Developing ESP students' online text reading performance and strategies in small group discussion

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ABSTRACT

Reading English text is often regarded as a difficult task by English for Specific Purposes (ESP) students during their individual reading time. Therefore, this research investigates the impact of a small group discussion on ESP students' online text reading performance and strategies. The quantitative research, employing a pre-experimental design, purposively recruited 90 students from the Computer Science and Engineering Faculty. The data were collected through pre- and post-assessments on reading comprehension and a survey on reading strategies. Analyzed using SPSS 27.0, the data of the research show that the small group discussion highly affects reading performance of ESP students. Besides, their reported reading strategy use demonstrates a high frequency of use in all three strategy categories (PROB, GLOB, SUP), with no significant difference found in all categories by age and major. In conclusion, the implementation of a small group discussion in the ESP classroom can effectively improve the online text reading performance and develop reading strategies of the students. It also positively implies that educators can employ a small group discussion to promote other reading aspects in various educational settings.

Keywords: Small group discussion, ESP students, reading

INTRODUCTION

In today's educational environment, fostering effective communication and collaboration among students has become increasingly important. One prevalent challenge faced by educators is the need to effectively engage students with diverse backgrounds in a way that promotes collective learning. It is an issue we commonly find in classroom teaching all over the world. As widely known by educators, teaching in a classroom in which the students coming from diverse backgrounds and encouraging them to develop a whole-class understanding are not tasks easy to accomplish. It is getting more difficult when educators have to teach their students in individual manner. They need to perform some strategies or interventions to achieve the learning objectives without leaving a student behind. One possible intervention is a small group discussion. Small-group (SG) intervention is defined as a group instruction that aims to provide instruction for three or more students simultaneously (Gersten et al., 2009). Small group discussions provide students with the opportunity to express their opinions, share ideas, and engage in meaningful conversations (Kamola, 2023).As mentioned by some past studies, this kind of intervention has proved its usefulness in many different studies: various studies (Hayashi et al., 2023; Turk, 2023), natural science (Alexopoulou & Driver, 1996; Davis & Palincsar, 2023; Esquivel-Martín et al., 2023; Hamidzada et al., 2023), social and political science (Pollock et al., 2011; Wen et al., 2023), mathematics and statistics (Knox & Kontorovich, 2023; Schneiter et al., 2023), medical science (Mamakli et al., 2023; Massé et al., 2024). The ubiquitous application of small group discussion in various studies ensures that this strategy can be effective to accomplish learning objectives.

Furthermore, related to this current study, the focus of which is on language study, it is important to mention several recent research examining the role of small group discussion in a language classroom:

(Chen et al., 2023; Gallagher et al., 2023; Heidari Darani et al., 2023; Heron et al., 2023; Jaramillo Cherrez, 2023; Kamola, 2023; Wotring et al., 2024; Wu et al., 2023). Most of the research discussed how to promote reading skills in English as a Foreign Language (EFL) context. Reading is the most possible activity to carry out in EFL classroom because in many countries around the world students have fairly limited access to spoken English, written English often takes on primary importance for stimulating language acquisition (Lazar, 2009). There are two main divisions within EFL. The first one refers to English as a General Purpose (EGP) and the second one refers to English for Specific Purposes (ESP) (Zohrabi, 2015). EGP includes general aspects of English such as grammar, vocabulary, cultures, geography, science, etc. (Ren, 2022), while ESP typically refers to imparting English language instruction with emphasis on the specific vocabulary and skills needed by university students or those in the workforce (Saidova, 2022). It can be said that ESP classes are usually designed for college students after they finish EGP learning. Therefore, ESP reading materials should be lexically more sophisticated than EGP ones, because linguistic contents are also important concerns for ESP teaching, and ESP classes should also promote students' language development in addition to their professional advancement (Ren, 2022). Sophisticated reading texts in this digital era can be obtained from online text. Reading text in online environments differs from its counterpart in presenting traditional setting. Readers normally confront potential challenges when attempting to apply conventional literacy skills to web-based text and media because many traditional concepts about print-based text remain consistent in web-based formats. In other words, applying only conventional reading strategies to online information texts can present new challenges or confusion for elementary students (Pilgrim et al., 2018).

