Exploring the results of college English learning under the perspective of artificial intelligence

Ming Cao

School of Humanities and International Education, Xi’an Peihua University, 888 Changning Street, Xi’an China

Abstract. Based on the theory of output hypothesis and the perspective of Artificial Intelligence (AI), the purpose of present study is to verify the result of applying Virtual Reality (VR) experiment. A quantitative method has been used. 69 students as an experimental group and 68 as a control group, by random sampled, have participated this quasi-experiment. After half a year, experimental group has obtained better performance than control group in CET (College English Test). T-test shows significant differences in the result of CET total score (t=2.05, p<0.05) and listening (t=2.70, p<0.01) as well as writing (t=2.32, p<0.05) section score. These results suggest that applying VR method brought positive result for college English learning.

1. Introduction

Turning into 21th century, artificial intelligence (AI) becomes one of the most popular techniques and spreads conspicuously fast. Since education is deeply influenced by technological development, more and more AI equipment has been installed to the university to execute the different tasks. This triggers the discussion of English teaching and learning (Zhu, 2018; Wang, 2019). For Virtual Reality (VR) experiment for English learning, research results are rare. But it is still worth exploring because of its developmental prospect. Whether it effects and how it effects make us pay attention to it. Based on this, the study explores and tries to verify how AI influences college English learning.

2. Theories review

AI refers to how machine imitates the process of human beings’ thinking and behaviors so as to allow us to explore the law of intelligent actions of human beings (Winston, 1984). Until now, AI has been experienced two stages and is facing the third one. The first, birth and preliminary exploring period (1950-2003), shows its grow and development; the second is the application and exploring period (2004-2017). During this period of time, many journal articles appeared and the amount of these articles account for 74.71% in total research of AI (Lin, 2019). Nowadays, we move on to the third period --- the peak of development. In this period, many signals show that AI closely relates to education field. For example, Vipkid, Grandescope, Pigai, Mindstorm EV3, AI campus, etc. are popular websites or platforms that have been used for people to solve problems in grading and teaching. While in education filed, it brings about a big challenge for teachers. Traditionally, teachers teach their students in a physical classroom by using textbooks, paper and pens, and evaluate by final examination. Encountering AI, both teachers and students need to explore a new way to teach and learn.
2.1. Output hypothesis
Canadian linguist Merrill Swain (1985) proposed output hypothesis in 1980s. She argued that producing output played very important roles in arousing learners attention and acquiring target language. The output has the function of assumption and self-examination. It promotes “noticing”, which means during producing, learners may notice the gap between what they say and what they can say. It serves the process of target language learning not only enhances fluency but also accuracy.

After doing a lot of researches and experiments in immersion language teaching, Swain (1995) proposed that output hypothesis had three main functions. (1) noting/triggering function; (2) hypothesis testing function; (3) metalinguistic function. These three functions apply the following aspects: (1) speaking and writing benefits language learners fluency and automaticity; (2) It makes language learner transfer from meaning producing to sentence producing; (3) Speaking and writing the target language make learner detect the hypothesis the learner produces; (4) The output of target language may acquire corresponding feedback(Swain, 1998). Therefore, language learning is a bilateral activity. Focusing on speaking and writing practice has more values than mechanical input only. It cannot be replaced.

2.2. How AI perspective learning contrasts with learning in traditional classroom
Here is the contrast about the characteristics learning in traditional classroom and learning under the perspective of AI. It’s easy to understand that both teachers and students change their roles under the perspective of AI. Both teachers and students have rights to talk and discuss.

| Items                  | Learning in Traditional Classroom                      | AI Perspective Learning                                                                 |
|------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Environment            | Teaching in common classrooms                          | Teaching in classroom with special equipment in special classrooms                      |
| Teaching Aids          | Using blackboards; chalk; paper; pens                  | Using blackboards; chalk; paper; pens; Computers; internet; special equipment of AI, etc.|
| Ways of teaching and learning | Students listen to the teachers only; teachers give homework, check answers, and grade, etc. | Both teachers and students have rights to talk and discuss; Encouraging problem solving; team work; individual study; online/offline learning; projects, etc. |
| Evaluation             | Mid-term/final examination; quiz; test, etc.           | Providing process evaluation; peer review; self evaluation; etc.                        |

