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Information Systems Undergraduates' Reading Gains and Their Association with Learning Motivation after Small Group Discussion

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ABSTRACT

Reading comprehension is essential for ESP undergraduates to engage with complex texts, yet prior studies have often overlooked students' reading progress and its relationship with motivation, a key factor in enhancing this engagement. This study explored reading comprehension gains and post-learning motivation following small group discussions, focusing on how these variables are interconnected. This quantitative, pre-experimental study recruited 108 second-semester Information Systems students at Universitas Indraprasta PGRI. Reading gains were measured using a 25-item pretest–posttest test and analyzed with the Wilcoxon signed-rank test, while post-learning motivation was assessed via a 25-item questionnaire adapted from the ARCS Learning Motivation Questionnaire and analyzed descriptively. Spearman's rank-order correlation examined the association between variables. All analyses were conducted in SPSS 27. Results showed moderate reading comprehension gain of 4.07 that were not statistically significant ($p > 0.05$). Students' post-learning motivation was at a medium level ($M = 4.73$, $SD = 0.49$), with no significant correlation between reading gains and motivation ($\rho = -0.09$, $p = 0.38$). These findings suggest that small group discussions may help maintain moderate levels of post-learning motivation and show potential for supporting reading engagement in ESP classrooms, although the observed improvement in reading comprehension was not statistically significant.

Keywords: Reading Gains, Learning Motivation, Small Group Discussion

INTRODUCTION

Reading comprehension plays a central role in higher education, as undergraduate students are required to engage with complex academic texts to construct knowledge, develop disciplinary understanding, and achieve academic success. In English for Specific Purposes (ESP) contexts, reading extends beyond general language proficiency and functions as a core academic competence that enables learners to access discipline-specific concepts, terminologies, and modes of reasoning embedded in academic texts (Hermawati, 2022; Ionitui,

2024; Rubtsova, 2021). This challenge is particularly evident among information systems undergraduates, who are frequently exposed to cognitively demanding reading materials such as technical documentation, system descriptions, and research-based texts that differ substantially from general English reading tasks (Garcia & Bondoc, 2024; Gordon et al., 2022; Maguire et al., 2023). Consequently, higher education institutions have increasingly promoted learning environments that emphasise active engagement and collaborative knowledge construction to support students' comprehension of academic texts (Kumar & Shahani, 2023). Within such environments, collaborative learning is recognised for its potential to facilitate meaning negotiation and deeper understanding (Wagino et al., 2023).

Reading instruction in higher education continues to be evaluated largely through final performance outcomes (Orellana et al., 2024; Yapp & Graaff, 2023), with limited attention to students' learning progress. This misalignment highlights the need to reconceptualise reading comprehension as a developmental process reflected through learning gains rather than merely as an end product of instruction. When reading development is understood as a process shaped through interaction and shared meaning-making, instructional practices must provide learners with opportunities to engage actively in dialogue and collaborative sense-making. From the perspective of *Sociocultural Theory*, this kind of learning is constructed through social interaction and mediated by language within a community of learners (Vygotsky, 1978). In this sense, small group discussion emerges as a pedagogically coherent approach, as it enables students to collaboratively interpret texts, exchange viewpoints, and refine understanding through peer interaction, rather than passively receiving information. As a teaching–learning methodology, small group discussion facilitates interactive and collaborative learning, promotes active participation and communication skills, and supports knowledge retention, making it particularly relevant for addressing the developmental nature of reading comprehension in higher education contexts (Jaiswal, 2023; Roshni & Rahim, 2020).