The importance of reading strategies in successful English reading has been proved by several research (Naseri & Zaferanieh, 2012; Tavakoli, 2014; Valizadeh, 2021), indicating that reading strategies and reading comprehension achievement are related each other. Further, the shortage and constraints facing by reading interventionists during the promotion of learning strategies can be mitigated by using SG reading intervention (Wu et al., 2023). One of reading strategies teachers often try to assess in a reading class is MARS (Metacognitive Awareness of Reading Strategies) which was promoted by Mokhtari & Reichard (2002). Though there were several research having used MARS assessment (Al-Mekhlafi, 2018; Kalita Nath, 2021; Manh Do & Le Thu Phan, 2021; Wallace et al., 2021; Zhang & Zheng, 2020), none of them discussed about the role of a small group discussion in developing reading strategies among ESP students and significant different in ESP students' reading strategies from the aspect of age and major.

Considering a high chance to fill the gap found in the previous research, the present research was aimed at investigating the impact of a small group discussion on ESP students' online text reading performance and strategies. To accomplish the purpose, this research was guided by the following research questions: first, does a small group discussion affect ESP students' online text reading performance?; second, what are reported frequencies of reading strategies used by ESP students during small group discussion on online text?; and third, is there a significant difference in ESP students' selected reading strategies in their varying age and major?

METHOD

This quantitative research employed a pre-experimental research design, in which a single group was studied and an intervention was implemented during the experiment. This design does not have a control group to compare with the experimental group (Creswell & Creswell, 2018). Conducted through pretest and posttest assessments, the study tried to measure changes in participants' reading performance and to find out the reading strategies developed under a group setting. A total of 90 ESP students purposively selected from Computer Science and Engineering Faculty participated in the study. The total comprised 71 males (78.9%) and 19 females (21.1%). The discrepancy in the gender ratio was due to the domination of male students enrolling in Engineering majors in Indonesia.

Table 1. Demographic variables of the participants

		Frequency	Percent
Gender	Male	71	78.9
	Female	19	21.1
	Total (n)	90	100
Age	17-20	75	83.3
	21-25	13	14.4
	26-30	2	2.2
	Total (n)	90	100
Major	Informatics	48	53.3
	Information System	42	46.7
	Total (n)	90	100

Two instruments were utilized to gather the data: a reading comprehension test and Metacognitive Awareness of Reading Strategies Inventory (MARSI) (Version 1.0), all of which were sent in the form of link of Goggle Forms to participants. The reading comprehension test consisting 25 multiple-choice questions was used to measure the extent to which the students perform their online text reading skill and develop their reading strategies in a small group discussion. MARSI survey adapted from Mokhtari & Reichard (2002) was distributed in Indonesian language to assess the students' use of reading strategies. The survey is regarded as valid considering its use in several previous study (Al-Mekhlafi, 2018; Manh Do & Le Thu Phan, 2021; Molotja & Themane, 2020; Par, 2020; Talebi et al., 2020).

Before filling the instruments, all participants had to first read and agree with the consent statements attached in the beginning of the instruments. In the pre-test, students were asked to individually sit the reading comprehension test comprising three kinds of online text (report text, literary text and technical text). The results of the data were then used by the researcher to form small groups consisting of 5 - 7 students by mixing low to high achievers in every group. In the post-test, the students were asked to discuss and answer the same reading comprehension test in their respective groups and to complete MARSI survey personally.

After being collected, the data in the form of scores on reading comprehension pre-test and post-test were analyzed based on three classifications: low (16.00-40.00), moderate (44.00-68.00) and high (72.00-100.00). The findings showed that overall level of students' reading performance in the pre-test was low as proven by 45.5% (n=41) of the students showed a low performance, 37.8% (n=34) appeared to be moderate achiever and 16.7% (n=15) had a high reading performance. Meanwhile, the results of students' post-test were categorized as: low-level (2.2%, n=2), medium-level 17(18.9%, n=17), and high-level (78.9%, n=71) reading performance. On average, the post-test results demonstrated students' high-level reading performance. These data were interpreted by employing SPSS 27.0 to find out descriptive statistics comprising means, percentages, and standard deviations. Next, to determine significance of the improvement and the effect size of the small group discussion intervention, the data were analyzed using paired sample t-test.

