International Journal of Learning, Teaching and Educational Research
Vol. 23, No. 10, pp. 544-563, October 2024
https://doi.org/10.26803/ijlter.23.10.26
Received Aug 22, 2024; Revised Oct 18, 2024; Accepted Oct 24, 2024

Reading Automated Feedback (RAF) in English for Nursing: Augmenting Perceptions and Reading Ability

Agus Wardhono
Universitas PGRI Ronggolawe
Tuban, Indonesia

Slamet Asari*
Universitas Muhammadiyah Gresik
Gresik, Indonesia

Anggia Kalista, Dumiyati
Universitas PGRI Ronggolawe
Tuban, Indonesia

Khoirul Anwar
Universitas Muhammadiyah Gresik
Gresik, Indonesia

Abstract. Despite adopting a variety of tactics, nursing students struggle to grasp main ideas, read and skim, and acquire specialist vocabulary. Reading automated feedback (RAF) can help by providing contextual information and dynamic vocabulary guidance, and assisting with summarizing and reflecting on content. The primary objective of this study was to thoroughly examine the effects of RAF on the reading abilities of second-year university students who participated in a English for Nursing course in their third semester, and to examine their perspectives regarding the incorporation of RAF in the education setting. The study used both quantitative and qualitative methods to assess the impact of RAF. The quantitative methods were an intervention for 60 students who had been sampled purposively and separated into experimental and control groups (30 students each), and a survey, and the qualitative method involved interviews. The data show that implementing RAF significantly improved nursing students' reading abilities, particularly comprehension, scanning and skimming, identifying main ideas, summarizing, and vocabulary development, while also fostering a highly positive classroom environment. In short,

*Corresponding author: *Slamet Asari, asari70@umg.ac.id*

implementing RAF could bring about significant gains in nursing students' reading abilities and promote a positive teaching environment. Ongoing examinations and comprehensive reviews of the long-term impacts of RAF are projected to result in major education gains.

Keywords: English for nursing; English for specific purposes learners; Reading automated feedback

1. Introduction

Nursing students are taught English reading skills with a systematic technique that allows them to grasp and analyze materials relevant to their specialty. This strategy not only improves their academic skills but also provides them with the skills they need to utilize this information in their professional activities (Nashir et al., 2022). The major objective is to improve students' reading proficiency, and facilitate their ability to extract and comprehend intricate material, recognize key concepts, and formulate concise content summaries (Poedjiastutie & Oliver, 2017). Attaining this objective is facilitated by employing a variety of methods, including material comprehension, scanning and skimming, and vocabulary development. Nevertheless, obstacles still emerge during this reading procedure. These obstacles include challenges related to identifying key concepts, scanning and skimming proficiency, and comprehension of the specialized terminology of a particular subject (Alanazi & Alharbi, 2021). Furthermore, second-year university students may experience difficulties with the process of summarizing, as a result of inadequate word proficiency or because they read at a slow pace.

To address these challenges, the techniques of reading automated feedback (RAF) has demonstrated potential to mitigate certain concerns. RAF is a technique is to help students learn by receiving quick feedback. Nevertheless, there are still unresolved matters that persist, including the need for enhanced approaches to improving student motivation, particularly in the context of online learning, and formulating ways to reduce students' dependence on instructors and to foster self-directed learning (Afriyie, 2020). In order to address these issues effectively and enhance the efficacy of English for specific purposes (ESP) reading education, it is imperative to do additional research and encourage innovation in teaching approaches.

This paper provides a comprehensive examination of the reading process, which is divided into three essential stages: pre-reading, while reading, and post-reading (Walkowska et al., 2023). The pre-reading stage refers to the time when the reader engages in preparatory activities for reading. The process of preparation encompasses the activities of strategic planning, content previewing, and the establishment of a reading aim. These activities establish the foundation for the reader's interaction with the text. In the next stage of the reading process, the while-reading stage, the reader engages in active interaction with the text (Anwar et al., 2022). This interaction entails engaging in systematic reading with a predetermined objective in mind, and establishing associations between newly acquired information and the reader's preexisting knowledge framework. This stage plays a critical role in enhancing the reader's understanding of the content

(Puluhulawa et al., 2021). The concluding stage is the post-reading stage, during which readers engage in three key activities: summarizing the information, pausing to process the content that was read, and thinking about the material.

The aforementioned steps enable readers to solidify their comprehension and assimilate the material, and underscore the potential of RAF to effectively address deficiencies in the reading process for nursing students who are learning English. Initially, learners of English for Nursing struggle to comprehend context during the pre-reading stage because of the contextual complexity inherent in their texts (Gabbay & Cohen, 2022). The RAF program has the potential to be customized, so that it offers contextual information or background knowledge, thereby augmenting the reader's level of comprehension (Garone & van de Craen, 2017). Furthermore, the widespread use of technical terminology or jargon means that ESP learners face difficulties with vocabulary acquisition during the while-reading stage. RAF provides real-time, tailored, and unbiased feedback. Through its use of interactive digital technologies, RAF improves learning efficiency and student engagement, and provides complete progress reports for continuous development. Finally, in the post-reading stage, readers possess the ability to proficiently summarize and contemplate the material. However, this might be a challenge for ESP learners, particularly when intricate or highly specialized texts are involved. RAF has the potential to integrate functionalities that assist learners to formulate concise summaries and engage in thoughtful analysis of a text by, for instance, providing prompts to identify significant points or to stimulate reflective inquiries. However, the potential of RAF to address the gaps in reading is contingent upon its comprehensive design and effective implementation.

The present study aimed to answer the following research questions:

1) To examine the specific impact of RAF on various cognitive processes, including content comprehension, scanning and skimming abilities, identification of key concepts, summarizing skills, and vocabulary acquisition; and
2) To explore students' perceptions of the integration of RAF as they engage with an English for Nursing curriculum.

