A Study on the Application of Human–Computer Combination Feedback in English Writing Teaching

Rui Wu(✉)

Beijing Information Technology College, Beijing, China
wur@bitc.edu.cn

Abstract. Feedback is an important part of process teaching of English writing. Feedback methods mainly include the traditional teacher feedback, peer feedback and the newly emerged automatic online feedback which is based on big data and artificial intelligence. In recent years, some researchers have combined the advantages of teacher feedback with automatic online feedback, and put forward a new method called human–computer combination (HCC) feedback. In this study, teacher feedback and HCC feedback were used for a four-month experimental teaching, and the differences of teaching effects between the two methods were examined. At the end of the experimental teaching, the attitudes of teachers and students toward teacher feedback and automatic online feedback were investigated. The results of experimental teaching show that the feedback method of HCC has significantly improved the quality of students' English writing, especially in the content of composition, the accuracy and coherence of language. The results of questionnaire and interview show that students prefer the traditional teacher feedback, but they also admit the help of automatic online feedback in correcting their word spelling and simple grammatical errors. Therefore, this paper suggests that teachers should try to use the HCC feedback method in their teaching of English writing, and the specific implementation steps are also suggested.

Keywords: Teacher feedback · Automatic online feedback · Human–Computer combination feedback · English writing teaching

1 Introduction

Writing has always been a difficulty in English teaching. Giving feedback is an important part in the Process Teaching Approach of English writing. The feedback methods and their quality and quantity play an important role in improving students' writing level. The traditional feedback methods mainly include teacher feedback and peer feedback. In recent years, the rapid development of computer, Internet, big data and artificial intelligence technology has given birth to a new way of writing feedback — automatic online feedback. All kinds of composition correction software came into being. A lot of research has been done on the traditional teacher feedback and peer feedback, but the research on the emerging automatic online feedback, especially its empirical research, is

Y. Pogrebnyak and R. Hou (Eds.): ICLCCS 2022, ASSEHR 689, pp. 149–159, 2023.
https://doi.org/10.2991/978-2-494069-27-5_18

far from enough. Teachers are eager to know the effect and the acceptability of automatic online feedback, so as to improve the quality of writing teaching.

2 Literature Review

Since 1950s, researchers have done a lot on the feedback methods of second language writing.

2.1 Teacher Feedback Method

Previous studies on the relationship between feedback methods and English writing quality mainly focus on teacher feedback and peer feedback. Teacher feedback, the most common method, has many advantages. For example, teachers know students better so that the suggestions put forward are more in line with students' level and students are more likely to accept them; teacher feedback is more direct and pays more attention to details from various aspects such as language, spelling and structure; teachers' feedback is more helpful to the content and structure of the composition (Zou, 2018).

However, teacher feedback usually requires teachers to spend a lot of time and energy reading, revising and writing comments on students' compositions, leading to an extremely high teaching cost, which may reduce the quality of the feedback. The amount of information provided by teacher feedback is limited and most of it is negative, which may cause students' anxiety (Tang & Wu, 2012). What's more, the feedback is accepted passively, which is not conducive to stimulating students' interest in writing. Therefore, some researchers believe that teacher feedback alone has no obvious effect on improving students' English writing level (Liu, 2002).

2.2 Peer Feedback Method

Peer feedback is a feedback method for students to communicate, negotiate and discuss with each other so as to evaluate and correct each other's compositions. It is a kind of two-way, immediate and active feedback. Students are more impressed by their classmates' evaluation, and their rejection and pressure are also reduced. In the process of correcting other people's compositions, students also improve their ability to judge high-quality compositions to a certain extent, thus helping to improve their own writing skills (Tan, 2009; Liu, Ge & Li, 2012).

However, the limitations of peer feedback are also obvious. Because the evaluators are mainly students and their English level is limited, the correctness, fairness and effectiveness of peer evaluation are questioned.

