Original Paper

A Quantitative Study on Undergraduate Students' Deeper Learning in Peer-Feedback and Self-Feedback Tasks in an English as a Foreign Language Writing Course

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Abstract

Deeper learning competencies, such as critical thinking, communication, collaboration, and self-management, are receiving increasing attention in education. In writing instruction, feedback-providing tasks have the potential for promoting deeper learning. This study develops and applies a self-report scale to explore the level of deeper learning among undergraduate students in China in providing peer feedback and self-feedback in an English as a Foreign Language (EFL) writing course. The scale includes three dimensions: involvement, use of deeper learning strategies, and deeper learning outcomes. The research found a generally moderate level of deeper learning in various feedback-giving tasks. Significant and positive correlations were found between the three dimensions of deeper learning as well as between deeper learning, anticipation toward feedback-giving tasks and overall course evaluation. At the same time, it was found that students may be more active in deeper learning from the perspectives of their use of deeper learning strategies and the perceived learning outcomes than from the perspectives of participation in discussion as well as time and effort spent on the tasks.

Keywords

Deeper learning, peer feedback, self-feedback, feedback providers, EFL writing course, higher-order competencies, learning strategies, feedback strategies

1. Introduction

The past decades have witnessed an increasing trend in education to highlight the development of general competencies essential for individual success in this fast-changing and connected world. While

discipline-specific knowledge and skills are still crucial in teaching, learning and assessments, transferable skills such as critical thinking, communication, collaboration, and self-management have been increasingly incorporated into learning objectives and educational assessments. The type of learning that fosters the development of such higher-order competencies is often referred to as "deep learning" or "deeper learning" (National Research Council [U.S.], 2012). While "deep learning" or "deeper learning" is much more frequently emphasized in secondary or primary school education and less mentioned in research on and practices in higher education, it is equally important to foster such higher-order competencies in higher education. In China, for example, the Ministry of Education emphasized in a policy document named "Opinions on Accelerating the Construction of High-level Undergraduate Education to Comprehensively Improve Talent Cultivation Capacity" in 2018 that undergraduate education should stimulate students' interest and potential in learning by deepening teaching reforms and improve students' autonomous learning capacities along with abilities in expression, communication, and teamwork (Ministry of Education of the People's Republic of China, 2018). Therefore, there is a need to research and promote deeper learning in undergraduate students and see how it leads to improved interests and transferable competencies.

Deeper learning can be promoted by a metacognitive approach to instruction (National Research Council [U.S.], 2000). Training students to provide feedback for their own work (and for their peers' work) and to reflect on effective choices and areas for improvement is an important way to teach metacognitive skills (National Research Council [U.S.], 2000). In English as a Foreign Language (EFL) writing courses for undergraduate students, peer feedback and self-feedback have received increasing attention in recent years. They can empower students to become self-regulated learners with enhanced higher-order competencies. Peer feedback and self-feedback are beneficial for promoting students' deeper learning, which not only helps improve their writing and second language proficiency, but also transferable skills like self-directed learning, communication and teamwork (Tian & Li, 2018; Vuogan & Li, 2022; Wang & Lee, 2021; Zou et al., 2022).

In order to promote deeper learning in EFL writing courses for undergraduate students, it is essential to encourage students' involvement in peer feedback and self-feedback activities and monitor the effects of these deeper learning activities. Existing studies have explored students' behavioral, cognitive and emotional engagement as feedback receivers (Xu & Long, 2022). Research has also demonstrated the positive effects of peer feedback and self-feedback on text revision or the development of writing skills (Lu et al., 2021; Vuogan & Li, 2022). However, there is limited research on first-year undergraduate students' deeper learning when they take on the role of feedback providers. To address this gap, the present study aims to explore the level of deeper learning in providing peer feedback and self-feedback in an EFL writing course for first-year non-English major undergraduate students in China. Based on existing research on deeper learning and on learner engagement in peer feedback and self-feedback activities, this study will develop and apply a self-report scale to explore the level of deeper learning from the perspective of feedback providers in EFL writing instruction. The research will also explore

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the relationships between the level of deeper learning and both anticipatory attitudes toward such feedback activities and students' overall evaluation of the EFL writing course.

