

INTEGRATING E-PORTFOLIOS IN FLIPPED ENGLISH CLASSES: IMPACTS ON NURSING ESP SPEAKING

BRIDGITA BERLIAN BUDIANI¹, SRI WULI FITRIATI*², WIDHIYANTO³, SRI WAHYUNI⁴

^{1,2,3,4}Universitas Negeri Semarang

bridgita_berlian@students.unnes.ac.id, sriwuli.fitriati@mail.unnes.ac.id*, pakwidhi_english@mail.unnes.ac.id, sriwahyunifbs@mail.unnes.ac.id

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Abstract

This study examines the effectiveness of integrating e-portfolios into a flipped English classroom to enhance English for Specific Purposes (ESP) speaking performance and speaking self-efficacy among nursing students. Grounded in ESP pedagogy, communicative language teaching, and self-efficacy theory, the study addresses the persistent gap between students' linguistic knowledge and their ability to perform professional oral communication in healthcare contexts. A quasi-experimental one-group pre-test-post-test design was implemented with 40 second-year nursing students at a private health sciences college in Central Java. The instructional intervention combined pre-class input, in-class communicative practice, and iterative speaking development through e-portfolio-based recording, feedback, and reflection over one academic semester. Speaking performance was assessed through task-based ESP speaking tests, while self-efficacy was measured using a Likert-scale questionnaire. The findings revealed statistically significant improvements in both speaking performance and speaking self-efficacy, with large effect sizes indicating substantial educational impact. The results suggest that integrating e-portfolios within a flipped classroom expands opportunities for structured practice, fosters reflective learning, and strengthens learners' confidence, thereby supporting both linguistic and psychological dimensions of professional communication. The study underscores the pedagogical value of technology-supported, contextually grounded speaking instruction in health sciences education and recommends the combined use of flipped learning and e-portfolio-based formative assessment to promote sustainable ESP speaking development.

Keywords: E-portfolio, flipped classroom, English for Specific Purposes (ESP), speaking self-efficacy, nursing students.

INTRODUCTION

Speaking skills are essential for preparing future healthcare professionals, as students must communicate effectively with patients, families, and multidisciplinary teams. For nursing students, English speaking competence is particularly important because professional practice involves interviewing patients, explaining procedures, providing care instructions, delivering health education, and accessing international medical literature (Hyland, 2019; Basturkmen, 2010). However, speaking remains one of the most challenging competencies in English for Specific Purposes (ESP) education, especially in health-related higher education contexts where opportunities for authentic oral interaction are limited (Goh & Burns, 2012).

Previous studies indicate that English instruction in higher education often prioritizes grammar, reading comprehension, and writing over oral communication (Nation & Newton, 2009). As a result, ESP learners may understand discipline-specific concepts yet struggle to express professional meanings clearly in spoken English. This gap between linguistic knowledge and communicative performance is common among health sciences students, who frequently report low confidence and anxiety when using English in academic or clinical simulations (Ockey & Choi, 2015).

Flipped learning has been proposed as a strategy to address these challenges by redistributing instructional time. In a flipped classroom, students engage with instructional materials before class, allowing in-class sessions to focus on interactive and student-centered activities such as discussions, role-plays, and problem-solving tasks (Bergmann & Sams, 2012). Research in language education suggests that flipped instruction can increase learner engagement and create more opportunities for meaningful language use (Hung, 2015; Lee & Wallace, 2018). Nevertheless, empirical findings show that flipped learning alone does not automatically improve speaking performance, particularly when learners lack structured preparation, rehearsal, and feedback outside the classroom (Thai, De Wever, & Valcke, 2017).

The integration of electronic portfolios (e-portfolios) may strengthen flipped language learning by providing structured support beyond classroom interaction. In language education, e-portfolios function as digital platforms for documenting learning progress, promoting reflection, and supporting formative assessment (Barrett, 2011). In speaking instruction, they enable students to record oral performances, monitor development over time, and receive targeted feedback, thereby encouraging repeated practice and self-directed learning (Lam, 2018; Cheng & Chau, 2013). Repeated recording and reflection have been shown to improve fluency, pronunciation awareness, and organization of spoken discourse (Sun, 2012). Despite these benefits, research examining the combined use of e-portfolios and flipped learning for ESP speaking development in health sciences education remains limited.