Furthermore, reading comprehension development in higher education has traditionally been examined through comparisons of pretest and posttest scores (Ismail & Saiful, 2022; Marlia & Si, 2025; Teferra, 2022). However, such an approach often provides a limited picture of students' actual learning progress. Recent discussions in educational research emphasise the importance of conceptualising improvement as learning gains, which capture the extent to which learners progress relative to their initial level of competence rather than merely their final performance (Amaro, 2025; Harerimana et al., 2023; Ilie & Vermunt, 2025; Rogaten & Rienties, 2020). From a cognitive perspective, reading comprehension development can be explained through *Schema Theory* (Rumelhart, 1980), which posits that comprehension occurs when readers actively integrate new textual information with their existing knowledge structures. As learners expand and reorganise their schemata through instructional experiences, their comprehension ability develops progressively rather than instantaneously (Aihua & Swanto, 2023; Huyen, 2023; Mccarthy & Mcnamara, 2021), supporting the use of reading comprehension gains as an indicator of learning progress rather than static end-point achievement. Gain-based measures have therefore been increasingly recommended to account for individual differences in prior knowledge and to provide a fairer representation of instructional impact, particularly in ESP reading contexts where learners enter classrooms with diverse linguistic and disciplinary backgrounds (Tulasi & Murthy, 2022).

Learning motivation in educational research has long been conceptualised as an antecedent variable that predicts academic performance (Zhou & Ahmad, 2025) or engagement (Dierendonck et al., 2021; Zhu et al., 2024). However, this view overlooks its dynamic nature as a psychological state that can also emerge from learning experiences. *Self-Determination Theory* (Ryan & Deci, 2000) suggests that learners' motivation is shaped by their perceived competence, autonomy, and experiences of success during instruction, while *Expectancy–Value Theory* (Wigfield & Eccles, 2000) emphasises that learners' motivation depends on their

expectations of success and the value they place on the task. When learners experience meaningful progress and mastery, their intrinsic motivation and task value are likely to increase (Bazán-Perkins et al., 2025; Lu et al., 2025). In instructional settings, learning motivation may also be viewed through ARCS model comprising Attention, Relevance, Confidence, and Satisfaction as key motivational dimensions (Keller, 1987, 2010). This model is relevant for understanding students' post-learning motivation following small group discussion. From this standpoint, post-learning motivation represents an affective outcome reflecting learners' evaluations of their learning process and perceived gains rather than a stable trait existing prior to instruction. This conceptualisation is particularly relevant in ESP reading contexts, where students are required to engage with cognitively demanding, discipline-specific texts (Britt et al., 2022; Zaynitdinova, 2025), and where perceived reading improvement may influence their willingness to engage with similar academic texts in future learning situations.

Despite extensive research on reading instruction and learner motivation, several important gaps remain evident in the literature. First, learning motivation has predominantly been conceptualised as a predictor of academic achievement (Angaelo, 2022; Aslam et al., 2021; Eteng-uket & Effiom, 2024) rather than as a post-learning outcome that reflects students' actual learning experiences and progress. Second, improvements in reading comprehension are commonly operationalised using posttest scores (Ahmed et al., 2024; Hukom & Ferdinandus, 2024; Miryam et al., 2024; Ramirez-avila & Barreiro, 2021), with limited attention given to gain-based indicators that more accurately represent individual learning development. Moreover, empirical studies rarely examine the relationship between reading comprehension gains and students' post-learning motivation following instructional activities, leaving the interplay between cognitive improvement and affective responses insufficiently explored. Although small group discussion has been widely investigated for its instructional effectiveness (Anwar et al., 2023; Ningsi et al., 2021; Rusmiati et al., 2021; Yustina et al., 2021), its role in shaping students' motivation after learning has received comparatively little empirical attention. In ESP reading research, particularly, cognitive learning gains and affective outcomes are often examined separately rather than within a single analytical framework (Kangxing et al., 2021; Muhammadpour & Khalili Sabet, 2024; Saidova, 2022). These limitations are further compounded by the scarcity of empirical studies focusing on information systems undergraduates, whose disciplinary reading demands differ substantially from those of general EFL learners, indicating a clear need for context-specific investigation.

In response to these gaps, the present study reframes learning motivation as a post-learning affective outcome associated with students' reading comprehension gains rather than as a mere antecedent of achievement. By employing gain-based indicators, this study offers a more sensitive representation of students' reading development after participating in small group discussion as a pedagogical context. Furthermore, it explicitly examines the relationship between reading comprehension gains and post-learning motivation, thereby integrating cognitive and affective dimensions of learning within a single analytical framework in an ESP reading setting. Accordingly, this study addresses the following research questions: (1) To what extent do information systems undergraduates achieve reading comprehension gains after small group discussion? (2) What are information systems undergraduates' learning motivation levels after participating in small group discussion? and (3) Is there a significant relationship between information systems undergraduates' reading comprehension gains and their post-learning motivation after small group discussion? By addressing these questions, the study integrates cognitive learning gains and affective outcomes within a single analytical framework and provides discipline-specific empirical evidence from an ESP reading context, contributing to a more nuanced understanding of reading development and learner motivation in higher education.

