



The Application of Blended Teaching Model Aiming at Enhancing Deep Learning Capacity: A Case Study on Translation Majors

Xueying Xu^(✉) and Mingkun Chen

School of International Studies, Zhejiang University, Hangzhou, China
shirleyxxy@zju.edu.cn

Abstract. In the context of the deep integration of information technology and education, blended teaching has become part of the teaching model which enhances students' deep learning capacity in higher education. Taking Norman Webb's Depth of Knowledge (DOK) as the theoretical framework, this study takes the main course "Advanced EC-CE Translation" of School of International Studies at Zhejiang University as an example, analyzes the innovative "Flipped Classroom + PAD Class"-based blended teaching design and its application effect. The blended teaching quality assessment results of 55 students in the course were used as samples to quantitatively analyze the effectiveness of blended teaching on promoting students' deep learning capacity. Using SPSS Statistics, the results of the study are statistically significant and provide experience for the optimization of teaching design and teaching programs for related disciplines at universities, and help to enhance the competitiveness of higher education and promote education reform in the information age.

Keywords: blended teaching · deep learning · DOK · Flipped Classroom + PAD Class · SPSS · translation majors

1 Introduction

Blended learning has become part of the learning landscape in higher education, both for campus-based courses and courses designed for students studying at a distance as well as for communities of professional learning and practice (Stacey & Gerbic, 2009) [1]. Though different scholars' definitions of blended learning vary, the common basic understanding of the concept is "a combination of online (virtual) and face-to-face (physical) learning environments". Bleed (2001)'s idea of future higher education was a hybrid model, a "50 percent virtual instruction and 50 percent redesigned physical campus spaces" one, incorporating uses of technology, architecture, and people [2]. Garrison and Kanuka (2004) described blended learning as "the thoughtful integration of classroom face-to-face learning experiences with online learning experiences" (2004) [3]. Graham (2006) classified the existing definitions of blended learning into three variations and favored "BL = combining online and face-to-face instruction" since it accurately reflected the historical emergence of blended learning systems. Graham defined

blended learning as the combination of instruction from two historically separate models of teaching and learning, who also emphasized the central role of computer-based technologies [4]. Stacey and Gerbic (2009) defined blended learning as a combination of face-to-face (physical) and online (virtual) learning environments.

According to *Education Informatization 2.0 Action Plan* issued by the Ministry of Education of the People's Republic of China, it's necessary to continue to promote the in-depth integration of information technology and education, and promote the deep integration of information technology and intelligent technology into the entire education process. Comprehensively promote the expansion from technology application to ability and quality, and adapt to the requirements of the development of the information society. *China's Education Modernization 2035* released by the Central Committee of the Communist Party of China (CPC) and the State Council points out that it is necessary to significantly enhance the competitiveness of higher education, accelerate the education reform in the information age, build intelligent campuses, coordinate the construction of an integrated intelligent teaching, management and service platform, use modern technology to accelerate the reform of talent training models, and realize the organic combination of large-scale education and personalized cultivation. Apparently, blended learning has become an important part of promoting the education reform in the information age and improving students' information literacy. In schooling, students' blended learning needs to be realized through the teacher's blended teaching.

At present, academic circles at home and abroad have conducted a lot of research on blended teaching. The keyword clustering of 4010 articles on blended teaching in the past five years of Web of Science shows that the focus of scholars in recent years has mainly focused on group, covid, effect and ability (Fig. 1). Specifically, despite conceptual analysis, studies on blended teaching mainly focused on practical application, including model construction and effect analysis. Liu XQ et al. (2016) focused on the construction of college English blended teaching model and explored the basic process and key factors for the blended college English teaching based on Moodle teaching platform [5]. Sadeghi et al. (2014) compared the students' learning and satisfaction in blended teaching with conventional lecture methods, and found that the blended method is effective in increasing the students' learning rate [6]. He Y adopted sampling method to assess the effect of blended teaching mode in listening course of college English, and found students with subjective acceptance and innovation had improved their English ability through the blended teaching mode [7].

