# A Teaching Experiment on a Knowledge-Network-Based Online Translation Learning Platform

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**Abstract.** This paper aims to elaborate on the design and application of an online platform as a knowledge-network-based system for online teaching/(self-)learning of translation in/between English and Chinese. We have two purposes for this research: first, to obtain a good understanding of translation trainees' learning behaviors in the corpus-assisted and knowledge-network-based translation learning setting, in the hope that sufficient data will be collected to draw a model of knowledge-network-based learning. Equally important is our second purpose, which is to initiate a more systematic and in-depth data-based empirical investigation into teaching designs for knowledge-based translation learning. This research conducts an experiment on how teachers can use knowledge nodes to organize online translation learning and how students perceive knowledge-network-based learning. The experiment reveals a rising trend of students' translation quality and they generally hold a positive attitude towards this learning model. Based on theoretical discussions of the platform design rationale and the findings from the teaching experiment, this paper explores how the knowledge-network-based translation learning can assist students in forming more efficient translation learning strategies.

**Keywords:** Knowledge network · Online translation learning · Corpus-based translation teaching

## 1 Introduction

With the rapid development of technologies in education practice and research, language teaching has also experienced tremendous progress in terms of technology-enhanced modes. Translation teaching, an advanced form of bilingual teaching, has been faced with challenges and opportunities of computer-assisted and data-based forms. In order to improve the efficiency of translation learning and teaching, an online translation teaching/learning platform, ClinkNotes Online Platform, has been designed and put into

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use, which includes a knowledge-network-based system with annotations of translation methods for the bilingual corpora and an automatic monitoring system for the tracking of students' learning records and historical performances.

The knowledge base of this project is designed with interdisciplinary approaches with recourse to computer science, knowledge engineering and management, translation studies, functional/text linguistics, language education, etc. to develop a groundbreaking and cost-effective educational paradigm for the teaching/(self-)learning of English-Chinese bilingual text-production in classroom/web-based settings to alleviate the pressure on labor-intensive language/translation courses.

## 2 Knowledge Network in Translation Learning

### 2.1 Literature Review on Knowledge Network

The concept "knowledge network" was explicitly put forward by Gagne in 1985. Hereby as a paradigm in conducting research on knowledge management, it has been gradually applied to different disciplines like management, economics and cognitive psychology. With the database of Web of Science and CNKI (China National Knowledge Infrastructure) as literature sources, we firstly searched the papers containing the concept "knowledge network". The retrieving results suggest that the number of the papers published has increased greatly since 2006, mostly in the field of library and information science and science and technology management [1, 2]. There are also some researches that apply the concept "knowledge network" to the educational field in recent years. When we further searched papers containing both "knowledge network" and "teaching", it can be found that most of the papers fall to the field of education technology, more to build macro framework, laying their emphasis on constructing learning cell and learning platform [3, 4], discussing teaching framework [5] and learners' learning trajectories and behavioral patterns [6, 7]; however, there are still not many researches on specific teaching implementations, and even fewer empirical studies on knowledge network's improving learners' abilities in certain aspects. Overall, researches on applying knowledge network to teaching are still at initial stage and recall further development. With translation teaching and learning as example, some scholars have already paid attention to constructing corpus-based network knowledge system and building online platform for translation teaching to improve students' translation ability [8, 9]. But few papers clearly put forward the concept "knowledge network" and verify its feasibility and validity in teaching process.

### 2.2 Platform Design

The ClinkNotes Online Platform endeavors to build a knowledge management system [10]. The database of this Platform is annotated by using a system of knowledge nodes ("tag-words") [11] derived from the text-analysis, which, in turn, is informed by text-linguistics, systemic-functional linguistics, stylistics, and discourse studies. To facilitate teaching/learning, the electronic system includes: annotations on cultural background knowledge and on textual design, stylistic features/effects, information management, and writing/translating skills; samples for discussion; multiple modes of access to annotated

textual phenomena (by: e.g. tagged features, navigation among related features, grouping of the textual manifestations of the same feature); study progress monitoring devices; and tutor-learner communication channels for on-line learning.