2. Literature Review

2.1 Challenges of English for Nursing

Language proficiency in the context of nursing encompasses a wide range of linguistic abilities, such as oral communication, auditory comprehension, written expression, and critical thinking (Paputungan et al., 2018; Puluhulawa et al., 2021). Language proficiency relates to a diverse range of topics, including medical terminology, anatomy and physiology, health assessment, drug administration, and comprehensive patient education. In addition to linguistic proficiency, English for Nursing also requires cultural competences and communication tactics that would enable healthcare practitioners to proficiently engage with patients and colleagues with various cultural backgrounds. Learners of English for Nursing encounter numerous obstacles to success (Garone et al., 2020; Sembel, 2018). One salient concern pertains to the intricacy involved in catering to the cultural and linguistic requirements of patients from diverse origins. Healthcare

practitioners who have engage with individuals who are not native English speakers will require instruction in cross-cultural communication and language interpretation if they are to provide efficient healthcare services.

Research consistently emphasizes the adverse impact of language barriers on patient outcomes and the overall quality of healthcare, which underscores the significance of providing English language training to healthcare staff (Ghobain, 2014; Kalola, 2022). The evidence indicates that healthcare professionals who receive training in English for Nursing have the potential to improve their communication abilities, hence enabling them to deliver higher quality care to patients. Moreover, there is empirical evidence that providing language and cross-cultural training to healthcare personnel yields positive effects on patient outcomes and mitigates healthcare expenditure. Nevertheless, a comprehensive examination of prior research indicates that the field of English for Nursing still faces challenges pertaining to access, mostly because of the significant number of individuals with inadequate ability in the English language (Ghobain, 2014). Another area of focus pertains to the assessment and appraisal of the efficacy of English training programs and their influence on patient outcomes.

2.2 Automated Feedback on Reading

Feedback on the effectiveness of reading is important in the context of English language acquisition for students planning to enter the nursing profession, given that reading is a fundamental skill that forms the foundation for other language proficiencies, including listening, writing, and speaking (Gabbay & Cohen, 2022; Stevenson & Phakiti, 2019). Providing feedback helps educators and students to identify areas of weakness and to develop suitable reading methods to improve reading proficiency. Feedback also serves to reinforce targeted training, thereby ensuring that learners receive instruction that is customized to their individual needs.

Interpreting feedback about language acquisition for nursing requires the utilization of legitimate and dependable instruments, and ensuring feedback precision (Tubino & Adachi, 2022). Effective assessments provide valuable feedback to learners, teachers, and other individuals involved in the learning process, and enable them to make informed instructional choices and promote enhanced learning achievements.

In the context of English for Nursing, it is imperative for learners to develop and refine reading abilities that are relevant to their specific field of study or their work environment (Nashir et al., 2022; Tubino & Adachi, 2022). Implementing automated feedback in the context of English language acquisition for nursing involves using technology and algorithms to furnish learners with constructive input pertaining to their linguistic proficiency (Gabbay & Cohen, 2022; Stevenson & Phakiti, 2019). This process generally entails the utilization of software that evaluates the performance of learners on various activities or exercises, such as grammar quizzes or speaking practice, and offering feedback. The fundamental concepts underlying the implementation of RAF in English learning are objectivity, timeliness, consistency, and adaptability. The automated feedback

system operates on parameters and remains unaffected by personal prejudice or subjectivity. Receiving feedback promptly after the completion of a task enables students to make timely corrections and provides opportunities for progress. Consistency in the provision of automated feedback ensures that each student receives an equivalent level of feedback. Moreover, automated feedback systems possess the capability to adjust to the skills levels of learners and deliver feedback that is congruent with their level of competency (Hoang, 2022).

3. Method

3.1 Research Design

This study adopted a mixed-methods approach by combining quantitative and qualitative methods. The quantitative component comprised a pre- and post-test experimental design and a survey to evaluate the influence of RAF on students' cognitive processes, such as content comprehension, scanning and skimming abilities, key idea identification, summarizing, and vocabulary acquisition. The qualitative component involved interviews, to assess students' impressions of using RAF during the English for Nursing learning process.

3.2 Sample Selection

The investigation focused on a particular group of 60 Indonesian students who were actively participating in the English for Nursing program at University of Muhammadiyah Gresik over two semesters. This heterogeneous cohort comprised 5 male and 55 female undergraduate students, all within the age range of 18 to 20 years. All participants were in the third semester of their English for Nursing course.

The 60 participants were chosen from 300 students through a rigorous screening procedure that included an admission exam designed by the Language Institute. The assessment was developed to ensure that all participants exhibited an English language ability that aligned with an intermediate competency level. Therefore, this particular English for Nursing class consisted exclusively of students who exhibited this elevated level of skill. This cohort was selected to embark on a year-long educational curriculum under the English for Nursing program in the academic year 2023–2024. An essential element of their educational experience was the thorough integration of an RAF-based instructional design.

3.3 Instrumentation

3.3.1 *Validity of pre-test and post-test*

This paper evaluates the effectiveness of the intervention. The study applied a dual-phase evaluation methodology, which involved the administration of pre-tests and post-tests. The exams the students sat for were specially tailored to encompass five key subjects: medical terminology, anatomy and physiology, health assessment, drug delivery, and patient education. This set of topics formed the basis for both the pre-test and post-test. A set of question items was developed for each topic. The assessment comprised 10 items that were designed to measure comprehension of content, 10 items that measured scanning and skimming skills, five items assessing identification of the main concept, five items assessing summarizing, and 10 items assessing vocabulary knowledge. The combined total of the pre- and post-tests was 40 items. The text types exhibited variation, despite

the consistency in topic coverage observed between the pre-test and post-test scores. The pre-test subtopics were medical equipment, physiological systems, fundamental health evaluation, a summary of the metered-dose administration system, and strategies for educating patients. In contrast, the subtopics addressed in the post-test study were medical processes, diseases and conditions, patient communication, pharmacy services, and patient learning styles.

The reading results obtained from the pre- and post-tests were carefully assessed by two experienced English instructors, both of whom possess a minimum of six years of pedagogical expertise in teaching English to nursing students. The assessment concepts proposed by Zhukova and Didenko (2020) served as the guiding framework for the evaluation. The final scores exhibited high inter-rater reliability, with a reliability score of more than .813 for all reading characteristics. Findings were validated by correlation coefficients of .751 and .797 for the pre-test and post-test, respectively, which indicate that the test was valid. The rigorous and humane methodology employed in this approach ensured an equitable and thorough evaluation of the progress made by every student.