METHOD

This quantitative study used a pre-experimental one-group pretest–posttest design to examine participants’ reading performance gains following small group discussion and a correlational approach to investigate their relationship with post-learning motivation. In the pre-experimental phase, small group discussion functioned as the instructional independent variable, while reading comprehension gains served as the dependent variable. In the correlational phase, reading comprehension gains and post-learning motivation were analysed as associated variables to examine their relationship. The participants were 108 second-semester students purposively selected from the Information Systems program at Universitas Indraprasta PGRI, with only students enrolled in the Business English course and completing all required instruments included. Of the participants, 67 (62%) were male and 41 (37.9%) were female. Regarding age, 81 participants (75 %) were aged 17–19, 22 (20.3%) were 20–22, and 5 (4.6%) were 23–25 years old.

This study used two instruments: Reading comprehension gains were measured using a 25-item pretest–posttest reading test with a maximum score of 100, while post-learning motivation was assessed using a 25-item questionnaire on a 6-point Likert scale (strongly agree–strongly disagree). The latter was adapted from the ARCS Learning Motivation Questionnaire (Lai, 2021) and translated into Indonesian to ensure linguistic and contextual appropriateness. Construct validity was examined using item–total correlation, showing Pearson’s r values of 0.22–0.70 for the reading test, with only one item invalid and 0.22–0.72 for the motivation questionnaire. Reliability analysis indicated good internal consistency, with Cronbach’s alpha values of 0.85 and 0.89 for the reading test and the motivation questionnaire, respectively. The Kolmogorov–Smirnov test indicated that reading gain data were not normally distributed ($p < 0.05$), whereas motivation data were normally distributed ($p = 0.38$). Therefore, non-parametric analyses were applied.

The study was conducted over one semester in a blended learning environment, where both face-to-face and online modes were used to support learning activities. Small group discussions were implemented across 11 instructional sessions, with students working in groups of five to six members. During these sessions, students discussed selected texts and answered comprehension questions, while some meetings involved transcribing listening recordings before responding to questions based on the transcribed texts. Data were collected via Google Forms, with the pretest administered before the intervention and the posttest and motivation questionnaire administered after the intervention. Reading comprehension gains were calculated by subtracting pretest scores from posttest scores, while post-learning motivation was analyzed descriptively, and the relationship between the two variables was examined using Spearman’s rank-order correlation. For descriptive interpretation, reading gain scores were categorized into low (-76–-8), medium (-4–20), and high (24–72) levels, and motivation scores were classified into low (3.52–4.36), medium (4.40–4.96), and high (5.00–5.88) levels based on score distribution. All analyses were conducted using SPSS version 27. Informed consent was provided at the beginning of the reading test and questionnaire, with students completing them considered to have agreed to take part in the study.

RESULTS AND DISCUSSION

Results

Extent of Reading Comprehension Gains of Information Systems Undergraduates after Small Group Discussion

This section presents the students’ reading comprehension improvement after participating in small group discussions. As shown in Table 1, it describes the overall gain and the results of a Wilcoxon signed-rank test to examine the significance of the observed improvement.

Table 1. Reading Comprehension Scores: Descriptive Statistics, Gain, and Wilcoxon Test

Test	M	SD	Gain	p
Pretest	77.63	19.27	4.07	.054
Posttest	81.70	17.06		

As seen in Table 1, students’ mean reading comprehension score increased from 77.63 (SD = 19.27) in the pretest to 81.70 (SD = 17.06) in the posttest, resulting in an average reading gain of 4.07 points. According to the predefined gain categorization, this gain falls within the medium level, indicating a moderate improvement in students’ reading comprehension following the instructional intervention. The detailed distribution of students’ reading gain categories is presented in Figure 1.