Similarly, the data collected from MARSI survey were analyzed using descriptive statistics. The analysis was performed to produce means to be measured according to Oxford & Burry-Stock's standard criterion (1995), specifying a mean of 3.5 or higher regarded as high, 2.5 to 3.4 considered as moderate, and 2.4 or lower termed as low. The analysis results were used to find out how large the reported reading strategy use frequencies were. Besides, the collected MARSI survey data were also analyzed using One-way ANOVA test and an independent sample t-test to identify any statistically significant differences in ESP students' selected reading strategies by age and major respectively. In term of age, participants were divided into three groups (group 1: 17-20; group 2: 21-25; group 3: 26-30), while in term of major, participants were classified into two groups (group 1: Informatics, group 2: Information System).

RESULTS AND DISCUSSION
Results

This following empirical findings are presented to address the three research questions. Each question is discussed under a separate subsection.

ESP Students' reported reading performance after participating in a small group discussion

The aim of this subsection is to answer the first research question 'Does a small group discussion affect ESP students' online text reading performance?' Before evaluating the effect of a small group

discussion on students' reading performance, pre-and-post tests of reading comprehension were administered to the students.

Table 2. Descriptive Statistics of ESP students' Reading Performance Test Result

Test type	Min	Max	M	SD
Pre-Test	16.00	96.00	48.22	20.33
Post-Test	32.00	100.00	82.00	14.11

Table 2 shows the students' reading performance is extremely low (*M*=48.22, *SD*=20.33), resulting in an urgent need to evaluate the use of small group discussion in ESP classroom. In addition, the data reveals that students developed their reading performance more after participating in a small group discussion as indicated by the post-test score after the intervention displaying a significant improvement in students' reading performance (*M*=82.00, *SD*=14.11). In conclusion, the findings proved the small group discussion significantly affects ESP students' online text reading performance as seen in the higher post-test scores than the pre-test scores.

Next, to statistically determine significance of the observed improvement and the effect size of the small group discussion intervention, it is important to carry out paired sample t-test for the pre-and post-tests of students' reading performance in experimental classes. The results of paired sample t-test are presented in Table 3:

Table 3. Paired sample t-test results of students' pre- and post-tests

	Pre-Test scores	Post-test scores	T	Df	Sig.
Pair 1	48.22	82.00	-13.469	89	0.001

Table 3 demonstrates the paired sample t-test for the students' reading performance test in the experimental class scored a *p*=0.001 < 0.05, signifying there is a substantial difference between pre-test and post-test. The actual difference in mean scores between the tests was considered remarkably high with the effect size of Cohen's d (|*d*|= -1.420). Therefore, it can be concluded that the implementation of the small group discussion is highly effective to develop the online text reading performance of ESP students.

ESP students' reported use of reading strategies during a small group discussion

This section is presented to answer the second research question 'What are reported frequencies of reading strategies used by ESP students during small group discussion on online text?'

Table 4. Descriptive Statistics of ESP students' Reading Strategy Use

Item	Category	M	SD
12. I try to get back on track when I lose concentration.		4.93	1.88
11. I read slowly but carefully to be sure I understand what I'm reading.		4.91	1.03
14. When text becomes difficult, I reread it to increase my understanding	PROB	4.88	1.09
13. When text becomes difficult, I pay closer attention to what I'm reading.		4.72	1.06
15. When I read, I guess the meaning of unknown words or phrases.		4.22	1.38
Average		4.73	0.90
1. I think about what I know to help me understand what I read.		4.92	1.09
2. I take an overall view of the text to see what it's about before reading it.		4.80	1.16
4. When reading, I decide what to read closely and what to ignore.	GLOB	4.61	1.87
3. I review the text first by noting its length and organizations.		4.50	1.25
5. I try to guess what the content of the text is about when I read.		4.30	1.32
Average		4.63	0.88
9. I go back and forth in the text to find relationships among ideas in it.		4.87	1.06
10. When reading, I translate from English into Indonesia.		4.68	1.23
7. When text becomes difficult, I read aloud to help me understand what I read.	SUP	4.23	1.39
8. I use reference materials (e.g., a dictionary) to help me understand what I read		4.07	1.39
6. I take notes while reading to help me understand what I read.		3.48	1.47
Average		4.26	0.88
Overall Reading Strategy Use		4.54	0.78

