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Examining Speaking Self-Efficacy and Attitudes in a OneNote-Based Self-Regulatory E-Portfolio Implementation

Raziyeh Mashayekh

PhD Candidate in TEFL, University of Tehran, Tehran, Iran

Reza Dashtestani*

Associate Professor of TEFL, University of Tehran, Tehran, Iran

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Abstract

Integrating Self-Regulated Learning (SRL) principles within Electronic Portfolios (e-portfolios) promotes reflection, progress monitoring, and strategic refinement, potentially strengthening learners' speaking self-efficacy. Despite this alignment, empirical research on self-regulatory e-portfolios for speaking self-efficacy is limited. To address this gap, the present study examined the effects of a OneNote-based self-regulatory e-portfolio on Iranian EFL learners' speaking self-efficacy and their attitudes toward the tool in an online speaking course. Grounded in SRL and social cognitive theory, speaking self-efficacy was conceptualized as a multidimensional construct encompassing performance, linguistic, and self-regulatory self-efficacy. A total of 52 intermediate and upper-intermediate Iranian EFL learners, selected based on a PET sample test, were randomly assigned to an experimental or a control group. Over a five-week online course, the experimental group developed self-regulatory e-portfolios in OneNote structured according to Zimmerman's (2000) cyclical model of self-regulation. In contrast, the control group received conventional instruction. Data were collected using the 18-item Self-Efficacy for EFL Speaking Scale (SEESS), an attitude questionnaire, and semi-structured interviews. A Multivariate Analysis of Covariance (MANCOVA) revealed statistically significant gains in performance, linguistic, and self-regulatory self-efficacy for the experimental group, with medium to large effect sizes. Learners also reported positive attitudes toward the e-portfolio, valuing its accessibility, organizational features, and support for reflection, goal setting, and feedback, despite some initial emotional and usability challenges. Overall, the findings underscore the pedagogical value of OneNote-based self-regulatory e-portfolios for enhancing speaking self-efficacy in online EFL contexts.

***Keywords**:* attitude toward e-portfolio, e-portfolio, OneNote, speaking self-efficacy, self-regulated learning

*Corresponding author's email: rdashtestani@ut.ac.ir

INTRODUCTION

Self-efficacy, defined as individuals' beliefs in their capability to organize and execute actions to achieve desired outcomes, is a central concept in social cognitive theory (Bandura, 1977, 1982) and plays a critical role in shaping learners' motivation, strategy use, and performance (Chen, 2020; Hermagustiana et al., 2021; Montaño-González & Cancino, 2020). In particular, in EFL contexts, strong self-efficacy, especially speaking self-efficacy, enhances willingness to communicate, task engagement, and oral proficiency, while simultaneously reducing anxiety and avoidance behaviors (Heidari et al., 2012). Moreover, speaking self-efficacy is multidimensional, encompassing learners' performance, self-regulatory, and linguistic self-efficacy, which collectively reflect domain-specific skills essential for effective communication (Gan et al., 2022; Wang & Sun, 2024). Despite growing recognition of the multidimensionality of speaking self-efficacy, its various dimensions remain underexplored.

In recent years, e-portfolios have gained attention as learner-centered tools that support reflection, self-assessment, and documentation of progress through multimodal artifacts (Buyarski et al., 2017; Dougherty & Coelho, 2017). Research suggests that e-portfolio-based instruction can improve self-efficacy (Laksana et al., 2021). This benefit is often attributed to repeated mastery experiences facilitated through reflection and feedback, a primary source of self-efficacy (Bandura, 1977). However, when e-portfolios lack pedagogical structure, they may function merely as digital repositories rather than effective learning tools (Segaran & Hasim, 2021). To maximize their impact, e-portfolios should be intentionally designed to promote SRL, a process through which learners plan, monitor, and evaluate their learning while managing motivational and emotional resources (Panadero & Alonso-Tapia, 2014). Zimmerman's (2000) cyclical model conceptualizes SRL as comprising forethought, performance, and self-reflection phases, which, when embedded in e-portfolio activities, can foster strategic engagement and self-efficacy (Alexiou & Paraskeva, 2019; Panadero, 2017).

Self-regulatory e-portfolios are particularly relevant for EFL speaking instruction, as speaking development requires sustained practice, strategic involvement, and emotional regulation (Derwing & Munro, 2022). Structured reflection on recorded speaking performances, combined with peer and instructor feedback, can help learners monitor progress and refine strategies, thereby enhancing self-efficacy (Nicolaidou, 2012; Al-Hawamdeh et al., 2023; López-Crespo et al., 2022). Despite this alignment, empirical research on self-regulatory e-portfolios for speaking is limited, with most studies focusing on writing or general proficiency rather than multidimensional speaking self-efficacy. Moreover, although Microsoft OneNote offers affordances for organizing multimodal content and supporting reflective practice, its use as a platform for self-regulatory e-portfolios in EFL speaking courses has received little empirical attention (Cavana, 2019; Guerrero et al., 2019). Addressing these gaps, the present study examines the impact of a OneNote-based self-regulatory e-portfolio, structured around Zimmerman's (2000) model, on the speaking self-efficacy and attitudes of intermediate and upper-intermediate Iranian EFL learners in an online speaking course.

LITERATURE REVIEW

Speaking Self-Efficacy in EFL Contexts

Self-efficacy, defined as individuals' beliefs in their capability to organize and execute actions to achieve desired outcomes, is a central construct in social cognitive theory (Bandura, 1977, 1982). learners with strong self-efficacy tend to persist through challenges, regulate effort effectively, and recover from setbacks, whereas those with low self-efficacy are more likely to avoid demanding tasks and experience heightened anxiety (Bandura, 1982). In the context of EFL learning, self-efficacy is positively associated with strategic engagement, motivation, and achievement, while it is negatively associated with anxiety (Heidari et al., 2012; Hermagustiana et al., 2021; Roshandel et al., 2018; Montaño-González & Cancino, 2020). Moreover, teacher feedback, conceptualized as social persuasion, can further shape learners' confidence

and performance (Ma et al., 2018). Among the various facets of self-efficacy, speaking self-efficacy is particularly salient, because learners' beliefs about their speaking ability directly influence willingness to communicate, task engagement, and oral performance. Consequently, higher speaking self-efficacy predicts lower anxiety and stronger proficiency, whereas lower efficacy is linked to avoidance and disengagement (Chen, 2020; Sardegna et al., 2018). These dynamics may become even more pronounced in online or blended learning environments, given that reduced immediacy can increase self-doubt.

According to social cognitive theory (Bandura, 1977), self-efficacy is shaped by four sources: mastery experience, vicarious experience, social persuasion, and physiological and emotional states. First, mastery experience, the most influential source, reflects one's interpretation of past successes and failures, with the result that achievements enhance self-efficacy, whereas repeated failures undermine it. Second, vicarious experience, or observing others' performances, also strongly affects self-efficacy, particularly as it is influenced by classroom climate. Third, social persuasion involves encouragement or discouragement, which can bolster or weaken self-efficacy depending on the credibility of the source, and is especially impactful in collectivist cultures. Finally, physiological and emotional states shape self-perception; for instance, anxiety or dread before speaking can lower self-efficacy, whereas improved well-being can enhance it.

