content experts, media experts, and educational

technology experts. In contrast, the practicality and effectiveness test subjects include students and the head of the study program. Data were collected through expert validation instruments, response questionnaires, as well as pretests and posttests. Experts validated the instruments, and the data were analyzed descriptively. The success of the product was measured based on three key categories: high validity, high practicality, and improvement in pretest and post-test results.

The Implementation phase involves trials with 100 second-semester students at Nurdin Hamzah University who have taken English courses. The research was conducted from February to May 2025. The trial was carried out on the campus of Nurdin Hamzah University and was directly supervised by the researcher and two research assistants, who are English lecturers and practitioners. The trial lasted 90 minutes and took place in two different classrooms and one computer laboratory, each class consisting of 35 students.

Data was collected through various methods, including questionnaires, interviews, observations, and system usage logs. Ethical aspects were ensured through informed consent and participant data confidentiality. Finally, the Evaluation stage was conducted with pre-test and post-test to measure improvement in English correspondence abilities, analyzed using SPSS with paired t-test and Cronbach's Alpha (>0.8). Qualitative data were analyzed according to Miles and Huberman's approach and strengthened with data triangulation and effect size calculations. This methodology proves its effectiveness in designing contextual and relevant AI-based adaptive expert systems that meet current higher education needs.

Results and Discussion

Need Assessment
The expert system development process began with a needs analysis focused on mapping learning problems and specific needs of Information Systems Study Program students at Nurdin Hamzah University. This analysis became the foundation for designing technological solutions that match students' academic and professional needs. In the design stage, the system was comprehensively designed from operational logic architecture to a user-friendly and responsive interface design. System development was then directed toward creating expert-based applications to assist the self-assessment process of students' English abilities, particularly writing and speaking skills in work contexts, such as creating CVs and application letters.

After the system was developed, implementation was conducted through limited trials to evaluate initial performance in real user environments. The final evaluation stage focused on the overall effectiveness, efficiency, and quality of the system. Research results show that the system has high practicality (89%), attractiveness (87%), and effectiveness (91%). This application is seen as capable of increasing student motivation and learning outcomes, reflected in significant improvement from pre-test to post-test scores. These findings indicate that the developed system is suitable for use as a technology-based learning tool.

Table 1. Analysis Results of Application Development Needs from Likert Scores

| Variable	Average Score	Interpretation
Urgency of English Proficiency	4.25	Very High
Level of Difficulty in English Interviews	3.73	Quite High
Impact on Job Opportunities	3.5	High
Interest in Attending Training	2.6	Quite High

Data analysis in Table 1 reveals students' important needs for developing a self-assessment-based expert system application for English language learning. The average score of 4.25 on the variable

of awareness of the importance of English proficiency reflects students' high motivation in preparing themselves for the global era and the workforce. This result aligns with (Clarke, 2023) findings, which state that higher education students are highly oriented toward improving language literacy as professional capital.

Furthermore, the score of 3.73 on the aspect of difficulty in English-language interviews shows that speaking ability remains a significant challenge. This reinforces García (2022) argument regarding the effectiveness of adaptive learning in increasing student confidence and participation in oral language learning. Meanwhile, the perception of English relevance in job opportunities is reflected in the score of 3.5. This confirms the results. Patel (2024) study, which found that foreign language proficiency increases job opportunities in the global technology sector by 35%.

Although the desire to participate in additional training is also relatively high (2.6), this figure is relatively lower compared to other variables. This could be due to limitations in time, cost, or Generation Z's characteristic learning style preferences. Nguyen (2025) noted that mobile learning and microlearning-based training formats tend to be more favored by this digital generation of students. Overall, these findings confirm the urgency of developing English learning applications that are technologically adaptive and relevant to professional contexts. Systems that are flexible and personalized based on self-assessment are considered effective in increasing user confidence and competence. This is also reinforced by Lee, (2023), who found that the use of AI-based digital tools and self-assessment can significantly improve self-efficacy and language learning outcomes.