2. Literature Review

2.1 Deeper Learning

Deeper learning is associated with a shift in education to prioritize higher-order skills and knowledge essential for learners to meet the new challenges in the 21st century. The National Research Council (U.S., 2012) viewed "deeper learning" as the learning process that leads to the development of transferable knowledge and skills, which they referred to as "21st century competencies". They organized these competencies into three broad domains, namely cognitive, intrapersonal, and interpersonal competencies. In 2013, the Hewlett Foundation (2013) highlighted six deeper learning competencies, which fit within these three domains (Table 1). While the Hewlett Foundation focused on high school education, the concepts they developed can apply to all levels of education. Table 1 summarizes the relationship between these domains and competencies, as well as the variables included in this study to measure deeper learning competencies.

Table 1. Mapping Concepts of Deeper Learning Competencies and Variables in This Study

Domains of 21st century competencies	Deeper Learning Competencies	Variables in this study
Cognitive	Master core academic content	English writing skills
	Think critically and solve complex problems	Critical thinking skills
Intrapersonal	Learn how to learn	Autonomous English learning skills
	Develop academic mindsets	English writing confidence
Interpersonal	Work collaboratively	Collaboration skills
	Communicate effectively	Verbal & written expression abilities

In a recent review of research on deeper learning, Peng and Zhu (2020) defined deeper learning as a form of meaningful learning with four key elements: deep involvement in learning, advanced learning strategies, development of higher-order knowledge and skills (another name for "the deeper learning competencies"), and an orientation toward learning transfer based on comprehension. The last element is essentially incorporated within the second element, as shown in the later explanation of advanced learning strategies. This study adopts Peng and Zhu's (2020) definition of deeper learning, as it provides a recent and comprehensive theoretical framework for examining the level of deeper learning. Inspired by the elements of deeper learning proposed by Peng and Zhu (2020), this study establishes a three-dimensional conceptual framework of deeper learning. The first dimension is involvement, which

measures the level of active participation and immersive experience in the learning process. The second dimension is the use of deeper learning strategies or advanced learning strategies, which are active learning strategies that students adopt when their learning is based on comprehension and their goal is to transfer learning to novel contexts (Peng & Zhu, 2020). The third dimension is deeper learning outcomes, which include increased interests and enhanced deeper learning competencies.

2.2 Peer Feedback and Self-Feedback

Peer feedback and self-feedback are important forms of assessment for learning (Lee & Coniam, 2013) and assessment as learning (Wang & Lee, 2021). Peer feedback refers to the activities where learners evaluate and comment on the work of their peers. Such activities are often described with related terms such as peer assessment and peer review. In writing courses, peer feedback can promote student learning from the perspectives of both the providers and the givers (Tian & Li, 2018).

Self-feedback is also known as self-assessment. In this study, it refers to the activities where learners evaluate their individual writing or evaluate and comment on their collaborative writing. While the effect of self-feedback on writing improvement was less obvious than peer feedback in previous studies, giving self-feedback in writing courses also familiarise students with the requirements and grading rubrics of the writing task and improve their writing quality (Lu et al., 2021; Zou et al., 2022). Furthermore, giving self-feedback involves learners in self-reflection, encourages critical thinking, helps them address global issues in their writing, and helps motivate and engage learners (Lu et al., 2021; Yu et al., 2020; Zou et al., 2022). Therefore, it is important to research deeper learning in both peer feedback and self-feedback tasks.

2.3 Learner Engagement and Deeper Learning in Peer Feedback and Self-Feedback Activities

While the concept of deeper learning has not often been mentioned in previous studies on providing peer feedback and self-feedback in writing courses, the involvement and deeper learning strategies dimensions in this study's deeper learning framework were partly covered by existing research on learner engagement, and the deeper learning outcomes dimension was partly addressed by research on the effects of giving feedback to EFL writings from the perspective of peer assessors or self-assessors.

Learner engagement, the extent to which a learner is committed to the learning activities, is conducive to boosting intrinsic learning motivation and improving learning outcomes (Fredricks et al., 2004; Xu & Fan, 2019). Prior studies often examine learner engagement from three perspectives, namely behavioral, emotional and cognitive engagement (Fredricks et al., 2004; Zhang et al., 2023). Behavioral engagement is defined by some researchers as active involvement in learning activities (Fredricks et al., 2004). This concept can be connected to the involvement dimension in this study's deeper learning framework. The concept of cognitive engagement, which often focuses on the use of strategies (Fredricks et al., 2004), can be connected to another dimension of the framework, namely the deeper learning strategies.

