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Evaluating the Effectiveness of Undergraduate Translation Technology Training in China

ZHANG JIE
[0009-0000-0123-4640]
School of Languages, Literacies and Translation
Universiti Sains Malaysia
Penang, Malaysia
zhangjiez7@student.usm.my

MALINI. N.G. GANAPATHY (Corresponding Author)
[0000-0002-1495-6340]
School of Languages, Literacies and Translation
Universiti Sains Malaysia
Penang, Malaysia
malinik@usm.my

MOHAMED ABDOU MOINDJIE
[0000-0003-2518-9033]
School of Languages, Literacies and Translation
Universiti Sains Malaysia
Penang, Malaysia
mohdmoindjie@usm.my

ABSTRACT

Translation technology plays an indispensable role in the global language services industry. As a key component of modern translation pedagogy, translation technology training has been widely integrated into tertiary translation programs in China. However, the effectiveness of undergraduate translation technology training remains underexplored. To address this gap, an online questionnaire survey was conducted with 309 undergraduate students to investigate their perceptions of translation technology training. Kaufman's model was adapted and used as the framework to evaluate the training's effectiveness. The results indicate that over half of the students expressed a positive attitude toward translation technology training. Most students found it effective in helping them acquire procedural knowledge of translation technology and enhance their overall technological competence. However, some students raised concerns about the availability of resources, insufficient hands-on practice, and the limited duration of training. The study concludes that undergraduate translation technology training requires increased resource investment, an extended training duration, and a stronger emphasis on fostering students' autonomy. These findings contribute to a deeper understanding of how to enhance undergraduate translation technology training in similar contexts and provide a reference for future program development.

Keywords: Autonomy, Evaluation, Training effectiveness, Translation technology, Undergraduate level

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INTRODUCTION

Translation technology, driven by rapid advancements in artificial intelligence, big data and cloud computing, has revolutionized both the translation industry and academic fields worldwide. It is universally acknowledged that modern professional translators must possess both linguistic proficiency and technological competence to effectively perform complex real-life translation tasks. As a result, translation technology training has become increasingly integral to tertiary-level translation curricula. In China, translation technology has been recognized as one of the core courses in the translation curricula as outlined in the *Teaching Guidelines for Undergraduate Translation Major* (Zhao & Feng, 2019). According to the survey conducted by Wang and Li (2021, p. 16) across 434 Chinese universities, 71.92% offer translation technology training, either as elective or compulsory courses.

Although previous studies have examined translation technology training from various perspectives, such as industry practices, instructor profiles, teaching materials, teaching methods, lab sessions, curriculum design and technological competences (Alcina et al., 2007; Doherty and Moorkens, 2013; Pym, 2013; Bowker, 2015; Gaspari et al., 2015; Austermühl, 2013; Raído, 2013; Kornacki, 2018; Rodríguez-Castro, 2018; Nunes Vieira et al., 2021; Zhang and Vieira, 2021; Wang and Liu, 2022), few studies have probed into undergraduate students' perceptions of the training effectiveness, despite the fact that translators with bachelor's degrees comprise the bulk (43.2%) of translation workforce according to the *Report on Language Services Industry in China* (TAC, 2023). Therefore, the effectiveness of translation technology training as seen by undergraduate students remains to be explored.

Curriculum evaluation is crucial to developing and improving translator training programs (Kelly, 2014). Accordingly, the present study sought to evaluate the effectiveness of undergraduate translation technology training from the students' perspectives in order to refine and improve the curriculum. To this end, a questionnaire survey was administered online in China to poll 309 undergraduates who had completed the course. Kaufman's model was adopted as the conceptual framework to evaluate the training effectiveness.

LITERATURE REVIEW

Translation technology, within the scope of this study, is broadly defined as an umbrella term that encompasses a wide variety of relevant technologies and tools that assist the translator throughout the translation process (Wang, 2014; Man et al., 2019), including but not limited to optical character recognition, file format conversion, task analysis, terminology extraction, machine translation (MT), parallel corpora, translation memory, terminology management and quality assurance, etc. Accordingly, translation technology training refers to the process of equipping students with the professional knowledge and skills (Su & Li, 2023) to utilize these technologies and tools.