The next step in the research is to evaluate students' English proficiency levels through written tests and interviews. These tests are conducted in two sessions, with and without device assistance, to measure pure competence. Speaking assessment is conducted directly, focusing on completeness, accuracy, and fluency. Data from this evaluation becomes the primary basis for designing application content and features, ensuring the application truly matches students' conditions and needs.
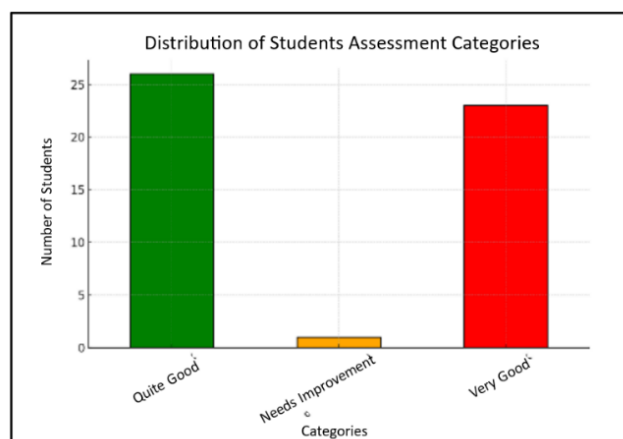
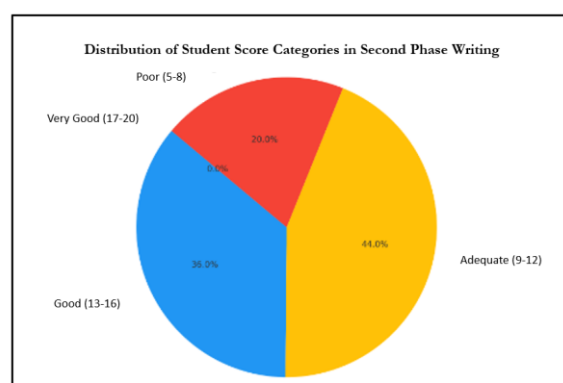**Image 1.** Distribution of Students' English Writing Ability Categories, Written Test Phase 1

Image 1 shows the distribution of first-phase written test results, where 26 out of 50 students (52%) are in the Good Enough category, 23 students (46%) fall into the Very Good category, and only one student (2%) is categorized as Needs Improvement. These findings indicate that most students have an adequate foundation in English writing skills, but only a small portion shows consistent potential for excellence. This initial average perception supports previous literature on students' initial readiness in the realm of professional English literacy. This aligns with Lee's (2023) findings,

which show that 60% of students in e-assessment programs display good writing abilities after implementing technology-based self-assessment. However, the relatively low variation in the upper categories indicates that differentiation strategies such as AI-based feedback can improve accuracy and learning motivation, as demonstrated by Li (W., T. C., & L. Y. Zhang, 2023) in the context of using GPT-3 for written feedback.

The importance of early detection of this imbalance is also emphasized by Oliveira (2023), who underline that although the majority of participants show promising results, individuals with additional needs ("Needs Improvement" category) require targeted intervention to avoid falling behind in the long term. Therefore, the expert system can be optimized to provide automatic remedial modules and flexible learning scheduling. Furthermore, this categorical variation reflects the complexity of professional English evaluation, where writing competence is not only viewed from grammar and vocabulary, but also from clarity of ideas, consistency of argumentation, and contextual adaptation effectiveness that demands layered evaluation systems as recommended by Sisman et al. (2022) in their study on EFL writing AI feedback.

Thus, this visualization becomes a strong foundation for expert system content development. Advanced modules can be designed based on ability categories: "Very Good" students can be directed to more complex professional writing challenges, while students in the "Good Enough" and "Needs Improvement" categories can receive intensive training focused on text structure, grammar, and cohesive devices.

Subsequently, a second phase written test was conducted. The test was designed to evaluate students' writing abilities without digital device assistance, to obtain a more authentic picture of their mastery of language structure, vocabulary, and writing coherence. This evaluation was conducted to assess students' basic competencies independently after exposure to the developed learning system. The results from this phase also function as an indicator of the system's effectiveness in improving formal writing skills in professional contexts, particularly for workplace communication needs. The following graph presents the distribution of assessment categories based on students' actual performance at this evaluation stage.

Image 2. Distribution of Student Score Categories in Second Phase Writing Test

The distribution results in Image 2 show student achievements in the second phase Writing test conducted without external tool assistance. Not a single student reached the "Very Good" category (score 17-20), while most were in the "Adequate" (44%) and "Good" (36%) categories, with the remainder (20%) in the "Poor" category. These findings indicate a significant performance decline compared to the first phase, which displayed many high scores. This confirms that most students do not yet possess solid English writing abilities when not using technological assistance. This

aligns with Geng et al., (2023) who emphasized the importance of explicit and repeated learning to build academic writing skills in EFL contexts.

