Functions, Values & Inadequacies
-------An Evaluative Discussion of Pigai Intelligent Online English Writing Correction System in View of Second Language Acquisition

Wang Yan
Humanities College
Xi’an ShiYou University
Xi’an, China
E-mail: 402583455@qq.com

Abstract. The recent development of AI technology leads to either the belief that the possibility for it to replace human being has been increasing, or the disbelief that AI technology is still of that potency. This research is to evaluate an intelligent online English writing correction system known as Pigai from the perspective of the second language acquisition. The research is made available (1) in light with learning theories such the Input Hypothesis, as well as investigation of the learners in China; (2) by discussion of functions found in the system, and (3) with analysis of values and inadequacies as demonstrated with the system. The thesis finally argues that writing practice with Pigai system may improve learners’ second language writing skills and language competence, but partially; and will not be of much help in promoting learners’ humanities quality.

1. Introduction
Pigai Intelligent Online English Writing Correction System (the word pigai, literally known as writing correction in Chinese, and hereafter abbreviated as Pigai), aiming to promoting both teachers’ correcting efficiency and learners’ linguistic competency, is an automatic and intelligent correction service of English writing based on corpus and cloud computing technologies offered by www.pigai.org. Pigai is typically Chinese as it is designed to aim at solving problems such as the negative transfer, over-generalization of English grammar, the unbalance of linguistic competency at the side of learners, the low efficiency in correcting at the side of teachers. According to estimation by service provider Pigai.org, more than 5,000 primary schools, technology vocational schools and universities (some of them are renowned institutions such as Tsinghua, Nanjing University) in China have taken this system for their instruction of English writing, and 0.2 billion of English writings have been corrected by January, 2018. 

Studies of Chinese learners of English based on the system have also thrived, most of which, however, have been concerned with (1) computer-based technologies; (2) big data based computations; (3) writing instruments for teachers; and (4) learners writing skill and competency promotions. Few of

1 http://www.pigai.org/?a=pad3, retrieved at 11: 30 am, Oct. 15, 2018.
2 Chen, Wen & Liu, Lian, “A Study of English Writing Competency on the Basis of Pigai Corpus”, Journal of Xi’an Aeronautical University, Vol. 34, No. 6, Nov. 2016: 21-24.
these researches give attentions to the functions and values of second language acquisition (hereafter abbreviated as SLA) that Pigai has or may have offered for SLA learners. The present thesis, therefore, attempts to evaluate how Pigai may be of help for learners of SLA in the perspectives of its functions and values, and, while in so doing, inadequacies of E-learning systems such as Pigai are also analyze and discussed. In discussion, theories of input-output for SLA and E-learning are employed to explain the performance of Pigai in dealing with SLA learners’ problems in writing skills, language competency and humanities promotion.

Author of the thesis finally argues that Pigai system may be of great help for SLA learners in China in terms of their language skill improvement, and partially adequate in their language competence, but partially inadequate of the system designed for interaction between the system itself and the SLA learners, and inadequate for promoting the humanities of the SLA learners.

2. Methods & Results

2.1. Theoretical Background

Input-output Model. SLA theory as proposed by Krashen and also known as Input Hypothesis consists of five hypotheses: 1) The acquisition-learning hypothesis, in which a dichotomy is drawn between acquisition and learning, the former being a subconscious way of developing L2 ability, whereas the latter a conscious way to know about language; 2) The natural order hypothesis, in which rules of language are acquired in a predictable order, which might be different from the order followed in class instruction; 3) The monitor hypothesis, the essence of which is that the ability to produce L2 utterances derives from the learner’s acquired competence (subconscious knowledge) while learning (conscious knowledge), simply as a Monitor, helps him make corrections or change output; 4) The input hypothesis, which states that language is acquired by receiving “comprehensible input” slightly above one’s current level of competence (i+1); 5) The affective filter hypothesis, in which the affective filter, like a mental block, can control the access of comprehensible input to the Language Acquisition Device (LAD) for acquisition.

Krashen’s Input Hypothesis can be summarized into the following diagram:

![Second language acquisition model by Stephen Krashen](image)

Learning Theories. According to Ashley, e-learning is characterized with the following conditions: firstly, understandable and readable language within training materials; secondly, self-reflective opportunities and thought-provoking; thirdly, user-friendly, easy navigation in an e-learning environment; fourthly, relevant, relatable, real-life scenarios; fifthly, enabling personalization; sixthly, responding to individual needs; and lastly, connecting through multi-sensory interaction.