To statistically examine whether this observed improvement was significant, a Wilcoxon signed-rank test was conducted to compare students’ reading comprehension scores before and after the small group discussion intervention. The results indicated that posttest scores tended to be higher than pretest scores; however, the difference did not reach statistical significance at .05 level ($Z = -1.93$, $p = .054$). Overall, although this indicates that students’ reading comprehension improved after the intervention, the magnitude of the improvement was limited and varied across students.

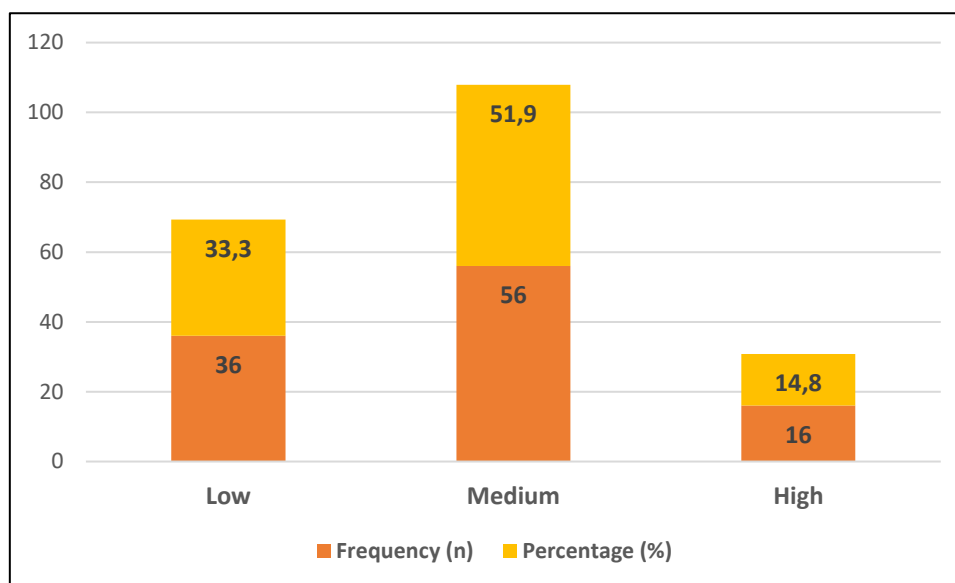


Figure 1. Reading Gain Level of Students

Information Systems Undergraduates’ Motivation after Small Group Discussion

Following the discussion of students’ reading comprehension gains, this section presents descriptive statistics of students’ learning motivation after the small group discussion. Table 2 reports the mean scores and standard deviations for each motivation item, arranged in descending order from the highest to the lowest mean value, which are then summarized into an overall learning motivation score.

Table 2. Descriptive Statistics of Learning Motivation

Statements	M	SD
5. Taking English classes is helpful in life.	5.50	0.73
7. The English class is very important to me.	5.25	0.83
9. I am confident that I can learn English well.	5.19	0.70
12. Learning English well allows me to do more things I like.	5.13	0.63
25. I am very happy to learn English.	5.11	0.73

24.	English class is great, I think I can learn English well.	5.05	0.63
2.	I think the English class is challenging.	4.98	0.77
14.	English examination is challenging.	4.97	0.75
15.	English class is very interesting.	4.94	0.62
10.	I will be pleased with the English class.	4.92	0.74
20.	English class activities are fun.	4.89	0.69
16.	I like taking English class very much.	4.87	0.70
13.	I will use the English words I learned in daily life.	4.85	0.73
22.	Taking English class makes me feel good.	4.84	0.69
17.	I can take the English exam well.	4.75	0.70
4.	I am satisfied with the score on the English test, and I think I am great.	4.69	1.32
3.	I know what to learn in English class.	4.62	0.82
6.	The textbooks in the English class are very attractive to me.	4.62	1.19
19.	The comments from my English teacher made me think I am great.	4.36	1.00
18.	I do not need to take English class because I have learned many things before.	4.30	1.25
8.	I think the English class is boring.	4.29	1.18
21.	English class activities are not fun.	4.17	1.26
23.	I do not understand what the English teacher teaches.	4.06	1.27
1.	I think the English class is easy.	3.98	1.50
11.	English textbooks are boring.	3.94	1.19
Overall Learning Motivation		4.73	0.49