The absence of maximum scores also indicates the need for automatic feedback systems capable of providing contextual suggestions directly, as offered by AI writing assistant technology (Egger et al., 2022). Deng, (2022) also found that feedback adjustment based on performance can significantly improve students' writing results. Using the ADDIE model, expert system development can support adaptive formative assessment and organize content based on Bloom's Taxonomy to respond to ability differences.

On the other hand, speaking ability evaluation through interviews showed an average score of only 60.06 out of 160 total points (37.5%), far below the minimum standard of 70%, with high deviation (11.91), indicating large performance variation. Dolcet, (2023) Study shows that EFL students tend to be weak in fluency and accuracy, especially without direct feedback (Liu, 2022). The use of AI applications like Liulishuo has proven capable of improving fluency and pronunciation (Ma et al., 2025). Qiao & Zhao, (2023) also support AI-based learning as a way to strengthen self-regulation and learning motivation.

Overall, both test results demonstrate a critical need for adaptive technology integration in English language learning, particularly in the form of expert system applications that provide real-time feedback, level-based learning, and MALL approaches. This intervention has great potential in bridging the gap between students' actual performance and professional demands in the global workforce.

Qualitative data were obtained through interviews with experts, observations of application usage, and student responses through open-ended questionnaires. The application was considered relevant and useful by both experts and students. Students felt more motivated, supported in their independent learning, and more confident in writing and speaking English. Data triangulation indicated that this expert system is effective, practical, and aligned with the needs of professional learning.

Learning Multimedia Expert Validation
The design and implementation process of the expert system application for self-assessment in English correspondence skills was carried out methodically and systematically, referring to the ADDIE development model (Analysis, Design, Development, Implementation, Evaluation). This approach not only enables the creation of functionally operating applications but also proves feasible from aspects of ease of use, visual appeal, and effectiveness in supporting learning. The development stages are visualized through three main components illustrated in the diagram prepared as shown in the following image.
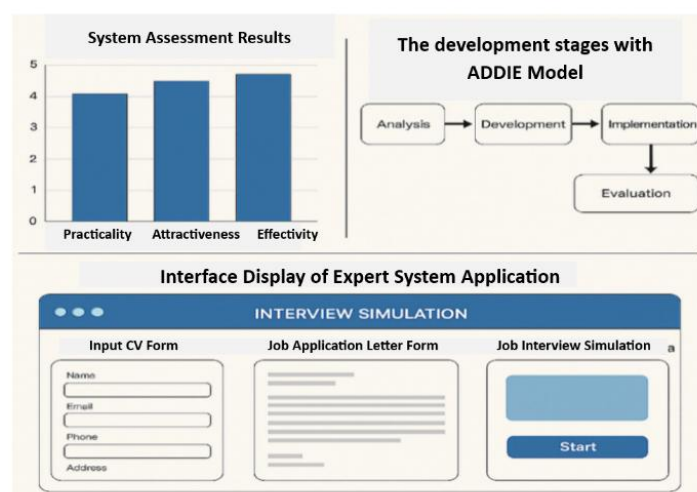
Image 3. System Assessment Results

Image 3 represents a comprehensive evaluation of the self-assessment-based expert system in the context of English language learning, referring to three leading indicators: practicality, attractiveness, and effectiveness. Based on user evaluation results, all indicators obtained average scores above 4.5 on a 5-point Likert scale, indicating the system is in the very high feasibility category. In terms of practicality, the system interface, designed intuitively and easily accessible, successfully meets user expectations, particularly students, regarding navigation and system usage. These findings support Xu (2023a) research results, which confirm that user experience is a key element in increasing the adoption of digital learning technology in higher education environments.

The system's attractiveness aspect reflects the visual quality and interactivity of the interface design that is not only aesthetically appealing but also increases student engagement in the learning process. L. Zhang et al. (2022a) Research found that learning systems with aesthetic and responsive interfaces significantly influence user motivation and perceived benefits of educational technology. From the effectiveness side, the system demonstrates adaptive capability in conducting evaluations according to student competency levels, showing accurate and personalized evaluative performance. This aligns with findings by Alshahrani (2023), which proved that rule-based systems with automatic assessment features can significantly improve self-reflection and foreign language skill mastery.