Although translation technology training has become an essential part in the undergraduate translation curricula, its effectiveness is yet to be investigated. Some previous studies focused on the training of MT or computer-assisted translation (CAT). Sycz-Opoń and Gałuskina (2016) used a self-built evaluation protocol in their MT modules and explored the effectiveness of MT training. It was found that most students were positive about MT application and the protocol devised in machine translation post-editing (MTPE) tasks. Rodríguez-Castro (2018) conducted a case study on a postgraduate CAT curriculum and examined the learning outcomes, a concept similar to training effectiveness, by investigating students' translation performance and perceptions. The results revealed that

although most students claimed that they had mastered how to use CAT tools, some felt that they were still not able to work in real-life projects. Mohammed and Al-Sowaidi (2023) designed and delivered a task-based e-Course via Moodle LMS to teach CAT tools. The results of their paired-sample tests revealed a remarkable increase in the scores of trainees, indicating that the training was effective.

Some researchers focused on self-efficacy as a key indicator for measuring the training effectiveness. Kenny and Doherty (2014) adopted self-efficacy to assess the effectiveness of the syllabus for a statistical machine translation (SMT) module. They recruited students to fill in a self-efficacy survey to gauge their confidence in using SMT. The results showed that the training significantly improved students' conviction, deemed as equivalent of self-efficacy, in applying SMT to translation tasks. Sha et al. (2022) surveyed Chinese MTI students enrolled in a translation technology course, focusing on their self-efficacy and perceptions. The results showed that anonymity in online peer feedback could enhance students' self-efficacy.

Other scholars have applied the Kirkpatrick model of training evaluation to explore the effectiveness of translation technology training. Samman (2022) systematically evaluated a 4-week MTPE training using the Kirkpatrick model and found that the training was effective in fostering students' positive attitudes towards MTPE and enhancing translation efficiency. Similarly, Su and Li (2023) conducted a comprehensive study framed within the Kirkpatrick model to assess the effectiveness of translation technology training at the postgraduate level. The results indicated that while most students felt that they had acquired knowledge of CAT tools, they continued to face challenges in dealing with real-life translation tasks.

Although these studies offer valuable examples for evaluating the effectiveness of translation technology training, several limitations could be identified. First, most of these studies are limited by their exclusive focus on individual components of translation technology, such as MT or CAT. Second, these studies provide limited insight into the undergraduate level, failing to address the systematic and layered structure of translation technology training (Wang & Liu, 2022; Cui, 2019), and neglected the availability of training resources. As a result, their findings may have limited applicability to undergraduate translation technology training.

Therefore, to address the gap, the present study examined students' perceptions using a questionnaire to assess the effectiveness of undergraduate translation technology training offered in various translation programs in China. This study adopted Kaufman's model of learning evaluation (1994) and incorporated the translation technology course proposal by Wang and Liu (2022), which is tailored for the undergraduate level in the Chinese context based on the minimalist approach devised by Austermühl (2013). This combined framework facilitates a comprehensive measurement and evaluation of the training.

ADAPTING KAUFMAN'S MODEL

Evaluating the effectiveness of translation training programs usually focuses on students' satisfaction, perception and output (Szarkowska, 2019). However, these subjective indicators require robust evaluation frameworks to measure and interpret. Mellinger and Hanson (2020) suggest that, in data-based empirical research, a theoretical foundation should be built to define the construct before formulating the indicators that can represent it. Therefore, in this study, the construct was defined as the effectiveness of undergraduate translation technology training, which was measured by adopting Kaufman's model. This model is a holistic and practical framework used for training program evaluation. It extends Kirkpatrick model's by expanding its original four levels to five levels and subdividing the first level, Reaction, into

two distinct sub-levels: Enabling and Reaction. These sub-levels evaluate both availability and value of resources and methods (Kaufman & Kelly, 1994). The model, combined with the Course Proposal of Wang and Liu (2022), proved effective in our evaluation of undergraduate translation technology training.

Kaufman's model (1994) operates across five levels. The first level is divided into two sub-levels: Enabling and Reaction. Enabling evaluates the availability and quality of resources while Reaction assesses the acceptability and efficiency of methods, means, and processes. The second level, Acquisition, measures trainees' mastery of skills and competencies after the training. The third level, Application, investigates whether trainees constantly apply the acquired knowledge and skills after the training. The fourth and fifth levels, on a macro level, address organizational contributions and societal consequences.