Importantly, research on self-efficacy is most meaningful when situated within specific domains and contexts (Bandura, 1997). As a multidimensional and domain-specific construct, self-efficacy should be examined in particular learning situations, because general measures, especially in language learning, may produce biased or less accurate findings (Pajares, 2002). Although self-efficacy has been extensively studied in mainstream education, its multidimensional nature in L2 contexts remains underexplored (Gan et al., 2022). This issue is particularly relevant for speaking, a complex skill involving linguistic knowledge, foundational speaking abilities, and communication strategies (Derwing & Munro, 2022).

Therefore, speaking self-efficacy should be conceptualized as learners' confidence in effectively using linguistic knowledge, communication, and interaction skills in specific contexts, rather than as a generalized measure (Wang & Sun, 2024).

Grounded in social cognitive theory (Bandura, 1977) and SRL (Zimmerman, 2000), speaking self-efficacy comprises three interrelated dimensions (Gan et al., 2022). First, performance self-efficacy refers to learners' confidence in completing speaking tasks and applying learned skills in classroom and real-life communicative situations (Bandura, 2006). Second, self-regulatory efficacy concerns learners' perceived ability to plan, monitor, and evaluate their learning processes, emphasizing metacognitive awareness, goal-setting, and learner agency, and it strongly predicts both performance and linguistic outcomes. Third, linguistic self-efficacy reflects confidence in accurate pronunciation, grammar, vocabulary, and linguistic structures, highlighting the foundational role of linguistic competence in L2 speaking development (Gan & Yang, 2018). Taken together, these dimensions provide a comprehensive framework for understanding learners' speaking self-efficacy in EFL contexts. Although speaking self-efficacy is increasingly recognized as a multidimensional construct, its performance, linguistic, and self-regulatory dimensions in EFL contexts remain underexplored.

E-Portfolios as Mechanisms for Enhancing Self-Efficacy

E-portfolios are digital collections of learners' work designed to support reflection, documentation, and formative assessment through multimodal artifacts (Lysenko et al., 2022; Dougherty & Coelho, 2017). In language education, they have increasingly been implemented to promote learner autonomy, feedback integration, and iterative skill development. Research suggests that e-portfolio-based instruction can enhance speaking performance, reduce anxiety, and strengthen self-efficacy by enabling repeated practice and reflective review (Kusuma & Waluyo, 2023; Laksana et al., 2021). From a social cognitive perspective, these benefits can be

explained through four sources of self-efficacy: mastery experiences, verbal persuasion, vicarious experiences, and emotional states (Bandura, 1977). Repeated recording and revision of speaking tasks provide mastery experiences that allow learners to observe incremental improvement and attribute progress to effort and strategy use, thereby reinforcing self-efficacy (Bandura, 1997). Instructor and peer feedback function as verbal persuasion, while exposure to peers' performances offers opportunities for vicarious learning (Lam, 2022). In addition, asynchronous recording environments may help reduce anxiety, positively influencing learners' emotional states, and repeated digital recording has been shown to increase confidence over time (Sun, 2016; López-Crespo et al., 2022). However, research also indicates that e-portfolios may fail to produce meaningful gains if implemented without structured pedagogical guidance, as learners may not engage in deep reflection or strategic regulation (Segaran & Hasim, 2021). Peer exposure may further introduce affective risks such as negative social comparison when insufficiently scaffolded.

Self-Regulated Learning (SRL) as a Framework for Structured E-Portfolios

SRL refers to learners' proactive engagement in planning, monitoring, and evaluating their learning while managing motivational and emotional processes (Guo & Li, 2024; Panadero & Alonso-Tapia, 2014). Zimmerman's (2000) cyclical model conceptualizes SRL as three interconnected phases: forethought (goal setting and planning), performance (strategy use and self-monitoring), and self-reflection (evaluation and adaptation) (Schunk & Zimmerman, 2012). Integrating SRL principles into e-portfolio design transforms these tools into structured environments that foster self-efficacy. Goal setting shapes motivation, performance monitoring makes progress visible, and reflective evaluation promotes adaptive attributions that strengthen future confidence (Panadero, 2017). Because self-efficacy develops through mastery experiences and reflective interpretation of

performance (Bandura, 1997), self-regulatory e-portfolios are theoretically positioned to enhance self-efficacy. Despite this theoretical convergence, research examining structured, self-regulatory e-portfolio interventions that target multidimensional speaking self-efficacy remains limited.

Zimmerman's Cyclical Model of Self-Regulation

Zimmerman's (2000) model conceptualizes SRL as an ongoing, iterative process in which learners engage in three phases, forethought, performance, and self-reflection, generating regular self-feedback that drives continuous improvement and emphasizes the central role of motivation (Panadero & Alonso-Tapia, 2014) (see Figure 1).

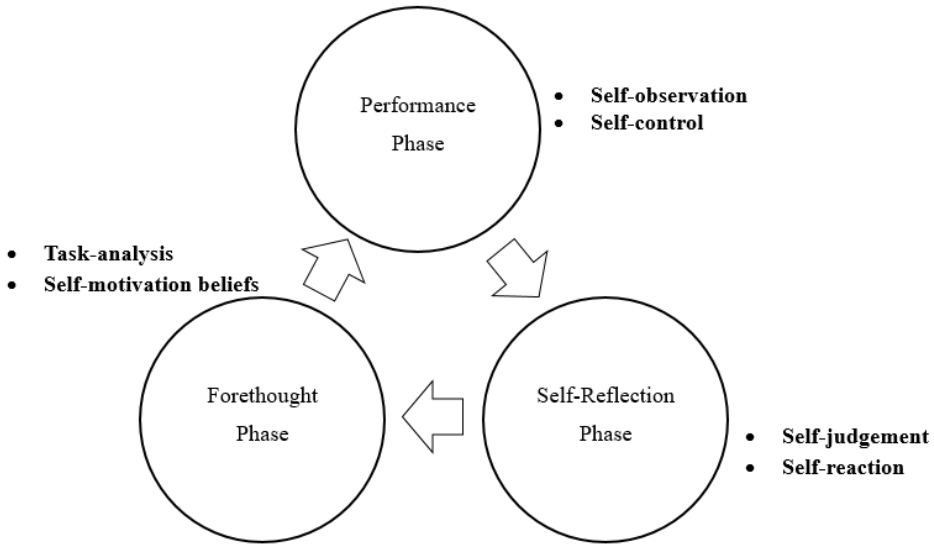


Figure 1: *Zimmerman's (2000) Cyclical Model of Self-Regulation*

During the forethought phase, learners assess the task, evaluate their capabilities, and establish goals and strategies. This involves two core processes: analyzing task characteristics to plan execution and evaluating the

task's value to determine motivation, effort, and attention (Panadero, 2017). Motivational factors such as self-efficacy, intrinsic interest, and outcome expectations are particularly influential at this stage (Zimmerman, 2000).