In its development, this expert system application uses the ADDIE model approach, consisting of five stages: Analysis, Design, Development, Implementation, and Evaluation. In the analysis stage, user needs were identified through contextual studies, as emphasized Mulyadi (2023), that user input must serve as the foundation in developing relevant learning media. System design and user interaction flow were formulated in the design stage, following Park (2022) approach, which emphasizes the importance of instructional design based on user comfort. The development stage involved implementing question content and interactive features, in line with adaptive learning models and gamification as practiced by García (2022) to encourage active student participation. The implementation process involved integrating the system into actual learning processes to test system reliability, as conducted by Ma (2025) in developing mobile speaking learning applications. Meanwhile, system evaluation was conducted by collecting user feedback and comprehensive testing of application effectiveness as recommended by Soh (2024).

The system interface display includes main features such as curriculum vitae (CV) input forms, job application letter forms, and job interview simulations designed to provide authentic and applicable

learning experiences. This design is intended for beginning-level students who are preparing to face the working world, in line with Chan's (2023) study, which found that e-portfolio-based simulations can improve student readiness and confidence in facing actual professional contexts.

Furthermore, evaluation by media experts showed very consistent results, with an average score of all indicators of 5.00 and a standard deviation of 0.000, meaning all validators gave the highest assessment. This evaluation confirms the consistency of expert perception regarding instructional quality and media design. Validation from educational technology experts also supported these results with a score of 88%, categorized as very feasible. The majority of indicators obtained maximum scores without any values below four, showing the system's completeness in meeting content, technology, and pedagogical aspects. W. , T. C. , & L. Y. Zhang (2023) state that alignment of pedagogical and technological aspects is an important foundation for the effectiveness of digital learning media. Alrasheedi (2022) add that the consistency of expert assessment becomes a key indicator of media validation success. Additionally, Nurhasanah (2024) emphasizes that integration of user experience principles in digital media strengthens positive perception of media quality and relevance in learning contexts.

Overall, empirical evidence from both user and expert evaluations demonstrates that this expert system is not only technically and functionally feasible but also has significant pedagogical value in supporting the development of students' professional English skills, particularly in the realm of academic and workplace correspondence.

Educational Technology Expert Validation

Based on validation results by educational technology experts, the expert system application for self-assessment in English language learning is declared very feasible for use in academic environments. The evaluation assessed 25 key indicators related to effectiveness, pedagogical appropriateness, and technological readiness. All indicators obtained maximum scores (5), with feasibility percentages reaching 100% in every aspect: from psychology and learning theory, learning resources, objective formulation, learning interaction, to application design and attractiveness.

These results indicate that the application meets all principles of responsive, adaptive, and user-centered learning technology as suggested by Liu (2022), who emphasizes the importance of integration between educational function and system ease of use. The application's main strengths lie in its intuitive interface, support for independent learning, and content relevance to workplace contexts factors identified by (W., T. C., & L. Y. Zhang, 2023) as keys to digital learning technology effectiveness. Although validation scores were very high, validators still provided valuable input regarding system navigation improvement, visual design, and provision of more informative feedback, so users can optimize their learning processes. This aspect aligns with studies by Alshahrani (2023) which emphasize the role of digital feedback in expert system-based learning.

Overall, this validation confirms that the application is not only technically feasible but also pedagogically effective, and ready for broader implementation in the context of digital technology-based English language learning.

English Language Material Expert Validation

Material expert validation is an essential stage in developing expert system-based digital learning content. Based on validation data analysis results conducted by an experienced English language material expert, it was found that all assessment aspects obtained maximum scores of 5.00, with a standard deviation of 0, reflecting full consistency and positive assessment of content, presentation, and linguistic aspects in the application. All items in the content feasibility, presentation, and

language aspects each obtained 100% percentages, categorized as "Very Feasible" based on Miles and Huberman's (1992) classification.

In line with Al-Mahrooqi (2023) findings, good English language material quality must include contextual appropriateness, professional vocabulary, and proper sentence structure. Additionally, the use of comprehensively validated media can increase user confidence and learning effectiveness. Nevertheless, suggestions for improvement were also provided by the validator, particularly regarding writing format aspects that need to be made consistent and the addition of questions that encourage higher-order thinking skills (HOTS). This input is highly relevant to studies by Saleh (2022), which emphasizes the need for HOTS integration in technology-based learning to improve students' cognitive abilities profoundly. Furthermore, the HOTS approach implementation has also proven capable of improving students' academic writing skills, as shown by Badger (2023).