3. Research design
A quasi-experiment has been designed in this research. 69 students as an experimental group and 68 as a control group, by random sampled, have participated this quasi-experiment. The experimental group has been provided to use the lab once a week during work hours. The lab assistant just taught students how to use the computer and left the students practice by themselves. There was no cellphone website available for them to practice. The control group has been arranged to do a cellphone experiment by providing a web link to make sure they could practice by cellphone after class only. They had no lab practice but they could choose to do it in their spare time. Both groups required to practice after regular class. But during the regular class, teachers set up a report time to check the result of students oral practice for both groups once a week. The teachers made evaluation and provided some comments when they do the report. After half a year, we found the differences.

3.1. Virtual Reality experiment
Under the perspective of AI, the school constructed a language lab for English major students. To improve language output ability, the lab has been designed as a Virtual Reality classroom. In this special classroom, students were allowed to use VR equipment to do language experiment. There were
different topics installed in the computer system and once students wore the VR glasses, they could feel as in the reality according to the topics. When they clicked the button, they would get the task they chose and started their practice. Students could practice for many times via the evaluation from the computer system (online) until they felt that they were confident to present in front of the teacher and students (offline). They could also use their cellphone to be the terminal to practice without wearing glasses at any time just like they were in the lab (online). In fact, there was no feeling of virtual reality. Nevertheless, the process was the same. The procedures of the experiment can be designed as follows (See figure 1).

![Figure 1. VR experiment procedure.](image)

### 3.2. Research hypothesis
The hypotheses are as follows. Whether the experimental group will get higher grade than control group from College English Test (CET) or not? If VR has more effects on students English study, on what aspect does it provided the effect?

### 4. Research results
This part includes a quantitative research results and the analysis of the data. We used T-test and SPSS22.0 to deal with the data. The results are as follows.

#### 4.1. The result of College English Test
We took College English Test (CET) result as an example to analyze students’ achievement. Students attended CET voluntarily. Within 57 testers, 45.6% students from experimental group passed the examination, while 30.3% students from control group passed (See table 1). Experimental group shows better performance in total grade as well as in sections of listening and writing. Reading score has a close similarity between two groups. T-test shows significant differences in the result of CET total grade ($t=2.05$, $p<0.05$) and other two sections of listening ($t=2.70$, $p<0.01$) and writing ($t=2.32$, $p<0.05$) (See Table 2).
Table 2. Contrast table

|                      | Experimental group |                     | Control group |                     |
|----------------------|--------------------|---------------------|---------------|---------------------|
|                      | Results            | Numbers attended    | 57            | Numbers attended    | 66            |
|                      |                    | Numbers passed      | 26            | Numbers passed      | 21            |
|                      |                    | Passing rate (%)    | 45.6          | Passing rate (%)    | 30.3          |

Table 3 T-test of experimental group and Control group

| Group               | Experimental group(n=57) | Control group(n=66) | t    |
|---------------------|--------------------------|---------------------|------|
| Listening           | 138.95±25.14             | 125.47±29.54        | **2.70|
| Reading             | 142.05±21.40             | 143.76±22.71        | -.43 |
| Writing             | 136.02±14.14             | 130.42±12.57        | *2.32|
| Total               | 417.02±43.73             | 399.65±49.09        | *2.05|

\[
t = \frac{(\bar{x}_1 - \bar{x}_2) - (\bar{\mu}_1 - \bar{\mu}_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}
\]

where

\[
df = \frac{(\frac{s_1}{n_1})^2 + (\frac{s_2}{n_2})^2}{\frac{n_1}{n_1-1} + \frac{n_2}{n_2-1}}
\]

4.2. Analysis of the results

4.2.1 VR experiment aroused students interests.

VR practice provided an environment for students just like they attended the real place, so they had more sense of opening their mouth to practice. They may feel that they were in the real setting so that they paid more attention to it. As a result, they learned more words and tried more times.

4.2.2 VR experiment provided a simple feedback.

Although it was pretty rough, it still gave students confidence to practice more. When they heard the sound, they may pay more attention to repeat. As good pronunciation will bring good listening sense, students can easily understand the listening materials from a foreign speakers during CET.