As the first attempt of its kind in the field, the cutting edge of this platform lies not in the size of its databases but in its knowledge-based, theoretically-informed delicacy and relevance of annotations and its teacher/learner-friendly data management. This platform endeavors to build a knowledge management system based on the domain-specific ontology for translation/bilingual writing, which features a computable network of interrelated and hierarchically distributed conceptual representations of the knowledge in this field, with "tag-words" as the knowledge nodes to form a roadmap of navigation and also as the keywords to introduce theory-informed annotations (Fig. 1).

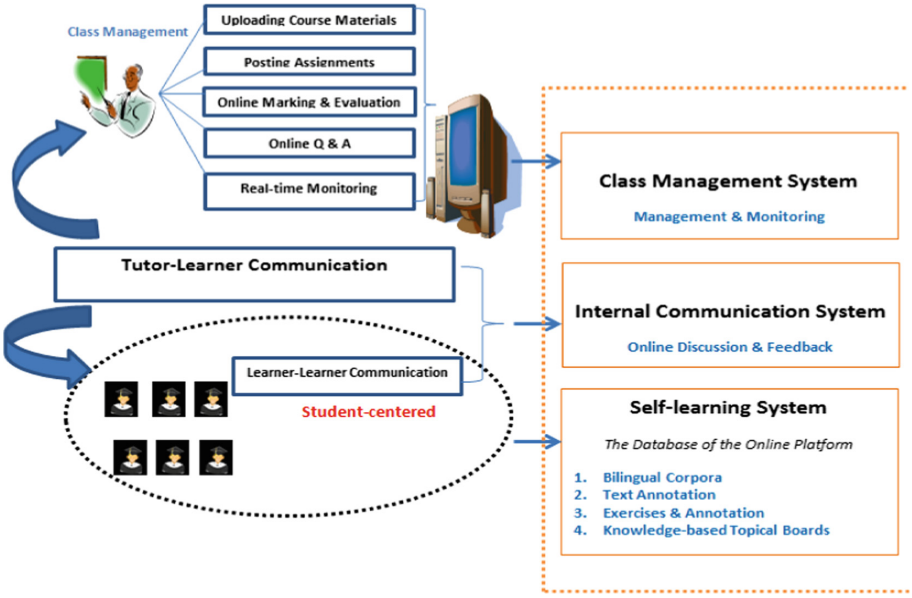


**Fig. 1.** The ClinkNotes Online Platform

## 3 The Teaching Experiment

On the corpus-based online translation teaching platform, this project aims at exploring the translation teaching model of knowledge network. To test out its feasibility and validity in improving students' translation ability, we carried out teaching experiment facilitated by ClinkNotes Online Platform.

### 3.1 Participants

The participants were 23 sophomore students majoring in English. Before joining in the specialized teaching experiment, they had already taken courses on translation between Chinese and English for two semesters. Therefore, they have basic translation knowledge

and skills. Also, they had been exposed to online learning before and was basically familiar with online information technology. Each student was well instructed and informed about the operation of the ClinkNotes Online Platform before learning through this platform.

### 3.2 Procedures

Before the experiment, a Chinese-English translation test was conducted with the help of a Chinese text of about 300 words to pre-test students' translation ability. In the experiment, students were instructed to learn 13 translation knowledge nodes related to the text within a month through the ClinkNotes Online Platform. The knowledge nodes are: (1) Parody; (2) Verb-Present Participle; (3) Idiom; (4) Alliteration; (5) Rhythm; (6) TransferredEpithet; (7) Noun-Pronoun; (8) Echo; (9) Reduplication; (10) Onomatopoeia; (11) Classifier; (12) Metaphor; (13) Intertextuality, covering five categories of translation method, rhetoric, grammar, information distribution within sentences and cultural background knowledge. The knowledge nodes are correlated with other knowledge nodes to form a knowledge network. After learning, students were again assigned to translate the same text as a posttest (Fig. 2).