Generally, expert validation results show that this expert system application material is not only feasible for use but also meets very high pedagogical and linguistic criteria. This quality makes this application a potential instrument in supporting students' professional English mastery, particularly for career and formal communication needs.

User Testing

The final results of the self-assessment-based expert system application testing are presented in detail in the form of an evaluation table. This table displays actual scores and averages from several important aspects that serve as indicators of the application's feasibility and effectiveness. Each aspect, from visual attractiveness, usage motivation, content and material presentation, to system interactivity, was assessed by respondents to measure the extent to which the application meets user expectations.

Table 2. Recapitulation of Expert System Final Testing Results Based on User Assessment Aspects.

Aspects	Actual Score	Average	Interpretation
Attractiveness and Users' Motivation	780	4.88	Very Good
Content and Material Presentation	760	4.75	Very Good
Interactivity and Expert System Features	740	4.63	Very Good
Attractiveness and Users' Motivation (Advanced)	720	4.50	Very Good

The final testing results of the self-assessment-based expert system application show very encouraging achievements in four main evaluation aspects: attractiveness and usage motivation, content and material presentation, interactivity and system features, and continued attractiveness. The highest score was obtained in the attractiveness and motivation aspect with an average of 4.88 (on a scale of 5), indicating that the application interface is well-designed and capable of attracting attention and encouraging student learning enthusiasm. This aligns with findings by Xu (2023), who emphasizes the importance of engaging interface design in supporting user motivation in digital learning. On the other hand, the content and material presentation aspect obtained a score of 4.75, indicating that the content is relevant, pedagogically structured, and contextual to student needs, as stated by García (2022) that context-based materials improve academic and professional skill mastery.

The interactivity and features aspect obtained a score of 4.63, indicating that users experienced benefits from interactive features such as interview simulations and automatic feedback systems.

This is reinforced by Serdyukov (2022), who states that adaptive interaction-based learning systems can improve individual learning effectiveness. The lowest score was recorded in the continued attractiveness aspect (4.50), which still falls into the "very good" category but provides signals for developing continuous features such as gamification and personalization. According to Alshammari (2023), progressive additional features are important in maintaining long-term user engagement. Overall, these results are also consistent with Chan (2023), who demonstrates that simulation integration in digital learning is highly effective in enhancing students' readiness to tackle workplace challenges.

Thus, this application is proven to be very feasible for use in digital-based English language learning. The combination of attractive design, content that meets needs, and deep interactive features makes this expert system an innovative and effective tool in supporting the development of students' professional correspondence skills.

The descriptive analysis results for each aspect in this study are presented in detail in the following table. The table contains statistical information such as mean values, standard deviations, and data distribution that reflects participants' responses to each indicator. Through this data, interpretations can be made regarding the quality and effectiveness of the developed system based on user perceptions. The complete details are displayed in the following table.

Table 3. The descriptive Analysis results and Statistical Information

Descriptions				Statistic	Std. Error
	Aspects				
Score	Interactivity	Mean		3.33	.333
		95% Confidence Interval for Mean	Lower Bound	1.90	
			Upper Bound	4.77	
		5% Trimmed Mean		.	
		Median		3.00	
		Variance		.333	
		Std. Deviation		.577	
		Minimum		3	
		Maximum		4	
		Range		1	
		Interquartile Range		.	
		Skewness		1.732	1.225
		Kurtosis		.	.
	Attractiveness	Mean		4.67	.211
		95% Confidence Interval for Mean	Lower Bound	4.12	
			Upper Bound	5.21	
		5% Trimmed Mean		4.69	
		Median		5.00	
		Variance		.267	
		Std. Deviation		.516	
		Minimum		4	
		Maximum		5	
		Range		1	
		Interquartile Range		1	
		Skewness		-.968	.845
		Kurtosis		-1.875	1.741
	Presentation	Mean		4.33	.333
		95% Confidence Interval for Mean	Lower Bound	2.90	
			Upper Bound	5.77	
		5% Trimmed Mean		.	
		Median		4.00	

Variance	.333	
Std. Deviation	.577	
Minimum	4	
Maximum	5	
Range	1	
Interquartile Range	.	
Skewness	1.732	1.225
Kurtosis	.	.