In previous studies on learners' engagement with feedback from the perspective of feedback receivers, mismatches have been found between behavioral, emotional and cognitive engagement (Xu & Long,

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2022). For example, Xu and Long (2022) revealed that a student who was emotionally and behaviorally engaged when responding to teacher feedback did not adopt enough cognitive strategies when utilizing the feedback. This finding implies that teachers and educational researchers should pay more attention to learners' use of strategies that promote deeper learning, instead of focusing only on their observable behaviors or emotions.

While many studies on learner engagement in feedback activities have examined how learners respond to feedback from different sources, engagement of learners as providers of peer feedback and self-feedback in EFL writing courses was underexplored. One of the few studies in this area was conducted by Xie (2021), who developed a convenient instrument to measure learner engagement in providing peer feedback, which was named Self-report Scale of Student Engagement in Peer Review of EFL Writing (SSSE-PREW; Xie, 2021). Xie demonstrated the usefulness of the instrument by showing positive correlations between the results of the self-report scale and the observable features of learners' actual engagement (Xie, 2021). Later, the scale was further validated with a Confirmatory Factor Analysis, resulting in a 3-dimensional, 6-factor model (Xie & Gao, 2022). However, these studies focused only on online peer feedback activities, while engagement in self-feedback activities and other types of peer feedback activities cannot be properly measured with this instrument. Another recent mixed-methods study investigated three providers of oral peer feedback and showed how learner engagement in providing feedback improved with accumulated experience in feedback activities (Zhang et al., 2023). While these studies have explored the extent to which Chinese undergraduates are engaged in providing peer feedback in EFL writing courses from behavioral, emotional and cognitive perspectives, self-feedback activities were much neglected in previous research.

Research on the benefits of providing feedback showed that acting as feedback providers could promote writing development by enabling learners to learn from their peers' writings, to develop their genre awareness, and to gain a better understanding of the criteria for effective writing (Tian & Li, 2018; Yu, 2019). In Yu's (2019) study on seven Master's students, providing feedback on thesis writing could help the peer reviewers cultivate a habit of thinking critically and reflectively in their writing process. Furthermore, it helps improve autonomous learning skills by prompting peer reviewers to strategically seek and incorporate information from various sources (Yu, 2019). Such deeper learning outcomes, however, have not been comprehensively investigated with quantitative methods in prior studies, and research on first-year non-English major undergraduate students in China in this area is lacking.

2.4 Filling the Research Gaps

In existing studies on feedback provision for EFL writings, there is a lack of research on learner engagement in giving both peer feedback and self-feedback, a lack of comprehensive quantitative studies on deeper learning outcomes of feedback provision, and a lack of research on first-year non-English major undergraduate students in China. To address these gaps and to connect learners' involvement and use of strategies in feedback-giving activities to deeper learning outcomes, this study

aims to examine the level of deeper learning when students work to provide feedback to the EFL writings of their peers and their own from three perspectives: learner involvement, the use of deeper learning strategies and deeper learning outcomes, including increased interests and enhanced deeper learning competencies.

3. Methods

3.1 Context and Participants

The participants were first-year healthcare undergraduate students from a university in China. The students were required to take a one-year College English course, which includes a writing module. In the second semester of the writing module, two natural classes within nursing and two within clinical medicine disciplines were included in an educational innovation to transform students into feedback providers in the writing module. The students completed both individual and group writing assignments, participated in various forms of peer feedback and self-feedback activities, including online and offline peer review, self-evaluation, collaborative feedback to group writings and presentation of their collaborative feedback. In addition, students also received teacher feedback and automated feedback. Based on multiple sources of feedback, students revised their writings and submitted their final version online. At the end of the course, these students were invited to complete an online course feedback questionnaire on a voluntary basis.

3.2 Instrument

As a part of the end-of-semester course feedback questionnaire, the survey instrument included 5-point Likert scale items on overall course evaluation, deeper learning in and anticipation toward providing peer feedback and self-feedback. For course evaluation, perceived learning outcomes and anticipatory attitudes, the options ranged from 1 = "completely disagree" to 5 = "completely agree"; for the subscales measuring involvement and use of deeper learning strategies, the options ranged from 1 = "never or almost never" to 5 = "always". Background information on gender and major was also collected.

The scale for overall course evaluation included 4 items, measuring interest in course content, usefulness of course content for future learning and personal development, satisfaction with the learning atmosphere and perceived gains in the course. The scale for anticipation toward feedback activities included 4 items on anticipatory attitudes towards providing different types of peer feedback and self-feedback.