Table 2 showed that students' mean learning motivation score was 4.73 (SD = 0.49), which corresponds to a medium level based on the predefined categorization. This finding suggests that, following participation in the small group discussion, students generally exhibited a moderate level of motivation toward learning. The relatively small standard deviation indicates that the motivation scores were fairly consistent across participants. Figure 2 illustrates the distribution of students across the predefined motivation categories.

At the item level, the five highest-rated motivation items all obtained mean scores above 5.00. The highest mean was observed for "Taking English classes is helpful in life" (M = 5.50, SD = 0.73), followed by "The English class is very important to me" (M = 5.25, SD = 0.83) and "I am confident that I can learn English well" (M = 5.19, SD = 0.70). Similarly, high mean scores were found for "Learning English well allows me to do more things I like" (M = 5.13, SD = 0.63) and "I am very happy to learn English" (M = 5.11, SD = 0.73). Overall, these top-rated items indicate that students' motivation after the small group discussion was primarily characterized by a strong perceived value of learning English, positive emotional engagement, and confidence in their learning ability, while the moderate overall score suggests that such positive perceptions were not uniformly reflected across all motivation items.

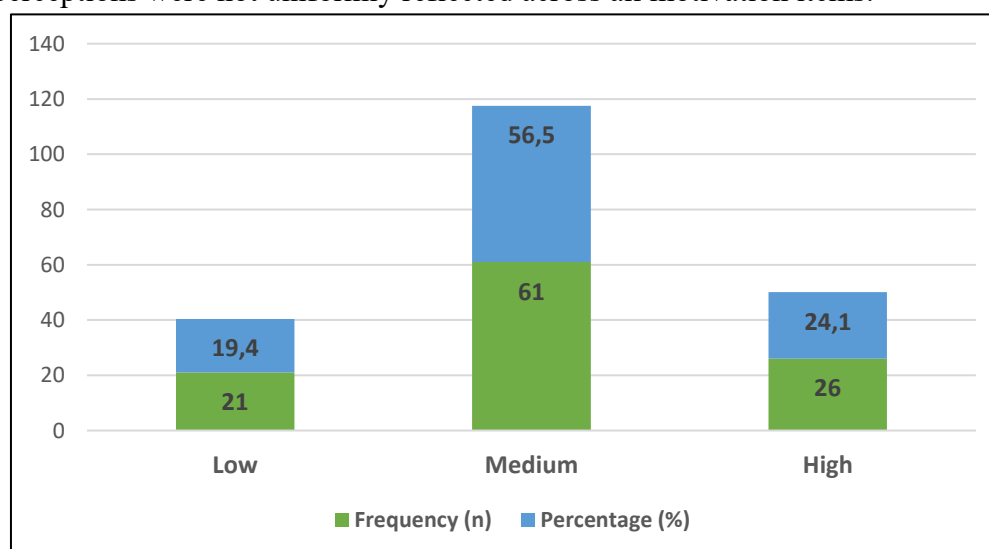


Figure 2. Learning Motivation Level of Students

Association Between Reading Comprehension Gains and Learning Motivation

Having examined students' reading comprehension improvement and their post-learning motivation, this section explores the potential relationship between these two variables. As presented in Table 3, a Spearman's rank-order correlation was conducted to determine whether students who showed greater gains in reading comprehension also exhibited higher levels of learning motivation.

Table 3. Correlation between Reading Comprehension Gain and Learning Motivation

Variable	1	2	<i>p</i>
1. Reading Comprehension Gain	1	-0.09	0.38
2. Learning Motivation	-0.09	1	

Table 3 revealed that the association between students' reading comprehension gains and their post-learning motivation was very weak and negative ($\rho = -0.09$) and not statistically significant ($p = 0.38$). The very weak magnitude indicates that changes in students' reading comprehension scores were almost unrelated to changes in their motivation. The negative sign suggests a slight tendency for students with higher reading gains to show lower motivation, but the effect is negligible. Overall, this result indicates that, in this sample, the magnitude of students' improvement in reading comprehension was not meaningfully associated with their level of learning motivation after participating in the small group discussion.