The descriptive table presented contains complete statistics for each indicator of the expert system, namely interactivity, attractiveness, and material presentation. The average score for interactivity is 3.33 (SD = 0.577), with a median of 3, and a value range between 3-4, showing that most students gave moderate appreciation to the application's interactive features. The interactivity skewness of 1.732 indicates a right-skewed distribution, meaning a small portion of users gave low ratings. For attractiveness (aesthetic appeal), the mean is 4.67 (SD = 0.516), median 5, and a similar range depicts very positive user perceptions. Negative skewness (-0.968) indicates that some respondents gave maximum scores. The material presentation aspect has a mean of 4.33 (SD = 0.577), median 4, showing consistency in good to very good ratings; skewness of 1.732 reflects positive assessment with small variation.

The relatively lower interactivity score compared to other aspects indicates an important area for improvement. Literature shows that interactive elements such as automatic feedback, dynamic simulations, and gamification elements can enhance user engagement and learning effectiveness (Alshammari, 2023; Serdyukov, 2022). Xu (2023) a study shows that increasing interactivity has proven to improve user satisfaction and retention. Meanwhile, very high visual attractiveness supports the importance of interface aesthetic aspects in increasing usage motivation (L. Zhang et al., 2022; García, 2022). Similarly, good material presentation according to digital pedagogy has been proven to accelerate content understanding and user acceptance (Chan, 2023; Soh, 2024).

Based on descriptive data, this expert system application is very effective in attractiveness and material presentation aspects, evident from high scores and good consistency. However, interactivity is a weak point that needs improvement. Future development recommendations include adding adaptive interactive features, real-time feedback, and gamification elements to enhance the learning experience and overall user engagement.

The uniqueness of this study lies in the integration of a rule-based expert system and the ADDIE approach to assess professional English skills, which has rarely been applied in the context of non-language major students. The novelty of this research lies in the development of an adaptive and contextual self-assessment system, specifically designed to meet the demands of the professional world, particularly in composing job application letters and conducting professional communication in English.

In other words, theoretically, this study enriches the body of research on AI-based learning system development within the field of English for Specific Purposes (ESP). As emphasized by Hutchinson (1987), ESP requires a flexible approach tailored to contextual and specific learning needs, such as English for the workplace. Technological support, such as expert systems, significantly enables the personalization and effectiveness of ESP learning (Tomlinson, 2007). Practically, this study offers a concrete solution for educators and higher education institutions in designing English learning that is more adaptive, self-directed, and technology-based. This aligns with Prensky's (2001) view on the characteristics of Generation Z digital natives, who require interactive, technology-driven, and practice-oriented learning approaches to enhance engagement and learning outcomes.

Conclusion

This study concludes that the development of the M.E.G.A for Job Seekers application, based on an expert system and utilizing the ADDIE model approach, has proven effective in improving students' English correspondence skills, particularly in writing and speaking within the context of the workplace. Expert validation indicated that the application is highly feasible in terms of content, media, and instructional technology. Trials involving 100 students showed a significant improvement in English skills, along with positive evaluations regarding the system's practicality, interactivity, and effectiveness. Operationally, the application provides a contextual self-assessment tool that is accessible and promotes independent learning. It has strong potential for broader implementation, not only within the Information Systems program but also in other academic programs requiring professional English communication skills. For future development, it is recommended that AI-based adaptive learning features and expanded coverage of professional communication materials, such as business emails and LinkedIn profiles, be integrated to enhance the scope and effectiveness of the learning experience.

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Bibliography

Al-Mahrooqi, R. , & D. C. (2023). Language assessment in the digital era: Pedagogical and technological integration. *Language Testing in Asia*, *13*(1).

Alrasheedi, M. , C. L. F. , & R. A. (2022). Quality assurance in educational media design: Insights from expert validation practices. . *Education and Information Technologies*, *27*(4), 5423-5442.

Alshahrani, F. , A. M. , & A. A. (2023). The effect of ai-based formative assessment on students' language acquisition and motivation. *International Journal of Emerging Technologies in Learning (IJET)*, *18*(3), 101–116.

Alshammari, M. T. , A. N. A. , & A. O. (2023). Digital learning environments: impact of interactive feedback on learner engagement. *Education and Information Technologies*, *28*(2), 2511–2532.