**Fig. 2.** The test text

To ensure the reliability and validity of the experiment, students were not informed in advance that the same text would be used for pretest and posttest, and they were also stipulated not to use other electronic resources except the platform during the one-month experiment, here hence to avoid students from referring to the reference translation after the pretest. Students could refer to paper dictionary to complete their translation within a certain limit of time. The test results were scored according to the scoring standards for the translation part of TEM-8 (Test for English Majors, band 8, which is supposed to be for senior students). The weighted scores were made by two teachers and averaged as the final scores of the students being tested. The statistical software SPSS 19.0 was used to compare the mean values of the test results to help understand the changes of

students' scores before and after the experiment, so as to test the learning effect of the teaching model.

The study also conducted a questionnaire survey after the test to understand students' self-perception and recognition towards the translation teaching model of knowledge network. The questionnaire was designed according to the Likert Scale, assigning 5 levels of point for different options with 5 the highest recognition and 1 the lowest. Also, one-to-one interviews were made, during which the teacher would ask students questions about the translation task, the platform and their learning experience. Combined all the above explorations, the study then probed into the feasibility of this translation teaching and learning model. The detailed procedures are shown in Fig. 3.

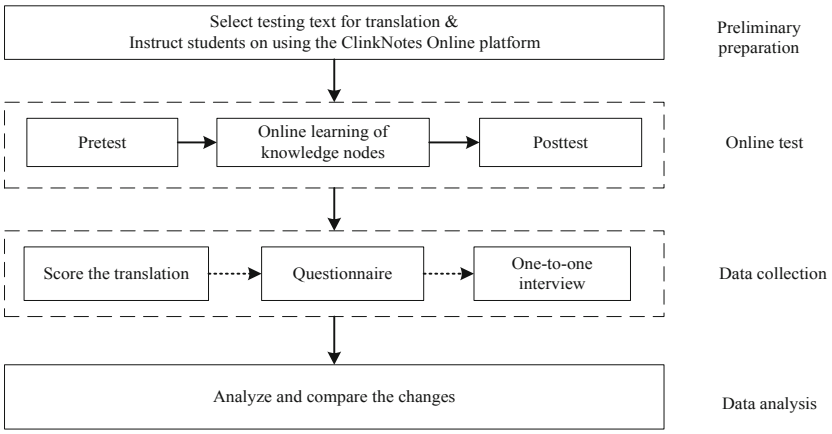


**Fig. 3.** Research procedures

## 4 Data Analysis and Discussion

### 4.1 Score Analysis

According to the scores of the two teachers, the pretest and posttest score of 23 students were calculated and counted. Assisted by SPSS 19.0, Q-Q plot was adopted to test the normal distribution of the scores, the results are shown respectively in Figs. 4 and 5.

As can be seen from Fig. 4, most of the points are allocated around the straight line and the scattered points are basically diagonally straight. Also, the points in the detrended normal Q-Q plot of pretest randomly fall around the zero-scale line, so it can be speculated that the pretest scores of the 23 students are approximately in line with the normal distribution. When observed in the same way, the posttest scores can be taken as normally distributed.

We then applied the paired sample t-test to explore the correlation and significance between the test scores and the knowledge-network-based translation learning model facilitated by SPSS 19.0. Here in this study, the hypothesis and standard should be