In addition to instructional design, psychological factors also influence speaking performance. Social cognitive theory emphasizes that self-efficacy, learners' beliefs in their ability to perform specific tasks, affects effort, persistence, and performance outcomes (Bandura, 1997). Self-efficacy develops through repeated practice, successful task completion, and constructive feedback. The iterative processes embedded in e-portfolios,

together with preparation opportunities in flipped learning, may therefore enhance both speaking practice and learners' confidence, indirectly supporting speaking development.

The ESP context of nursing education requires specific communicative competencies. Nursing students must use English to describe symptoms, explain care procedures, provide medication instructions, and deliver clear, patient-centered health information (Basturkmen, 2010). Developing these abilities requires not only exposure to language input but also structured speaking practice aligned with professional contexts. Integrating e-portfolios into a flipped English classroom may extend opportunities for practice and feedback beyond limited classroom time.

Accordingly, this study investigates the impact of integrating e-portfolios into a flipped English classroom on the ESP speaking development of nursing students at a private college of health sciences. The study examines both linguistic outcomes, represented by speaking performance, and psychological outcomes, represented by speaking self-efficacy, recognizing that effective professional communication requires both language proficiency and confidence.

The research employs a quantitative one-group pre-test-post-test design involving 40 second-year nursing students. Speaking performance is measured through task-based ESP speaking assessments, while speaking self-efficacy is evaluated using a self-efficacy questionnaire. By comparing pre- and post-intervention results, this study aims to provide empirical evidence on the effectiveness of technology-enhanced flipped instruction supported by e-portfolios in improving discipline-specific oral communication in health sciences education.

Grounded in the foregoing theoretical and pedagogical perspectives, this study investigates how the integration of e-portfolios in a flipped English classroom supports nursing students' development of English for Specific Purposes (ESP) speaking skills, with particular emphasis on both linguistic performance and psychological readiness for professional communication. Specifically, the study is guided by two research questions: to what extent does the integration of e-portfolios within a flipped English classroom improve nursing students' ESP speaking performance? and to what extent does this integration enhance nursing students' speaking self-efficacy when performing professional communication tasks? By addressing these questions, the study seeks to elucidate the pedagogical value of combining technology-mediated formative assessment with a flipped instructional design in promoting discipline-specific oral communication competence while

simultaneously strengthening learners' confidence in English-mediated healthcare interactions.

Literature Review

In English for Specific Purposes (ESP), language instruction is shaped by the communicative requirements of particular professional domains rather than by general linguistic competence alone (Basturkmen, 2010; Hyland, 2019). In health sciences education, speaking competence therefore involves not only grammatical accuracy but also the ability to perform interactional, explanatory, and procedural communication in authentic professional contexts. Nursing students, for instance, must conduct patient interviews, explain medical procedures, provide medication instructions, and collaborate with healthcare professionals in patient-centered interactions (Candlin & Candlin, 2003; McCarthy, O'Keeffe, & Walsh, 2010). Effective nurse-patient communication integrates informational clarity with interpersonal competence, including politeness strategies, empathy, and culturally appropriate language use, reflecting the broader dimensions of communicative competence such as grammatical, sociolinguistic, discourse, and strategic abilities (Sheldon, Barrett, & Ellington, 2006; Kourkouta & Papathanasiou, 2014).

Despite its importance, many nursing students encounter difficulties performing oral communication tasks in English-medium or simulated clinical settings. Although they may understand medical terminology conceptually, they often struggle to use it fluently and spontaneously, revealing a gap between declarative knowledge and procedural communicative competence (Chan, 2013; Yang, 2015; Nation & Newton, 2009; Goh & Burns, 2012). These challenges are further intensified by the cognitive and emotional demands of clinical communication, where students must simultaneously manage medical reasoning, patient interaction, and language production. Anxiety and low confidence frequently emerge when learners are required to communicate in English before peers or simulated patients, underscoring the need for repeated practice, constructive feedback, and reflective learning opportunities (Liu & Jackson, 2008; Khampusaen & Lao-Un, 2018; Bandura, 1997).

One instructional approach that addresses these challenges is flipped learning, which relocates content delivery outside the classroom and allocates class time for interactive learning activities (Bergmann & Sams, 2012). In language education, flipped instruction has been associated with increased engagement, collaboration, and opportunities for meaningful communication aligned with communicative language teaching principles (Hung, 2015; Lee

& Wallace, 2018). Within ESP contexts, this approach supports task-based speaking activities such as case discussions, role plays, and healthcare simulations. However, research suggests that flipped learning alone does not automatically improve speaking performance; its effectiveness depends on structured preparation, guided practice, and continuous feedback (Thai et al., 2017; Foronda, Liu, & Bauman, 2013; Gopalan et al., 2018).