The scale of deeper learning in providing peer feedback and self-feedback (SDL-PPFSF) contained 20 items measuring the degree of involvement, use of deeper learning strategies, and deeper learning outcomes from the perspective of feedback providers in the peer feedback and self-feedback activities. The items were largely based on two scales with established validity and reliability. The first scale, SSSE-PREW (Xie, 2021; Xie & Gao, 2022), was a 3-dimensional, 6-factor scale to measure learner engagement in providing peer feedback. The second was the College Students' Deep Learning Scale for

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Blended Learning Environment (CSDLS-BLE, Li et al., 2018).

The involvement dimension of the instrument included two items adapted from the behavioral engagement dimension of SSSE-PREW (Xie, 2021; Xie & Gao, 2022) and one item from the deep learning engagement dimension of CSDLS-BLE (Li et al., 2018). The outcomes dimension comprised 7 items adapted from the deep learning result subscale from CSDLS-BLE and tailored for relevance to the context of the English writing course.

As the use of cognitive strategies may deserve more attention than the external behavioral aspect (Xu & Long, 2022), the subscale measuring the use of deeper learning strategies included many more items than the involvement subscale. Four items were adapted from the task management factor and another four items from the feedback strategies factor from the SSSE-PREW. Both factors belonged to the cognitive engagement dimension (Xie & Gao, 2022) and positively correlated with observable cognitive efforts as measured with particular cognitive features of their feedback comments (Xie, 2021). Modifications were made to reflect the current research context with both online and offline peer feedback and self-feedback. Another item was adapted from the deep learning strategy subscale from CSDLS-BLE. A self-designed item was also included in the deeper learning strategies dimension to measure self-reflection, because reflection is also an essential component of deeper learning (Peng & Zhu, 2020).

3.3 Data Collection and Analysis

A total of 120 responses were collected from the participants who completed the online survey. After removing one invalid response, 119 valid responses were analyzed using the statistical software jamovi (Version 2.3). Responses to the SDL-PPFSF were analysed using principal components analysis to establish validity. After inappropriate items were identified and removed, Cronbach's α testing was employed to determine the reliability of the revised subscales and the overall scale. Cronbach's α testing was also conducted to confirm the internal consistency of the scales for anticipation toward feedback-giving activities and overall course evaluation. Finally, descriptive, bilateral correlational, and multiple linear regression analyses were conducted to achieve the research objectives.

4. Results and Discussion

4.1 Factor Analysis of the SDL-PPFSF

Exploratory factor analysis (EFA) was conducted using principal components analysis and varimax rotation to uncover factor structures of the SDL-PPFSF. For the initial 20 items, the overall KMO measure of sampling adequacy (MSA) was 0.909 and Bartlett's test of sphericity was significant (approximate $\chi2 = 1620$, df = 190, p < 0.001), indicating suitability for factor analysis. In the first EFA, all items had loadings above 0.5, but one item did not meet the factor extraction requirements because it had cross-loadings above 0.4. This item was removed, resulting in a final scale with 19 items. For the remaining items, the overall KMO (0.906), the MSA for individual items (all above 0.85) and Bartlett's test (approximate $\chi2 = 1492$, df = 171, p < 0.001) still upheld factor analysis suitability. The second

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EFA extracted three factors from these items, explaining 65.1% variance. Table 2 shows the results of the second EFA. All scale items showed clean loadings onto the expected factors of involvement, deeper learning strategies, and deeper learning outcomes as conceptualized. Eighteen items had robust loadings above 0.60 on their intended factors and the only remaining item also had a loading above 0.57. All item communalities were above 0.48. The scree plot also suggested that interpretability became difficult after three factors, further confirming the appropriateness of a three-factor structure.

Table 2. Factor Loadings of the SDL-PPFSF

Abbreviated descriptions of scale items	Strategies	Outcomes	Involvement
Giving peer feedback tactfully or starting with strengths	0.795		
Pointing out locations of the writing issues	0.790		
Offering targeted revision suggestions	0.747		
Integrating diverse perspectives in feedback	0.747		
Giving feedback according to the rubrics	0.734		
Explaining the reasoning for evaluations or suggestions	0.728		
Using dictionaries or reference materials to ensure quality feedback	0.694		
Learning from peers' work when giving feedback	0.694		
Reflecting on my own writing issues when giving feedback	0.677		
Improvement in English writing skills		0.795	
Improvement in English writing confidence		0.793	
Improvement in critical thinking		0.784	
Improvement in verbal & written expression		0.756	
Improvement in collaboration skills		0.673	
Improvement in autonomous English learning skills		0.671	
Increased interest in English writing		0.628	
Sharing about the feedback activities with peers out of class			0.821
Active participation in feedback-related discussions			0.777
Investing a lot of time and effort into feedback-giving tasks			0.573

Note. Factor loadings greater than 0.40 are shown.