NOTE: PROB (Problem-Solving Strategies), GLOB (Global Reading Strategies), SUP (Support Reading Strategies)

As seen in table 4, the students' overall reported reading strategy (*M=4.54*) falls into high-level classification, indicating highly active use of reading strategy by ESP students during a small group discussion. Besides, the results also display that the ESP students' reading strategies demonstrate high frequency in all three categories. In descending order, the means were as follows PROB (*M=4.73*), GLOB (*M=4.63*) and SUP (*M=4.26*). In other words, the students tend to overcome their reading problems by rereading the texts seriously and guessing the meaning of the words.

Moreover, based on the item distribution in table 4, it can be inferred that the ESP students demonstrate moderate–to–high frequency of reading strategy use (*M=3.48–4.92*), with 1 strategy item (item 6 'I take notes while reading to help me understand what I read') (6.67%) moderately used and 14 (93.33%) mainly adopted. The data further reveal that in PROB category (*M=4.22–4.93*), the students' mostly used strategies are item 12 'I try to get back on track when I lose concentration' (*M=4.93*), item 11 'I read slowly but carefully to be sure I understand what I'm reading' (*M=4.91*) and item 14 'When text becomes difficult, I reread it to increase my understanding' (*M =4.88*). As for GLOB category (*M=4.30–4.92*), the strategies frequently employed by students are item 1 'I think about what I know to help me understand what I read'(*M=4.92*), item 2 'I take an overall view of the text to see what it's about before reading it' (*M=4.80*) and item 4 'When reading, I decide what to read closely and what to ignore' (*M=4.61*). With regard to SUP category, the strategies the students primarily adopted are item 9 'I go back and forth in the text to find relationships among ideas in it' (*M=4.87*), item 10 'When reading, I translate from English into Indonesia' (*M=4.68*) and item 7 'When text becomes difficult, I read aloud to help me understand what I read' (*M=4.23*). In conclusion, the result of the study is in accordance with Lahuerta Martinez's (2008) research, mentioning that language learners' frequency of reading strategy use is generally classified into moderate to high level.

ESP students' selected reading strategies based on differing age and major

Having examined the students' reported reading strategies use and thus answered the second research question, it was time to focus on the third question as an effort to identify any significant differences in ESP students' selected reading strategies in terms of their age and major.

Table 5. One-way ANOVA by Age

Strategy Category	Age	M	SD	F	Sig.	η2
	17-20	5.00	1.41	.180	.915	.002
PROB	21-25	4.72	0.88			
	26-30	4.73	0.91			
	17-20	5.00	1.41	.180	.835	.004
GLOB	21-25	4.61	0.91			
	26-30	4.62	0.88			
	17-20	5.00	1.41	.821	.443	.019
SUP	21-25	4.34	0.78			
	26-30	4.22	0.90			

Table 5 shows that data analyzed using a one-way between-groups analysis of variance test (ANOVA) demonstrate no significant difference at $p > .05$ level in all participants' reading strategy categories: PROB ($F(2,87)=.180$, $p=.915$, η2=.002), GLOB ($F(2,87)=.180$, $p=.835$, η2=.004), and SUP (($F(2,87)=.821$, $p=.443$, η2=.019). The actual difference in mean scores in both PROB and GLOB categories was considered medium with the effect size of eta squared of .002 and .004 respectively, while mean scores in SUP category were termed large, as shown in the effect size of eta squared of 0.19. Post-hoc comparisons using Tukey HSD test also illustrated no significant difference among groups in each category: PROB – group 1 (*M=5.00, SD=1.41*), group 2 (*M=4.72, SD=0.88*) and group 3 (*M=4.73, SD=0.91*); GLOB – group 1 (*M=5.00, SD=1.41*), group 2 (*M=4.61, SD=0.91*) and group 3 (*M=4.62, SD=0.88*); SUP – group 1 (*M=5.00, SD=1.41*), group 2 (*M=4.34, SD=0.78*) and group 3 (*M=4.22, SD=0.90*).