As a discipline that places equal emphasis on theoretical knowledge and practical skills, translation studies put forward high requirements for students' comprehensive quality. Translation studies of the School of International Studies of Zhejiang University is committed to cultivating inter-disciplinary high-end translation talents with solid language skills, good cross-cultural communication ability and critical thinking ability, profound Chinese and foreign cultural heritage and humanistic literacy, and global competitiveness and sound personality. According to the list of national and provincial first-class undergraduate professional construction sites in 2020 announced by the Ministry of Education of the People's Republic of China in 2021, the translation major of the School of International Studies was selected as a national first-class undergraduate major construction site. The main course of translation major, Advanced EC-CE

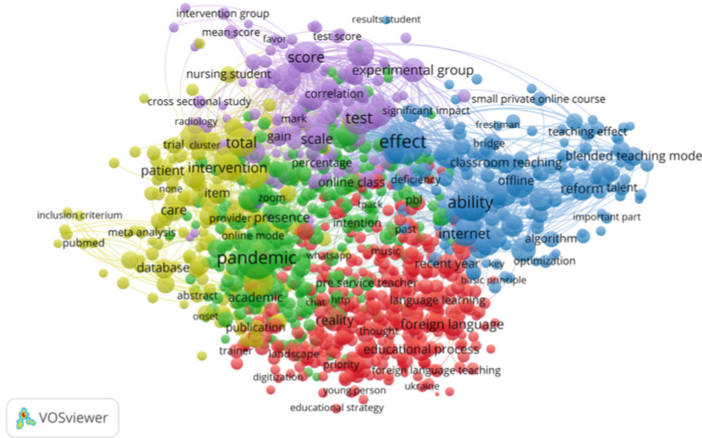


Fig. 1. VOSViewer Network Visualization

Translation, actively explores the optimal blended teaching model of “translation theory + practice deepening”, and achieves the purpose of promoting students’ deep learning capacity and enhancing students’ international competitiveness through teachers’ unique offline classroom design and the information technology assistance of online intelligent teaching platforms including ZJU Ding Talk. The course was awarded as a first-class undergraduate internationalization course at the provincial level in Zhejiang in May 2022. This study provides an example of blended teaching enhancing students’ deep learning capacity, which is helpful to optimize teaching design and teaching schemes in related disciplines, improve students’ comprehensive literacy, and help to improve the competitiveness of higher education and promote the education reform in the information age.

2 Theoretical Foundation

Originally, deep learning is a concept in the field of artificial intelligence, which is essentially a neural network. In 1976, F. Marton and R. Säljö employed Bloom’s Taxonomy (1956) to their research on students’ learning process and proposed “surface-level processing” and “deep-level processing” [8], which marked deep learning entered the field of education. In 2012, Dinsmore and Patricia Alexander systematically examined empirical research on deep and surface processing in definitions, measurement, context and model specification. The study showed that researchers theoretically defined the concepts differently [9]. Generally, deep learning is a learning style characterized by higher-order thinking, focusing on applying, analyzing, evaluating and creating.

Different from Bloom’s Taxonomy, Norman Webb’s Depth of Knowledge (DOK) (1997) focused more on how the students learn (Fig. 2). As a framework for classifying and assessing the depth of students’ understanding of knowledge, DOK contains 4 levels: recall, skill/concept, strategic thinking and extended thinking. Capacities described in level 3(strategic thinking) and level 4(extended thinking) are considered as performance

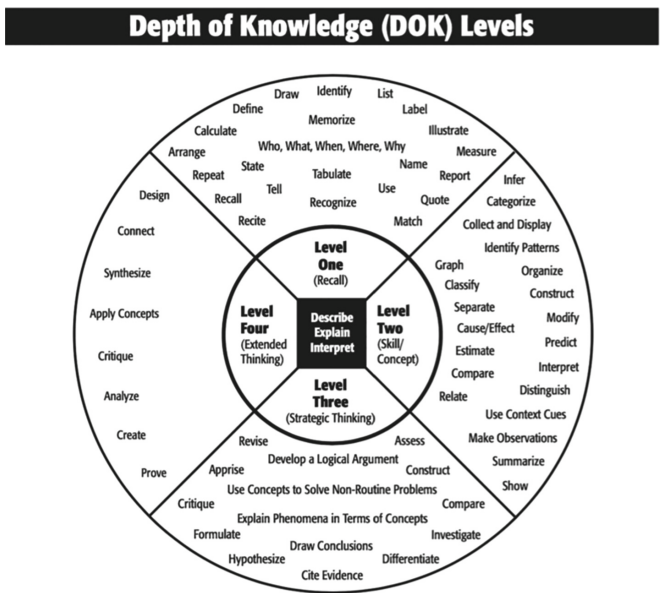


Fig. 2. Norman Webb’s Depth of Knowledge (DOK) [10]

in deep learning. Interestingly, the classifications in Bloom’s Taxonomy (apply, analyze, evaluate and create) are included in level 4 of DOK.