3.3.2 *Validity of the questionnaire*

The survey that was used consisted of 13 items, and employed a five-point Likert scale. Every item in this questionnaire was carefully crafted to evaluate students' attitudes toward several aspects of RAF, such as critical thinking, language improvement, participation in collaborative activities, internal motivation, and self-confidence, thereby covering a wide range of students' educational experiences.

The questionnaire employed in this study is not a unique measurement tool, but was developed and validated by Zarei and Navidinia (2024). Using this questionnaire effectively guaranteed the validity and reliability of the measurement instrument used in this research. In order to establish the content validity of the questionnaire, the researchers enlisted the assistance of five experts in English as a Foreign Language (EFL) to evaluate the items of the questionnaire. All these experts had Master's degrees in applied linguistics and at least seven years of experience teaching English. The researchers calculated the content validity ratio and the content validity index, which returned values of .8 and .94, respectively, which indicates that the questionnaire is valid. The researchers evaluated the questionnaire reliability using Cronbach's α coefficient, which rendered a value of .82, indicating a satisfactory level of reliability. As a result, the researchers confidently assert that this questionnaire was an appropriate tool for measuring students' perceptions of the implementation of the RAF.

3.3.3 *Interviews*

This study used structured interviews to acquire a thorough knowledge of the participants' perspectives. The interviews were conducted over WhatsApp, one week after the post-tests, which gave students time to reflect on their experiences. Before the interviews, students were introduced to the notion of the RAF, and its importance for their classroom activities was emphasized. To elicit responses, two

techniques were used, based on availability and preference: instant messaging and voice over internet protocol (VoIP) calls.

The interview questions were derived from a study by Röhl et al. (2021), and were designed to investigate the students' perspectives and understandings of RAF. Three sets of open-ended questions represented a series of crucial inquiries. The first objective was to obtain students' overall perspectives on the notion of RAF. Then, we sought their perspectives regarding the utilization of RAF in the framework of English language acquisition for nursing education by enquiring whether individuals regarded it as a valuable tool for their educational endeavors. Finally, we inquired about their perceptions of the efficacy of utilizing RAF in the study of English for Nursing. We were also interested in obtaining the underlying reasoning for their viewpoints.

In posing these inquiries, our objective was to gain a deeper understanding of students' perceptions of and engagements with the RAF notion during their educational experiences. These inquiries functioned as catalysts in our collaborative exchanges, by prompting students to articulate their opinions and recount their personal experiences. The replies provided by participants offered useful insights into the efficacy and effects of utilizing RAF in the context of English language acquisition for nursing students. This, in turn, contributed to the development of a more compassionate and learner-centered approach to research.

3.4 Data Collection and Analysis

The study was carried out in the academic year 2023–2024 in a classroom setting that was committed to integrating the principles of RAF. A cohort of 60 students was selected for the RAF implementation trial on the basis of their entrance test scores. The class was divided into two groups, each consisting of 30 students, in order to provide a consistent implementation experience of the RAF across both groups.

After the pre-test, the instructor selected pertinent English for Nursing topics, such as medical terminology, anatomy, and patient education. This phase ensured that the material was applicable and promoted an engaged learning experience. The session started with an introduction that covered the topic subject matter, learning objectives, and use of the Automated Reading Feedback System (ARFS), which effectively prepared students for interactive learning. During the first phase of the program, students completed a reading exercise using the ARFS, and obtained immediate feedback to correct errors and clarify topics. A class discussion followed, which helped to clarify uncertainties. The program then progressed to interactive tasks, such as role playing and problem-solving, which gave students opportunities to apply their knowledge. ARFS continued to offer personalized input. Finally, students reflected on their learning, which improved their comprehension and encouraged independent learning.

Data analysis involved a comparison of pre- and post-test outcomes after the experimental intervention. Hypotheses were evaluated using descriptive statistics

and inferential tests, notably T-tests and Wilcoxon tests. In addition, a one-sample test was used to examine questionnaire results. Interview data were analyzed using thematic analysis.

4. Results

4.1 Influence of RAF on Various Cognitive Processes, such as Content Comprehension, Scanning and Skimming Ability, Identification of Important Concepts, Summarizing Skills, and Vocabulary Knowledge

The preliminary assessment outcomes, as depicted in Table 1, offer a concise overview of the students' competence in many aspects of reading, serving as a guiding tool for this investigation. The components encompassed in this framework consist of content comprehension, scanning and skimming, identifying main ideas, summarizing, and vocabulary knowledge.

Table 1: Descriptive statistics of the pre-test results

Pre-test of RAF	N	Min.	Max.	Mean	SD	Skewness		Kurtosis	
						Statistic	Std. error	Statistic	Std. error
Content comprehension	60	65.00	80.00	70.3500	3.23553	1.547	.309	3.010	.608
Scanning and skimming	60	67.00	80.00	72.2833	2.40121	1.591	.309	4.599	.608
Identifying main ideas	60	67.00	80.00	71.8333	3.21103	1.116	.309	.186	.608
Summarizing	60	65.00	80.00	70.6167	3.28371	1.390	.309	2.028	.608
Vocabulary knowledge	60	65.00	83.00	72.8167	3.91647	.548	.309	-.710	.608
Pre-test	60	68.40	80.60	71.5800	2.48322	2.205	.309	5.075	.608

Note. SD = Standard deviation; Std = Standard

This study assessed students' reading abilities in five main areas that each offers distinct information. Content comprehension has an acceptable mean score of 70.35, with a left-skewed distribution. Scanning and skimming abilities obtained an average score of 72.28. The area of identifying main ideas has a mean score of 71.83, which indicates a modest degree of competency. The mean score for summarizing is 70.62, with a left-skewed distribution. Vocabulary knowledge has a higher average score, of 72.82, and a more normal distribution, which indicates that student performance was consistent.

The evaluation outcomes of the RAF in English for Nursing, as shown in Table 2, provide substantial insights into the usefulness of RAF for improving nursing students' reading skills. These skills, which include content comprehension, scanning and skimming, identifying core ideas, summarizing, and vocabulary knowledge, include a wide range of talents.