---

3 Liu, Dayan, “A Critical Review of Krashen’s Input Hypothesis: Three Major Arguments”, Journal of Education and Human Development, Vol. 4, No. 4, December, 2015: 139-146.
4 Krashen, Stephen (1977). “Some issues relating to the monitor model”, in Brown, H; Yorio, Carlos; Crymes, Ruth, Teaching and learning English as a Second Language: Trends in Research and Practice: On TESOL ’77: Selected Papers from the Eleventh Annual Convention of Teachers of English to Speakers of Other Languages, Miami, Florida, April 26 – May 1, 1977: 144–158.
5 Casey,Ashley, “7 Characteristics Of Learner-Centered eLearning”,elearningindustry.com, retrieved at 10: 01 am, Oct. 10, 2018.
inspiring to this thesis: (1) Learning is growth; (2) Learning is adjustment; (3) Learning is experience; (4) Learning is intelligent; and (6) Learning is both individual and social.  

The two theories mentioned above shed some light onto the understanding of Pigai and its impact upon SLA learners, which could be found in the following statements: (1) to what degree can Pigai improve the SLA learners with their skills and linguistic competence? (2) how the SLA learners may interact with Pigai? (3) how possibly will Pigai promote the humanities of SLA learners?

2.2. Investigations, Test and Questionnaire

In order to demonstrate the Pigai’s availability of learners’ SLA, investigations with tests and questionnaire (will be discussed in section three) were carried out from Mar. 18 to Apr. 20, 2018 on the basis of SLA learners’ language writing skills; SLA learners’ competence to do things with language; and SLA learners’ worldview. More than 200 participants in the investigations were selected at random from among students in 2 universities in Xi’an, where College English level is believed to be relatively higher in terms of teaching performance and learning effects, and 2 in Kunming where College English is regarded relatively poorer in terms of teaching performance and learning effects. All the participants have had frequent contacts with Pigai and used it for correcting their writings previous to the investigations. Basic information about participants are as follows (figure 2):

| participants | age       | sexes                  | National Matriculate Test Score of English: total score = 150 |
|--------------|-----------|------------------------|-------------------------------------------------------------|
| Total: 205   | (1) 97 aged from 18 to 21, amounting to 47%; (2) 108 aged from 22 to 25, amounting to 53% | (1) Male: 100, amounting to 49%; (1) Female: 105, amounting to 51% | (1) 21 scored between 69 and 84, amounting to 10%; (2) 43 scored between 85 to 100, amounting to 21%; (3) 61 scored between 101 to 106, amounting to 30%; (4) 58 scored between 107 to 122, amounting to 28%; (5) 22 scored between 123 and above, amounting to 11% |

Test items in figure 3 are carefully chosen from among the most frequently errors committed by Chinese SLA learners. In this test, participants were required to write a short meaningful passage with about 200 words that will have to use the four pairs of items in the following chart. Item 1 to Item 4 are two pairs to test how well they understand and use them in their writings, of which 1 and 3 indicate the improper uses, while 2 and 4, the proper uses.

| Items                  | Pre-test situations | Submissions for the same piece of writing | Post-test results |
|------------------------|---------------------|------------------------------------------|------------------|
| (1) “be consist of” or “be consist” | 156, amounting to 76% | (1) twice (2) 5 times | (1) 51% (2) 17% |
| (2) “consist of”       | 49, amounting to 24% | (1) twice (2) 5 times | (1) 30% (2) 76% |
| (3) “was happened”    | 189, amounting to 92% | (1) 3 times (2) 5 times | (1) 67% (2) 49% |
| (4) “happened”        | 16, amounting to 8%  | (1) 3 times (2) 5 times | (1) 15% (2) 80% |
| (5) No use of “therefore” to link | 192, amounting to 93% | (1) 3 times | (1) 67% |

6 Prakash, Jay, “9 most important characteristics of learning as specified by Yoakman and Simpson”, Perspective Articles. Com, retrieved at 9:54 am, Oct. 16, 2018.
sentences (2) 6 times (2) 68%

(6) Use of “therefore” to link sentences 13, amounting to 7% (1) 3 times (2) 6 times (1) 27% (2) 68%

(7) No use of “with which” to link sentences 190, amounting to 92% (1) 3 times (2) 8 times (1) 80% (2) 43%

(8) Use of “with which” to link sentences 15, amounting to 8% (1) 3 times (2) 8 times (1) 22% (2) 56%