Table 6. An independent sample t-test by major

Strategy Category	Major	M	SD	T	Sig.	D
PROB	Informatics	4.58	0.97	-1.751	.083	-.370
	Information System	4.91	0.79			
GLOB	Informatics	4.56	0.90	-.736	.464	-.156
	Information System	4.70	0.86			
SUP	Informatics	4.22	0.92	-.498	.620	-.105
	Information System	4.31	0.85			

The data analyzed using an independent sample t-test indicated that no significant difference at $p > .05$ level in all participants' reading strategy categories: PROB ($t(88)= -1.751$, $p=.083$, $d= -.370$), GLOB ($t(88)= -.736$, $p=.464$, $d= -.156$), and SUP ($t(88)= -.498$, $p=.620$, $d= -.105$). The actual difference in mean scores among groups, in both GLOB and SUP categories were considered small as seen in the effect size of Cohen's d of -.156 and -.105 respectively, while mean scores among groups in PROB category was considered medium, with the effect size of Cohen's d of -.370. Moreover, there was also no statistically significant difference found among groups in all three categories: PROB – group 1 ($M=4.58$, $SD=0.97$) and group 2 ($M=4.91$, $SD=0.79$); GLOB – group 1 ($M=4.56$, $SD=0.90$) and group 2 ($M=4.70$, $SD=0.86$); SUP – group 1 ($M=4.22$, $SD=0.92$) and group 2 ($M=4.31$, $SD=0.85$).

Discussion

The first research question aimed to determine how small group discussions affect learners' English reading skills. The analysis revealed significant improvement in ESP students' reading performance after the intervention of a small group discussion. This finding emphasizes the effectiveness of small group discussions, consistent with previous studies (Begeny et al., 2012; Klubnik & Ardoin, 2010; Wanzek et al., 2011), that highlight the benefits of collaborative learning environments in enhancing language skills. By applying this method in higher education, the study expands on existing research, emphasizing its applicability in diverse educational settings. The collaborative nature of small group discussions fosters peer learning, encourages active participation, and enhances critical thinking skills, all of which are essential for language acquisition. Although this intervention proved effective, as Duhon et al. (2004) suggests, numerous other reading interventions can also enhance learners' skills, indicating that small group discussions are not the only option. This diversity in intervention strategies offers educators flexibility in addressing the different needs of students, ensuring that different learning styles and preferences are accommodated. Therefore, educators are encouraged to explore various methods to further improve reading skills, particularly in online contexts where different dynamics may play a role. Online learning environments present unique challenges and opportunities for interaction, making it crucial to adapt teaching strategies that maintain engagement and support skill development.

The second research question focused on the reading strategies frequently used by ESP students during small group discussions. The analysis of the reading strategy data showed that Problem-Solving Strategies (PROB) were most frequently employed, followed by Global (GLOB) and Support (SUP) Reading Strategies. This result is in accordance with previous research (Babashamasi et al., 2022; Kalita Nath, 2021; Meniado, 2016; Pammu et al., 2014; Sheorey & Mokhtari, 2001; Yüksel & Yüksel, 2012), suggesting a strong preference for strategies that involve careful text analysis and context-based guessing. This finding implies that there is a tendency that students deal with their reading problems by reading the texts slowly more than once and guessing the meaning of the unknown words, which is very important in developing comprehension skills. The emphasis on problem-solving highlights the students' ability to deal with complex texts, fostering students' independent learning and resilience when facing difficult material. However, it is important to consider the fact that metacognitive strategies significantly vary depending on language learners' backgrounds and settings (Meniado, 2016; Pammu et al., 2014). So, it can be said that PROB is not always the dominant strategy. This variability calls for further exploration into how different educational and cultural contexts influence strategy preferences. Understanding these influences can help educators adjust their teaching to better meet the diverse needs of learners, promoting more effective reading strategies across various contexts.