Combining with the theories of deep learning, the application of blended teaching in higher education should have a clear focus on students’ strategic thinking and extended thinking. In this study, the design of “Advanced EC-CE Translation” blended teaching model aiming at enhancing translation majors’ deep learning capacity provides an example in the teaching practice of related disciplines.

3 The Design of Blended Teaching Model Enhancing Deep Learning Capacity on Translation Majors

3.1 Course Objectives and Features

Guided by the cultivation of the global competence of translation talents, “Advanced EC-CE Translation” enhances students’ in-depth cognitive ability of Chinese and Western cultural differences through translation theory learning, comparison of Chinese and Western thinking styles and cultural differences, translation appreciation of classic Chinese literature, English and Chinese translation of modern and contemporary hot words and documents, translation discussion and commentary, etc. Based on the main line of introduction and dissemination of Chinese culture, the course enhances students’ in-depth cognitive ability of Chinese and Western cultural differences with the help of cross-cultural exchanges and thinking collisions between Chinese and international students. Through strengthening students’ interdisciplinary multi-text translation practical ability, the course can effectively improve cross-cultural communication and cross-cultural understanding ability.

Specifically, the features and innovations of the course mainly lie in the following two aspects:

1. Emphasize the role of translation practice as an international platform. By participating in various translation practice platforms such as the UNESCO *Courier* translation project and the Chinese Academy of Translation and Translation Studies, students take the initiative to undertake and complete diversified translation tasks. This can solve the pain point of the disconnect between students' theoretical knowledge and practical ability in translation, and effectively improve students' practical ability and professional quality in translation.
2. Introduce cross-cultural interaction between Chinese and international students in teaching. Based on the mixed teaching environment of Chinese students and international students, the translation strategies of Chinese and international students' texts are compared and reviewed in classroom teaching. The students are guided to deepen their in-depth cognition and understanding of the cultural differences and thinking differences between the East and the West behind translation.

3.2 Innovative Blended Teaching Design

The teaching design of "Advanced EC-CE Translation" draws on the models of "Flipped Classroom" and "PAD Class", and adjusts the two appropriately to achieve the best results. Originated in the American classroom in 2007, Flipped Classroom's teaching process is to learn electronic resources before class, to practice and discuss face-to-face in class, and to consolidate and reflect after class. PAD Class is a new model of teaching proposed by Professor Zhang Xuexin of Fudan University in 2014, which consists three parts: Presentation, Assimilation and Discussion. Specifically, PAD Class is divided into two types: "in-class division" and "next-class division", each of which is carried out in the order of presentation-assimilation-discussion.

The blended teaching design of "Advanced EC-CE Translation" integrates the Flipped Classroom and PAD Class mode, dividing the entire teaching process into three parts: before class, in class and after class (Fig. 3). Before class, students preview electronic study resources through online intelligent teaching platforms including ZJU Ding Talk, and finish preliminary translation to initially assimilate the learning content. During the class, "presentation and discussion" is implemented in communication, cooperative translation, translation presentation, text discussion, translation commentary, skill explanation, content extension and deepening. After class, students are encouraged to deepen their in-depth knowledge and understanding of the cultural differences and thinking differences between the East and the West behind translation through translation practice, and improve their cross-cultural communication skills.

3.3 Teaching Effectiveness Measurement and Results Analysis

"Advanced EC-CE Translation" constructed a DOK-based blended teaching quality assessment system. The deep learning effect of students is evaluated through questionnaires, so that teachers can visualize the effect of this teaching mode. The blended teaching quality assessment system. Taking Level 3 and Level 4 in the DOK framework which are related to deep learning as the theoretical basis, the assessment system takes