Asafo-adjie R, M. R. Klu. E. S.-I. E. (2023). *Social media and English language writing performances of a Ghanaian ESL class*. The nexus.

Badger, R. , & Y. M. (2023). Developing academic writing through higher order thinking tasks. *Journal of English for Academic Purposes*.

Chan, K. H. , & W. C. W. (2023a). E-portfolio simulation for enhancing english professional writing skills: An experimental study. *Computer Assisted Language Learning*.

Chan, K. H. , & W. C. W. (2023b). *E-portfolio simulation for enhancing English professional writing skills: An experimental study*. . Advance online publication. .

Clarke, E. (2023). Motivational shifts in higher education efl learners in career-aligned language programs. . *Language Teaching Research*, *27*(2), 198–215.

Deng, L. , & Z. Y. (2022). Effects of automated writing evaluation on efl learners' writing development: A longitudinal study. *Computers & Education*.

Dolcet, G. , K. H. , & L. Y. (2023). Evaluating efl speaking performance: A multi-aspect analysis. *System,*.

Egger, M., Florack, A., & Hübel, C. (2022). How placement affects brand preferences in advergames: A test of inhibition and facilitation processes during search. *Computers in Human Behavior*, *134*, 107328. https://doi.org/10.1016/j.chb.2022.107328

Feng, J. , & S. T. (2023). Information technology, according to the ADDIE model on English subject teaching enhances learning achievement: A quasy-experimental study. *Turkish Online Journal of Educational Technology*, *22*(4), 121-130.

García, F. J. , R. J. , & S. J. L. (2022). Gamified adaptive learning systems and user engagement: A quasi-experimental study. *Interactive Learning Environments*, *30*(1), 108–127.

Geng, F., Yu, S., & Yuan, R. (Eric). (2023). Exploring l2 writing teachers' feeling rules, emotional labor and regulation strategies. *System*, *119*, 103160. https://doi.org/10.1016/j.system.2023.103160

Getie, A. S. (2020). Factors affecting the attitudes of students towards learning english as a foreign language. *Cogent Education*, *7*(1). https://doi.org/10.1080/2331186X.2020.1738184

Hutchinson, T. , & W. A. (1987). *English for specific purposes: A learning-centred approach*. Cambridge University Press.

Jaya, S., Hamzah, S. ., & Yunita, W. . (2025). Needs analysis for critical reading e-book based on problem-based learning: Perspectives from EFL students, lecturers, and stakeholders. *Indonesian Journal of Educational Development (IJED)*, *6*(1), 55-67. https://doi.org/10.59672/ijed.v6i1.4682

Karami, S., Sadighi, F., Bagheri, M. S., & Riasati, M. J. (2018a). The potential impact of the application of electronic portfolio on iranian efl learners' writing performance seeking their gender role. *Cogent Social Sciences*, *4*(1), 1562509. https://doi.org/10.1080/23311886.2018.1562509

Karami, S., Sadighi, F., Bagheri, M. S., & Riasati, M. J. (2018b). The potential impact of the application of electronic portfolio on iranian efl learners' writing performance seeking their gender role. *Cogent Social Sciences*, *4*(1), 1562509. https://doi.org/10.1080/23311886.2018.1562509

Lee, S. , & C. T. (2023). AI-supported self-assessment tools and student efficacy in efl contexts. *Journal of Computer-Assisted Learning*, *39*(7), 1290–1304.

Liu, M. , & Z. W. (2022). Feedback absence and speaking stagnation among efl learners. *Computers & Education*.

Ma, R. , L. Y. , & C. Z. (2025). Mobile-assisted speaking instruction for efl learners: A usability and learning outcome study. *Language Learning & Technology*, *29*(1), 45–64.

Masruria W, A. S. (2021). *Exploring Self-Assessment of Speaking Skill by EFL High School Students*.

Mohammadi, A., Koerich, A. L., Moro-Velazquez, L., & Cardinal, P. (2025). *Automatic Proficiency Assessment in L2 English Learners*.

Mulyadi, D. , S. E. , & A. F. (2023). Designing contextual mobile learning systems: A student-centered approach. *Journal of Educational Multimedia and Hypermedia*, *32*(1), 66–85.

Nguyen, P. , T. D. , & L. M. (2025). Microlearning and mobile-assisted language learning engagement among Gen Z university students. *Interactive Learning Environments*, *33*(5), 1023–1039.