To address this limitation, electronic portfolios (e-portfolios) have been widely adopted as formative assessment tools that support documentation, reflection, and iterative improvement of learning outcomes (Barrett, 2011). In speaking instruction, e-portfolios allow learners to record oral performances, review their progress, and receive targeted feedback, thereby encouraging self-regulated learning and metacognitive awareness. Previous studies report that digital portfolio use can enhance speaking performance, learner autonomy, and reflective capacity in language learning contexts (Huang & Hung, 2010; Aghazadeh & Soleimani, 2020), while similar benefits have been observed in nursing education where digital portfolios facilitate reflective development of clinical communication skills (Garrett, MacPhee, & Jackson, 2013; Wuetherick & Dickinson, 2015). Nevertheless, their effectiveness depends on purposeful task design and meaningful feedback to ensure that portfolios function as active learning tools rather than passive repositories (Cheng & Chau, 2013).

Integrating flipped learning and e-portfolios therefore offers a complementary instructional framework for ESP speaking development. While flipped classrooms expand opportunities for in-class interaction and feedback, e-portfolios support continuous practice, reflection, and evidence of progress beyond classroom boundaries (Bergmann & Sams, 2012; Lee & Wallace, 2018; Barrett, 2011; Cheng & Chau, 2013). This integration aligns with cyclical models of skill acquisition involving input exposure, guided rehearsal, performance, feedback, reflection, and revision (Candlin & Candlin, 2003; Thai et al., 2017). Moreover, speaking performance and self-efficacy are closely interconnected, as learners' confidence influences participation, persistence, and emotional regulation during communication tasks (Bandura, 1997; Kusuma & Waluyo, 2023; Khampusaen & Lao-Un, 2018). Despite these theoretical connections, empirical studies examining the combined implementation of flipped learning and e-portfolio-based formative assessment in ESP health sciences education remain limited. Accordingly, this study investigates the impact of an e-portfolio-supported flipped classroom on nursing students' ESP speaking performance and speaking self-efficacy within a healthcare education context.

METHOD

Research Design

This study employed a one-group pre-test-post-test quasi-experimental design to examine the effectiveness of a flipped English classroom supported by e-portfolio-based speaking practice in improving nursing students' ESP speaking performance. The study was categorized as quasi-experimental because participants were not randomly assigned, and the research was conducted within an intact class without a parallel control group.

The design allowed measurement of performance changes over time by comparing speaking outcomes before and after the instructional intervention. The independent variable was the integrated instructional model combining flipped learning with e-portfolio-mediated speaking tasks. The dependent variables were (1) students' ESP speaking performance and (2) speaking self-efficacy, included to provide complementary evidence of learners' perceived ability to perform professional oral communication tasks.

Participants and Context

The participants consisted of 40 second-year diploma nursing students enrolled at a private college of health sciences in Central Java. The class was selected through purposive sampling, as the students required English primarily for professional communication tasks, including explaining nursing procedures, providing patient care instructions, monitoring patient conditions, documenting symptoms, and participating in simulated clinical interactions.

Previous English instruction had largely emphasized receptive skills and theoretical knowledge rather than sustained oral production, making speaking development a key instructional need. Participation followed institutional academic procedures; students were informed that their learning activities would be used for research purposes, confidentiality of performance data was maintained, and participation did not affect course grades.

Instructional Intervention

The instructional intervention was conducted over one academic semester using an e-portfolio-supported flipped classroom model to enhance students' ESP speaking performance and speaking self-efficacy in healthcare communication contexts. The design integrated structured pre-class preparation, intensive in-class communicative practice, and continuous formative assessment through digital portfolios, allowing speaking development to occur through iterative cycles of input, rehearsal, performance, feedback, and reflection.

Learning activities were divided into pre-class and in-class phases. During the pre-class phase, students accessed materials through Google Drive, including video explanations of target language functions, nursing-related ESP vocabulary and expressions, model nurse-patient dialogues, and scenario-based speaking tasks. This phase provided linguistic input and discourse models prior to classroom meetings, enabling face-to-face sessions to focus on communicative performance. A WhatsApp Group served as an additional communication channel for instructions, reminders, and ongoing lecturer support outside class hours.