4.2 Reliability Tests

Internal consistency reliability tests were conducted for the final version of the SDL-PPFSF and the other two scales. The Cronbach's alpha coefficients were as follows: 0.79 for the subscale of involvement, 0.93 for the subscale of deeper learning strategies, 0.89 for the subscale of deeper learning outcomes, 0.94 for the overall scale of SDL-PPFSF (19 items), 0.88 for the scale of anticipation toward providing different types of feedback (4 items) and 0.87 for the scale of overall course evaluation (4

items). These values indicated strong internal consistency and reliability of each scale or subscale.

4.3 Descriptive Analysis

Table 3 shows the demographic distribution of the participants. The clinical medicine and nursing disciplines were equally represented. The total number of female participants was much higher than male students, which corresponded with the higher percentage of female students in the nursing discipline.

Table 3. Demographic Data of Participants (N=119)

		Number	Percent
Major	Clinical Medicine	61	51.3
	Nursing	58	48.7
Gender	Male	45	37.8
	Female	74	62.2

Descriptive statistics were calculated for students' responses on the three subscales of the SDL-PPFSF as well as the scales for anticipation toward providing different types of feedback and overall course evaluation (Table 4). Results showed moderately high means for the scales or subscales. The mean values for the three subscales of deeper learning ranged from 3.47 to 3.89. Responses to the anticipation items like "I very much look forward to participating in the online peer feedback activities" yielded a mean of 3.73. Considering the qualifier "very much" in the items, the results indicated notably positive and enthusiastic anticipation toward participation in the various feedback activities. The overall course evaluation yielded even more positive results (M = 4.07, SD = 0.55). Overall, these descriptive results showed that students were generally actively and strategically involved in deeper learning in the peer feedback and self-feedback activities, and that they perceived many benefits of these activities, which may explain their moderately strong motivation toward these activities and their strong positive evaluation of the whole writing course.

Analysis of responses to the SDL-PPFSF at the item level showed that the average scores for all items were above the midpoint. Further analysis showed that students perceived the greatest gains in collaboration skills (M = 4.08), critical thinking (M = 3.96) and autonomous English learning skills (M = 3.90). The most frequently used strategies are consulting dictionaries or online reference materials when providing feedback (M = 4.13), self-reflection during various feedback-giving activities (M = 3.89) and utilizing the rubrics (M = 3.83). In line with previous studies (Yu, 2019; Zou et al., 2022), these findings further demonstrate the transferable learning outcomes of peer feedback and self-feedback provision tasks. The findings also demonstrate the importance of examining the tendency of self-reflection in peer feedback and self-feedback provision, which was neglected in the existing feedback engagement scale SSSE-PREW (Xie & Gao, 2022). The enhanced autonomous English learning skills may be explained by the habit of information-seeking (Yu, 2019), self-reflection and assessing the work according to the

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rubrics. The highest-ranking outcome, perceived improvement in collaboration skills, could be connected to the research context where collaborative feedback tasks were implemented.

The average scores for the involvement dimension ranged from 3.39 to 3.55, lower than the average scores for all other items of the other two dimensions. Further analysis showed that the 14 students who did not report themselves as active participants in feedback-related discussions (choosing 1 or 2 for the item) reached an average score of 3.43 (SD = 0.51) on the strategy use dimension and 3.47 (SD = 0.41) on the outcomes dimension. Similarly, the 14 students who did not invest much time and effort in feedback-giving tasks reached an average score of 3.39 (SD = 0.64) on the strategy use dimension and 3.63 (SD = 0.65) on the outcomes dimension. In Xu and Long's (2022) study on feedback engagement from the perspective of feedback receivers, the researchers revealed that frequent observable behaviors of utilising feedback in text revision could be fake engagement that did not correspond to inadequate use of cognitive strategies. The present study, however, shows that students may be more active in deeper learning from the perspectives of their use of deeper learning strategies and the perceived learning outcomes than from the perspectives of observable participation in feedback-related discussion as well as time and effort spent on feedback tasks.