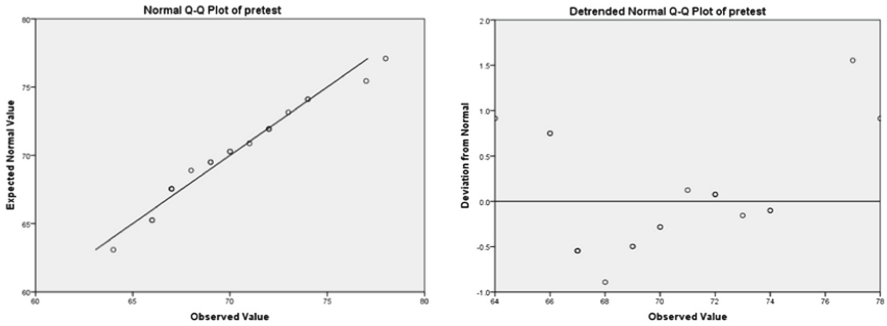


**Fig. 4.** Q-Q Plot of pretest

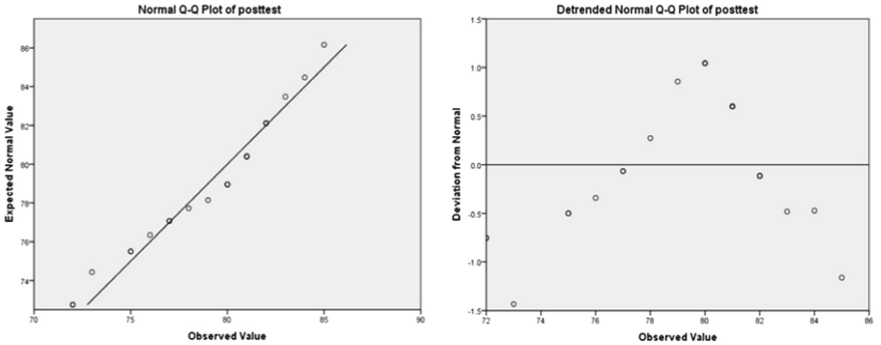


**Fig. 5.** Q-Q Plot of Posttest

firstly specified. Hypothesis $H_0$ is that the changes between the two groups of data are not correlated with this translation learning model, while that for $H_1$ vice versa. Without peculiar requirements, the standard $\alpha$ is set as 0.05 to decide whether to accept $H_0$ or not. The basic statistical information is shown in Table 1.

**Table 1.** Statistics of pretest and posttest

| | Mean | N | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Pretest | 70.08 | 23 | 3.630 | .757 |
| Posttest | 78.96 | 23 | 3.735 | .779 |

As can be observed from Table 1, the mean value of pretest scores is 70.08 and that of posttest scores is 78.96. Combined with the characteristics of normal distribution of students' scores, it indicates that most students' pretest scores are around 70 points while for posttest 79, uprising of about 9 points when compared with pretest.

The paired samples correlations are suggested in Table 2 as above. It can be seen from Table 2 that the correlation value is a positive value 0.507, and $p = 0.014 < 0.05$. With the standard $\alpha = 0.05$, hypothesis $H_0$ is rejected but $H_1$ accepted. That is, the changes between the pretest and posttest scores are significantly correlated. A detailed result of the paired samples test is shown in Table 3.

**Table 2.** Paired samples correlations

| | N | Correlation | Sig. |
|---|---|---|---|
| Pair 1 pretest & posttest | 23 | .507 | .014 |

As can be seen in Table 3, the average difference of pretest and posttest score is 8.870. Meanwhile, the observed $p = .000 < 0.05$, suggesting that statistically $H_0$ is rejected while $H_1$ accepted. Combined with the correlations between the two groups of data, it can be stipulated that the knowledge-network-based translation leaning model significantly helps in improving students' posttest scores and the translation quality of students' posttest is improved when compared with that of their pretest.

**Table 3.** Paired samples test of pretest and posttest

| | Paired differences | | | | | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | | | | |
| | | | | Lower | Upper | | | |
| Pair 1 pretest-posttest | – 8.870 | 3.659 | .763 | – 10.452 | – 7.287 | – 11.624 | 22 | .000 |

## 4.2 Analysis of Questionnaire and One-to-One Interview

A questionnaire survey and one-one-to-one interview were conducted after the test to help further demonstrate the above statistical hypothesis. Totally 23 copies of questionnaire survey were sent out to students and 23 were effectively received with effective rate 100%. According to the evaluation index of the five-level scale, if the option value is between 1 to 2.5 points, it means that the students hold a negative attitude towards the survey item; if 2.5 to 3.5 points, then neutral attitudes and if 3.5 to 5 points, then positive attitudes. The detailed results of the survey items related to knowledge network are listed in Table 4.