The performance phase occurs during task execution, where learners apply strategies to maintain focus, monitor progress, and sustain motivation (Panadero, 2017). Two processes are central: self-observation, where learners monitor progress and identify discrepancies between current performance and goals to trigger corrective actions, and self-control, which involves implementing strategies such as time management, attention focusing, and using learning aids (Schunk & Zimmerman, 2012).

In the self-reflection phase, learners evaluate outcomes, interpret results, and experience emotional responses that influence future learning. Through self-judgment, learners compare performance against personal or external standards; through self-reaction, they generate affective and cognitive responses, such as satisfaction, disappointment, or renewed motivation (Panadero, 2017). Insights from this phase inform subsequent goal setting, strategy adaptation, and motivational beliefs, completing the cycle. This iterative process enables learners to continuously refine their approaches and develop a deeper understanding of their own learning (Schunk & Zimmerman, 2012).

OneNote as a Platform for Self-Regulatory E-Portfolios

Microsoft OneNote, a versatile and free application for collecting notes, drawings, screen clippings, audio recordings, images, diagrams, and videos (Guerrero et al., 2019), offers significant potential to support SRL, experiential learning, and flexible content management across diverse educational contexts (Cavana, 2019). OneNote-based e-portfolios can effectively embed pedagogical principles into their structures. Its affordances, flexible organization, multimodal integration, and longitudinal tracking of learning artifacts, facilitate goal setting, performance documentation, and reflective comparison across tasks, aligning closely with Zimmerman's

(2000) cyclical model of SRL. However, empirical studies examining OneNote-based self-regulatory e-portfolios in EFL speaking instruction remain limited.

To address the gaps in the literature, this study posed the following research questions:

RQ1. Does the use of a OneNote-based self-regulatory e-portfolio have a significant effect on Iranian EFL learners' speaking self-efficacy?

RQ2. What are the attitudes of Iranian EFL learners toward using a OneNote-based self-regulatory e-portfolio in the online speaking course implemented in this study?

METHOD

Design

This study employed a quasi-experimental design, featuring pre-test and post-test with a randomly assigned control group. The experimental group received training on using a OneNote-based self-regulatory e-portfolio for speaking practice, whereas the control group received conventional instruction. The independent variable was the OneNote-based self-regulatory e-portfolio intervention, whereas the dependent variables were the three dimensions of speaking self-efficacy. Learners' attitudes were also examined descriptively among the experimental group. Additionally, Semi-structured interviews were qualitatively analyzed to deepen understanding of the experimental group's perception of the intervention.

Participants

The participants in this study were 52 intermediate and upper-intermediate Iranian EFL learners, recruited voluntarily through social media advertisements. The sample included both males (17%) and females (83%) aged 19 to 48 years. Initially, 74 volunteers were randomly assigned to 37 in the experimental group, and 37 in the control group, and a sample PET was

administered to form a homogeneous participant group. According to the Cambridge scoring guidelines, each section of the test was worth 25 marks, leading to a total of 100. Participants scoring above 85 (N = 55) were considered approximately intermediate to upper-intermediate learners, corresponding to B1–B2 levels on the Common European Framework of Reference (CEFR). From these 55 eligible participants, 27 remained in the experimental group and 28 in the control group. During the course, one participant from the experimental group and two from the control group withdrew, leaving a final analyzed sample of 26 participants per group (N = 52). Although participants who did not meet the selection criteria continued to attend classes, only the results of the selected participants were included in the analyses.

Instrumentation

The Preliminary English Test (PET)

To assess participants' general language proficiency, a sample of the PET was administered. The reading and listening sections, as well as the first part of the writing section, which consisted of 65 multiple-choice questions, were graded twice by the same rater, using the provided answer key. The estimated reliability of the test, using Cronbach's alpha formula, was a high value of .81. The second and third parts of the writing section, which consisted of essay-type questions, as well as the speaking section, were evaluated by two different raters. Notably, according to the Pearson Correlation results, the inter-rater reliability coefficients were .87 for the writing section and .82 for the speaking section.

The Self-Efficacy for EFL Speaking Scale (SEESS)

The 18-item SEESS, developed and validated by Gan et al. (2022), was used in the present study to assess participants' speaking self-efficacy. Grounded in SRL and social cognitive theory, the SEESS measured three dimensions of speaking self-efficacy. The performance self-efficacy subscale (8 items)

examined learners' confidence in completing speaking tasks and comprehending classroom content. The linguistic self-efficacy subscale (4 items) assessed learners' perceived ability to use grammar, vocabulary, pronunciation, and sentence structure accurately. The self-regulatory self-efficacy subscale (6 items) assessed learners' beliefs in their ability to improve their speaking through metacognitive strategies, including goal setting, planning, monitoring, and evaluation. All items were rated on a seven-point Likert scale ranging from 1 (not at all true of me) to 7 (very true of me). The Cronbach's alpha reliability coefficients for all measures administered in the pre- and post-tests exceeded .70, indicating satisfactory internal consistency (Dörnyei & Taguchi, 2009).

The Attitude Questionnaire

Harrell (2004) defines attitude as a consistent tendency to react in a particular way, often positively or negatively, toward a given issue or social subject. Due to the novelty of the intervention, no established instrument was available to examine learners' attitudes toward the OneNote-based self-regulatory e-portfolio. Therefore, the researchers developed a 30-item questionnaire to assess participants' attitudes toward the tool. Initially, a pool of 60 items was generated based on previous studies that developed and validated attitude questionnaires to examine EFL learners' perceptions of e-portfolios in the Iranian context (e.g., Karami et al., 2019; Khodi et al., 2024). The initial item pool was then reviewed for content validity by two applied linguistics professors, each with over ten years of experience teaching academic courses and numerous research article publications. They offered suggestions on the appropriateness and relevance of the items. Based on their feedback, 30 items were selected for inclusion in the final questionnaire. The attitude questionnaire asked if learners felt autonomous, confident, motivated, concentrated, and responsible for learning English while practicing speaking in OneNote e-portfolios. The instrument also included items about the tool's usefulness as an accessible environment for reflection and collaboration that

could help learners to speak more fluently and accurately. Some items were reverse coded. These items required learners to evaluate if they felt uncomfortable and anxious when recording and sharing voice records or when receiving comments on their speaking performance. The reverse-coded items also asked learners to assess if they felt confused or lacked concentration when developing e-portfolios in OneNote, or if they perceived constructing e-portfolios to be time-consuming and demanding and preferred traditional use of paper and pencil. This questionnaire used a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The reliability of the attitude questionnaire for this study was estimated using Cronbach's alpha, which yielded a high score of .90.

Semi-Structured Interviews

To complement the quantitative findings from the attitude questionnaire and to deepen understanding of learners' perceptions, semi-structured interviews with eight randomly selected participants from the experimental group were conducted online via Google Meet. Drawing on the results of the attitude questionnaire, an interview protocol comprising eight questions was developed to elicit participants' views on the OneNote-based self-regulatory e-portfolio in the online speaking course (see Appendix). The questions addressed the learners' perceived advantages and disadvantages of using OneNote e-portfolios, as well as their experiences with key self-regulatory practices embedded in the intervention, including goal setting, planning, voice recording, and post-task reflection. In addition, participants were asked about their perceptions of sharing voice recordings with peers and receiving feedback from both teachers and classmates. This qualitative phase also served to triangulate the questionnaire data and provide richer insights into learners' experiences.