4.2.3 Why writing score is also different?

As we know, writing is closely related to our thinking. It is an integrated effect. As Swain (1998) emphasized both speaking and writing benefits language learners fluency and automaticity, writing is a kind of output activity either, so it did effect. Once students practiced more, they got sense to speak,
so they got sense to express their ideas in writing. Good writing needs not only understanding the meaning of the words, but also using the words. VR experiment provided the chance to practice the words. It inevitably provided a positive influence for students’ writing.

4.2.4 Other concerns.
Some points may not be related to output hypothesis or AI itself, but students may feel to be more supported than those who were not involved in lab experiment. As control group accepted cellphone experiment, there was no VR environment, so they may feel it is just a common practice. Since no requirements for the practical hours, they may slack themselves. Therefore, they were lack of practice and the CET result is lower than experimental group.

4.2.5 Teachers attitudes may be another factor.
For experimental group, since no cellphone practice carried out, all their practice focused on AI environment so that the teacher may respect students’ feelings in different ways. They may ask more student-centered questions, set up more group work during regular class, and provided more chances for students to practice. These perspective of AI may influence students learning output. While for control group, both teachers and students just treated the task as a common assignment, so less importance made them paying less attention to the practice on cellphone. Even if they paid attention to it, they did not get the VR environment. Therefore, it is hard to arouse their interests. As a result, output process did not really happen. For teachers of control group, less influence happened under the perspective of AI.

5. Conclusion
Artificial intelligence brings about a new idea, new concept, and new angle of seeing the world. Although being pretty arguable, for example, lack of knowledge of AI, not considering the feeling of students and teachers, and offending privacy, etc. (Bai, et al, 2019), AI is still an attractive research area which is worth exploring. In current education field, especially for language teaching and learning, we need to treat AI as a practical technology to promote language teaching and reform. Based on the perspective of AI and the theory of output hypothesis, this study just explored a little about the application of VR, introduced the experiment, summarized the result of students’ learning and analyzed the effect. It also tried to emphasize the student-centered teaching and learning under the perspective of AI. It acquired that AI did effect the English learning result, but we did not dig out more due to the limitation of the time. There will be another research direction in the future.

Acknowledgement
Thanks to Professor Hao Wang, from Xi’an University of Finance and Economics, who helps me a lot in dealing with the data.
2018 Shaanxi Science of Education “Thirteen-Five” Project “Flipped Class Teaching research on College English Major Based on MOOC Platform”, Project No. SGH18H496; 2017 Higher Education Science Project from Shaanxi Association of Higher Education “Research on Countermeasures of Improving English Output competence of students in Application-Oriented University Based on Context of Globalization”, Project No. XGH17190.

References
[1] Bai, Shehua, Li, Suling, & Ding, Liangxi. Problems and strategies of artificial intelligence on the development of education [J]. Chinese University Science & Technology, 2019(9): 94-96.
[2] Liang, Yingshan. Research on the college English practical system design under the environment of artificial intelligence [J]. Journal of Jiangxi Vocational and Technical College of Electricit, 2019(3): 110-111.
[3] Lin, Xiao-feng &Xie, Kang. The current situation of artificial intelligence and the rational thinking of its educational application [J]. Modern Educational Technology, 2019(8): 12-17.
[4] Swain, M. Communicative competence: Some roles of comprehensible input and comprehensible output in its development [A]. In Gass S & Madden C (eds.). Input in Second Language Acquisition[C]. Rowley, MA: Newbury House, 1985. 235-253.

[5] Swain, M. Focus on form through conscious reflection [A]. In Doughty C & Williams J (eds.) Focus on Form in Classroom Second Language Acquisition [C]. New York: Cambridge University Press, 1998: 64-81.

[6] Swain, M. Three functions of output in second language learning [A]. In Cook G. & Seidlhofer B (eds.), Principles and practice in applied linguistics(C). Oxford: Oxford University Press, 1995: 125-144.

[7] Winston, P H. Artificial intelligence [M]. 2nd ed. Boston: Addison-Wesley Longman Publishing Co., 1984.

[8] Zhu, Yan. Research on college English translation teaching mode under the background of artificial intelligence [J]. Chinese & Foreign Entrepreneurs, 2018(9):179-180.