The standard deviation of all the survey items, except item 7, is less than 1.00 and their overall number is small, suggesting a relatively low discrete degree in their data distribution with the option of each students closer to the mean score. Also, the mean

**Table 4.** Questionnaire results

| Question item | Statistical counting | | | | | Mean | Std. Deviation | Var. |
|---|---|---|---|---|---|---|---|---|
| | 5 | 4 | 3 | 2 | 1 | | | |
| 1. How do you think the assigned knowledge nodes are related to the difficult points when re-translate the text? | 6 | 14 | 2 | 1 | 0 | 4.09 | 0.72 | 0.51 |
| 2. Do you think the learning of the 13 specific knowledge nodes and their annotation is helpful in completing the assigned translation or not? | 3 | 15 | 5 | 0 | 0 | 3.91 | 0.58 | 0.34 |
| 3. From your self-perception, do you think your translation quality is improved or not when you re-translate the same text after learning the 13 knowledge nodes? | 3 | 10 | 9 | 1 | 0 | 3.65 | 0.76 | 0.57 |
| 4. There may be one or more knowledge nodes involved in annotating the sample sentences, and there may be other related nodes combined to explicate the translation methods. How do you think of the combination of knowledge nodes? | 2 | 13 | 6 | 2 | 0 | 3.65 | 0.76 | 0.57 |
| 5. Does the networked knowledge method by combining knowledge nodes help in translation learning? | 3 | 15 | 4 | 1 | 0 | 3.87 | 0.68 | 0.46 |
| 6. Through this online learning, do you agree to the networked knowledge learning method of translation? | 6 | 10 | 6 | 1 | 0 | 3.91 | 0.83 | 0.69 |
| 7. The networked knowledge learning method of translation presented in this platform is more accurate and effective than that in traditional classroom learning. Do you agree with this hypothesis? | 4 | 8 | 6 | 5 | 0 | 3.48 | 1.02 | 1.03 |
| 8. In your future learning, will you try to consciously cultivate your networked translation learning model based on the knowledge nodes? | 7 | 11 | 5 | 0 | 0 | 4.09 | 0.72 | 0.51 |

value of all the survey items listed is above 3.5 points, indicating their generally positive attitude towards the listing items. Besides, for all the items, their scores are bigger than 1, showing no students holding a completely negative attitude.

A further probe into the specific survey items is made in combination of the one-to-one interview. From students' self-perception, it is generally believed that the 13 specific knowledge nodes are positively correlated with the difficult points in translation (scoring 4.09). They thought that "when I translate the texts again, I would consciously think about which knowledge nodes could be applied to the text, and I found that some could be directly used in the translation", and thus the knowledge nodes are much helpful in translating (scoring 3.91). Different students held different opinions on what type of knowledge nodes is more helpful, but they generally agreed that many knowledge nodes could help them deal with the difficulties they came across during their pretest, and thereby improving their translation quality when compared with their previous translation (scoring 3.65). This can be well illustrated by their posttest scores, which is consistent with their self-perception. As to the knowledge network interconnected and formed by the 13 nodes, students' acceptance level is relatively high (scoring 3.65). They argued that this combination way of knowledge "let us intuitively understand the connection among different knowledge nodes", "I can master one node while also get to know another", "pretty systematic and overall", "feel like they are in one system", "it much saves my time and energy while learning", etc. Therefore, this way helps in translation learning (scoring 3.87) and students approved of the method for translation learning with the aid of the knowledge network (scoring 3.91).