The in-class phase emphasized active speaking practice through role plays simulating nurse-patient interactions, problem-solving discussions based on clinical scenarios, and task-based speaking activities. The lecturer modeled appropriate professional language use, monitored interactions, and provided immediate formative feedback. As a result, classroom time prioritized fluency development, interactional competence, and real-time communication rather than direct language explanation.

A central component of the intervention was the e-portfolio system, which functioned as a structured environment for rehearsal, documentation, and reflection. Each student maintained an individual digital portfolio containing recorded speaking performances. Students uploaded audio or video tasks, revised their performances based on feedback, and produced reflective entries addressing progress and challenges. This system extended speaking practice beyond classroom sessions, supported iterative improvement, and provided observable evidence of performance development.

The intervention procedure consisted of 10 structured meetings, as outlined below.

Table 1. Instructional Intervention Procedure

Phase	Description of Activities	Duration
Pre-Intervention Requirement	Students had completed at least one semester of English/ESP and were familiar with basic healthcare terminology (symptoms, body parts, simple instructions).	-
Meeting 1 - Pre-Test	Students performed a simulated clinical speaking task (healthcare professional-patient role-play) involving greeting, symptom inquiry, and basic instruction giving. Performances were recorded and assessed using a standardized speaking rubric. Students also completed a Speaking Self-Efficacy Questionnaire.	1 meeting
Meeting 2 - Orientation	Introduction to the flipped classroom model, e-portfolio procedures, recording techniques, reflection guidelines, and assessment rubric.	1 meeting

Treatment Phase (Meetings 3-9)

Each meeting followed the cycle: Pre-class preparation → In-class speaking task → E-portfolio submission → Reflection and feedback

Meeting	ESP Speaking Focus	Pre-Class Input	In-Class Activity	E-Portfolio Task
3	Taking patient history	Clinical dialogue video + vocabulary	Role-play: symptom inquiry	Upload + reflection
4	Describing pain and symptoms	Video explanation	Pair dialogue practice	Re-record + reflection
5	Explaining procedures	Demonstration video	Simulation: therapy explanation	Upload + self-evaluation
6	Giving instructions	Instructional language video	Task-based instruction practice	Upload + peer feedback reflection
7	Responding to patient questions	Clinical Q&A video	Spontaneous role-play	Upload + fluency reflection
8	Patient education and advice	Education scenario video	Simulation: giving advice	Upload + clarity reflection
9	Integrated clinical interaction	Case-based video	Full clinical role-play	Upload best performance + progress reflection

Phase	Description of Activities	Duration
Meeting 10 - Post-Test	Students completed a post-test clinical speaking task with greater interactional complexity. Performances were recorded and assessed using the same rubric as the pre-test. Students again completed the Speaking Self-Efficacy Questionnaire, and final e-portfolios were collected.	1 meeting

The instructional intervention operationalized a pedagogical cycle in which flipped input supported classroom performance, while the e-portfolio system facilitated continuous rehearsal, reflection, and formative feedback. This integration was intended to enhance both observable speaking performance and learners' confidence in their communicative ability.

Research Instruments

Two instruments were employed to obtain comprehensive data on students' linguistic performance and psychological readiness: an ESP speaking performance test and a speaking self-efficacy questionnaire.

ESP Speaking Performance Test

Students' speaking performance was measured through a task-based speaking test administered as both pre-test and post-test. The tasks reflected authentic nursing communication scenarios, including explaining care procedures, describing patient

conditions, providing treatment instructions, and delivering patient education, thereby ensuring content validity through alignment with professional communication demands.

All performances were video-recorded and evaluated using an analytic scoring rubric adapted from established language assessment frameworks. The rubric assessed five components: fluency, pronunciation, vocabulary use, grammatical accuracy, and content relevance, allowing detailed evaluation of speaking proficiency. Instrument validity was established through expert judgment by lecturers in English language education and ESP. Reliability was ensured through independent scoring by two trained raters, with inter-rater reliability calculated using Pearson's correlation coefficient.

Speaking Self-Efficacy Questionnaire

Students' perceived speaking capability was measured using a Likert-scale self-efficacy questionnaire administered during both pre-test and post-test phases. The instrument assessed confidence in explaining procedures in English, speaking before others, managing communication difficulties, and completing ESP speaking tasks. Prior to implementation, the questionnaire was pilot tested, and internal consistency reliability was examined using Cronbach's Alpha, with coefficients of 0.70 or higher considered acceptable. The questionnaire complemented performance data by capturing affective factors influencing language use and willingness to communicate.