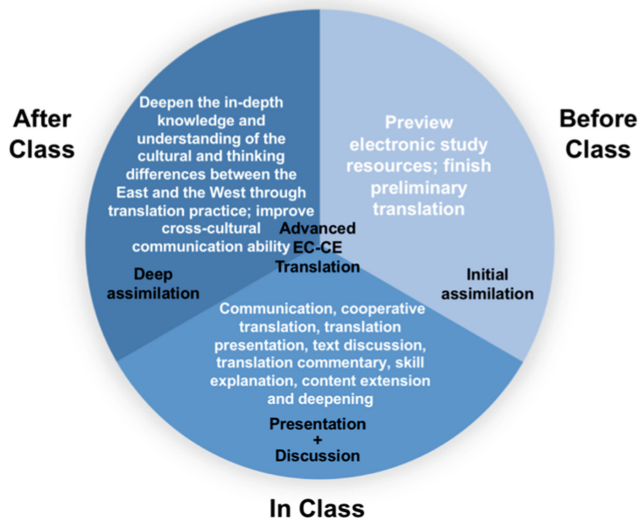


Fig. 3. The innovative “Flipped Classroom + PAD Class”-based blended teaching design of “Advanced EC-CE Translation”

the questionnaire as the evaluation method, sets up 3 first-level indicators, 10 s-level indicators and 15 third-level indicators, and collects students’ learning experience and evaluation of the course with the help of the Likert Scale. Quantitatively analyze the blended teaching quality assessment of “Advanced EC-CE Translation” to evaluate the improvement of students’ deep learning capacity.

4 The Practice of Blended Teaching Model Enhancing Deep Learning Capacity on Translation Majors

4.1 The Practice of Blended Teaching Model of “Advanced EC-CE Translation”

The blended teaching model of “Advanced EC-CE Translation” integrates the Flipped Classroom and PAD Class mode, dividing the entire teaching process into three parts: before class, in class and after class. Before class, the teacher releases e-study resources on online intelligent teaching platforms including ZJU Ding Talk, and students complete preliminary translations. During the class, the teacher will teach the core content of translation theory and practice, issues that should be paid attention to in translation, and explore the best translation strategies for different texts. The specific teaching contents include the history of translation and translation theory, the role of translation in cultural exchanges between China and the West, the difference between English and Chinese thinking (theory and practice), the translation of diplomatic hot words and current affairs, the translation of masterpieces, and the practice of advanced EC-CE translation. After class, students actively participate in translation practice. Relying on the four major practice platforms -- UNESCO *Courier* translation project, the National Social Science Fund of China translation project, the “Zheli Translation Studio” and the Chinese Academy of Translation and Translation Studies, the student-student cooperation,

Table 1. “Advanced EC-CE Translation” blended teaching quality assessment system.

DOK Levels	First-level Indicators	Second-level Indicators	Third-level Indicators
Strategic Thinking (Level 3)	Learning Mindset	Systems thinking	Understand the whole process of EC-CE translation with systems thinking and have the awareness to conclude
		Speculative thinking	Logical thinking: to think logically in different contexts in the process of EC-CE translation
			Critical thinking: to understand translated texts in a critical way; be able to propose hypothesis and correct the original text after verification
		Sustainable thinking	Have the awareness to compare, distinguish, evaluate, review and summarize
Extended Thinking (Level 4)	Learning Capacity	Comprehension	In-depth understanding of translation theory
			In-depth understanding and judgment of the overall quality of the translation
		Analysis	Capacity to analyze the texts in the process of EC-CE translation
		Application	Capacity to apply knowledge learned in the course to translation practice
		Creativity	Capacity to skillfully incorporate one's own original ideas into translation practice

(continued)

Table 1. (continued)

DOK Levels	First-level Indicators	Second-level Indicators	Third-level Indicators
	Learning Literacy	Humanistic literacy	The accumulation of Chinese and Western cultural heritage
			The appreciation of Chinese and Western masterpieces
		Personality cultivation	The cultivation of human feelings in theoretical learning and translation practice
			The establishment of the goal of providing suggestions for national development and strengthening the deep integration of national feelings and global concerns
		Global competence	In-depth understanding of the cultural differences between China and the West
			Cross-cultural communication

teacher-student interaction, and international teaching activities of translation practice are carried out, which closely integrates translation practice with translation research.

4.2 Blended Teaching Effectiveness Measurement and Results Analysis

Questionnaires were distributed to 55 students learning “Advanced EC-CE Translation” to assess their learning mindset, learning capacity, learning literacy and overall satisfaction on the Likert Scale. The three first-level indicators are used as the three dimensions of the statistics. The scales of satisfaction refer to the extent that the students think they’ve enhanced their deep learning capacity through the course. In addition to descriptions of the questionnaire results, this study uses SPSS Statistics to conduct Correlation Analysis and Logistic Regression Analysis.