The chart in figure 3 is divided into 4 parts. The 1st part includes the items indicating usages of SLA learners in China; data of the pre-test situations in the 2nd part refer to respectively the number of participants who have used the items and their percentage of the total participants; in the third parts, both (1) and (2) are data referring to number of times participants submit their writings; and both (1) and (2) in part 4, referring to the results after participants submit their writings. If checked horizontally, for example, the first line means that, when the item “be consisted of” or “be consisted” is tested, the pre-test situation show there are 156 , amounting to 76% of the total participants, used “be consisted of” or “be consisted” in their writings; after they have submitted the same writing to Pigai twice, the post-test results indicate that 51% of them were still using , and 17% of them were still using the same item five times after they have submitted the same writing. On the other hand, in the second line, the item “consist of”, which is regarded as the proper usage, is to be tested with to indicate that only 49, amounting to 24 % of the participants use the item properly in their writing before the test; and the proper use of this item increases to 30% after their have submitted their writing to Pigai twice and to 70% after their submission came to 5 times.

3. Functions

3.1. Brief Introduction to the Functional Frame for Writing Correction

As Pigai is an automatic correction system, with which second language learners may check their results of writing (scored with percentage) in split seconds after their writing is submitted, this system consists of some other functions including correction services7, such as writing assignment collection for collecting and storing homework; automatic and intelligent correction for spontaneously correcting, scoring, analyzing, evaluating and offering feedback to users; writing training for practicing writings that are particularly found in CET (College English Test), IELTS, TEFL,etc.; teaching instruments for trainers to comment on learners’ works, peer-review, class-manage as well as to check plagiarism; online test for millions of examinee to work on test of writing at the same time; backend management for manager to keep information of team members in terms of their job behavior; research corpus for teachers as well researchers to keep data produced through the use of the system; and corpus of 25 types including those such as BNC and NYT.8

3.2. The Correction Function

Learners are required to copy their own writing into a frame, and the result after its correction through this functional diagram will be shown.

The correcting frame illustrates how the writing, after being scored, is displayed with problems found in sentences or syntactic structures in the each paragraph of which this is the first. The correcting diagram indicates that below each of the problematic sentence, three types of functions are served: (1) to display to learners problems including misspelling, semantic as well as pragmatic errors; (2) to recommend the proper words, phrases or syntactic structures for substitutions; (3) to offer tips of

---

7 https://www.pigai.org/corpus/index.php, retrieved at 11: 39 am, Oct. 15, 2018.

8 Chen, Wen & Liu, Lian, A Study of English Writing Competency on the Basis of Pigai Corpus, Journal of Xi’an Aeronautical University, Vol. 34, No. 6, Nov. 2016: 21-24.
related words, phrases or syntactic structures to those recommended or those that are found to be problematic.

3.3. Correcting Functions for SLA Learners

From the above investigations, tests and case analysis, it is found that Pigai can in one way or the other function as the following.

First as a corrector. If active SLA learners submit their writing time and again, it is more likely that some problems they conventionally ask teacher could be solved through repeated submissions. This indicates that Pigai has replaced some functions of a teacher. In this way, it may also mean that time and energy of both the learners and teacher are saved. Moreover, when Pigai offers an adequate linguistic corpus such as collocations in English, learners may check with it as the corpus recommends some proper usages. And this further indicates that function as a corrector will be like that of a dictionary. Both corrector and dictionary, as people often find, are helpful for and to a great degree necessary to create a self-learning environment.

Secondly, as a grower. A grower herein refers to instrument that is able to increase both the input and output of linguistic knowledge as suggested by Krashen. The input includes not only knowledge of grammar, phrase collocations, proper syntactic structuring, but also experience with which SLA learners solve their problems in perceiving the different ways of expressions in both languages. The output, on the other hand, may be seen in their simulating skills of writing found in their input, representation of their thought (but in a very limited way), and, to a larger extent, their language competence through communication with writing, or even their test score.

4. Values & Inadequacies

4.1. Questionnaire

In contrast with the input hypothesis raised by Krashen, and other learning theories, a questionnaire was distributed among the participants to perceive whether they feel promoted in terms of humanities through their writing with Pigai writing correction system. By humanities, it means herein those qualities that may help promote and improve human perception; changes that take place within human mind and ways to see the world, and the virtues are beneficial to human development. In this questionnaire, 8 questions related to humanities are asked and results are found in the following (figure 4:)