Data Analysis

Data analysis aimed to determine whether the intervention produced statistically significant improvements in ESP speaking performance and speaking self-efficacy. Normality of score distribution was first tested using the Shapiro-Wilk test due to the sample size being fewer than fifty, with significance values above 0.05 indicating normal distribution. A paired-samples t-test was then conducted to compare pre-test and post-test scores, determining statistical significance at the 0.05 level. To measure the magnitude of improvement, Cohen's *d* effect size was calculated and interpreted as small (0.20), medium (0.50), or large (0.80 or above). Reliability analyses were subsequently reconfirmed using the actual research data to ensure consistency of questionnaire responses and rater scoring.

RESULTS

Descriptive Statistics

Descriptive statistics were computed to provide an overview of students' ESP speaking performance before and after the instructional intervention.

Table 2. Descriptive Statistics of Speaking Scores

Test	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	40	53.55	5.15379	0.81489
Post-test	40	63.10	6.02048	0.95192

As presented in Table 2, the mean score in the pre-test was 53.55, while the post-test mean increased to 63.10. This difference indicates a mean gain of 9.55 points, suggesting that students performed better after participating in the e-portfolio-supported flipped English classroom.

The standard deviation values show the spread of scores in both testing phases. Although variability remained present among learners, the higher post-test mean demonstrates that overall speaking performance improved across the group rather than being limited to only a few individuals. The standard error of the mean further indicates that the mean estimates are statistically stable and representative of the sample.

Taken together, these descriptive findings provide preliminary evidence that the instructional intervention was associated with improved ESP speaking performance among nursing students. However, inferential statistical analysis is required to determine whether this observed improvement is statistically significant.

Paired-Samples t-Test

Because the same group of students participated in both the pre-test and post-test, a paired-samples t-test was conducted to determine whether the observed improvement in ESP speaking performance was statistically significant. This test is appropriate for repeated-measures data where two sets of scores are obtained from the same participants.

Table 3 presents the paired-samples statistics. The mean score increased from 53.55 in the pre-test to 63.10 in the post-test, with 40 participants in both measurements. The difference in means indicates an overall improvement following the instructional intervention.

Table 3. Paired Samples Statistics

Pair	Test	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	53.55	40	5.15379	0.81489
	Post-test	63.10	40	6.02048	0.95192

To test whether this increase was statistically meaningful, a paired-samples t-test was performed. The results are displayed in Table 4.

Table 4. Paired Samples Test

Pair	Mean Difference	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-Post	9.55	7.92	1.253	7.621	39	.000

The mean difference between the pre-test and post-test scores was 9.55 points. The obtained t-value of 7.621 with 39 degrees of freedom resulted in a p-value below .05, indicating that the improvement in students' speaking performance was statistically significant. Therefore, the null hypothesis stating that there is no difference between pre-test and post-test scores is rejected.

Effect Size (Cohen's d)

In addition to statistical significance, Cohen's d was calculated to assess the magnitude of the intervention's impact.

$$d = \frac{\text{Mean Difference}}{\text{SD of differences}}$$

$$d = \frac{9.55}{7.92} = 1.21$$

According to Cohen's criteria (0.20 = small, 0.50 = medium, 0.80+ = large), a value of 1.21 indicates a large effect size. This means that the improvement was not only statistically significant but also educationally substantial. The integration of e-portfolios within the flipped English classroom had a strong practical impact on students' ESP speaking development.

Summary of Findings for Speaking Performance

The results demonstrate a clear improvement in students' ESP speaking performance following the instructional intervention. Mean speaking scores increased from 53.55 to 63.10, and the difference was statistically significant ($t(39) = 7.621, p < .05$). Furthermore, the large effect size ($d = 1.21$) indicates that the intervention produced a meaningful enhancement in students' speaking ability. These findings confirm that implementing e-portfolios within a flipped English classroom effectively supports speaking development among nursing students.

Students' Speaking Self-Efficacy

Descriptive analysis was conducted to examine changes in students' speaking self-efficacy before and after the intervention.

Table 5. Descriptive Statistics of Speaking Self-Efficacy

Test	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	40	2.98	0.41	0.065
Post-test	40	3.74	0.46	0.073

The results show that students' perceived confidence in performing ESP speaking tasks increased from 2.98 to 3.74 on a 5-point scale. The mean gain was 0.76. This indicates a noticeable improvement in students' belief in their speaking capability.