Basically, in order to explore the differences in the three dimensions and satisfaction of students of different genders in the blended teaching model, an independent sample t-test was performed on the scores of students of different genders on each dimension and satisfaction. Among the 55 students, 18 are male and 37 are female. As the results

shown in Table 2, there are no significant differences in students' learning mindset, learning capacity, learning literacy and satisfaction among different genders ($P > 0.05$), which means there is no difference in the degree of deep learning capacity enhancement of students of different gender.

- Basic descriptions of the questionnaire results

In general, the rates of students who are relatively largely and largely equipped with learning mindset, learning capacity and learning literacy are as high as 81.82%, 89.09% and 72.72% respectively (Fig. 4). Under the dimension "learning mindset", 80% of the students understand the whole process of EC-CE translation with systems thinking and have the awareness to conclude to a relatively large or large extent; 90.91% of the students can think logically in different contexts in the process of EC-CE translation, understand translated texts in a critical way, and are able to propose hypothesis and correct the original text after verification to a relatively large or large extent; 70.9% of the students have the awareness to compare, distinguish, evaluate, review and summarize to a relatively large or large extent, which means they learn in a sustainable way (Fig. 5). Under the dimension "learning capacity", 78.18% of the students have in-depth understanding of translation theory and in-depth understanding and judgment of the overall quality of the translation to a relatively large or large extent; 96.36% of the students can analyze the texts in the process of EC-CE translation to a relatively large or large extent; 92.72% of the students can apply knowledge learned in the course to translation practice to a relatively large or large extent; 81.82% of the students can skillfully incorporate one's own original ideas into translation practice to a relatively large or large extent (Fig. 6). Under the dimension "learning literacy", 67.27% of the students' accumulation of Chinese and Western cultural heritage and the appreciation

Table 2. Differential analysis of gender on three dimensions

Dimensions	Gender		T	P
	Male	Female		
Learning mindset	4.14 ± 0.52	4.08 ± ± 0.62	0.340	0.735
Learning capacity	4.14 ± 0.53	4.18 ± ± 0.43	-0.292	0.771
Learning literacy	4.02 ± 0.44	3.91 ± ± 0.61	0.673	0.504
Satisfaction	90.78 ± ± 6.7	88.86 ± ± 6.26	1.039	0.318

Table 3. The impact of three dimensions on satisfaction

		OR (95%CI)	P
Satisfaction	Learning mindset	52.724(2.273–1223.103)	0.013
	Learning capacity	107.045(1.465–7819.633)	0.03
	Learning literacy	189.925(2.713–13294.942)	0.016

ability of Chinese and Western masterpieces has improved to a relatively large or large extent; 58.18% of the students has cultivated human feelings in theoretical learning and translation practice and established the goal of providing suggestions for national development and strengthening the deep integration of national feelings and global concerns to a relatively large or large extent; 92.62% of the students has improved the in-depth understanding of the cultural differences between China and the West and cross-cultural communication ability to a relatively large or large extent (Fig. 7). It can be seen that “Advanced EC-CE Translation” can effectively deepen students’ strategic thinking and extended thinking to improve their deep learning capacity.

- Correlation analysis and logistic regression analysis

The correlation analysis of the three dimensions and satisfaction scores of the students in the blended teaching model was conducted to investigate the detailed correlation between the three dimensions and satisfaction. The analysis results in Fig. 8, 9, and 10 shows that the respective correlation between students’ learning mindset, learning capacity, learning literacy and satisfaction are high (r^2 reached respectively 0.498, 0.512 and 0.674). In other words, students who have made great progress in learning literacy are