2.3 Automatic Online Feedback Method

Automatic online feedback, as a new method, emerged in recent years. It builds an automatic evaluation system based on a large database and artificial intelligence. After students submit their compositions online, the system immediately evaluates the compositions from the perspectives of vocabulary, grammar, content, and text structure,

points out mistakes and puts forward suggestions for revision. Many companies from home and abroad have developed such automatic feedback products. Automatic online feedback has many advantages that teacher feedback and peer feedback can't match. Firstly, because students are faced with machines, their anxiety, pressure and frustration are greatly reduced, and their writing enthusiasm is protected. Secondly, its timeliness arouses students' interest in writing. Thirdly, students can revise their compositions repeatedly according to the suggestions until they are satisfied, which makes students see their progress and enhance their confidence. Lastly, students can obtain more personalized and targeted advice from artificial intelligence, which is helpful to their English learning (Wang, 2014). On the other hand, Automatic feedback frees teachers from the heavy task of composition correction, reduces their work load and thus is welcomed by teachers.

Of course, machine correction also has some disadvantages. For example, the suggestions on vocabulary and grammar are not clear enough, and the feedback quality on the text structure and content is not high (Wu, 2020).

2.4 The Combination of Various Feedback Methods

Some researchers have tried to combine some feedback methods. For example, foreign studies have shown that the integration of peer feedback into automatic online feedback can provide more information for writers, give them more objective evaluation and more specific suggestions for revision (Guardado & Shi, 2007).

In recent years, some researchers have combined the advantages of man's manual correction with computer's automatic correction, and put forward the feedback mode of "human–computer combination (HCC)" or "human–computer double evaluation" (Wu, 2020; Peng, 2021; Li, 2021). In this method of HCC, students' compositions are evaluated and corrected at least twice, first by the artificial intelligence based on big data through a certain website (i.e. automatic online feedback), then by the teacher who corrects the composition by hand on paper version of the composition (i.e. teacher feedback). A limited number of research showed that students generally accept the feedback method of HCC, because it increases their composition scores and writing interest (Peng, 2021; Li, 2021).

3 Research objectives

This study applies teacher feedback and human–computer combination (HCC) feedback to English writing teaching practice, examines the effect of the two feedback methods on improving English writing teaching quality, and investigates the attitudes of students and teachers toward teacher feedback and automatic online feedback, so as to provide practical suggestions for improving the teaching quality of English writing.

4 Research design

4.1 Subjects, Methods and Instruments

This study is an empirical study. Altogether 260 students of grade one and grade two in a higher vocational college are involved in this research. The methods of literature research,

experimental research, quantitative and qualitative research are employed. Research tools include an English composition correction website with the address of www.pigai.org, mid-term and final exam writing papers, questionnaires, interview outlines and SPSS 17 statistical software.

4.2 Grading Standard

The grading standard is used to grade students' compositions in mid-term and final exams, so as to judge the effect of different feedback methods on improving students' English writing quality. After referring to the grading standards of NMET English composition and IELTS composition, taking into account the English teaching objectives of higher vocational colleges and students' actual English level, and referring to previous research results (Lu, 2008; Wu & He, 2014), this study plans to adopt the decomposition-integration evaluation standard when evaluating writing quality, mainly from three aspects: content, text structure and language (accuracy, complexity and coherence). However, because the compositions that students need to finish in this study are practical writing, with short length and low requirements for text structure, the marking of text structure is cancelled and the marking of format is added instead. So in the actual grading, the scores are given from five aspects: format, content, language accuracy, language complexity and language coherence. Each of the five items has 3 points and there are altogether 15 points for each composition.

4.3 Development of Questionnaire

The questionnaire in this study is used to investigate students' attitudes towards different feedback methods. It is self-designed and adopts the Likert Five Point Scale. The points 1–5 represent the five scales which range from "totally disagree" to "totally agree". For the convenience of students to answer questions, the questionnaire is set into seven columns: spelling, word use, grammar, content, format, the way of submission and the way of correction. The compilation of questionnaire items is exploratory. According to the function of the composition correction website and the grading standard formulated in this study, after soliciting and revising the opinions of some students and teachers, 23 question items were sorted out and a test questionnaire was made. Twenty-two of the twenty-three items belong to two dimensions: automatic online feedback and teacher feedback.

After that, a class of 30 students were selected for the pilot study, and the answers of the trial questionnaire were entered into SPSS 17.0 for validity and reliability analysis. The results showed that the piloting questionnaire had high validity and reliability. Therefore, it was decided to be the final questionnaire.