Paired-Samples t-Test

Because the same students completed both the pre- and post-questionnaires, a paired-samples t-test was employed to determine whether the change in students' speaking self-efficacy was statistically significant.

Table 6. Paired Samples Statistics

Pair	Test	Mean	N	Std. Deviation	Std. Error Mean
1	Pre-test	2.98	40	0.41	0.065
	Post-test	3.74	40	0.46	0.073

Table 6 presents the descriptive statistics for students' speaking self-efficacy scores before and after the intervention. The mean score increased from 2.98 in the pre-test to 3.74 in the post-test, indicating a noticeable rise in students' confidence in their speaking ability. The relatively similar standard deviations in both tests suggest that the improvement occurred consistently across participants rather than being limited to only a few individuals.

Table 7. Paired Samples Test

Pair	Mean Difference	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-Post	0.76	0.58	0.092	8.26	39	.000

The inferential analysis results are displayed in Table 7. The paired-samples t-test shows a mean difference of 0.76, with $t(39) = 8.26$ and a significance value of $p = .000$, which is lower than the alpha level of 0.05. Based on this decision rule, the null hypothesis stating that there is no difference in students' self-efficacy before and after the intervention is rejected. Therefore, there is a statistically significant increase in students' speaking self-efficacy following the implementation of the e-portfolio-supported flipped classroom.

Effect Size

To determine the practical magnitude of the improvement, Cohen's d was calculated:

$$d = \frac{\text{Mean Difference}}{\text{SD of differences}} = \frac{0.76}{0.58} = 1.31$$

A value of $d = 1.31$ indicates a large effect size, meaning that the intervention had a strong practical impact on students' psychological confidence in speaking English. This suggests that the instructional model substantially strengthened learners' belief in their speaking ability, not merely producing a statistically detectable change.

Overall Findings

Table 8. Conclusion of Result

Variable	Pre-Mean	Post-Mean	t-value	Sig.	Effect Size	Interpretation
Speaking Performance	53.55	63.10	7.621	.000	1.21	Large
Speaking Self-Efficacy	2.98	3.74	8.26	.000	1.31	Large

Table 8 summarizes the principal statistical outcomes for both variables: ESP speaking performance and speaking self-efficacy. Students' mean speaking scores increased from 53.55 in the pre-test to 63.10 in the post-test. A paired-samples t-test confirmed that this improvement was statistically significant, $t(39) = 7.621, p < .05$, with a large effect size ($d = 1.21$), indicating substantial gains in students' speaking ability within nursing-related ESP tasks.

A comparable trend emerged in speaking self-efficacy. The mean score rose from 2.98 to 3.74, with the increase reaching statistical significance, $t(39) = 8.26, p < .05$. The large effect size ($d = 1.31$) suggests a strong practical impact, demonstrating that the intervention enhanced not only linguistic performance but also students' confidence in performing speaking tasks successfully.

The findings confirm that the e-portfolio-supported flipped classroom exerted a meaningful effect on both performance and psychological dimensions. The intervention facilitated measurable speaking improvement while strengthening learner self-efficacy, aligning with ESP perspectives emphasizing contextualized communicative competence and with self-efficacy theory highlighting the role of mastery experience and feedback in developing learner confidence.

DISCUSSION

The findings of this study indicate that integrating e-portfolios into a flipped English classroom significantly enhanced nursing students' English for Specific Purposes (ESP) speaking performance. The mean speaking score increased from 53.55 in the pre-test to 63.10 in the post-test, accompanied by a large effect size ($d = 1.21$). This outcome suggests that the instructional intervention produced not only statistically significant improvement but also a meaningful pedagogical impact. The results contribute to the growing body of evidence indicating that technology-supported learning environments can effectively facilitate oral language development in ESP contexts.

The improvement in speaking performance can be explained through the pedagogical structure of the flipped classroom. By relocating content delivery to the pre-class phase and allocating in-class time for communicative practice, students were able to participate more actively in task-based speaking activities. Such an instructional arrangement aligns with prior

research demonstrating that flipped learning fosters greater interaction, engagement, and meaningful language use. For example, Hung (2015) reported that flipped instruction encourages active learner participation in English language classrooms, while Lee and Wallace (2018) found that flipped EFL environments expand opportunities for collaborative communication and spoken production. The present study extends these findings by showing that flipped learning can be particularly advantageous in ESP settings, where professional communication tasks require sustained practice and contextualized language use.