Table 2: Descriptive statistics of the post-test results

Post-test of RAF	N	Min.	Max.	Mean	SD	Skewness		Kurtosis	
						Statistic	Std. error	Statistic	Std. error
Content Comprehension 2	60	70.00	80.00	74.6833	2.50079	.085	.309	.213	.608
Scanning and skimming 2	60	72.00	82.00	75.7500	2.06361	1.449	.309	2.775	.608
Identifying main ideas 2	60	72.00	81.00	76.4333	2.07786	.496	.309	-.509	.608
Summarizing 2	60	70.00	83.00	75.6167	2.77453	.147	.309	.838	.608
Vocabulary knowledge 2	60	72.00	85.00	77.0833	2.66993	.637	.309	.335	.608
Post-test	60	72.80	82.00	75.9133	1.69000	1.810	.309	4.667	.608
Valid N (listwise)	60								

Note. SD = Standard deviation; Std = Standard

The study's post-test results reveal significant increases in students' reading competency in five areas.

The experiment findings from the paired sample test, as presented in Table 3, provide strong evidence for the effectiveness of the RAF in the field of English for Nursing. This study undertook a comparative examination of the pre-test and post-test outcomes to investigate whether student skills had improved in the subdomains of reading, namely content comprehension, scanning and skimming, identifying main ideas, summarizing, and vocabulary knowledge.

Table 3: Results of paired samples test for aspects of reading

Aspects of reading in pre-test and post-test		Paired differences					t	Df	Sig. (2-tailed)
		Mean	SD	Std. error mean	95% CI of the difference				
					Lower	Upper			
Pair 1	Pre-test content comprehension – Post-test content comprehension	-4.33333	3.01784	.38960	-5.11292	-3.55374	-11.122	59	.000
Pair 2	Pre-test scanning and skimming – Post-test scanning and skimming	-3.46667	1.32085	.17052	-3.80788	-3.12546	-20.330	59	.000

Pair 3	Pre-test identifying main ideas – Post-test identifying main ideas	-4.60000	2.42305	.31281	-5.22594	-3.97406	-14.705	59	.000
Pair 4	Pre-test summarizing – Post-test summarizing	-5.00000	2.16286	.27922	-5.55873	-4.44127	-17.907	59	.000
Pair 5	Pre-test vocabulary knowledge – Post-test vocabulary knowledge	-4.26667	2.12225	.27398	-4.81490	-3.71843	-15.573	59	.000

Note. CI = Confidence interval; SD = Standard deviation; Std. = Standard; Sig. = Significance

This study evaluated the effect of RAF on students' reading ability in five categories and found statistically significant improvements ($p < .001$). The assessment of content comprehension has a statistically significant mean difference of -4.33333. The examination of scanning and skimming has a significant mean difference of -3.46667. The investigation into identifying major ideas rendered a statistically significant mean difference of -4.60000. Summarizing has a statistically significant mean difference of -5.00000. Finally, vocabulary knowledge on the pre- and post-tests demonstrates a statistically significant mean difference of -4.26667, which indicates an improvement in vocabulary knowledge. The full evaluation of the RAF in English for Nursing is achieved by the analysis of the paired samples test outcomes, as presented in Table 4. The efficacy of RAF was determined by comparing the pre-test and post-test outcomes of two correlated population averages.

Table 4: Overall paired differences between pre-test and post-test for RAF

		Paired differences					***t***	**df**	**Sig. (2-tailed)**
		Mean	**SD**	**Std. error mean**	**95% CI of the difference**				
					Lower	**Upper**			
Pair 1	Pre-test – Post-test	-4.33333	1.26848	.16376	-4.66102	-4.00565	-26.461	59	.000

Note. CI = Confidence interval; SD = Standard deviation; Std. = Standard; Sig. = Significance

The findings show a mean improvement of -4.33333 in reading skills after the RAF intervention, with a standard deviation of 1.26848, which represents a steady improvement. The standard error of 0.16376 demonstrates the precision of this improvement. The 95% confidence interval moved from -4.66102 to -4.00565, which supports a considerable improvement, while a *t*-value of -26.461 and a

significance level of .000 supports that RAF is effective in improving reading skills.

The hypothesis test summary, as presented in Table 5, offers a comprehensive assessment of the RAF technology in the context of English for Nursing. The assessment is grounded in the Wilcoxon test, which is a non-parametric statistical hypothesis test that is used to compare two interoperable samples. In the present context, the purpose of the test was to evaluate the efficacy of RAF by comparing the pre-test and post-test outcomes.

Table 5: Hypothesis test summary

	Null hypothesis	Test	Sig.	Decision
1	The distributions of pre-test content comprehension, pre-test scanning and skimming, pre-test identifying main ideas, pre-test summarizing, pre-test vocabulary knowledge, post-test content comprehension 2, post-test scanning and skimming 2, post-test identifying main ideas 2, post-test summarizing 2, and post-test vocabulary knowledge 2 are the same.	Related-samples Friedman's two-way analysis of variance by ranks	.000	Reject the null hypothesis

Note. Asymptomatic significances are displayed. The significance level is .05

The negative mean value of the paired differences column (Table 4 Column 3) implies higher post-test scores, implying improved reading abilities after RAF intervention. The high *t*-value provides compelling evidence against the null hypothesis. A two-tailed significance value of .000, less than the .05 criterion, indicates a substantial improvement from pre-test to post-test. This data shows the effectiveness of RAF in improving nursing students' reading ability, as supported by the Wilcoxon test results.

4.2 Student Perceptions of the Integration of RAF as they Engaged in the English for Nursing Curriculum

The descriptive statistics in Table 6 provides a summary of a survey conducted among nursing students to gauge their perceptions of the impact of RAF on their learning. The survey utilized a Likert scale to measure various aspects of learning, and the mean scores are as follows.