5 Research process

5.1 Teaching With Teacher Feedback Method

The first phase of experimental teaching employed teacher feedback method only, which lasted 8 weeks from the beginning of school term to the mid-term exam. During that

period, three practical writing tasks were assigned to students. After completing the writing, the students submitted the paper version to the teacher, and the teacher returned it to the students after correcting it. The students then revised their compositions based on their teachers' feedback. During the mid-term exam, one of the compositions was randomly selected for students to finish, and the students' English composition scores under teacher feedback method were thus obtained.

5.2 Teaching With Human-Computer Combination Method

The second phase of experimental teaching employed human–computer combination method, which also lasted 8 weeks from after the mid-term exam to the end of school term, and three practical writing tasks were assigned to students as well. Based on the previous research (Wu, 2020), the specific steps taken at this phase were as follows.

First of all, students submitted their compositions to the website. With the help of the automatic online feedback, students checked whether the compositions were off topic, and then corrected spelling, capitalization and punctuation errors of words. They were also required to correct vocabulary and grammar errors according to the automatic feedback, and try to replace high-frequency words with low-frequency ones recommended by the system. Through the above modifications, the complexity and accuracy of language should be improved to some extent.

After revising the composition based on suggestions put forward by the automatic online feedback, the students transcribed the revised composition in the exercise book and gave it to the teacher, who was to correct it for the second time. While reviewing the composition, the teacher first checked whether the composition had rich content and reasonable structure, then pointed out how to enrich the content and adjust the structure. After that, the teacher checked the errors in vocabulary and grammar and made corrections, paying special attention to run sentences and Chinglish. Finally, the teacher put forward some suggestions on the use of cohesive words to help students increase the coherence of sentences. Then the students revised the composition again according to the teachers' feedback.

At the end of the term, one of the compositions was randomly selected for students to finish during the final exam, through which the students' English composition scores under human–computer combination feedback method were obtained.

5.3 Contrastive Analysis of Composition Scores

The scores of two English compositions in the mid-term and the final examinations were input into SPSS 17 for quantitative analysis, and the correlation and difference of composition scores under the two feedback methods were investigated. A total of 178 students not only participated in the experimental teaching but also took the two examinations.

5.4 Questionnaire and Interview

After the final examination, a questionnaire survey was conducted on the acceptability of the two feedback methods. Altogether 260 questionnaires were returned and 208 of

them were valid. The data of the questionnaire were then input into SPSS 17.0 to test its validity and reliability. Factor analysis showed that the two variables (dimensions) contained at least three items, conforming to the theoretical design; all factor loadings were greater than 0.50 (with the lowest of 0.525); the two dimensions accumulatively explained more than half of the variations of students' attitudes toward different feedback methods (63.96%). The above results showed the questionnaire had good construct validity. Besides, the internal consistency test result showed the questionnaire had a Cronbach Alpha of 0.918 and that figure of the two subscales was over 0.90. All of the test results indicated the questionnaire was a reliable instrument.

After the questionnaire survey, 9 students were interviewed, including 3 poor students, 3 average students and 3 excellent students. Besides, three teachers were interviewed as well.

6 Results and discussion

6.1 Composition Scores Under Teacher Feedback and HCC Feedback

The composition scores in the mid-term and final exams respectively reflect the quality of writing teaching under teacher feedback and human–computer combination (HCC) feedback methods. Altogether there are 178 students taking part in both the mid-term and the final exams, and the number of subjects is equal.

Correlation analysis shows that the final composition scores are moderately and highly correlated with the mid-term composition scores in the five aspects (sub-items) of format, content, language coherence, language accuracy and language complexity, as well as the total score, which shows that the two groups of data are paired one by one and have similar trends.

The statistical results show that, except for the format, the final score is higher than the mid-term score in all the other items. In the item of format, the mid-term score is slightly higher than the final score by 0.048 points, with a significance of 0.310 ($p > 0.05$), and there is no significant difference. It shows that human–computer combination feedback has no significant influence on the format of writing.