Data Collection Procedure

The Online Speaking Course

Fifty-two EFL learners (26 in the experimental group and 26 in the control group) participated in 10 online speaking sessions, each lasting 90 minutes over five weeks, using Google Meet. Additionally, in an introductory session before the course, the instructor trained the experimental group in SRL strategies, which included cognitive strategies (such as rehearsal, elaboration, organization, and critical thinking), metacognitive strategies (like skimming and goal setting), and resource management strategies (such as following schedules and collaborating with peers). She also guided them in developing self-regulatory e-portfolios in OneNote and in providing feedback to their peers. Both the experimental and control groups participated in the same speaking sessions, discussed the same topics, and received the same study materials. The materials included instructor-selected units from six books: Oxford Word Skills (Intermediate and Upper-Intermediate, Advanced), Vocabulary in Use (Upper-Intermediate and Advanced), Vocabulary for IELTS (Upper-Intermediate and Advanced). Each unit was carefully selected based on the session topic. These books provided learners with valuable vocabulary, collocations, and expressions that were relevant to the speaking topics practiced in the course. In addition to the books, instructor-designed PowerPoint slides covering the topics were created and shared with students from both groups before each session. The content of these slides was discussed during the following session. This approach aimed to activate the learners' pre-existing knowledge of the second language and provide them with an opportunity to practice speaking. Both the experimental and control groups were asked to join a WhatsApp group to receive the topic-based slides. Similar to the experimental group, the control group was required to study the assigned topic-based units from their books before each session. However, unlike the experimental group, the control group was not required to use the OneNote application or share voice recordings via WhatsApp; instead, they completed all speaking tasks during regular class time. Both groups received

feedback on their speaking performance; however, the nature of the feedback differed. The control group received collective feedback at the end of each speaking session, whereas the experimental group received both peer and instructor feedback on samples of their voice recordings shared in their WhatsApp group. This feedback targeted grammatical and lexical accuracy, pronunciation and intonation, as well as cohesion and relevance in learners' speech.

Implementing OneNote-Based Self-Regulatory E-Portfolio

Participants in the experimental group created self-regulatory e-portfolios in OneNote, explicitly structured around Zimmerman's (2000) Cyclical Model of Self-Regulation. Each participant in the experimental group created four corresponding notebooks in their self-regulatory e-portfolio in OneNote: 1) Goal Setting, 2) Plan, 3) Record, and 4) Review. The Goal Setting and Plan notebooks were designed to support the forethought phase of Zimmerman's (2000) cyclical model of self-regulation. The Record notebook aligned with the performance phase, while the Review notebook was associated with the self-reflection phase, as illustrated in Figure 2.

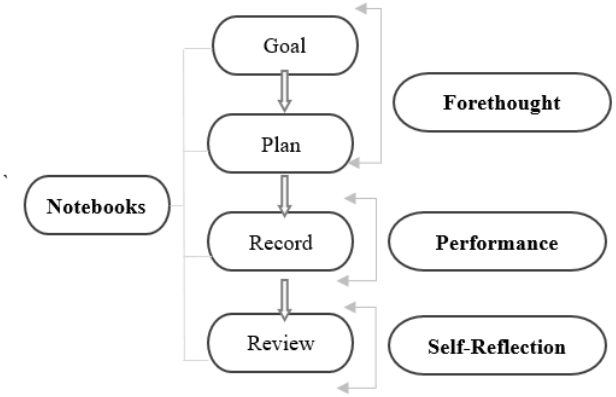
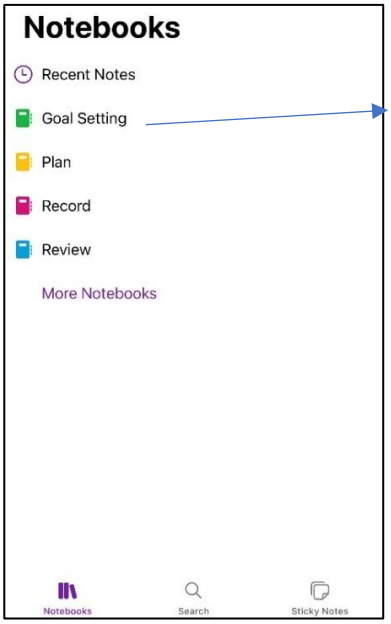


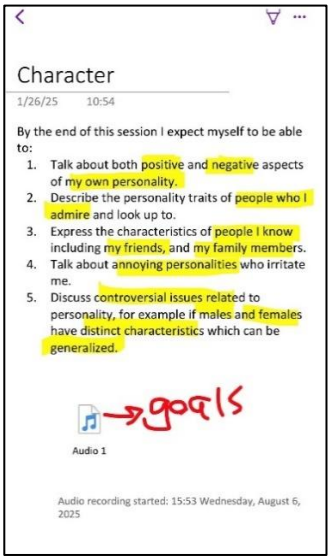
Figure 2: *Alignment of OneNote Notebooks with Zimmerman's (2000) Cyclical Model of Self-Regulation*

Goal Setting and Plan. Before each session, the learners were instructed to study the topic-related units from the assigned books, along with the topic-based slides shared in their WhatsApp group. They then created a section for each task, such as "Task One," in the goal-setting and plan OneNote notebooks. Following the SRL strategies they had learned before the course, they engaged in goal setting and planning before the class. During this process, they could take notes, add pictures, or record their voices in English to establish clear goals and prepare for the speaking task. The goal-setting and plan notebooks of the self-regulatory e-portfolio in OneNote are depicted in Figure 3.

Record. Following the performance phase of the model, during class discussions of the slides, learners engaged in speaking practice and utilized topic-based vocabulary to address questions posed by the instructor. Importantly, some of these questions were included in the topic-based slides, allowing learners the opportunity to prepare. After each session, the instructor selected a speaking task, posted it in the WhatsApp group, and requested that learners submit a recorded voice message lasting about two minutes. This process required learners to enter the recording phase, where they recorded their responses to maintain a collection of their voice samples related to the topic in their OneNote record notebook. They then shared one sample of their recordings in the WhatsApp group and received feedback from peers on their strengths and areas for improvement. The instructor provided final feedback on their voice recordings, addressing grammatical and vocabulary issues, pronunciation and intonation errors, and cohesion and relevance in their speech.