Nevertheless, the positive outcomes observed in this study cannot be attributed solely to the flipped classroom model. Previous research suggests that flipped instruction does not automatically lead to improvements in speaking ability if learners lack structured opportunities for rehearsal and feedback (Thai et al, 2017). The incorporation of e-portfolios in the present study appears to have addressed this limitation by providing an additional platform for continuous speaking practice beyond classroom interaction. Through the e-portfolio system, students repeatedly recorded their speaking performances, reviewed lecturer feedback, and reflected on their learning progress. This iterative learning cycle likely contributed to the development of speaking fluency and discourse organization, consistent with Sun (2012), who demonstrated that repeated oral production through digital recording platforms can strengthen fluency and self-monitoring skills.

The positive contribution of e-portfolios to speaking performance is also consistent with previous studies on digital portfolio-based assessment in language education. Huang and Hung (2010) found that electronic portfolios enhanced EFL learners' oral performance by promoting reflective learning and enabling the longitudinal monitoring of progress. Similarly, Aghazadeh and Soleimani (2020) reported that e-portfolio assessment significantly improved both speaking ability and learner autonomy among EFL students. The present findings reinforce these conclusions and further suggest that e-portfolios function effectively as formative assessment tools that support continuous skill development rather than one-time evaluation. By allowing learners to document, review, and revise their spoken performances, e-portfolios encourage deeper metacognitive engagement with language production.

Beyond improvements in linguistic performance, the study also revealed a substantial increase in students' speaking self-efficacy. The mean self-efficacy score rose from 2.98 to 3.74, with a large effect size ($d = 1.31$). This finding indicates that the instructional intervention strengthened not only students' observable speaking competence but also their confidence in performing professional communication tasks in English. The relationship

between repeated speaking practice and the development of self-efficacy can be explained through social cognitive theory, which identifies mastery experience as the most influential source of self-efficacy beliefs (Bandura, 1997). Through repeated practice, successful task completion, and constructive feedback, students gradually developed stronger confidence in their communicative capabilities.

The observed increase in speaking self-efficacy is consistent with previous research in both language education and healthcare communication training. Khampusaen and Lao-Un (2018) reported that the use of electronic portfolios improved nursing students' confidence in English communication tasks. Similarly, Kusuma and Waluyo (2023) found that digital portfolio-based speaking assessment enhanced students' reflective ability and confidence in EFL speaking classrooms. These studies suggest that portfolio-based learning environments can foster psychological development by enabling learners to observe their own progress over time. The present findings extend this evidence by demonstrating that when portfolio-based reflection is integrated with flipped classroom interaction, both linguistic competence and psychological readiness can develop simultaneously.

Another significant implication of the findings relates to the ESP-oriented design of the instructional tasks. In nursing education, speaking competence involves the ability to perform contextually appropriate professional communication, such as explaining procedures, giving instructions, and responding to patient concerns. The task-based speaking activities implemented in this study simulated authentic nurse-patient interactions, thereby aligning language learning with real-world professional communication demands. This contextualization likely contributed to the observed learning gains, as previous research has emphasized that ESP instruction is most effective when language practice reflects the communicative situations learners are likely to encounter in their professional domains (Basturkmen, 2010; Hyland, 2019).

Furthermore, the integration of flipped learning and e-portfolio practice represents a pedagogical framework that supports the transformation of declarative knowledge into procedural communicative competence. Students first encountered linguistic input during the pre-class phase, then applied this knowledge through interactive classroom tasks, and subsequently revisited their performances through portfolio-based reflection and revision. This cyclical learning process corresponds with models of skill acquisition that highlight repeated practice, feedback, and reflection as essential mechanisms for developing automaticity in language production (Goh & Burns, 2012; Nation & Newton, 2009). In this

context, the intervention created a structured learning environment in which speaking development emerged through sustained engagement rather than isolated performance tasks.

Overall, the findings confirm that the combination of flipped learning and e-portfolio-based formative assessment offers a pedagogically robust framework for ESP speaking instruction. While flipped classrooms expand opportunities for interactive speaking practice, e-portfolios facilitate reflective learning and continuous improvement beyond classroom boundaries. Together, these complementary strategies address both the linguistic and psychological dimensions of speaking development, which are particularly critical in professional communication contexts such as nursing education.