The third research question examined significant differences in reading strategies among ESP students based on age and major. The data analysis revealed no significant differences across the three strategies concerning these demographics. This finding is in accordance with other studies examining

reading strategy variations by gender and language proficiency level (Al-Mekhlafi, 2018), gender (Arrastia et al., 2016), gender and reading ability (Wallace et al., 2021). It suggests that while demographic factors may not significantly impact strategy use, other factors like individual learning preferences and educational backgrounds might. This insight challenges assumptions about the homogeneity of reading strategies across demographic groups, highlighting the complexity of reading strategy use. In line with Meniado (2016) and Pammu et al. (2014) noting that reading strategies vary based on multiple factors, indicating that the significant difference in reading strategy may also vary if analysed from other differing demography characteristics, factors or variables that the participants have. The present research has the potential to provide a better understanding of how different types of learners use reading strategies. Such research could inform the development of personalized learning approaches that optimize reading strategy instruction, ultimately improving reading performance for students from various backgrounds and abilities.

The research shows that small group discussions and reading strategies greatly help ESP students improve their online text reading performance. These discussions encourage students to use Problem-Solving Strategies (PROB) more often. This engagement is enhanced by the collaborative nature of small group settings, where students discuss and share insights, helping each other comprehend challenging sections of the online text. Interestingly, the research found that students' age and major did not affect which reading strategies they used. This shows that small group discussions and effective reading strategies can work well for all students, regardless of their background. This universality may be attributed to the inclusive nature of collaborative learning, which accommodates various learning styles and preferences, ensuring equitable benefits for all students. Overall, these findings highlight how working together in groups and using specific reading strategies can help ESP students improve their online text reading performance, emphasizing their broad applicability across student demographics.

CONCLUSION

The findings clearly demonstrate an improvement in students' online text reading performance after participation in small group discussions. The substantial improvement in post-test scores, supported by statistical significance, highlights the value of this collaborative learning method as mentioned in Kamola's theory that small group discussions encourage active student participation and meaningful engagement, which are crucial in enhancing comprehension skills among ESP students. This enhancement in reading performance is not only a testament to the immediate academic benefits but also suggests long-term improvements in comprehension skills essential for ESP students.

Furthermore, the study revealed that ESP students actively use various reading strategies during small group discussions. The frequent use of strategies such as rereading texts and guessing word meanings across different categories (PROB, GLOB, SUP) during these discussions shows the flexibility and engagement fostered by these collaborative environments as stated by Lahuerta Martinez (2008), categorizing the frequency of reading strategy use among language learners as moderate to high. This active engagement suggests that small group discussions not only enhance comprehension but also promote strategic reading behaviors critical for language acquisition among students (Lazar, 2009). Despite variations in age and major among students, there were no significant differences in the frequency of reading strategy use. This consistency, as supported by Baştuğ's findings (2014) on demographic influences in reading comprehension, strengthens the universal applicability of small group discussions and reading strategies across diverse student demographics. In other words, this approach can be a valuable tool in various educational contexts.

This study's importance lies in its demonstration that small group discussions can create an inclusive and effective learning environment, promoting both academic performance and strategic learning. By situating these findings within the broader context of educational research, this study provides strong evidence supporting the integration of collaborative techniques in ESP curricula. The originality of this work stems from its comprehensive analysis of strategy uses and its implications for improving reading performance, contributing to the ongoing discourse on best practices in language education by supporting pedagogical strategies that empower students in diverse educational settings.

Moreover, the current study is still limited in scope, that it is not possible to draw fixed conclusions on the research area. However, the study has certainly provided enough recommendations for other future research. Firstly, it would be a great idea for language teachers to explicitly apply a small group discussion in a classroom since it can create a less-threatening condition for understanding

online English texts. Secondly, with reference to the research results, it is advisable that language teachers wisely focus on developing students' mostly used reading strategies to maximize their reading performance. Finally, it is recommended that educational researchers continue researching ESP reading performance from different perspectives. It is also expected that the limitations of this study can be further discussed in future studies. The next research can take into account larger samples with balanced representation in term of demography characteristics to produce more generalizable results.

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