Notebooks
Recent Notes
Goal Setting
Plan
Record
Review
More Notebooks
Notebooks
Search
Sticky Notes


Goal Setting
Edit
Sections
Task 1. Character
Task 2. Relationships
Task 3. Health and Lifestyle
Task 4. Travel and Tourism
Task 5. Technology
Task 6. Entertainment
Task 7. Success and Happiness
Task 8. Social Issues
Task 9. The Environment
Task 10. Careers
Notebooks
Search
Sticky Notes


Character
1/26/25 10:54
By the end of this session I expect myself to be able to:
1. Talk about both positive and negative aspects of my own personality.
2. Describe the personality traits of people who I admire and look up to.
3. Express the characteristics of people I know including my friends, and my family members.
4. Talk about annoying personalities who irritate me.
5. Discuss controversial issues related to personality, for example if males and females have distinct characteristics which can be generalized.
Audio 1
Audio recording started: 15:53 Wednesday, August 6, 2025

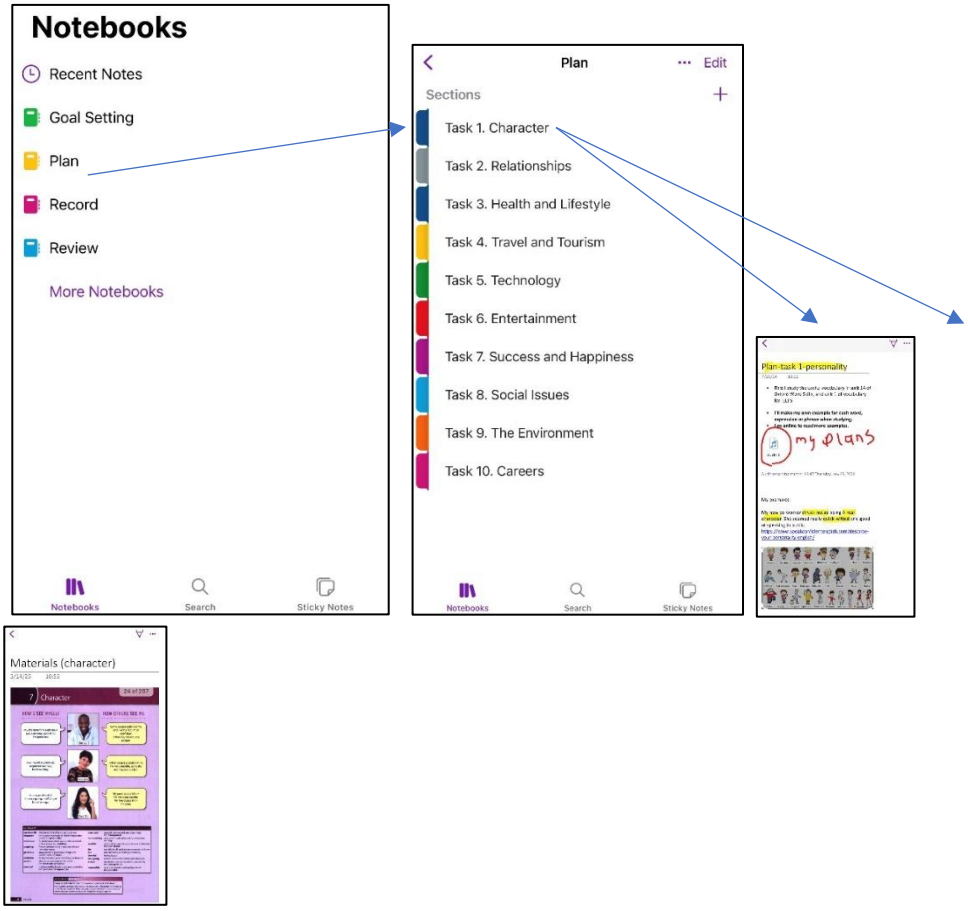


Figure 3: *Depiction of the Goal-Setting and Planning Notebooks for the First Speaking Session (Topic: Character)*

Review. After receiving feedback on their performance, participants were required to enter the review phase on OneNote to engage in self-reflection. They could take notes on the feedback they received, examine their strengths and weaknesses, and determine their next steps. This process of reflection could significantly impact learners' future efforts by influencing their confidence, goal-setting habits, and strategies. Consequently, insights gained during this phase played a crucial role in future planning, including the setting

of goals, adapting strategies, and shaping motivational beliefs for upcoming tasks (Panadero, 2017).

Data Analysis

The data collected from the sample PET were examined to determine the distribution's normality. To address the first research question, a Multivariate Analysis of Covariance (MANCOVA) was conducted to compare the experimental and control groups' mean posttest scores on linguistic, self-regulatory, and performance self-efficacy, while controlling for pretest scores.

To address the second research question, a frequency analysis was conducted on the experimental group participants' responses to the attitude questionnaire, and the findings were summarized using descriptive statistics. For the qualitative component, interview data were analyzed thematically in accordance with Dörnyei's (2007) guidelines. All interviews were recorded and transcribed verbatim and reviewed repeatedly during a pre-coding familiarization phase. An iterative, inductive coding process was then employed. This process began with open coding to generate descriptive, low-inference codes capturing learners' experiences with the OneNote e-portfolio for speaking practice. Subsequently, the codes were refined and organized into higher-order pattern codes through axial coding and constant comparison across participants. In line with Nowell et al. (2017), the coding procedures, as well as the identification of sub-themes and overarching themes, were cross-checked by two experts in applied linguistics to enhance analytic trustworthiness. Additionally, attention was paid to divergent and negative cases to minimize confirmation bias and ensure that variations in learners' experiences were adequately represented.

RESULTS

Participants Selection

The descriptive statistics of the PET scores for the initial and selected participants are presented in Table 1.

Table 1: *Descriptive Statistics of the PET Scores for the Initial and Selected Participants*

Group	Participants	N	Min.	Max.	Mean	SD	Skewness	
							Statistic	Std. Error
Control	Initial	37	76.00	95.00	87.9189	4.73977	-.800	.388
	Selected	28	86.00	95.00	90.1071	2.60113	.200	.441
Experimental	Initial	37	73.00	97.00	86.8919	6.95934	-.429	.388
	Selected	27	85.00	97.00	90.4444	4.01280	.041	.448

Answering the First Research Question

MANCOVA was conducted to test the first null hypothesis, which posited that the use of the OneNote-based self-regulatory e-portfolio has no significant effect on Iranian EFL learners' speaking self-efficacy. Prior to the analysis, the assumptions of normality, reliability, homogeneity of variances, linearity, homogeneity of regression slopes, and homogeneity of covariance matrices were examined and confirmed. Table 2 presents the adjusted mean posttest scores for both groups. After controlling for pretest scores, the experimental group demonstrated higher mean scores on the posttests than the control group.

Table 2: *Descriptive Statistics for Posttests of Self-Efficacies by Group with Pretest*

Dependent Variable	Group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Post-Linguistic	Experimental	20.420[a]	.236	19.945	20.895
	Control	19.541[a]	.236	19.067	20.016
Post-Self-Regulatory	Experimental	36.438[a]	.224	35.988	36.888
	Control	35.139[a]	.224	34.689	35.589
Post-Performance	Experimental	45.547[a]	.151	45.243	45.851
	Control	44.376[a]	.151	44.072	44.680

a. Covariates appearing in the model are evaluated at the following values: Pre-Linguistic = 18.96, Pre-Self-Regulatory = 34.00, Pre-Performance = 42.65.

Table 3 presents the main results of the MANCOVA. The findings indicated a statistically significant multivariate effect for group, F (3, 45) = 15.52, p < .05, partial η^2 = .509, representing a large effect size. These results demonstrate that, after controlling for pretest scores, there were significant differences between the experimental and control groups' mean posttest scores.