Discussion

This study examined the role of small group discussion in supporting reading development and learning motivation among information systems undergraduates in an ESP reading context and explored whether progress in reading was related to students' motivational responses after instruction. The findings showed a modest increase in students' reading comprehension scores following participation in small group discussions; however, this change did not reach statistical significance within the duration of the study. In addition, students generally reported positive attitudes toward learning English, indicating a medium level of motivation following their participation in the discussion-based activities. However, the results suggest that improvements in reading and students' motivation did not develop in a closely linked manner. These findings suggest that small group discussion may support positive learning attitudes and provide opportunities for reading engagement in ESP classrooms, although changes in reading performance and motivational responses were not observed to develop in a closely linked manner within the duration of the study.

The finding that small group discussion was associated with a moderate improvement in students' reading comprehension, despite the lack of statistically significant gains, suggests that the instructional approach supported reading development in a gradual and ongoing manner rather than producing immediate outcomes. It is in line with *Sociocultural Theory* by Vygotsky (1978), as small group discussion provided a socially mediated learning environment in which students collaboratively negotiated meaning and clarified discipline-specific concepts, a process that is particularly important in cognitively demanding ESP texts (Yawiloeng, 2021). From a cognitive viewpoint, this pattern also aligns with *Schema Theory* (Rumelhart, 1980), suggesting that comprehension develops as learners progressively activate and reorganise prior knowledge rather than showing instant score improvement. However, these findings contrast with previous empirical studies (Cairns & Areepattamannil, 2022; Dugasa et al., 2022; Wendaferew & Damte, 2023) reporting that reading instruction emphasising explicit, teacher-directed approaches resulted in statistically significant post-test gains, while collaborative or minimally guided learning produced weaker or less immediate effects on measurable reading outcomes. Despite this contrast, the findings of the present study support prior research

advocating learning gains as a more sensitive indicator of instructional impact, as gain-based measures capture students' progress relative to their initial competence and better reflect reading development in ESP contexts characterised by heterogeneous prior knowledge (McGowen & Davis, 2022; Rogaten & Rienties, 2020; Zoanetti, 2021).

The present findings partly align with previous studies that have reported positive effects of small group discussion on reading comprehension, while also drawing attention to important contextual factors. Earlier research has shown that collaborative discussion can improve comprehension by encouraging interaction, clarification, and shared meaning construction (Chen & Lin, 2021; Ye & Pennisi, 2022). However, the extent of improvement often differs depending on the length of instruction, learner characteristics, and text difficulty. In ESP settings, particularly in fields such as information systems, technical reading materials tend to place substantial cognitive and linguistic demands on learners, which may limit short-term measurable improvement (Sintia et al., 2025). When compared with studies conducted in general EFL contexts, the moderate and non-significant gains observed in this study suggest that reading development in ESP contexts is more gradual and depends on learners' increasing familiarity with disciplinary language (Tamrin, 2023). Moreover, by using a gain-based perspective rather than relying only on posttest scores, this study extends previous research by showing that meaningful learning progress may still occur even when statistical significance is not obtained (Hopkins, 2022; Magara & Boury-Jamot, 2024), supporting the contemporary argument by Khadka's (2024) argument that reading development should be understood as a process-oriented outcome rather than a fixed final result.