Given the purpose of this study, the first three micro levels of Kaufman's model were deemed most suitable for developing the framework. There, these three levels were operationalized (see Table 1) so as to collect context-specific data on students' perceptions, which serve as indicators for the variables of training effectiveness. The Enabling level evaluates the availability and quality of resources and content, which are considered to be the building blocks of translation training programs (Kelly, 2014). The Reaction level measures students' overall perceptions, including their satisfaction with the course structure, teaching methods, assessment methods, and perceived difficulties. The Acquisition level evaluates students' technological competences classified by Wang and Wang (2016). Finally, the Application level investigates the frequency with which students use translation technology after the training.

Table 1

Operationalization of the first three levels in Kaufman's model

Levels	Contextualized description	Operationalization or variables in the questionnaire
Level 1a Enabling	The extent to which students perceive resources and contents as effective	Students' perceptions of resources input Students' satisfaction with contents (textbooks and slides)
Level 1b Reaction	The extent to which students perceive translation technology training as satisfactory	Students' attitudes towards translation technology Students' overall perceptions of the training Students' satisfaction with duration, progression, teaching, assessment methods and perceived difficulties
Level 2 Acquisition	The extent to which students rate their technological competences after training	Students' perceived technological competences
Level 3 Application	The frequency to which students use translation technology after training	Frequency of students' use of translation technology

Through adapting the model, this study sought to evaluate the effectiveness of undergraduate translation technology training, focusing on the first three levels of Kaufman's model. The comprehensive evaluation examined students' attitudes, satisfaction, perceived difficulties, technological competences, and frequency of application. Therefore, the study sought to address the research questions below:

(1) To what extent students perceive the translation technology training as effective?
(2) What difficulties are encountered in students' learning process?
(3) To what extent students rate their technological competences after the training?
(4) How frequently do students use translation technology after the training?

METHODOLOGY

Participants. The target population consisted of upperclassmen majoring in English or Translation in China who had completed the course related to translation technology. To recruit the eligible participants, we emailed eight teachers in charge of undergraduate translation technology training, whose contact information was available on their official university websites. With the assistance of these teachers, we sent a web-based questionnaire to qualified students. Additionally, we recruited an initial group of twelve eligible students from an online group created for a translation technology contest through purposive sampling. Through these students, the snowball sampling method was used to allow the questionnaire to reach more eligible participants. The final valid sample comprised 309 undergraduate students (51 men, 16.50%; 258 women, 83.50%) from comprehensive universities (24.27%) and universities of foreign studies (74.76%) across 14 cities in China. The participants included 78 third-year students (25.24%) and 231 fourth-year students (74.76%) with a mean age of 20.71 years (SD=0.76). The purposes and scope of the survey were clearly explained in the questionnaire. Prior to completing the questionnaire, all participants were informed that the survey was anonymous and purely voluntary so as to reduce potential subjectivity and bias.

Instrument. The present study used a questionnaire adapted from Kaufman's model, the Couse Proposal by Wang and Liu (2022), and the scale of Su and Li (2023) to collect data. The questionnaire was administered online from 1 July to 31 October 1 in 2024. Based on the first three levels (Enabling and Reaction at Level 1, Acquisition at Level 2 and Application at Level 3) of Kaufman's model, the questionnaire was mostly composed of rating items and structured into four parts. The first part solicited students' demographic information. The second part, Level 1, consists of two sub-levels: Enabling and Reaction. The Enabling sub-level investigated the extent to which students perceived available resources and contents in their translation technology training as effective. The Reaction sub-level, focusing on the training implementation, started with students' satisfaction with training duration and progression, and examined the extent to which students perceived the teaching and assessment methods used in the training as effective. This sub-level also investigated students' perceived difficulties encountered in their learning process. Students were asked to rate on a 5-point Likert scale ranging from "Very Effective" to "Very Ineffective" or from "Strongly Agree" to "Strongly Disagree". The third part, Level 2: Acquisition, asked the students to rate their technological competences after training, ranging from "Excellent" to "Poor" with rating items. The fourth part, Level 3: Application, probed into the frequency with which students use translation technology in assignments and freelance tasks after training, using a rating item ranging from "Always" to "Never".