| Questions asked                                                                 | agree  | Partially agree | disagree | unsure |
|---------------------------------------------------------------------------------|--------|-----------------|----------|--------|
| (1) Will Pigai help with provocative thinking?                                  | 23/11% | 101/49%         | 80/39%   | 2/1%   |
| (2) Will writing with Pigai help with your cross-cultural competence?            | 44/22% | 92/45%          | 58/28%   | 11/5%  |
| (3) Are you able to write to English native speakers more effectively after your writing practice with Pigai? | 89/43% | 89/43%          | 14/7%    | 13/7%  |
| (4) Do you feel freer than ever to express yourself while writing in English after writing with Pigai? | 89/43% | 103/51%         | 12/5.5%  | 1/0.5% |
| (5) Do you discover more differences between Chinese and English languages after writing with Pigai? | 131/64% | 70/34%          | 0/0%     | 4/2%   |
| (6) Does writing with Pigai help with your academic thesis writing?             | 104/51% | 68/33%          | 27/13%   | 6/3%   |
| (7) Does writing with Pigai play a role in offering a new worldview?            | 70/34% | 64/31%          | 35/18%   | 36/17% |
| (8) Without Pigai, can you survive your writing in such occasions as CET tests, TOEFL, etc.? | 150/73% | 28/14%          | 17/8%    | 10/5%  |
4.2. Analysis of the Questionnaire

Questions asked in the questionnaire basically can be divided into two types: the type for human quality, which includes Q1, Q2, Q5 and Q7, and the type for instrumentality, which may be found in Q3, Q4, Q6 and Q8. The first type is intended for investigating the facts how participants’ internalization is made available through writing in English with Pigai, whereas the second, for exploring the truths how participants may use the skills of writing trained with Pigai as an instrument, or in Austin words, how to do things with words9.

Answers to these questions reveal the following facts. Firstly, the percentage for those who agree Pigai helps with their thought provoking quality is rather low (11%), but about half of them partially agree and about 40% of them totally disagree, as is found in Q1. In raising their cross-cultural competence with Pigai (Q2), again nearly half can partially agree (45%), which could be explained with the fact that cross-cultural competence is rather complicated and writing is a very small part of it. Contrary to low percentage for agreement, 64% of the participants agree they find more distinction between the two languages through writing practice with Pigai (Q5), which indicates that such functions found in recommending proper usages, the correction behaviors by Pigai’s corpus, and the increasing submissions help participants discover more of such differences. Similarly complicated is the question (Q7) about worldview presumably because many other facts may also contribute to the formation of worldview. Nevertheless, one third of the participants agree that writing with Pigai brings impact on their worldview.

Secondly, as far as the instrumentality is concerned, writing with Pigai has its merit in the participants’ writing to the native speakers as more than 40 % agree and another 43% partially agree, says the answers to Q3, which prove to be of great help through writing with Pigai, and may probably because both the skills of writing to native speakers and the training of writing with Pigai are similar. The use of Pigai for writing practice is also valuable for participants’ expression in English as 94% of them totally and partially agree (Q4), indicating that they feel promoted in language competence. And the same is true for the answers to Q6 that more than 80% participants think writing with Pigai does add value to their academic career, also meaning an increase in their pragmatic competence to do things with language. It is surprise to find that more than 70% believe that their tests of writing scores is attributed to Pigai, an index that further demonstrates the availability and the more functional instrumentality of this writing correction system.

Thirdly, some typical data are worth mentioning: one is the answers to Q5 shows that no one disagree with the idea that writing with Pigai is not able to help participants find out differences between two languages; another is that almost all the answers with “unsure” to all the questions prove to be of little impact on and insignificant to judgment of writing behavior and nature in this study.

4.3. Inadequacies

However, inadequacies in writing with Pigai are obvious. Firstly, as could found, although writing with Pigai may provide a self-learning and self-teaching environment, it is , unlike the conventional one, an environment with human absence. There is, in the conventional writing learning and teaching situation, a face-to-face interaction between teachers and learners, a group discussion among the peer from which collaborating learning takes place. And this is much the same situation as what is decribed by Ashley: A true learner-centered design is a multi-sensory experience. Engaging learners through visual, auditory, and kinesthetic methods simultaneously immerses the learners in the educational content to ensure learning is remembered.10 This environment is in many ways dehumanized with the cold interface between man and machine. As is mentioned in the above learning theory, writing is not only individual, but also social.