The finding that students demonstrated an overall medium level of learning motivation after participating in small group discussion indicates that the instructional approach promoted generally positive emotional responses toward learning English without leading to very high motivational levels. From the perspective of *Self-Determination Theory* (Ryan & Deci, 2000), this finding of this study support the view that small group discussion may have supported students' sense of relatedness and, to some degree, their perceived competence through peer interaction and collaborative work with texts. However, the moderate level of motivation suggests that students' experiences of autonomy and mastery were still developing, especially in an ESP reading context that involves cognitively demanding and discipline-specific materials (Britt et al., 2022; Zaynitdinova, 2025). Likewise, *Expectancy-Value Theory* (Wigfield & Eccles, 2000) offers a useful framework for interpreting this result, as students' motivation is influenced by both their expectations of success and the value they assign to the learning task. Although students appeared to recognise the importance of English and its relevance to their academic field, their expectations of successfully understanding complex technical texts may have remained cautious, resulting in a moderate rather than high motivational state. Nevertheless, these findings contrast with studies reporting that collaborative learning can lead to high motivational gains, especially when instructional tasks are less cognitively demanding and learners experience rapid success (Evans et al., 2024; Loes, 2022). Despite this contrast, the present findings support previous research suggesting that post-learning motivation can be viewed as an affective outcome that reflects students' evaluation of their learning experience and perceived progress (Cho et al., 2021), rather than as a stable characteristic, which is particularly relevant in ESP contexts where motivation often develops through sustained exposure and repeated learning success.

The absence of a significant relationship between students' reading comprehension gains and their post-learning motivation indicates that cognitive development and affective responses following small group discussion did not develop in a simple or directly proportional way. Consistent with *Schema Theory* (Rumelhart, 1980), the findings of this study support the view that reading comprehension growth involves the gradual activation and reorganisation of knowledge structures, processes that learners may not immediately recognise as clear

improvement. As a result, students may feel engaged and satisfied with collaborative learning activities even when they do not perceive substantial gains in their reading performance. At the same time, motivational theories such as *Self-Determination Theory* (Ryan & Deci, 2000) and *Expectancy-Value Theory* (Wigfield & Eccles, 2000) suggest that motivation can be influenced by social interaction, perceived task value, and classroom experiences independently of measurable cognitive outcomes. In the ESP context of information systems, motivation may therefore reflect students' appreciation of the learning process and its relevance rather than their immediate reading improvement (Hotak et al., 2024). However, this finding contrasts with prior studies reporting a positive association between motivation and reading achievement, which suggest that higher motivation directly facilitates comprehension improvement (Ma & Zhao, 2025; Spadafora et al., 2021; Zenebe & Kebede, 2024). Taken together, the present findings emphasise the importance of understanding learning outcomes as multidimensional, in which cognitive gains and affective responses develop through different but complementary pathways, particularly in socially mediated instructional approaches such as small group discussion.

CONCLUSION

This study explored how reading comprehension develops and how learning motivation is shaped among information systems undergraduates in an ESP setting through small group discussions. The results showed that participating in these discussions led to moderate but statistically non-significant improvements in reading comprehension, suggesting that peer discussion alone may be insufficient to substantially enhance students' understanding of academic texts in a short-term intervention. Nevertheless, students reported a medium level of motivation, reflecting generally positive attitudes toward learning English. This indicates that cognitive progress and motivational engagement may function independently in brief collaborative learning sessions. Theoretically, these findings contribute to the understanding of collaborative learning by highlighting the potential role of social interaction in supporting learning processes, as emphasized in Vygotsky's Sociocultural Theory, while also suggesting limitations in short-term collaborative settings. They also suggest that activating learners' background knowledge through peer interaction alone may be insufficient to produce meaningful improvements in reading comprehension, offering a more nuanced understanding of Rumelhart's Schema Theory in collaborative learning settings.

The study offers several practical implications for educators by suggesting small group discussions with clearly structured reading activities, guided interaction, and peer feedback opportunities, while indicating that sustained implementation and stronger instructional support may be necessary to improve reading comprehension and learning motivation meaningfully. To better assess students' motivation, instructors could combine self-reports with simple observation or online participation tracking. Limitations include a single-institution sample, the short duration of discussion sessions, and reliance on self-reported motivation measures, which may limit generalizability. Future research could examine longer discussion programs, compare different group sizes or types of activities, and include students from multiple institutions to enhance generalizability, while using mixed-method designs to better understand the interaction between cognitive and motivational outcomes. Overall, the study suggests that despite supporting positive learning experiences, small group discussion alone is unlikely to produce meaningful improvements in reading comprehension or motivational outcomes without sustained implementation and stronger instructional support in ESP contexts.

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