In the item of language complexity, although the final score is higher than the mid-term score, it is only 0.006 points higher, with a significance of 0.903 ($p > 0.05$), which shows that the feedback mode of human–computer combination has no significant impact on language complexity. The results of the subsequent interview show that, because of the limitation of English proficiency, students don't know how to use the low-frequency words recommended by artificial intelligence, and in order to avoid mistakes, they tend not to take the advice of the website. In the other three aspects of content, language coherence and language accuracy, the final score is obviously higher than the mid-term score, showing significant difference ($p < 0.05$).

The above research shows that HCC feedback method has no significant impact on the format and language complexity of writing, but it has significant positive effects on the content, language coherence and language accuracy of writing. That is similar to the previous research results which show that the combination of teacher feedback and automatic online feedback can promote the content, structure, sentences and vocabulary of students' writing to varying degrees (Zou, 2018). Another study shows that compared

with the single teachers' written corrective feedback, the integrated feedback of teacher's written feedback and automatic grading system has a more obvious effect on the accuracy of English writing and can better promote students' English writing ability (Yan, 2018).

6.2 Attitudes Toward Teacher Feedback and Automatic Online Feedback

6.2.1 Students' Overall Attitudes Toward the Two Feedback Methods

According to the descriptive statistics and the paired sample T test results obtained by SPSS 17, the average score of teacher feedback is 3.96, and that of automatic online feedback is 3.38. In the questionnaire of this study, 3 points are "hard to say" and 4 points are "agree". The above average scores are both over 3 points, but the teacher feedback score is significantly higher than that of automatic online feedback, and the difference is significant ($p < 0.05$). It shows that students prefer teacher feedback, but they can accept automatic online feedback as well. That provides a basis for teachers to continue to use human–computer combination feedback. Students' attitudes toward using online feedback alone is not positive enough, probably because the language of online feedback information is stylized and a bit vague so that students are hard to get enough clear suggestions for modification and its help to students is limited. Generally speaking, Students in higher vocational colleges have a relatively low basic English level, and their self-study ability is poor. Without clear suggestions, students will have no way to start the correction.

6.2.2 Students' Attitudes Toward the Two Feedbacks on Various Writing Aspects

In six of the seven aspects of the survey (word spelling, word use, grammar, content, format, way of submission and way of correction), the scores of teacher feedback method are 0.5–0.9 points higher than those of automatic online feedback, with the lowest difference of 0.546 points and the highest of 0.834 points except the aspect of way of submission. Their differences are significant ($p < 0.05$). The highest difference of 0.834 points appears in grammar, indicating that students strongly hope that grammatical errors can be corrected by teachers instead of by the automatic correcting system. The reason may be that, for the students in this study, grammar is a weakness and a learning focus, so students attach great importance to grammar learning. However, most students don't have strong self-study ability, so they hope to get more definite help in this respect.

In the aspect of content, students also show high recognition for teacher feedback, whose average score is 0.651 points higher than that of the automatic online feedback, which confirms the conclusions of previous researchers: online feedback can't give effective feedback on the completeness of the composition (Wu, 2020). Students affirm the outstanding contribution of teacher feedback in improving the content and logic of composition (Dang, 2018).

The smallest difference lies in the way of submission, and the difference between paper submission and online submission is only 0.063 points, and there is no significant difference ($p > 0.05$). Perhaps this is because paper submission is a traditional way for students, and they are used to it. On the other hand, online submission is simple and convenient, so it is also popular among students.

6.2.3 Students' Specific Attitudes on Each Item of Teacher Feedback

Among all the question items in the teacher feedback dimension, there are five items with an average score of more than 4 points. The top three are Item 9 (I prefer the teacher to help me point out grammatical mistakes and tell me how to correct them), Item 3 (I prefer the teacher to help me correct word spelling mistakes) and Item 6 (I prefer the teacher to point out my word use mistakes and make suggestions for correction). It can be seen that students pay the most attention to word spelling, word use and grammar. On the one hand, they are the knowledge that students need to employ directly in their writing, and words and grammar are two key factors in deciding writing quality; on the other hand, students are prone to make many mistakes in the two aspects. Therefore, students hope to get explicit and specific help from teachers in vocabulary and grammar, so as to improve their language accuracy.