Table 6: Students' perceptions

Perception	N	Sum	Mean	SD
Impact of RAF on critical thinking skills	60	217.00	3.6167	.66617
Effect of RAF in enhancing problem-solving skills	60	232.00	3.8667	.72408
Improvement in analytical skill	60	232.00	3.8667	.74712
Role of RAF in vocabulary development	60	235.00	3.9167	.71997
Improvement in language proficiency	60	235.00	3.9167	.76561
Impact in collaboration strategy	60	230.00	3.8333	.78474
Role of RAF in teamwork	60	247.00	4.1167	.69115
Improvement in collaborative learning	60	248.00	4.1333	.70028

Impact in intrinsic motivation	60	292.00	4.8667	6.61910
Role of RAF in self-directed learning	60	233.00	3.8833	.69115
Impact on self-efficacy	60	225.00	3.7500	.72778
Role of RAF in building confidence	60	227.00	3.7833	.73857
Improvement in self-reliance	60	245.00	4.0833	.76561
Valid N (listwise)	60			

Note. SD = Standard deviation

The survey found that applying RAF increased nursing students' critical thinking, problem-solving, and analytical abilities. RAF also improved language development, and caused significant increases in vocabulary and linguistic competency. Additionally, RAF improved collaboration skills such as teamwork and collaborative learning. Using RAF increased self-directed learning, motivation, and self-efficacy. These data highlight the usefulness of RAF as a technique for teaching English for Nursing.

The findings of the one-sample test, as depicted in Table 7, offer a complete illustration of nursing students' perspectives regarding the influence of RAF on their education progress. The test statistic was established as 0, and the findings are derived from a sample of 60 pupils.

Table 7: Results of one-sample test

Perception	Test value = 0					
	t	df	Sig. (2-tailed)	Mean difference	95% CI of the difference	
					Lower	Upper
Impact of RAF on critical thinking skills	42.053	59	.000	3.61667	3.4446	3.7888
Effect of RAF in enhancing problem-solving skills	41.364	59	.000	3.86667	3.6796	4.0537
Improvement in analytical skill	40.089	59	.000	3.86667	3.6737	4.0597
Role of RAF in vocabulary development	42.138	59	.000	3.91667	3.7307	4.1027
Improvement in language proficiency	39.626	59	.000	3.91667	3.7189	4.1144
Impact in collaboration strategy	37.838	59	.000	3.83333	3.6306	4.0361
Role of RAF in teamwork	46.137	59	.000	4.11667	3.9381	4.2952
Improvement in collaborative learning	45.720	59	.000	4.13333	3.9524	4.3142
Impact in intrinsic motivation	5.695	59	.000	4.86667	3.1568	6.5766
Role of RAF in self-directed learning	43.522	59	.000	3.88333	3.7048	4.0619
Impact on self-efficacy	39.912	59	.000	3.75000	3.5620	3.9380
Role of RAF in confidence building	39.679	59	.000	3.78333	3.5925	3.9741
Improvement in self-reliance	41.313	59	.000	4.08333	3.8856	4.2811

Note. CI = Confidence interval; Sig. = Significance

Students indicated that RAF improved their learning capability, and they reported considerable gains in critical thinking, problem-solving, and analytical capabilities. RAF also aided vocabulary development and language proficiency. It improved collaborative skills, strategy, and collaborative learning. Finally, RAF promoted self-directed learning and motivation, resulting in significant increases in intrinsic motivation, self-efficacy, confidence, and self-reliance. These findings highlight the efficacy of RAF as a teaching technique in English for Nursing education.

4.2.1 *Analysis of student interviews about RAF*

According to information provided in interviews, many students considered RAF to be an important element of their education, particularly for English for Nursing. Students believed that RAF enhanced their reading skills considerably. To obtain a more detailed picture, we collated major student opinions using thematic analysis.

Theme 1: Intrinsic motivation

Students reported that the inclusion of RAF in lessons increased their participation in classroom activities. They observed that, while they were less enthused about online lectures and followed class instructions, RAF sparked interest, particularly during collaborative projects and feedback sessions (Student 10). Student 9 stated that RAF improved their focus and engagement in online lessons by emphasizing the significance of reading and selecting correct answers. Furthermore, Student 8 reported that RAF exercises contributed considerably to vocabulary development, and made independent study, without an instructor providing direction, possible. Overall, students acknowledged the importance of RAF incentives in promoting active engagement and collaboration in learning activities (Eryılmaz, 2023; Haerazi et al., 2019; Kazemi et al., 2020; Tavakoli et al., 2019).

Theme 2: Teamwork

Collaboration is vital for creating an environment that promotes effective classroom participation. The introduction of RAF fostered a culture of successful collaboration among students. Student 7 observed that, whereas English lessons typically involve companion work, the RAF program encouraged collaboration among classmates both inside and outside the classroom. Student 6 reflected on the personal development benefits of teamwork, and cited improvements in vocabulary acquisition, inventiveness, and grammar proficiency. This mutual reinforcement of knowledge occurs when students help each other when they struggle to comprehend concepts fully. Furthermore, the RAF model handles obstructions (quick, limited feedback) well. Student 5 reported how the RAF model provides experiential learning opportunities, especially when faced with gaps in reading expertise. Collaborative learning enables students to request peer assistance during collaborative assignments. Overall, the partnership dynamics fostered by RAF improved reading proficiency considerably (Kazemi et al., 2020; Kukulska-Hulme & Shield, 2008; Sathiya Priya & Shilaja, 2016; Supunya, 2023).

Theme 3: Language development

RAF helped students to improve their reading comprehension skills in a variety of areas, including content understanding, scanning and skimming, recognizing key concepts, summarizing, and vocabulary learning. As Student 5 pointed out, there is an overlap between Indonesian and English medical vocabulary, which RAF greatly facilitates. Student 4 stressed the need for context and visual assistance for learning medical terminology, by stating that diagrams and illustrations in instructional phrases help comprehension.

Student 3 acknowledged experiencing difficulties deducing primary ideas from readings, but reported that the automatic feedback of the RAF system improved their comprehension of material. Students also noticed increases in their scanning and skimming skills. Student 7 stated that group feedback during the RAF process enabled them to understand text content quickly. Despite studying English for many years, some adult learners still struggle to achieve competency. According to Student 11, RAF reduced feelings of embarrassment caused by unfamiliarity with the English language, because RAF allows students to access information independently.

Furthermore, Student 3 emphasized the role of RAF in strengthening summarizing skills through collaborative efforts, while Student 13 remarked that RAF helped them to identify critical keywords and make accurate text summaries. Student 9 said that language proficiency and reading speed improved their summarizing abilities. These findings are consistent with earlier peer-reviewed studies that report on the efficacy of RAF in the context of English for Nursing (Anwar, 2016; Mustiah et al., 2024; Yang & Qian, 2020; Yu et al., 2013).