Table 3: *Test of MANCOVA*

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	.236	4.622	3	45	.007	.236
	Wilks' Lambda	.764	4.622	3	45	.007	.236
	Hotelling's Trace	.308	4.622	3	45	.007	.236
	Roy's Largest Root	.308	4.622	3	45	.007	.236
Group	Pillai's Trace	.509	15.527	3	45	.000	.509
	Wilks' Lambda	.491	15.527	3	45	.000	.509
	Hotelling's Trace	1.035	15.527	3	45	.000	.509
	Roy's Largest Root	1.035	15.527	3	45	.000	.509

Table 4 presents the results of the tests of between-subjects effects. Based on these findings, along with the adjusted mean scores reported in Table 2, it can be concluded that: (a) the experimental group (M = 20.42) obtained a significantly higher mean score than the control group (M = 19.54) on the posttest of linguistic self-efficacy, F(1, 47) = 6.78, p < .05, partial η^2 = .126, indicating a moderate effect size; (b) the experimental group (M = 36.43) significantly outperformed the control group (M = 35.13) on the posttest of self-regulatory self-efficacy, F(1, 47) = 16.51, p < .05, partial η^2 = .260, reflecting a large effect size; and (c) the experimental group (M = 45.54) also achieved a significantly higher mean score than the control group (M = 44.37) on the posttest of performance self-efficacy, F(1, 47) = 29.32, p < .05, partial η^2 = .384, representing a large effect size.

Table 4: *Tests of Between-Subjects Effects*

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Group	Post-Linguistic	9.606	1	9.606	6.782	.012	.126
	Post-Self-Regulatory	21.016	1	21.016	16.512	.000	.260
	Post-Performance	17.048	1	17.048	29.328	.000	.384
Error	Post-Linguistic	66.575	47	1.416			
	Post-Self-Regulatory	59.819	47	1.273			
	Post-Performance	27.320	47	.581			
Total	Post-Linguistic	21253.000	52				
	Post-Self-Regulatory	67951.000	52				
	Post-Performance	106676.000	52				

Figure 4 illustrates the adjusted mean scores across the three posttests. As it is shown, the experimental group achieved higher mean posttest self-efficacy scores than the control group across all three dimensions. This consistent trend indicates greater posttest gains in self-efficacy for the experimental group, after accounting for pretest scores.

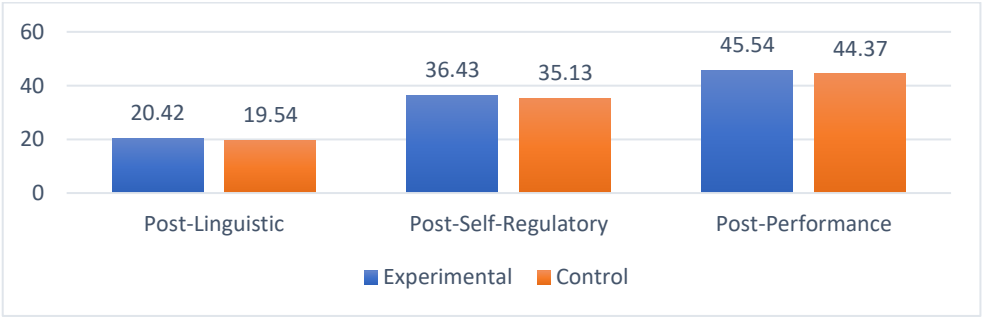


Figure 4: *Mean Scores on Posttests of Self-Efficacy by Group with Pretest*

Overall, as significant differences were found between the experimental and control groups on all measures of self-efficacy, the first null hypothesis was rejected**.**

Answering the Second Research Question

To address the second research question, both quantitative data from the attitude questionnaire and qualitative data from the interviews were analyzed. The questionnaire data were examined using frequency analysis, with the results summarized through descriptive statistics. Items 19 through 30, which were negatively worded, were reverse-coded prior to analysis to ensure that higher scores consistently reflected a more positive attitude toward the OneNote-based self-regulatory e-portfolio and to minimize potential response bias.

Table 5: *Description of Experimental Group Participants' Responses to the Attitude Questionnaire (N = 26)*

Items	Options						
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	SD
1. OneNote e-portfolio makes me autonomous in English-speaking practice.	0	0	7	9	10	4.12	.816
2. I am less anxious about making mistakes when practicing English by using the OneNote e-portfolio.	0	1	4	15	6	4.00	.748
3. Practicing English-speaking using an e-portfolio has helped me communicate more effectively with my classmates.	0	0	3	9	14	4.42	.703
4. Using OneNote e-portfolio helps me feel more confident in my speaking performance.	0	1	1	9	15	4.46	.761
5. I am responsible for my English learning when using the OneNote e-portfolio.	0	0	4	10	12	4.31	.736
6. OneNote e-portfolio gives me a good chance to recognize my weaknesses in speaking English.	0	0	0	6	20	4.77	.430

7. OneNote e-portfolio should be used more frequently in English-speaking practice.	0	0	4	11	11	4.27	.724
8. I will continue using OneNote e-portfolio for English-speaking practice in the future.	0	5	6	6	9	3.73	1.151
9. When I use the OneNote e-portfolio, I have the chance to correct my speaking.	0	0	2	11	13	4.42	.643
10. OneNote e-portfolio keeps me motivated in English-speaking practice.	0	2	5	9	10	4.04	.958
11. The advantage of the OneNote e-portfolio is that it is accessible everywhere, at any time.	0	0	1	9	16	4.58	.578
12. The OneNote e-portfolio is helpful because all speaking tasks are saved in one place on my cellphone.	0	0	1	12	13	4.46	.582
13. OneNote e-portfolio helps me speak English more fluently.	0	0	2	11	13	4.42	.643
14. OneNote e-portfolio helps me speak English more accurately.	0	0	1	10	15	4.54	.582
15. Using OneNote e-portfolio helps me organize my speaking tasks.	0	0	0	13	13	4.50	.510
16. Setting goals before each speaking task is very useful.	0	0	4	9	13	4.35	.745
17. Reflecting on speaking performance after each speaking task is very helpful.	0	0	0	11	15	4.58	.504
18. Using OneNote e-portfolio helps me concentrate on what I am studying for each speaking task.	0	0	2	12	12	4.38	.637
19. I prefer to practice speaking on my own rather than in OneNote (reverse-coded).	1	4	4	14	3	3.54	1.029
20. Using OneNote slows me down to practice speaking (reverse-coded).	0	8	5	10	3	3.31	1.050
21. I had difficulty understanding the requirements of developing my e-portfolio in OneNote (reverse-coded).	1	1	4	12	8	3.96	.999