Data Analysis. First, data cleansing was performed to filter out indifferent and extreme responses with inconsistencies and errors. A total of 334 responses were collected. 25 invalid responses were filtered out, resulting in 309 valid responses and a 92.51% valid response rate. Then reliability analysis was conducted on the multi-item scale. Each Cronbach Alpha coefficient was higher than the recommended threshold (see Table 2), indicating good reliability. The quantitative data collected from the questionnaire were descriptively analyzed using SPSS Version 26.0.

Table 2

Reliability coefficients.

Question Number	Variables	Cronbach alpha coefficients
Q09	Students' perceptions of available resources	0.807
Q10	Students' satisfaction with contents (textbooks and slides)	0.889
Q11	Students' satisfaction with training duration and progression	0.856
Q12	Students' satisfaction with teaching methods	0.926

Q13	Students' satisfaction with assessment methods	0.903
Q14	Students' perceived difficulties	0.954
Q15	Students' perceived technological competences after training	0.874

RESULTS

Students' perceptions of available resources are shown in Table 3. Most students (90.61%) had access to computer labs and more than half (13.59 + 47.57%) felt that lab sessions were effective and very effective. However, other resources were notably lacking, including online platform (48.54%), industry experts (33.98%), industrial visits (66.34%), authentic projects (77.35%) and case studies (51.13%). Among those with access to these resources, less than half (16.51%) considered online platform effective; a majority (42.39%) believed that industry experts invited as guest lecturers offered effective guidance; about half (16.5%) felt industrial visits effective; over half (16.83%) deemed authentic translation projects effective; and a significant portion (30.42%) found real-life case studies effective in aiding them to solve technical problems in practice.

Students' satisfaction with contents including textbooks and Powerpoint slides is shown in Table 3. Overall, students responded neutrally to the contents. Although some students felt positively (35.92%) that the contents were well-structured with a balanced difficulty for undergraduate level and agreed (35.6% and 43.69%) that the training covered both theoretical and practical knowledge of translation technology, a significant portion (45.63% and 28.48%) held that the contents should incorporate more authentic cases and align more closely with current industry realities.

Table 3

Level 1a Enabling: Students' perceptions of resources and contents in translation technology training.

Q9: Perceptions of resources	Very Effective	Effective	Average	Ineffective	Very Ineffective	Not Used	Mean	SD
[1] Computer lab	13.59%	47.57%	21.68%	6.80%	0.97%	9.39%	3.73	0.85
[2] Online platform	5.18%	11.33%	24.92%	7.44%	2.59%	48.54%	3.19	0.97
[3] Industry experts	11.00%	31.39%	13.27%	8.09%	2.27%	33.98%	3.62	1.01
[4] Industrial visits	4.53%	11.97%	12.94%	2.59%	1.62%	66.34%	3.45	0.98
[5] Authentic projects	9.39%	7.44%	3.88%	1.62%	0.32%	77.35%	4.06	1.01
[6] Case studies	11.97%	18.45%	15.21%	2.27%	0.97%	51.13%	3.78	0.94
Q10: Satisfaction with contents (textbooks and PPT slides)	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		Mean	SD
[1] Well-structured & balanced difficulty	4.85%	31.07%	34.95%	18.45%	10.68%		3.01	1.06
[2] Basic knowledge introduced	8.74%	26.86%	31.72%	22.98%	9.71%		3.02	1.11
[3] Operational procedures and techniques exhaustively described	13.59%	30.10%	44.66%	7.77%	3.88%		3.42	0.95
[4] Insufficient authentic cases	5.50%	40.13%	42.07%	7.44%	4.85%		3.34	0.88
[5] Materials misaligned with industry	6.80%	21.68%	49.19%	20.06%	2.27%		3.11	0.88

As it is shown in Table 4, a majority of students (62.13%) agreed and strongly agreed that the ability to use translation technology is crucial for the professional development of translators. Most students (67.31%) expressed a remarkable change in attitudes towards translation technology after training. Overall, most students perceived the translation technology training as very effective (25.24%) or effective (40.13%).