---

9 Austin, J. How to Do Things with Words. London: Oxford University Press, 1962; 120.

10 Casey,Ashley, “7 Characteristics Of Learner-Centered eLearning”,elearningindustry.com, retrieved at 10: 01 am, Oct. 10, 2018.
Secondly, as seen in figure 3, those data indicate that writing with Pigai is quite capable of promoting SLA learners’ writing skills, as well as, partially, their language competence, but when it comes to such competences as thought provoking, thought pattern development arising from writing with language, etc., such correcting systems as Pigai almost fails to achieve the goal that has been usually done through conventional writing. This may point to the facts that the correcting system may be adequate to fulfil the SLA learners’ need at lower level of writing, but inadequate to further the SLA learners’ development when they come to a higher level. And in accordance with Krashen’s Input hypothesis, linguistic knowledge could be input, processed and even internalized in some way through the system, but the output is almost the same as the input. To put is simply, when the SLA learners have learned skills of writing with such system, what they output is the skills of writing almost as exactly the same as what they have been input. This is in sharp contrast with the traditional way of learning writing, in which situation, learners output may produce more than they have been input.

Thirdly, it is not yet known and verified how well such writing system as Pigai may customize the SLA learners, though it is true that writing practice with Pigai could be individualized to a certain degree. Customization may mean, in terms of writing, that poetic expressions, the author’s thought, as well as his personal style etc., are highly individualized, personalized, and with their own idiolect. The design of such system is therefore inadequate in customization to SLA learners as the corpus in the system is not able to weave organically all the experiences that specifically belongs to that person into a coherent and cohesive writing, and it is able to discern what logic and tone author of the writing intends to take in their writing.

5. Conclusion
From the investigations, analysis and discussion above, it may conclude that (1) writing with Pigai system may improve to a greater degree the writing skills of SLA learners in China along with an environment of self-learning and self-teaching than what is achieved with traditional methods; (2) SLA learners’ language and communicative competences with writing are also improved by various degree when trained with the system; and (3) there are, however, some inadequacies in ways that the system does not provide functions concerned with intelligence such as thought provoking, logical judgment, corpus of poetic expressions etc., which are thought to be achievements that could be obtained in traditional instruction of writing.

Despite some inadequacies in the research, the above conclusions still imply and suggest that, firstly, intelligent correction systems such as Pigai are in want of improvement in its design with a more advanced technology; secondly, conventional methods with which writing instruction is made available still prove effective for the time being; and finally, a better policy to be made in terms of writing instruction is to integrate the artificial intelligence into human intelligence so that SLA learners may both develop their language skill and competence with the help of machine, and the humanities quality with the help of social members.

Acknowledgments
I would like to take this opportunity to express my deep gratitude to my supervisor, professor Yan Ping, who has encouraged me to contribute and offered me constructive guidance for the planning of the invaluable advice. Secondly, I want to show my sincere thanks to professor Wang Qingjiang, who has given me important guidance and relevant data and information on the thesis. Professor Wang is a brilliant man who has rigorous scholarship and profound knowledge. Without his help, my thesis would have been impossible. Again, I want to give my most sincere thanks and respects to them.

References
[1] Austin, J. How to Do Things with Words. London: Oxford University Press, 1962.
[2] Casey,Ashley, “7 Characteristics Of Learner-Centered eLearning”,elearningindustry.com, retrieved at 10: 01 am, Oct. 10, 2018.(http://www.pigai.org/?a=pad3, retrieved at 11: 30 am,
Oct. 15, 2018.

[3] Chen, Wen & Liu, Lian, “A Study of English Writing Competency on the Basis of Pigai Corpus”, Journal of Xi’an Aeronautical University, Vol. 34, No. 6, Nov. 2016: 21-24.

[4] Krashen, Stephen, "Some issues relating to the monitor model", in Brown, H; Yorio, Carlos; Crymes, Ruth, Teaching and learning English as a Second Language: Trends in Research and Practice: On TESOL '77: Selected Papers from the Eleventh Annual Convention of Teachers of English to Speakers of Other Languages, Miami, Florida, April 26 – May 1, 1977: 144–158.

[5] Liu, Dayan, “A Critical Review of Krashen’s Input Hypothesis: Three Major Arguments”, Journal of Education and Human Development, Vol. 4, No. 4, December, 2015: 139-146.

[6] Prakash, Jay, “9 most important characteristics of learning as specified by Yoakman and Simpson”, Perspective Articles. Com, retrieved at 9: 54 am, Oct. 16, 2018.

[7] https://www.pigai.org/corpus/index.php, retrieved at 10: 23 am, Oct. 12, 2018.

[8] Zhang, Shumei, “The Role of Input, Interaction and Output in the Development of Oral Fluency”, English Language Teaching, Vol. No. 4, 2009: 91-100.