22.Keeping voice records for speaking tasks makes me feel uncomfortable (reverse-coded).	0	7	3	4	12	3.81	1.297
23.I am nervous to receive negative comments on my performance from my peers (reverse-coded).	2	3	3	6	12	3.88	1.336
24.Developing an e-portfolio in OneNote is impractical because it is time-consuming (reverse-coded).	0	5	3	12	6	3.73	1.041
25.I prefer the traditional use of paper and pencil to keep records of my English tasks (reverse-coded).	0	6	4	11	5	3.58	1.065
26.Developing a OneNote e-portfolio is demanding (reverse-coded).	1	2	1	12	10	4.08	1.055
27.OneNote is an inappropriate tool to establish a speaking e-portfolio (reverse-coded).	1	3	3	12	7	3.81	1.096
28.I was confused about what to do in each notebook of my OneNote e-portfolio (reverse-coded).	1	4	2	8	11	3.92	1.230
29.I could not concentrate while recording my voice in OneNote (reverse-coded).	1	2	3	9	11	4.04	1.113
30.OneNote e-portfolio did not help me improve my speaking (reverse-coded).	0	0	6	7	13	4.27	.827

The descriptive statistics in Table 5 indicate an overall favorable attitude of the OneNote-based self-regulatory e-portfolio, with most item means exceeding 4.00 on a five-point Likert scale and minimal "strongly disagree" responses. Items 6, 11, and 17 received the highest mean scores, highlighting three key strengths of the intervention: Item 6, *"OneNote e-portfolio gives me a good chance to recognize my weaknesses in speaking English"* (M = 4.77), Item 11, *"The advantage of the OneNote e-portfolio is that it is accessible everywhere, at any time"* (M = 4.58), and Item 17, *"Reflecting on speaking performance after each speaking task is very helpful"* (M = 4.58). In contrast, the lowest mean scores were observed for

reverse-coded items 19, 20, and 25: Item 19, *"I prefer to practice speaking on my own rather than in OneNote"* (M = 3.54), Item 20, *"Using OneNote slows me down to practice speaking"* (M = 3.31), and Item 25, *"I prefer the traditional use of paper and pencil to keep records of my English tasks"* (M = 3.58). While these indicate some minor usability concerns or conventional preferences, overall attitudes were positive. These patterns suggest learners valued the e-portfolio for self-regulated learning, reflection, and accessibility, with initial discomfort diminishing over time.

Following a qualitative analysis of the interview data, several key themes emerged. The identified themes are presented below. Representative quotations are provided to enhance analytic transparency and illustrate each theme.

Organization and Accessibility of Speaking Practice

All eight participants identified the organizational features of the OneNote e-portfolio as an important affordance for speaking practice. Learners valued the ability to store voice recordings together with images, notes, and external links within a single, centralized space. One participant explained, *"everything for one speaking task was in one place, so it was easy to go back and see what I did before"* (P3). This organization enabled learners to track their speaking development over time and reduced the effort required to manage learning materials. However, two participants reported that these organizational benefits were not immediately evident. As one learner noted, *"at the beginning, it was confusing and took a lot of time to organize everything"* (P7). For these participants, the platform initially increased cognitive load before becoming a supportive tool, suggesting that usability perceptions changed over time.

Goal Setting and Strategic Planning

Six participants emphasized the role of goal setting in shaping their speaking practice. They reported that articulating specific goals prior to recording

helped them approach speaking tasks more deliberately and avoid unfocused practice. One participant stated, *"when I set my goal first, I knew what I should pay attention to instead of just speaking randomly"* (P2). This planning process increased awareness of task requirements and learning objectives. In contrast, two participants expressed difficulty formulating effective goals without explicit guidance. One learner explained, *"sometimes I didn't know what kind of goal was good, so I felt a bit lost"* (P6). This suggests that goal setting, while potentially beneficial, may require instructional scaffolding to be effective for all learners.

Self-Monitoring through Voice Recording

The voice recording feature emerged as a central component of learners' experiences. All participants reported that listening to their own recordings enabled them to identify strengths and weaknesses in fluency, vocabulary use, grammatical accuracy, and pronunciation. One participant reflected, *"when I listened again, I could clearly hear my grammar mistakes and pauses"* (P1). The learners described recording the same task multiple times, reporting that repeated recording helped reduce hesitation and improve speech flow. At the same time, three participants described initial resistance and discomfort with self-recording. One participant admitted, *"I really didn't like hearing my own voice at first"* (P4). For these learners, self-monitoring was emotionally challenging before becoming a productive learning strategy, indicating that its benefits developed gradually rather than immediately.

Emotional Regulation and Confidence Development

Emotional responses to speaking practice varied across participants. Three learners reported experiencing anxiety and fear of making mistakes during early recording attempts. As one participant stated, *"I was very nervous because I knew my mistakes would be recorded"* (P8). Over time, however, repeated exposure to recording appeared to reduce anxiety and increase confidence. One learner noted, *"after several times, I stopped worrying so*

much and felt more confident speaking" (P8). These findings suggest that confidence development was not an automatic outcome of e-portfolio use but emerged through sustained engagement and increasing familiarity with the process.

Feedback and Peer Learning

The participants described instructor and peer feedback as helpful for identifying specific areas for improvement, particularly in vocabulary, grammatical accuracy, and pronunciation. One participant commented, *"the teacher's feedback showed me exactly what I needed to improve"* (P2). Listening to peers' recordings was also perceived as a learning opportunity, as it exposed learners to alternative expressions and speaking strategies. As one learner noted, *"I learned new words and expressions by listening to other students"* (P6). Nevertheless, peer learning was not uniformly positive. One participant reported discomfort when comparing their performance to others, stating, *"sometimes I felt discouraged when I listened to classmates who were better than me"* (P4). This highlights the affective complexity of peer-based learning in speaking contexts.

Perceived Transferability and Future Use

Five participants expressed intentions to continue using OneNote beyond the course, particularly for developing speaking and writing skills. One participant stated, *"I think I can use this method in other classes, especially for writing"* (P5), indicating perceived transferability of the self-regulatory structure. In contrast, three participants were uncertain about continued use, citing time demands and efficiency concerns. One learner explained, *"if it's not required, I'm not sure I would keep using it because it takes a lot of time"* (P7).

Constraints, Resistance, and Adaptation Over Time

Despite generally positive perceptions, participants also identified constraints that limited their engagement with the e-portfolio. Two participants described the OneNote interface as time-consuming and difficult to navigate during the early stages of the course. One participant noted, *"at first, I spent more time figuring out OneNote than practicing speaking"* (P1). These challenges diminished as learners became more familiar with the platform, suggesting that continued exposure and consistent use could reduce technical barriers.

DISCUSSION

The present study found that participation in a self-regulatory e-portfolio implemented through OneNote was associated with reported improvements in performance, self-regulatory, and linguistic self-efficacy in speaking among intermediate and upper-intermediate Iranian EFL learners. Participants expressed generally positive attitudes toward the tool, particularly appreciating its accessibility, organizational features, and support for reflection and self-monitoring. Learners reported increased awareness of their speaking strengths and weaknesses and described engaging in more deliberate practice through goal-setting and feedback. Although some participants initially experienced resistance, emotional discomfort, and usability challenges, these concerns appeared to diminish over time, suggesting gradual adaptation and increasing engagement with the e-portfolio.