CONCLUSION

The findings indicate that integrating e-portfolios into a flipped English classroom produced statistically significant and educationally meaningful improvements in nursing students' ESP speaking performance and speaking self-efficacy. The substantial increase in post-test scores, accompanied by a large effect size, reflects improved ability to perform professional communication tasks such as explaining procedures, giving instructions, and describing patient conditions. These outcomes suggest that the intervention effectively strengthened context-specific communicative competence, a central objective of ESP instruction.

Pedagogically, the flipped structure redistributed cognitive load across learning phases. Pre-class exposure to language input through video explanations, model dialogues, and vocabulary resources enabled students to process linguistic forms independently, while classroom time was devoted to communicative practice, role play, and feedback. This arrangement aligns with communicative language teaching principles, which emphasize meaningful language use and feedback as key drivers of fluency and accuracy development.

The e-portfolio functioned as a crucial component by extending learning beyond classroom boundaries. As a repository of recorded performances and revisions, it supported iterative cycles of practice, feedback, and reflection. Repeated recording opportunities likely reduced speaking anxiety, allowing students to focus more on message delivery than on error avoidance.

Alongside performance gains, students' speaking self-efficacy improved substantially. Consistent with self-efficacy theory, structured practice, visible progress, and constructive feedback provided mastery experiences that strengthened learners' confidence. This psychological development is pedagogically significant, as higher self-efficacy is associated

with greater willingness to communicate, persistence in challenging tasks, and sustained language use in professional contexts.

These findings carry important instructional and curricular implications. For ESP practitioners, integrating flipped learning with e-portfolios offers a systematic approach to speaking instruction by reserving classroom time for interaction and feedback while enabling continuous performance monitoring and personalized guidance. The results also highlight the importance of embedding profession-specific speaking tasks within authentic clinical contexts to ensure relevance to real-world healthcare communication demands.

Assessment practices similarly benefit from combining analytic rubrics with recorded performances, enabling more consistent evaluation, detailed analysis of speaking components, and longitudinal tracking of development. Overall, the study underscores the importance of addressing both linguistic competence and psychological factors, as instructional approaches that simultaneously enhance performance and confidence produce more sustainable and comprehensive learning outcomes.

Limitations and Future Research

Despite the positive findings, several methodological and contextual limitations should be considered when interpreting the results. The study employed a one-group pre-test-post-test design without a control group, which limits causal inference. Although significant improvements were observed, these gains cannot be attributed solely to the e-portfolio-supported flipped classroom. External factors such as incidental exposure to English, concurrent coursework, test familiarity, or natural language development (maturation effect) may also have contributed to the outcomes. While common in classroom-based research using intact groups, this design constrains internal validity. Future studies should incorporate control or comparison groups, randomized assignment where feasible, or alternative quasi-experimental designs to strengthen evidence of instructional effectiveness.

The sample size and research context further limit generalizability. The participants consisted of 40 nursing students from a single private health sciences institution, forming a relatively homogeneous group. Although this enhances contextual relevance, it restricts applicability to other ESP settings. Learners from different health disciplines or institutions may demonstrate varying language needs, proficiency levels, and learning preferences that influence their responses to flipped learning and e-portfolio integration. Replication across diverse institutions, regions, and ESP domains is therefore necessary to determine whether the instructional model is transferable or context-dependent.

The intervention lasted only one academic semester, which may be insufficient to capture long-term instructional effects. ESP speaking development, particularly in professional communication contexts, requires sustained exposure and practice. While post-test results indicate short-term improvement, the durability of these gains and their transfer to authentic clinical environments remain uncertain. Longitudinal studies tracking students across subsequent semesters, clinical placements, or professional contexts would provide stronger evidence regarding sustainability and practical relevance.

Although analytic rubrics and inter-rater procedures were applied, speaking assessment inherently involves some degree of subjectivity. Differences in raters' interpretations of fluency, pronunciation, or content relevance may introduce measurement bias. Reliability statistics reduce but cannot fully eliminate this limitation. Future research may improve measurement accuracy by combining human evaluation with complementary approaches such as automated speech analysis, discourse analysis, or triangulated assessment methods to strengthen validity and reliability.

The study focused primarily on speaking performance and self-efficacy without examining other learner variables. Factors such as speaking anxiety, motivation, learning strategies, and willingness to communicate may influence engagement with e-portfolio activities and flipped learning environments. Investigating these dimensions through mixed-method designs would provide a more comprehensive understanding of cognitive, affective, and behavioral development in technology-enhanced ESP instruction.

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