It is worth noting that in view of the hypothesis put forward in item 7, the mean value of scores is 3.48 points, a little bit lower than 3.5 points. Still, 5 people chose the option scoring 2, and the standard deviation of this item is bigger than the other 7 items, indicating a variation in students' options. A further interview targeting at this item is made to students, especially those holding negative attitude. It is found that their controversial points are mainly in the annotation of knowledge nodes and the explanation of example sentences. Some believed that "it is the first time for me to learn these knowledge nodes. But some nodes are way too professional to understand", and "some nodes are not easy for me to understand, and it becomes even more difficult for me to understand when another node is involved in". Some students held that "there are repeated examples among different nodes. I understand that there may be several nodes in the same example, but I am used to recalling knowledge through examples, and that makes me a little confused." The conflicting part is more concerned about the students, as their learning habits and their knowledge base vary. But overall, students are willing to cultivate this learning model in their future translation learning (scoring 4.09), as "the learning efficiency is relatively high, and I can master several knowledge nodes at the same time".

## 5 Research Findings and Conclusion

It can be seen from the experiment that according to students' self-perception, the 13 specific knowledge nodes are positively correlated with the difficult points in translation. The students generally accept the knowledge-network-based learning modes.

In fact, based on the learning instructions from the knowledge-network-based experiment, the translation quality of students' posttest is improved when compared with that of their pretest, which, to some extent, testifies the efficiency and effectiveness of knowledge-network-based translation learning platform. However, it should be noted that the familiarity of the test material in the posttest may, to some extent, affect the performance of the students. They may be supposed to achieve a relatively higher score due to familiarity of the text. But it is true that the abovementioned factor cannot determine the overwhelmingly higher score. Since the improvement of the posttest is very significant, we cannot deny the positive function of knowledge-based network in this translation teaching experiment.

With the help of the ontology-based knowledge management system and the monitoring system involved in this platform, we may expect to exploit the ontological representations of the learning environment and provide a mimetic optimization algorithm capable of generating the most effective learning pathway for learners.

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## References

1. Gao, J., Ding, K., Pan, Y., Yuan, J.: Analysis of the research status of knowledge network at home and abroad. Inf. Stud. Theor. Appl. **38**(9), 120–125 (2015)
2. Cai, B., Chen, G., Huang, X.: International research on knowledge network: present situation, hotspot and trend — bibliometrics analyzing based on web of science. J. Xidian Univ. (Social Science Edition). **27**(4), 40–51 (2017)
3. Yang, X., Li, W., Gu, Y.: Research on the construction of knowledge element based teaching resources organization model. Documentation, Inf. Knowl. **1**, 101–107 (2016)
4. Yu, S., Duan, J., Cui, J.: A double spiral deep learning model based on learning cell platform. Modern Distance Education Research. (6), 37–47 + 56 (2017)
5. Yan, Z., Li, M.: Technological pedagogical and content knowledge network — a new knowledge framework for teachers in information age. China Educ. Technol. **4**, 58–63 (2012)
6. Cao, L.: Studies on learning path and learning behavior characteristics in online learning. Distance Educ. China **4**, 25–30 (2014)
7. Yang, X., Li, J., Xing, B.: Behavioral patterns of knowledge construction in online cooperative translation activities. Internet High. Educ. **36**, 13–21 (2018)
8. Zhu, Y., Chen, J.: The theoretical conception and engineering practice of a corpus-based computer-assisted translation. Technol. Enhanced Foreign Lang. Educ. **4**, 52–57 (2015)
9. Zhu, C., Mu, Y.: Towards a textual accountability-driven mode of teaching and (self-) learning for translation and bilingual writing: with special reference to a CityU online teaching platform. Chin. Translators J. **2**, 56–62 (2013)
10. Mu, Y., Tian, L., Yang, W.: Towards a knowledge management model for online translation learning. In: Hao, T., Chen, W., Xie, H., Nadee, W., Lau, R. (eds.) SETE 2018. LNCS, vol. 11284. Springer, Cham (2018). https://doi.org/10.1007/978-3-030-03580-8_21
11. Tian, L., Mu, Y., Yang, W.: Designing a platform-facilitated and corpus-assisted translation class. In: Hao, T., Chen, W., Xie, H., Nadee, W., Lau, R. (eds.) SETE 2018. LNCS, vol. 11284. Springer, Cham (2018). https://doi.org/10.1007/978-3-030-03580-8_22