Table 4. Descriptive Statistics (N=119)

Scale (shorthand)	Minimum	Maximum	Mean	Std. Deviation
Involvement	1.33	5.00	3.47	0.75
Strategies	2.11	5.00	3.81	0.62
Outcomes	2.29	5.00	3.89	0.54
Anticipation	2.00	5.00	3.73[a]	0.65
Course evaluation	2.75	5.00	4.07	0.55

Note. a. Due to missing data from 26 participants for one of the four items on the scale of anticipation, the mean value for the remaining three items was used.

4.4 Correlation and Linear Regression Analysis

The results of the Pearson correlation analysis between the mean values of the three subscales of the SDL-PPFSF are reported in Table 5. As expected, there were statistically significant positive correlations between all dimensions, with coefficients ranging from 0.547 to 0.642 (all p-values are less than 0.001). The moderate correlations provide further evidence to support the reliability and construct validity of the three-dimensional scale.

A multiple linear regression analysis was further conducted to evaluate how well the involvement in the learning process and the use of deeper learning strategies predicted deeper learning outcomes (Table 6). The model fit the data well: R^2 = 0.403, RMSE = 0.412, F(4, 114) = 19.3, p < 0.001. When controlling for major and gender, both involvement (β = 0.292, p = 0.003) and deeper learning strategies (β = 0.401,

p < 0.001) still significantly and positively predicted deeper learning outcomes. The results indicate that students who were more actively involved and used more sophisticated cognitive strategies when giving peer feedback and self-feeback also tended to perceive more gains in their interest to write and in their higher-order competencies.

As for the relationships between the three dimensions of the SDL-PPFSF, anticipation toward various feedback-giving activities and overall evaluation of the writing course, results showed that the mean values for these scales or subscales all correlated significantly and positively with each other (Table 5). This indicates that involvement throughout the learning process and use of deeper learning strategies in the feedback activities could predict anticipatory attitudes toward the feedback-giving activities, which corresponds with previous research finding that engagement predicted intrinsic learning motivation (Xu & Fan, 2019). The significant and positive relationships between the three dimensions of deeper learning in feedback-giving activities and overall course evaluation provide additional support for incorporating feedback-providing tasks and emphasizing deeper learning in these tasks in the EFL writing course.

Table 5. Bivariate Correlations of the Scales / Subscales (N = 119)

	1	2	3	4	5
1 Involvement	—				
2 Deeper learning Strategies	0.642 **	—			
3 Outcomes	0.547 **	0.576 **	—		
4 Anticipation	0.506 **	0.534 **	0.736 **	—	
5 Course evaluation	0.460 **	0.439 **	0.613 **	0.646 **	—

Note. ** p < 0.001.

Table 6. Linear Regression Results for Deeper Learning Outcomes (N = 119)

Predictor	B	SE	β	t	p
(Intercept)	1.860	0.248		7.52	< .001
Involvement	0.208	0.067	0.292	3.09	0.003
Deeper learning strategies	0.347	0.082	0.401	4.22	< .001
Gender	-0.125	0.087	-0.233	-1.44	0.151
Major	0.138	0.084	0.258	1.65	0.101

5. Conclusion

This study has developed and applied a self-report scale to explore the level of deeper learning in

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providing peer feedback and self-feedback in an EFL writing course. The scale includes three dimensions: involvement, use of deeper learning strategies, and deeper learning outcomes. Based on first-year healthcare undergraduate students in China, the research found a generally moderate level of deeper learning in various feedback-giving tasks. Significant and positive correlations were found between the three dimensions of deeper learning as well as between deeper learning, anticipation toward feedback-giving tasks and overall course evaluation. At the same time, it was found that students may be more active in deeper learning from the perspectives of their use of deeper learning strategies and the perceived learning outcomes than from the perspectives of observable participation in feedback-related discussion as well as time and effort spent on feedback tasks.

However, this study has several limitations. First, it was a cross-sectional study, so changes in the levels of deeper learning over time could not be monitored. Future research should consider adopting a longitudinal or pretest-posttest design to gain more insight into learners' deeper learning in feedback-giving tasks. Second, this study did not examine factors that may influence deeper learning. To provide educators with more guidance on implementing effective peer feedback and self-feedback activities to support deeper learning, the effect of different feedback task designs, writing task designs, training procedures or supporting materials should be investigated in future studies. Third, the perceived gains, instead of observable improvements in deeper learning competencies, were used to measure the deeper learning outcomes. Researchers could consider triangulating the self-report data with objective assessments to comprehensively evaluate deeper learning outcomes of feedback-giving tasks in writing courses.

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