The other two items with average scores of above 4 are Item 15 (I prefer the teacher to point out the problems of composition format) and Item 12 (I prefer the teacher to point out the problems of composition content and tell me how to revise it). As the six compositions used in the experimental teaching of this study were all letters, which required strict format, many problems involving format appeared. In the aspect of format, automatic online feedback is obviously less intuitive and vivid than teachers' written feedback on paper, so students hope to get a clear correction from the teacher. In the aspect of composition content, online feedback can only judge whether the content is relevant, but can't point out its richness and comprehensiveness. Therefore, automatic online feedback is not as helpful to students as teacher feedback to a large degree in this respect.

6.2.4 Students' Specific Attitudes on Each Item of Automatic Online Feedback

Among the thirteen question items of automatic online feedback, the four with the highest scores are Item 2 (I am able to correct the word spelling mistakes according to the suggestions put forward by the website), Item 16 (I am willing to submit my composition online), Item 5 (I am able to revise my composition online according to the suggestions on word use put forward by the website) and Item 1 (I prefer to correct word spelling mistakes online). Their average scores are all close to 3.5 points. Item 5, 2 and 1 are all about the spelling and use of words, which shows that students are more satisfied with the automatic feedback on those three aspects. Compared with other aspects such as format, content, etc., automatic online feedback offers more suggestions on the spelling and use of words, and the feedback quality is also higher.

6.2.5 Interview Results of Some Teachers and Students

Interviews with students show that there are obvious differences between different groups of students in answers to questions. For the question "what aspects of writing can the composition correction website help you", the answers of low level students mainly focus on word spelling, whose information they think is the most effective feedback from the website. Besides the spelling of words, the middle level students say that they also benefit a lot from automatic feedback in the use of words and phrases. The top students think that in addition to the above aspects, the advanced vocabulary recommended by the website

is excellent, and the automatic online feedback can help them notice many grammatical errors such as subject-predicate inconsistency.

As for the question "among the three feedback methods of teacher feedback, automatic online feedback and human–computer combination feedback, which do you like best", low level and middle level students prefer teachers' direct correction, thinking that teachers' correction is more intuitive and clear, which makes it easier for them to revise. However, top level students favor human–computer combination feedback method. They think that the advanced vocabulary recommended by the website has expanded their vocabulary and broadened their horizons. In addition, the timeliness of automatic online feedback and the instantly updated score after revision make them see their own progress and enhance their interest in learning.

The three English teachers in charge of the experimental teaching think that the biggest help they have got from the website is its correction for spelling mistakes and some obvious grammar mistakes, which greatly reduce the simple mistakes in students' compositions, so that teachers can concentrate on complex mistakes while correcting them. What is more, the artificial intelligence can directly and quickly identify plagiarized and off-topic compositions. Because the plagiarism is identified by the Internet, students have no excuse to justify it. Those unqualified compositions are sent back to students online without teachers having to face the students, which avoids the direct conflict between teachers and students, thus reducing the psychological pressure of teachers.

6.2.6 Summary

As for the traditional teacher feedback and the new emerged automatic online feedback, students prefer the former, but they can also accept the latter. In the aspects of words, grammar, content and format, students show a more positive attitude toward teacher feedback than the automatic online feedback alone and there are significant differences. Students attach great importance to vocabulary and grammar, hoping to obtain more help from both the teacher feedback and the automatic feedback. There are obvious differences between excellent students and low level students in the use of the composition correction website. Low level students pay more attention to the correction of word spelling by the website, while excellent students pay more attention to its suggestions on word use.

7 Conclusion

7.1 Conclusions

After studying the role of HCC feedback in improving English writing quality, and investigating the attitudes of teachers and students toward teacher feedback and automatic online feedback, this paper draws the following conclusions: firstly, HCC feedback significantly improves students' writing quality, especially in content, language coherence and language accuracy; secondly, teacher feedback information is specific and vivid, and can be perceived directly through the senses, so it is welcomed by students and it is not advised that English teachers give up the traditional teacher feedback method; thirdly, automatic online feedback can help students improve their writing quality by correcting simple errors such as word spelling, word use and some grammatical ones, along with

protecting students' learning interest, so students are willing to use the composition correction website; lastly, automatic feedback greatly reduces teachers' workload and is therefore welcomed by teachers.

