

Syntactic complexity development in college students' essay writing based on AWE

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Abstract. Syntactic complexity is considered to be an important device for assessing the quality of writing in a second language (L2), as it indicates the diversity and complexity of production units or grammatical structures. This paper studies the development of Chinese college students' syntactic complexity in essay writing by using an Automatic Writing Evaluation (AWE) tool, the Pigai system (www.pigai.org, which has been most widely used in China in the last ten years). The data analysis showed that the students' syntactic competences in their final drafts outperformed that in their first drafts in three aspects: length of production unit, amount of subordination, and amount of coordination.

Keywords: syntactic complexity, automated writing evaluation, argumentative writing.

1. Introduction

Although effective second language (L2) writing instruction requires the provision of regular feedback on students' drafts (Bitchener & Ferris, 2012), for English as a Foreign Language (EFL) teachers, writing has long been seen as a tedious and unrewarding task (Hyland, 1990). With development of technology, AWE tools make it possible to solve this dilemma by providing instant holistic and diagnostic feedback.

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Complexity, as one of the three important constructs of language development, along with accuracy and fluency (Larsen-Freeman, 1978), has been operationalized at lexical and syntactic levels (Wolfe-Quintero, Inagaki, & Kim, 1998). As mentioned in Lu and Ai (2015), “syntactic complexity has been commonly [considered] as the range of syntactic structures that are produced and the degree of sophistication of those structures (Ortega, 2003)” (p. 2). According to Lu (2010), four measures are commonly adopted for accessing syntactic complexity, namely, mean length of production units, amount of coordination, amount of subordination, and degree of phrasal sophistication. Based on Hunt (1965), the measure T-unit refers to “one main clause plus any subordinate clause or non-clausal structure that is attached to or embedded in it” (p. 141).

A set of studies were conducted to examine the relationship between syntactic complexity and writing quality. Significant relationships have been identified between subordination and writing quality (Flahive & Snow, 1980), between finite clausal subordination and holistic grades (Homburg, 1984), and between length measures and composition quality (Homburg, 1984). Several longitudinal studies focus on learners' development in syntactic complexity. For example, Casanave (1994) found after three semesters of instruction that Japanese English learners' writing had become more grammatically complex as measured by per clauses per T-units. The current study employed a full set of 14 measures provided in the L2 Syntactic Complexity Analyzer (L2SCA; Lu, 2010), an online computational tool used to analyze the syntactic complexity of the writing samples. The detailed information about the 14 different measures can be retrieved from Lu and Ai (2015, p. 3).

2. Method

The research question of the current study is whether AWE-based formative feedback has any positive effects on EFL learners' syntactic complexity.

This study was conducted at a college located in northern China, where English was taught as a one-week interval compulsory course. The study was carried out from October 2019 to November 2019 which lasted for five weeks with participation of 66 non-English major freshmen.

In the first week, students were assigned to write an argumentative essay entitled *My View on the Role of Technology in Education* on an AWE platform, the *Pigai* system. Students were required to complete at least 150 words of the writing task

within 50 minutes before revising their drafts based on the system's corrective feedback and the instructor's guidance. In the following four weeks, students were asked to revise their drafts for at least three times after being instructed on how to write an argumentative essay and how to develop topic-relevant arguments. The students did all the writing and revision through the system, and by which all the drafts were recorded and collected. Then the exported drafts were examined through the online computational tool, L2SCA, and statistical descriptions of syntactic complexity were collected and processed by using SPSS 24.0 software.

3. Results and discussion

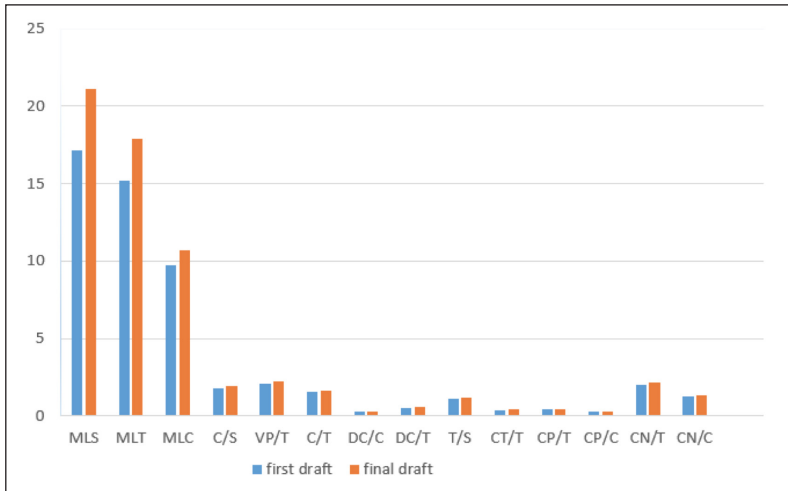
Table 1 was produced to summarize the comparison of mean and standard deviation (SD) of the first and the final drafts in nine syntactic structures. It can be found that students' performances in all nine syntactic structures in the final drafts outperformed than that in their first drafts.

For other syntactic complexity indices, it is shown in Figure 1 that students produced more grammatically complex sentences based on the AWE system's corrective feedback and the instructor's guidance.

Table 1. Descriptive statistics of first and final drafts

Measures	drafts	Mean	SD
W	First draft	190.61	58.28
	Final draft	317.86	57.15
S	First draft	11.44	4.26
	Final draft	17.05	5.00
VP	First draft	25.98	10.10
	Final draft	41.80	9.96
C	First draft	19.97	7.65
	Final draft	31.41	7.94
T	First draft	12.91	5.03
	Final draft	19.7	5.44
DC	First draft	5.88	3.71
	Final draft	10.11	4.80
CT	First draft	4.79	2.74
	Final draft	7.92	3.41
CP	First draft	5.27	3.58
	Final draft	8.06	4.00
CN	First draft	24.71	8.66
	Final draft	39.59	8.47

Figure 1. Comparison of students' mean scores in first and final drafts



The results can be further explained in four ways. Firstly, students wrote much longer sentences, T-units, and clauses compared with first drafts, which shows development in writing quality according to findings of [Wolfe-Quintero et al. \(1998\)](#). Secondly, students' progress in CP/T and CP/C indicates that they applied more coordinate phrases in T-units and clauses. Thirdly, their improvement in CN/C and CN/T demonstrates they can utilize more complex nominals in T-units and clauses. Lastly, that students did not make much progress in DC/C and DC/T reflects the fact that they did not employ dependent clauses in T-units or clauses. These findings confirm the results provided by [Lu \(2010\)](#). From the [Table 1](#) and [Figure 1](#) above, it is obvious that AWE-based argumentative writing has a positive effect on EFL learners' syntactic complexity.

4. Conclusions

This study focuses on the students' development in syntactic complexity based on the AWE system's corrective feedback and the instructor's guidance. The results show that AWE-based argumentative writing plays a positive role in improving EFL learners' syntactic complexity. Online statistical analysis shows that the students' syntactic competence in their final drafts outperformed that in their first drafts in the three following aspects: length of the production unit, amount of subordination, and amount of coordination. In the process of learner-computer interaction, students tend to modify their drafts with longer and more complex

sentences. We hope the study may provide other EFL instructors and learners with pedagogical implications for personalized learning in some similar computer assisted language learning teaching contexts.

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