Table 4

Level 1b Reaction: Students' attitudes towards translation technology and overall perceptions of the training effectiveness.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	SD
Q6: Mastery of translation technology is significant to professional translators.	20.06%	42.07%	26.54%	10.68%	0.65%	3.70	0.93
Q7: The training has changed my attitudes towards translation technology.	28.80%	38.51%	20.06%	10.68%	1.94%	3.82	1.03
	Very Effective	Effective	Average	Ineffective	Very Ineffective		
Q8: My overall perception of translation technology training effectiveness.	25.24%	40.13%	21.04%	11.97%	1.62%	3.75	1.02

Over half of students were dissatisfied with training duration (see Table 5) as 46.93% disagreed and 6.15% strongly disagreed with the statement. Students showed mixed feelings about training progression. A large portion were reported to be neutral (46.60%) while some (34.31%) disagreed that the training was delivered in a progressive manner.

As for teaching methods (see Table 5), classroom tutorials with Powerpoint slides remained the most prevalent and accessible means, which was perceived as effective or very effective by most students (70.55%). The availability of other methods varied. Flipped classroom method had a relatively low effectiveness rating, with a significant portion of students (40.78%) feeling it ineffective. In-class reports were generally deemed ineffective by a large portion of students (36.90%). Case studies, which expose students to real-life technical problems, received a more favorable rating (26.86%). Brainstorming was perceived moderately positively, with some finding it effective (22.98%). Peer review revealed neutral perceptions and mild satisfaction, with a significant portion (25.89%) rating it as ineffective. Outcome sharing was the least used method (42.07%).

The assessment methods were also rated (see Table 5). Group presentations were perceived positively as most effective (67.63%), followed by situated tests in which students were required to solve problems in real-world translation scenarios (60.19%), in-class tests on application of translation technology (56.31%), and the final exam (51.46%). Final essays were considered to be least effective (60.20%).

Table 5

Level 1b Reaction: Students' satisfaction with training duration, progression, teaching and assessment methods.

Q11: Satisfaction with duration and progression	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		Mean	SD
[1] Sufficient training duration	2.27%	7.44%	37.22%	46.93%	6.15%		2.53	0.81
[2] Well-designed progression	4.21%	14.89%	46.60%	27.51%	6.80%		2.82	0.91
Q12: Satisfaction with teaching methods	Very Effective	Effective	Average	Ineffective	Very Ineffective	Not Used		
[1] Classroom tutorials	22.33%	48.22%	16.83%	10.36%	2.27%		3.78	0.98
[2] Flipped classroom	2.91%	5.50%	22.33%	26.86%	13.92%	28.48%	2.39	1.02
[3] In-class reports	3.56%	11.97%	24.27%	26.54%	10.36%	23.30%	2.63	1.05
[4] Case studies	11.00%	15.86%	30.74%	6.80%	5.50%	30.10%	3.29	1.09
[5] Brainstorming	5.83%	17.15%	32.04%	10.68%	7.77%	26.54%	3.04	1.06
[6] Peer review	3.88%	12.30%	26.54%	18.12%	7.77%	31.39%	2.80	1.04
[7] Outcome sharing	4.53%	13.59%	28.16%	7.77%	3.88%	42.07%	3.12	0.97
Q13: Satisfaction with assessment methods	Very Effective	Effective	Average	Ineffective	Very Ineffective			
[1] Group presentation	23.62%	44.01%	26.54%	3.56%	2.27%		3.83	0.91
[2] In-class test	21.36%	34.95%	27.51%	10.36%	5.83%		3.56	1.11
[3] Final essays	3.56%	6.47%	29.77%	42.72%	17.48%		2.36	0.96
[4] Final exam	19.74 %	31.72%	34.63%	9.06%	4.85%		3.52	1.06
[5] Situated test	31.39%	28.80%	33.01%	4.85%	1.94%		3.83	0.99

Table 6 shows students' perceived difficulties in learning. Lack of authentic projects obtained the highest mean (3.72) as the biggest difficulty for students (63.10%). The second biggest difficulty faced by students (59.87%) was insufficient hands-on practice with translation tools. Many students (58.90%) reported that the training duration was too short. Nearly half of students (47.57%) were concerned with poor lab conditions. While some students (33.66%) agreed that the training content was too complicated, others did not find it challenging, indicating a mixed response. Little outside-the-classroom training obtained the lowest mean (2.81), indicating that it was not perceived as a major issue.