These findings are consistent with earlier empirical studies indicating that when learners actively engage in goal-setting, self-assessment, and reflection, they may develop stronger beliefs in their ability to manage the affective demands of language learning. For example, Guo and Li (2024) reported that structured e-portfolios were associated with enhanced self-efficacy by making learning goals explicit and progress observable. A similar pattern was observed in the present study through learners' systematic documentation of speaking tasks. Likewise, Laksana et al. (2021) found that

e-portfolio-based speaking activities corresponded with increased self-efficacy, particularly when regular self-evaluation and reflection were incorporated. The multidimensional self-efficacy gains observed here align with these findings, although the present results remain limited to learners' self-reported perceptions.

The mechanisms underlying these associations can be interpreted through Bandura's (1977, 1997) four sources of self-efficacy. In line with the emphasis on mastery experiences as a primary source of efficacy beliefs, learners in the current study engaged in repeated speaking recordings and revisions that may have allowed them to perceive incremental progress. López-Crespo et al. (2022) similarly observed that iterative speaking tasks within e-portfolio environments helped learners recognize improvement over time, which corresponded with increased confidence. The present qualitative findings further suggest that listening to earlier recordings and comparing them with later performances encouraged learners to attribute improvement to effort and strategy use rather than fixed ability. While such interpretations are based on learners' self-reports, they align with theoretical explanations of how mastery experiences contribute to efficacy development.

Verbal persuasion also appeared to play an important role. Consistent with Nicolaidou's (2012) findings that formative feedback in e-portfolio contexts can strengthen learners' confidence by clarifying performance expectations, participants emphasized the motivational and instructional value of instructor and peer feedback. Dialogic feedback within the portfolio environment was described as encouraging a view of errors as opportunities for improvement. Rather than suggesting that feedback alone caused increases in self-efficacy, the findings indicate that feedback embedded within reflective and learner-controlled digital environments may contribute to more supportive interpretations of performance.

The findings related to vicarious learning and social comparison offer a similarly nuanced perspective. Lam (2022) reported that exposure to peers' work in e-portfolios supported both self-regulated and co-regulated learning by enabling learners to observe effective strategies. In the present study,

participants likewise reported that listening to peers' recordings provided useful models for organizing ideas and improving fluency. However, some learners experienced discomfort when comparing themselves with more proficient peers. This suggests that while vicarious experiences may support self-efficacy development, they may also introduce affective challenges if not carefully scaffolded, particularly in speaking-focused contexts.

Emotional regulation emerged as another important theme. Learners initially described anxiety and fear of negative evaluation, especially when listening to their recorded speech. Over time, however, the asynchronous and relatively low-stakes nature of the e-portfolio appeared to reduce immediate performance pressure. Lysenko et al. (2022) similarly found that e-portfolios may provide a psychologically safer space for rehearsal by allowing experimentation without real-time social evaluation. The present findings are consistent with this interpretation, suggesting that sustained engagement in reflective speaking tasks may gradually reshape learners' perceptions of emotional control. Nevertheless, these conclusions remain limited to perceived emotional regulation rather than objectively measured anxiety reduction.

From a self-regulated learning perspective, the findings are broadly consistent with Zimmerman's (2000) cyclical model. Learners' descriptions of goal-setting prior to recording, strategy use during performance, and reflection after task completion parallel the forethought, performance, and self-reflection phases identified in the model. Similar patterns were reported by Guo and Li (2024), who found that digital SRL tools were associated with enhanced awareness of task goals and strategic planning in online language learning contexts. At the same time, learners in both studies reported difficulty formulating effective goals without explicit guidance, reinforcing the view that SRL skills require structured scaffolding rather than assumption. Furthermore, the findings agree with a growing body of evidence that technology-enhanced interaction, self-assessment, reflection, and collaboration are linked to improved self-efficacy, particularly in online or blended learning environments (Namaziandost & Çakmak, 2020; Peechapol

et al., 2018). In the present study, the organizational affordances of OneNote, such as accessibility and longitudinal documentation, appeared to facilitate these processes, although the effects observed in this study reflect the combined influence of SRL instruction, feedback practices, and structured reflection rather than the technological platform alone.

Importantly, this study contributes to the literature by conceptualizing speaking self-efficacy as a multidimensional construct, thereby offering a more differentiated view of affective factors in speaking development. It also provides context-specific evidence that Microsoft OneNote can function as a viable medium for implementing structured self-regulatory e-portfolios. Within the boundaries of its design, the findings suggest that integrating SRL principles within a digital portfolio environment may provide affective and metacognitive scaffolding that supports learners' speaking self-efficacy. However, these conclusions should be interpreted as reflecting associations within a specific instructional context rather than definitive evidence of causal effects.

CONCLUSION AND IMPLICATIONS

This study suggests that OneNote-based self-regulatory e-portfolios can promote Iranian EFL learners' speaking self-efficacy in online contexts, resulting in measurable gains across performance, linguistic, and self-regulatory dimensions. Participants viewed the OneNote-based self-regulatory positively, highlighting its support for organization, reflection, and purposeful practice. Initial discomfort and usability challenges diminished over time as learners adapted and became more engaged. The findings highlight the pedagogical value of integrating SRL strategies into digital language instruction to enhance learners' self-efficacy.

However, some limitations should be acknowledged. First, the participants of this study were recruited as volunteers via social media, which may introduce selection bias, as they could be more motivated or technologically adept than the broader population, thereby limiting

generalizability. Second, although participants were randomly assigned to experimental and control groups, strengthening internal validity, the sample was relatively small and predominantly female (83%), and the instructor both implemented the intervention and collected data, potentially introducing bias. Moreover, the intervention combined multiple components: SRL training, reflection, feedback, and technology use, making it difficult to isolate the effects of individual elements, and the short-term design precludes conclusions about longer-term impacts. Finally, the researcher-developed attitude questionnaire was content-validated by two experts. Still, no factor analysis was conducted to establish construct validity, underscoring the need for more rigorous instrument validation in future research.

Despite these constraints, the study has practical and theoretical implications. For instructors, OneNote-based self-regulatory e-portfolios can be a viable tool for enhancing speaking self-efficacy, provided adequate training, phased integration, and support are in place to address workload and technological limitations. Theoretically, the findings support Bandura's and Zimmerman's models, highlighting the importance of mastery experiences, reflective evaluation, and self-regulatory cycles in fostering multidimensional self-efficacy. Future research should employ larger, more diverse samples, and longitudinal approaches, while examining the relative contribution of individual SRL components and the transfer of self-efficacy gains to actual speaking performance across contexts.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Raziyeh Mashayekh https://orcid.org/0009-0002-3097-9187
Reza Dashtestani https://orcid.org/0000-0002-1741-642x

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Appendix: Semi-Structured Interview Questions

1. What are some of the advantages of OneNote e-portfolios?
2. What are some of the disadvantages of OneNote e-portfolios?
3. What do you think about setting goals for each speaking session?
4. What do you think about planning for each speaking session?
5. What do you think about recording your voice for each speaking task?
6. How do you feel about reflecting on your performance after each speaking task?
7. What do you think about sharing your voice records with your peers?
8. How do you feel about receiving comments on your voice records from the teacher and peers?