Table 8: Summary of student interviews

Themes	Sample excerpts	%
Intrinsic motivation	I've attended online classes quite a few times, and there's a tendency for most students to lack enthusiasm when following class instructions. However, RAF has sparked our interest, especially during teamwork and feedback sessions.	81% (8 students)
Teamwork	In most English classes I've attended, students are typically asked to work only with a partner. However, in this RAF class, we also collaborate on tasks with classmates both inside and outside the classroom.	75% (7 students)
Language development	When I'm reading a text, guessing the main ideas can be challenging. RAF has been a great help in learning to understand them well, thanks to the automatic feedback provided. It's such that by the time I've read the text for the third time, I've gained a good understanding. The more we progress, the more I learn about word knowledge and its power.	86% (9 students)

The comprehensive data provided in Table 8, as shared by students during their interviews, provided valuable insights into the significant impact of RAF on the English for Nursing curriculum. A notable 81% of students expressed that the RAF program sparked a sense of curiosity and heightened their excitement in

relation to online courses, particularly in the context of collaborative work and feedback sessions. This finding indicates that the implementation of RAF has a beneficial and inspiring effect on students' inherent motivation. Approximately 75% of students acknowledged and appreciated the crucial function of RAF in promoting collaboration. In contrast to other English programs that only involved paired work, RAF lessons provided opportunities for students to engage in collaborative assignments with their peers, both within the confines of the classroom and in extracurricular settings. This feedback describes a learning environment that is characterized by increased collaboration and inclusivity, which are fostered by RAF. Furthermore, an impressive 86% of students reported that the use of RAF proved to be a useful strategy for assisting them to overcome difficulties encountered in the realm of reading comprehension, particularly, in the area of predicting important concepts. Students reported that the automatic feedback offered by RAF functioned as a guiding mechanism, by facilitating improved comprehension of the material and expanding their vocabulary, hence suggesting notable advancements in language acquisition.

5. Discussion

The primary aim of this study was to examine the impact of RAF on the reading skills of students who were receiving English for Nursing instruction. Additionally, the study sought to explore the students' perspectives on the implementation of RAF in the classroom environment. Through the analysis of both quantitative and qualitative data, the study demonstrated that integrating RAF could yield positive effects for the reading proficiency of nursing students, specifically in domains such as content comprehension, scanning and skimming abilities, identification of key concepts, summarizing, and vocabulary acquisition. In addition, the students conveyed that they had positive attitudes about their educational experiences in the classroom.

RAF has been identified as a potentially effective approach to improving both writing and reading abilities of nursing students who are studying ESP. The current body of literature on automatic feedback in writing is extensive; nevertheless, there was a dearth of studies that specifically examined its effects on reading comprehension (Aritonang et al., 2019; Kruse et al., 2023; Shi & Aryadoust, 2024). This study investigated the benefits of automated feedback on reading instruction and the potential of RAF in this domain. The study explored the impact of RAF on the reading process, which unfolds in three stages: pre-reading, while reading, and post-reading (Shi & Aryadoust, 2024). RAF enhances the pre-reading stage by helping with planning and previewing content, and supports the while-reading stage by providing vocabulary support, thereby helping learners navigate the technical language of ESP texts (Insuasty Cárdenas, 2020). In the post-reading stage, RAF facilitates guided reflection by helping learners focus on key points and deepening their understanding of the material (Lee, 2020; Santi et al., 2021).

RAF has proven to be instrumental in helping nursing students to enhance their summarizing skills for ESP. Identifying main ideas and summarizing are intricate skills that present challenges for struggling readers, particularly those who

struggle with reading (Stevens et al., 2019). Reviews have demonstrated the effectiveness of reading interventions, but there exists a need to scrutinize the impact of specific components of reading ability, such as instruction in identifying the main idea or summarizing (Alshahrani, 2019; Santi et al., 2021). Comprehending these effects can enhance the quality of reading instruction, and could boost struggling readers' comprehension and success, and provide insights for fortifying the reading comprehension component of multicomponent interventions. RAF demonstrated its capability to enhance readers' ability to understand main ideas and summarize.

RAF has emerged as an effective strategy for enhancing vocabulary knowledge of nursing students studying ESP. Various strategies have been employed to bolster vocabulary skills, including direct word instruction, the cover, copy, compare (CCC) method, storybook reading strategies, and memorization techniques such as the keyword strategy and Kramsch's procedure (Buckingham Shum et al., 2023; Jia et al., 2022; Taskiran & Goksel, 2022). However, these strategies have limitations, such as the time and effort required for the CCC approach and direct word instruction, and the challenges posed by the keyword strategy when learning a large volume of words (Santi et al., 2021). RAF addresses these limitations by integrating these strategies with digital learning tools, and facilitating long-term vocabulary retention and the transferability of these skills to other language learning facets. Furthermore, RAF underlines the importance of reading practices and attitudes in the reading process (Buckingham Shum et al., 2023). Data reveals that the application of reading strategies and a positive attitude toward reading are crucial for effective reading, while lack of practice and poor strategies often hinder reading effectiveness (Aritonang et al., 2019; Ramirez-Avila & Barreiro, 2021).

RAF has proven to be a powerful tool for enhancing reading skills, especially for students in the field of nursing who are studying ESP. Despite the challenges of integrating certain strategies, such as the CCC approach and direct word instruction, RAF successfully incorporates these into digital learning tools, to promote long-term vocabulary retention and skill transferability. This study underscores the importance of positive attitudes toward reading and the potential of RAF for improving various aspects of the reading process, thereby paving the way for further exploration and research in this domain.

The key weakness of this study is that it focused on a specific group of nursing students learning ESP, and the findings may not be applicable to other student demographics or fields. Furthermore, while the study sheds light on the effect of RAF on reading skills, the differences between education contexts remain unexplored. To properly grasp the scope of the benefits of RAF, further studies should take into account diverse student groups and longer timeframes.