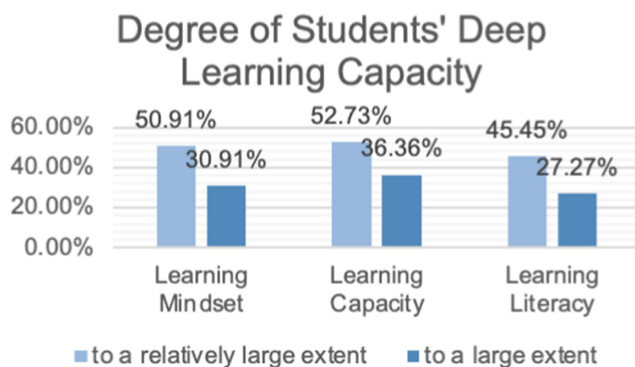


Fig. 4. Degree of Students’ Deep Learning Capacity

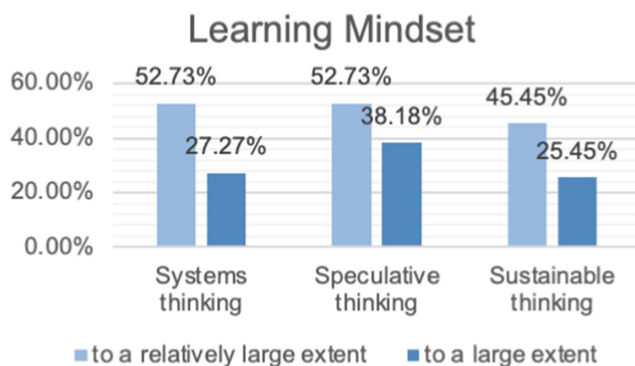


Fig. 5. Degree of Students’ Learning Mindset

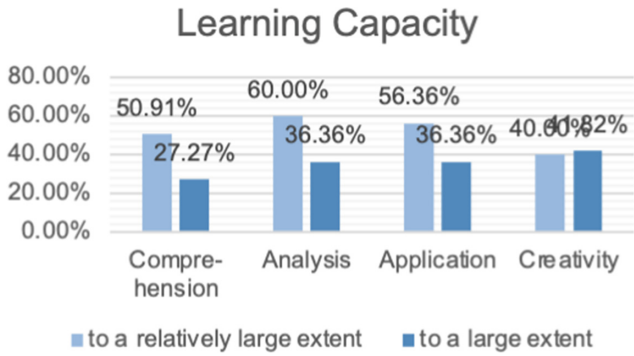


Fig. 6. Degree of Students' Learning Capacity

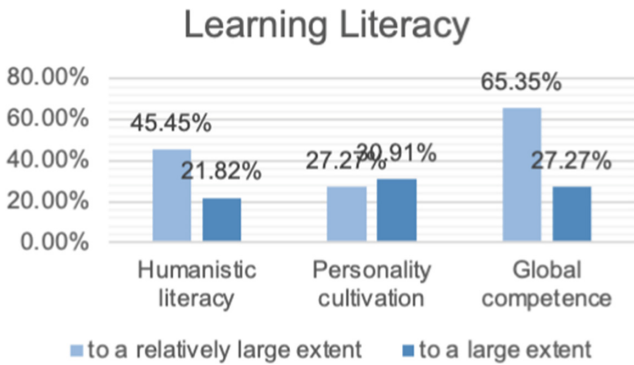


Fig. 7. Degree of Students' Learning Literacy

more likely to enhance their deep learning capacity. This provides constructive feedback for teachers when carrying out follow-up teaching activities – emphasis should be placed on improving students' learning literacy.