7.2 Suggestions

Therefore, this paper suggests that teachers should apply HCC feedback, i.e. the feedback method of human–computer combination, in the teaching of their English writing. The specific procedures are as follows: firstly, students correct spelling mistakes as well as simple word and grammar mistakes through automatic online feedback to improve language accuracy; then they try to use advanced vocabulary to improve language complexity according to the website's suggestions; finally, the teacher makes manual written corrections, and gives specific suggestions for revision in the aspects of format, content, complex grammatical errors and language coherence.

However, HCC feedback has no significant effect on the language complexity of the composition, so teachers should pay attention to guiding students to consciously use complex vocabulary or low frequency words to enhance their richness of language.

7.3 Limitations of Research

In this study, only one website was used as a platform for the automatic composition correction. The writing tasks given to students were all letters, and the experimental teaching lasted only one semester. All of the above are limitations of this research, so the research results are expected to be confirmed by more extensive empirical studies.

Authors' Contributions. This paper is independently completed by Rui Wu.

References

Dang, W. J. (2018). The empirical study on Bingo English automated essay assessing system in high school writing feedback. Unpublished master thesis, Northwest Normal University, Gansu, China.

Guardado, M. & Shi, L. (2007). ESL students' experiences of online peer feedback. *Computers and Composition, 2007(24)*, 443-461. https://doi.org/10.1016/j.compcom.2007.03.002

Li, K. Q. (2021). A study on the application of teacher feedback and automatic feedback to English writing teaching in senior high school. Unpublished master thesis, Harbin Normal University, Harbin, China. https://doi.org/10.27064/d.cnki.ghasu.2021.000714

Liu, B., Ge, L. L. & Li, G. W. (2012). An empirical study of college English writing teaching model based on corpus. *Foreign Languages and Literature, 2012(4)*, 131–135. https://doi.org/10.3969/j.issn.1674-6414.2012.04.027

Liu, J. D. (2002). Self-assessment of students' English writing ability. *Modern Foreign Languages, 2002(3)*, 21-29. https://doi.org/10.3969/j.issn.1003-6105.2002.03.003

Lu, J. (2008). Integration and decomposition of English writing evaluation criteria. *Journal of Shandong Youth Administrative Cadres College, 2008(03)*, 141–143. https://doi.org/10.16320/j.cnki.sdqnzzxyxb.2008.03.007

Peng, J. Y. (2021). Comparative study of automatic feedback and teacher feedback in high school English writing teaching. Unpublished master thesis, Southwest University, Chongqing, China. https://doi.org/10.27684/d.cnki.gxndx.2021.001036

Tan, Q. (2009). The net-based teaching of college English writing under the vision of constructivism: a classroom action research. Unpublished doctor thesis, Minzu University of China, Beijing, China.

Tang, J. L. & Wu, Y. A. (2012). Research on the application of automatic writing evaluation system in college English teaching. *Foreign Language and Their Teaching, 2012(4)*, 53–59. https://doi.org/10.13458/j.cnki.flatt.000527

Wang, H. X. (2014). Reform of college English writing teaching in the era of big data. *Modern Distance Education Research, 2014(*3), 66–72+86. https://doi.org/10.3969/j.issn.1009-5195.2014.03.008

Wu, R. (2020). Differences between Teacher Feedback and Automatic Online Feedback in Higher Vocational College Students' English Writing. *Contemporary Education Research and Teaching Practice, 2020(8),1-2.*

Wu, R. & He, X. J. (2014). Effect of task-based approach on vocabulary richness of English writing in higher vocational colleges. *Overseas English, 2014(13)*, 82-83.

Yan, D. (2018). A contrastive study of effects of different types of feedback on the English writing of senior high school students. Unpublished master thesis, Hunan Normal University, Hunan, China.

Zou, M. (2018). Effects of three types of feedback on college students' English writing. Unpublished master thesis, Jiangxi Normal University, Jiangxi, China.