6. Conclusion

This study investigated two main areas: the impact of RAF on cognitive processes such as content comprehension, scanning and skimming abilities, identifying key concepts, summarizing skills, and vocabulary acquisition, as well as students' perceptions of RAF integration in the English for Nursing curriculum. The findings show that RAF greatly improved nursing students' reading capabilities, including subject matter comprehension, scanning and skimming abilities, key concept identification, summarizing strategies, and language acquisition. Furthermore, students had favorable experiences with RAF, demonstrating that its implementation not only improved reading competency, but also fostered a supportive learning environment. The data imply that adding RAF as strategy in English for Nursing courses can lead to significant academic improvements and boost overall student satisfaction with their education.

Furthermore, the study reveals that students hold favorable opinions of their learning experiences with RAF in the classroom. This finding indicates that the implementation of RAF not only enhances reading proficiency, but also fosters a conducive learning atmosphere. The conclusions of this study have significant implications that extend widely. Research indicates that the inclusion of RAF in English for Nursing courses has the potential to yield significant benefits, including better academic achievement by students. Furthermore, the favorable student view of RAF suggests that its incorporation in the classroom has the potential to enhance the overall educational experience.

To advance future research on this topic, it would be advantageous to investigate the enduring impacts of RAF on students' reading proficiency and their ongoing perception of its efficacy. Furthermore, further investigation could be conducted to examine the efficacy of RAF in alternative contexts or academic fields, thereby broadening its potential scope of application. Finally, research could investigate ways of enhancing the utilization of RAF in educational settings, such as ascertaining the optimal frequency of feedback or examining the integration of RAF with other pedagogical approaches. These potential avenues of investigation have the potential to enhance our comprehension of RAF and optimize its advantages as part of instructional methodologies.

7. References

Afriyie, D. (2020). Effective communication between nurses and patients: An evolutionary concept analysis. *British Journal of Community Nursing*, *7*(10), 505−512. https://doi.org/10.12968/bjcn.2020.25.9.438

Alanazi, S. A., & Alharbi, M. A. (2021). ESP courses for Saudi nursing students: A mixed method study. *Asian ESP Journal*, *17*(3.2), 108–127. https://www.asian-esp-journal.com/esp-march-2020-17-3-2/

Alshahrani, H. A. (2019). Strategies to improve English vocabulary and spelling in the classroom for ELL, ESL, EO and LD students. *International Journal of Modern Education Studies*, *3*(2), 65–81. https://doi.org/10.51383/ijonmes.2019.41

Anwar, K. (2016). Panel discussion and the development of students' self confidence. *English Language Teaching*, *9*(4), 224–229. https://doi.org/10.5539/elt.v9n4p224

Anwar, K., Wardhono, A., & Budianto, L. (2022). Attitude and social context in MALL classes: A view from midwifery learners. *Cypriot Journal of Educational Sciences*, *17*(9), 3048–3066. https://doi.org/10.18844/cjes.v17i9.7332

Aritonang, I. R., Lasmana, S., & Kurnia, D. (2019). The analysis of skimming and scanning technique to improve students in teaching reading comprehension. *PROJECT (Professional Journal of English Education)*, *1*(2), 101–106. https://doi.org/10.22460/project.v1i2.p101-106

Buckingham Shum, S., Lim, L. A., Boud, D., Bearman, M., & Dawson, P. (2023). A comparative analysis of the skilled use of automated feedback tools through the lens of teacher feedback literacy. *International Journal of Educational Technology in Higher Education*, *20*(1), Article 40. https://doi.org/10.1186/s41239-023-00410-9

Eryılmaz, R. (2023). Opinions of students learning Turkish as a foreign language on the use of e-portfolio in writing lessons. *International Journal of Education and Literacy Studies*, *11*(4), 85–97. https://doi.org/10.7575/aiac.ijels.v.11n.4p.85

Gabbay, H., & Cohen, A. (2022). *Investigating the effect of automated feedback on learning behavior in MOOCs for programming* [Conference session]. Proceedings of the 15th International Conference on Educational Data Mining., July 2022, Durham, United Kingdom (pp. 376–383). https://doi.org/10.5281/zenodo.6853125

Garone, A., & van de Craen, P. (2017). The role of language skills and internationalization in nursing degree programmes: A literature review. *Nurse Education Today*, *49*, 140–144. https://doi.org/10.1016/j.nedt.2016.11.012

Garone, A., van de Craen, P., & Struyven, K. (2020). Multilingual nursing education: Nursing students' and teachers' interests, perceptions and expectations. *Nurse Education Today*, *86*, Article 104311. https://doi.org/10.1016/j.nedt.2019.104311

Ghobain, E. A. (2014). *A case study of ESP for medical workplaces in Saudi Arabia from a needs analysis perspective* [Doctoral thesis]. Warwick University, Coventry, England.

Haerazi, H., Prayati, Z., & Vikasari, R. M. (2019). Contextual teaching and learning (CTL) approach to improve students' reading comprehension in relation to motivation. *English Review: Journal of English Education, 8*(1), Article 139. https://doi.org/10.25134/erjee.v8i1.2011

Hoang, G. T. L. (2022). Feedback precision and learners' responses: A study into ETS criterion automated corrective feedback in EFL writing classrooms. *The JALT CALL Journal*, *18*(3), 444–467. https://doi.org/10.29140/jaltcall.v18n3.775

Insuasty Cárdenas, A. (2020). Enhancing reading comprehension through an intensive reading approach. *HOW*, *27*(1), 69–82. https://doi.org/10.19183/how.27.1.518

Jia, Q., Young, M., Xiao, Y., Cui, J., Liu, C., Rashid, P., & Gehringer, E. (2022). Automated feedback generation for student project reports: A data-driven approach. *Journal of Educational Data Mining*, *14*(3), 132–161. https://doi.org/10.5281/zenodo.7304954

Kalola, E. E. (2022). *Exploring the current English language needs of medical students in the School of Medicine at Hage Geingob UNAM campus* [Master's thesis]. Namibia University of Science and Technology. https://doi.org/10.13140/RG.2.2.21733.27362

Kazemi, A., Bagheri, M. S., & Rassaei, E. (2020). Dynamic assessment in English classrooms: Fostering learners' reading comprehension and motivation. *Cogent Psychology*, *7*(1), Article 1788912. https://doi.org/10.1080/23311908.2020.1788912

Kruse, O., Rapp, C., Anson, C. M., Benetos, K., Cotos, E., Devitt, A., & Shibani, A. (2023). *Digital writing technologies in higher education: Theory, research, and practice*. Springer. https://doi.org/10.1007/978-3-031-36033-6

Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, *20*(3), 271–289. https://doi.org/10.1017/S0958344008000335

Lee, Y. J. (2020). The long-term effect of automated writing evaluation feedback on writing development. *English Teaching (South Korea)*, *75*(1), 67–92. https://doi.org/10.15858/engtea.75.1.202003.67

Mustiah, M., Dayat, D., & Sadek, N. (2024). The impact of mobile-assisted hybrid dynamic assessment on Arabic language leaners' reading comprehension performance. *Journal of Languages and Language Teaching*, *12*(1), 524–534. https://doi.org/10.33394/jollt.v12i1.9158

Nashir, M., Laili, R. N., Sholihin, S., & Wirawati, W. A. (2022). Needs analysis: The primary step in designing English instructional materials for nursing students. *Acitya: Journal of Teaching and Education*, *4*(2), 374–390. https://doi.org/10.30650/ajte.v4i2.3305

Paputungan, N. A., Otoluwa, H. M., & Machmud, K. (2018). Developing supplementary English speaking materials for nursing vocational school. *European Journal of English Language Teaching*, *4*(1), 1–21. https://doi.org/10.5281/zenodo.1344219

Poedjiastutie, D., & Oliver, R. (2017). English learning needs of ESP learners: Exploring stakeholder perceptions at an Indonesian university. *TEFLIN Journal – A Publication on the Teaching and Learning of English*, *28*(1), 1–21. https://doi.org/10.15639/teflinjournal.v28i1/1-21

Puluhulawa, Y. M., Mariana, A., & Mansur, R. F. (2021). Overview of the nursing students' needs: The initial step in designing English instructional materials. *Al-Lisan: Jurnal Bahasa*, *6*(2), 128–145. https://doi.org/10.30603/al.v7i2.1932

Ramirez-Avila, M. R., & Barreiro, J. P. (2021). The effect of summarizing narrative texts to improve reading comprehension. *Journal of Foreign Language Teaching and Learning*, *6*(2), 94–110. https://doi.org/10.18196/ftl.v6i2.11707

Röhl, S., Bijlsma, H., & Rollett, W. (2021). The process model of student feedback on teaching (SFT): A theoretical framework and introductory remarks. In W. Rollert, H. Bijlsma, & S. Röhl (Eds.), *Student feedback on teaching in schools: Using student perceptions for the development of teaching and teachers* (pp. 1–11). Springer. https://doi.org/10.1007/978-3-030-75150-0_1

Santi, E., Kholipa, R., Putri, M. G., & Mujiono. (2021). Reading interest strength and vocabulary acquisition of EFL learners: A meta-analysis. *Journal of Language and Linguistic Studies*, *17*(3), 1225–1242. https://doi.org/10.52462/jlls.87

Sathiya Priya, T., & Shilaja, C. L. (2016). Collaborative learning. *Man in India, 96*(9), 2943−2947. https://doi.org/10.5367/000000000101294922

Sembel, J. S. (2018). Developing learner-oriented English for Nursing syllabus. *Nursing Current Jurnal Keperawatan*, *6*(1), 60–67. https://doi.org/10.19166/nc.v6i1.1347

Shi, H., & Aryadoust, V. (2024). A systematic review of AI-based automated written feedback research. *ReCALL*, *36*, 187–209. https://doi.org/10.1017/S0958344023000265

Stevens, E. A., Park, S., & Vaughn, S. (2019). A review of summarizing and main idea interventions for struggling readers in Grades 3 through 12: 1978−2016. *Remedial and Special Education*, *40*(3), 131–149. https://doi.org/10.1177/0741932517749940

Stevenson, M., & Phakiti, A. (2019). Automated feedback and second language writing. In K. Hyland, & F. Hyland (Eds.), *Feedback in second language writing: Contexts and issues* (pp. 125–142). Cambridge University Press. https://doi.org/10.1017/9781108635547.009

Supunya, N. (2023). A systematic review on ESP teachers: Current focus, collaboration, and sustainability. *REFLections*, *30*(2), 287–317. https://doi.org/10.61508/refl.v30i2.267295

Taskiran, A., & Goksel, N. (2022). Automated feedback and teacher feedback: Writing achievement in learning English as a foreign language at a distance. *Turkish Online Journal of Distance Education*, *23*, 120–139. https://doi.org/10.17718/tojde.1096260

Tavakoli, H., Lotfi, A. R., Biria, R., & Wang, S. (2019). Effects of CALL-mediated TBLT on motivation for L2 reading. *Cogent Education*, *6*(1), Article 1580916. https://doi.org/10.1080/2331186X.2019.1580916

Tubino, L., & Adachi, C. (2022). Developing feedback literacy capabilities through an AI automated feedback tool. *ASCILITE Publications*, e22039. https://doi.org/10.14742/apubs.2022.39

Walkowska, A., Przymuszała, P., Marciniak-Stępak, P., Nowosadko, M., & Baum, E. (2023). Enhancing cross-cultural competence of medical and healthcare students with the use of simulated patients: A systematic review. *International Journal of Environmental Research and Public Health*, *20*(3), Article 2505. https://doi.org/10.3390/ijerph20032505

Yang, Y., & Qian, D. D. (2020). Promoting L2 English learners' reading proficiency through computerized dynamic assessment. *Computer Assisted Language Learning*, *33*(5–6), 628–652. https://doi.org/10.1080/09588221.2019.1585882

Yu, Y. H., Hu, Y. N., & Zhang, J. S. (2013). A research on reading model of interactive children picture book application based on the theory of "zone of proximal development." *Applied Mechanics and Materials*, *411–414*(4), 2952–2956. https://doi.org/10.4028/www.scientific.net/AMM.411-414.2952

Zarei, M. J., & Navidinia, H. (2024). Improving EFL students' writing skills through digital storytelling. *Computer-Assisted Language Learning Electronic Journal*, *25*(1), 108–128.

Zhukova, N., & Didenko, I. (2020). Designing the reading module in an ESP course for the students majoring in radio engineering, telecommunications and economic studies. *Language for International Communication: Linking Interdisciplinary Perspectives, 3*(3), 119–134. https://doi.org/10.22364/lincs.2020.10