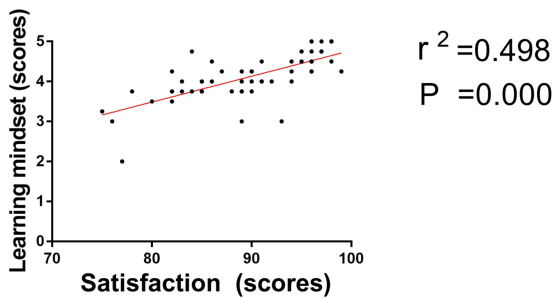


Fig. 8. Correlation between learning mindset and satisfaction

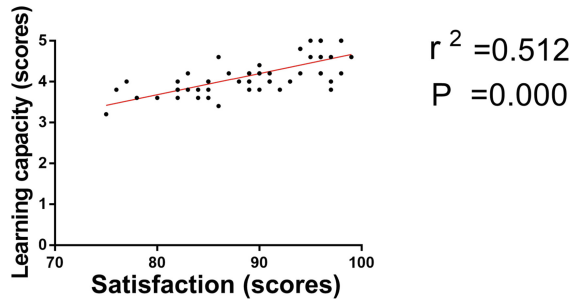


Fig. 9. Correlation between learning capacity and satisfaction

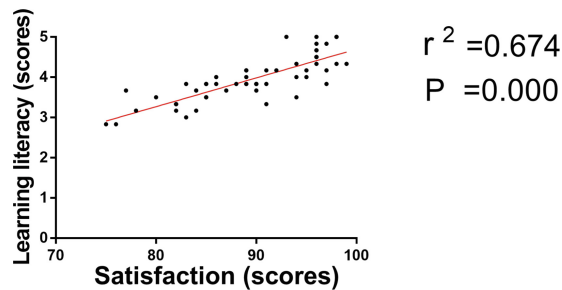


Fig. 10. Correlation between learning literacy and satisfaction

Conduct logistic regression analysis of three dimensions and satisfaction ($P < 0.05$, the results are statistically significant), the results in Table 3 show that learning mindset, learning capacity and learning literacy are all influencing factors of satisfaction.

5 Conclusion

“Advanced EC-CE Translation” of the School of International Studies of Zhejiang University constructed the innovative “Flipped Classroom + PAD Class” blended teaching model to improve the deep learning capacity of translation majors with the help of online intelligent teaching platforms including ZJU Ding Talk, and pays high attention to the development of students’ learning mindset, learning capacity and learning literacy. The course encourages students to enhance their global competence through translation practice. This study uses SPSS Statistics to conduct correlation analysis and logistic regression analysis to measure the significance of the three dimensions to students’ overall satisfaction and the improvement of translation majors’ deep learning capacity in the blended teaching model. The results showed that more attention should be paid to the improvement of students’ learning literacy to enhance their deep learning capacity. This study provides experience for related disciplines in universities to promote the education reform in the information age.

Acknowledgment. This paper is sponsored by “Understanding China, Communicating with the World – A Study on the Course Ideological and Political Initiatives in the Translation Courses under the Perspective of Constructing China’s International Discourse Power”, an Ideological and Political Course Teaching & Research Project of Zhejiang Province (2022–1), “Multi-track Coordination, Multi-major Integration – Cultivation and Practice on the High-calibre Foreign-relate Talents” of New Liberal Studies and Reforms Practice Project of Ministry of Education, the PRC (2021110054) and “Cultivation on the Innovative Talents with Global Competitiveness – ‘Twin Teacher’ Teaching Mode Exploration and Practice” of Zhejiang University (2022).

References

1. Stacey, E. and Gerbic, P. eds. *Effective Blended Learning Practices: Evidenced-Based Perspectives in ICT-Facilitated Education*, Chapter 1. “Introduction to Blended Learning Practices”, 2009, pp.1–20.
2. Ron Bleed, *A Hybrid Campus for the New Millennium*, Educause review, 2001, pp.16–24.
3. Garrison, R. and Kanuka, H., *Blended Learning: Uncovering its Transformative Potential in Higher Education*. Internet and Higher Education, 2004, 7: 95–105.
4. Bonk, C. J. and Graham, C.R. eds. *Handbook of Blended Learning: Global Perspective, Local Designs*, Chapter 1. “Blended Learning Systems: Definition, Current Trends, and Future Directions”, San Francisco, 2006, http://curtbonk.com/graham_intro.pdf
5. Liu, Xiaqing, Li, Songqing and Dun, Xiaohui, *Study on Blended Learning Model for College English Teaching Based on Moodle System*, Advances in Intelligent Systems Research, pp.489–493.
6. Sadeghi, R. Sedaghat, M.M., and Ahmadi, F.S. *Comparison of the effect of lecture and blended teaching methods on students’ learning and satisfaction*. Journal of Advances in Medical Education & Professionalism, 2014, pp. 146–150.
7. He Yan, *Practice and Effect of Blended Teaching Mode in Listening Course of College English*, Advances in Intelligent Systems Research, 2018, pp. 251–256.
8. Marton F, Säljö R., On qualitative differences in learning—ii Outcome as a function of the learner’s conception of the task[J]. *British Journal of educational Psychology*,1976, p. 116.
9. Dinsmore, D. L. and Alexander P A., *A Critical Discussion of Deep and Surface Processing: What it Means, How it is Measured, the Role of Context, and Model Specification*[J]. *Educational psychology review*, 2012, pp. 499–567.
10. Webb’s Depth of Knowledge, The Idea Book, University of Saskatchewan. <https://openpress.usask.ca/ideabook/chapter/webbs-depth-of-knowledge/>

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