Nurhasanah, R. , F. T. N. , & S. M. (2024).). Evaluating user experience in educational technology: A UX-based approach to digital media validation. *Interactive Learning Environments*. .

Oliveira, F. , S. A. , & M. R. (2023). GPT 3 automated writing feedback in efl classes: A controlled study. *Language Learning & Technology*, *27*(1), 45–62.

Park, Y. , & L. J. (2022). Learner-centered design in e-learning: Enhancing usability and motivation. . *Educational Technology Research and Development*, *70*(3), 723–743.

Patel, A. , & K. S. (2024). Foreign language proficiency and employability outcomes in global it graduates. *Higher Education*, *88*(3), 321–338.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon*, *9*(5), 1–6. https://doi.org/10.1108/10748120110424816

Qiao, H., & Zhao, A. (2023). Artificial intelligence-based language learning: illuminating the impact on speaking skills and self-regulation in chinese efl context. *Frontiers in Psychology*, *14*. https://doi.org/10.3389/fpsyg.2023.1255594

Roe, J., Perkins, M., & Tregubova, Y. (2024). *The EAP-AIAS: Adapting the AI Assessment Scale for English for Academic Purposes*.

Saleh, M. , K. Z. , & M. M. (2022). HOTS-based digital module to foster efl learners' critical writing skill. *Asian EFL Journal*, *29*(4), 65–91.

Serdyukov, P. , & H. P. (2022). Evaluating interactive features in adaptive learning systems. *Learning Environments*, *30*(5), 1248–1264.

Sisman, B., Kucuk, S., & Ozcan, N. (2022). Collaborative behavioural patterns of elementary school students working on a robotics project. *Journal of Computer Assisted Learning*, *38*(4), 1018–1032. https://doi.org/10.1111/jcal.12659

Soh, X. , L. Y. , & T. J. (2024). Comprehensive evaluation of ai self-assessment tools in language learning. *Interactive Learning Environments*, *32*(2), 185–202.

Spatioti, A. G. , K. I. , & P. J. (2024). A comparative study of the addie instructional design model in distance education: A meta-analysis of 23 studies. *Education Sciences. .*

Takarroucht, K. (2022). The effect of self-assessment on the development of efl writing self-efficacy: A case of algerian higher education. *International Journal of Language Education*, *6*(2), 157. https://doi.org/10.26858/ijole.v6i2.22065

Tomlinson, B. (Ed.). (2007). *Language acquisition and development: Studies of first and other language learners*. Continuum.

Tripathi, K. P. (2011). *A review on knowledge-based expert system: Concept and architecture. In Artificial Intelligence Techniques-Novel Approaches & Practical Applications*.

Wang, X., Zhong, Y., Huang, C., & Huang, X. (2023). *ChatPRCS: A Personalized Support System for English Reading Comprehension based on ChatGPT*.

Widana, I. W. (2020). The effect of digital literacy on the ability of teachers to develop HOTS-based assessment. *Journal of Physics: Conference Series 1503* (2020) 012045. https://doi.org/10.1088/1742-6596/1503/1/012045

Xu, Q. , Z. M. , & L. H. (2023a). Designing engaging digital learning environments in higher education: User interface and user experience perspectives. *Computers & Education*.

Xu, Q. , Z. M. , & L. H. (2023b). Designing engaging digital learning environments in higher education: User interface and user experience perspectives. *Computers & Education*.

Zhang, L., Carter, R. A., Qian, X., Yang, S., Rujimora, J., & Wen, S. (2022a). Academia's responses to crisis: A bibliometric analysis of literature on online learning in higher education during COVID-19. *British Journal of Educational Technology*, *53*(3), 620–646. https://doi.org/10.1111/bjet.13191

Zhang, L., Carter, R. A., Qian, X., Yang, S., Rujimora, J., & Wen, S. (2022b). Academia's responses to crisis: A bibliometric analysis of literature on online learning in higher education during COVID-19. *British Journal of Educational Technology*, *53*(3), 620–646. https://doi.org/10.1111/bjet.13191

Zhang, W. , T. C. , & L. Y. (2023). Expert-based validation of multimedia learning environments in higher education: Impacts on learner engagement and performance. *Australasian Journal of Educational Technology,* , *39*(1), 113–130.