Table 6

Level 1b Reaction: Students' perceived difficulties and constraints

Q14: Perceived difficulties	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	SD
[1] Insufficient practices	19.42%	40.45%	28.48%	7.44%	4.21%	3.63	1.01
[2] Lack of authentic projects	21.68%	41.42%	27.51%	6.47%	2.91%	3.72	0.97
[3] Little outside-the-classroom training	8.74%	18.12%	30.10%	31.39%	11.65%	2.81	1.13
[4] Poor lab conditions	17.80%	29.77%	30.10%	13.59%	8.74%	3.34	1.12
[5] Short training duration	23.95%	34.95%	26.54%	10.68%	3.88%	3.64	1.08
[6] Training content too complicated	10.36%	23.30%	41.75%	15.86%	8.74%	3.11	1.07

Table 7

Level 2 Acquisition: Students' perceived technological competences after the training.

Q15: Perceived technological competences	Excellent	Good	Average	Inadequate	Poor	Mean	SD
[1] Basic Computer literacy	11.97%	24.60%	36.89%	18.77%	7.77%	3.14	1.10
[2] Information searching	16.83%	25.89%	30.74%	20.06%	6.47%	3.27	1.15
[3] CAT tools	9.06%	23.30%	30.10%	26.86%	10.68%	2.93	1.14
[4] Terminology management	5.83%	15.21%	23.30%	40.78%	14.89%	2.56	1.10
[5] MTPE	15.53%	35.60%	39.16%	7.12%	2.59%	3.54	0.93
[6] Autonomy	2.91%	17.80%	44.34%	28.48%	6.47%	2.82	0.90

Table 7 shows the Acquisition level, where students were asked to rate their technological competences after the training. Although some students (36.57%) rated their basic computer literacy as good or excellent, many (36.89%) rated it as average, indicating room for improvement. Information searching competence received a relatively high mean (3.27) with 42.73% rating it as good or excellent, showing a positive perception. As for the ability to use CAT tools, a significant portion of students (37.54%) rated it as inadequate or poor. Terminology management received the lowest mean (2.56) with a majority of students (55.76%) rating it as inadequate or poor, indicating ineffective or deficient training. MTPE competence received the highest mean (3.54), with a large portion of students (51.13%) rating it as good or excellent, implying their confidence in MTPE skills. Many students (44.34%) rated their autonomy as average, with a significant portion (34.95%) rating it as inadequate or poor, indicating the need for enhancing their independence in learning future translation technologies.

Table 8

Level 3 Application: Students' frequency of using translation technology after training.

	Always	Often	Sometimes	Seldom	Never	Mean	SD
Q16: Frequency of application	13.59%	29.13%	31.72%	24.27%	1.29	3.29	1.02

The Application level (see Table 8) provides insights into how frequently students apply translation technology after training. 42.72% reported that they use translation technology regularly (either always or often) in their translation assignments or freelance tasks. 31.72% use it sometimes and 25.56% rarely or never use it after the training, indicating that the training did not significantly change students' behavior towards regular application.

DISCUSSION

The first research question explored the extent to which students perceive the translation technology training as effective. Overall, most students perceived the training as effective, indicating that it was well-received and beneficial. The study also found a significant change in students' attitudes towards translation technology after training, which is consistent with those of previous studies by Alotaibi (2014), Çetiner (2019) and Su and Li (2023).

As for resources and contents, although most students had access to computer labs, there was a notable lack of other crucial resources. This finding is consistent with the studies of Wang and Li (2021) and Sánchez-Castany (2023), who also noted financial constraints, including lab maintenance, licensed software and limited funding, remained a major challenge. On the institutional level, it could be incumbent to raise the awareness about the need to input more resources for the training (Cui, 2021). A significant portion of the students felt the contents should include more authentic cases and be aligned with the latest industry realities. This finding is echoed in the study of Khatim and Sir (2022). A possible explanation could be that the teacher, having limited contact with the industry (Sánchez-Castany, 2023), faced difficulties in adapting their teaching materials to the current market situation. Moreover, complex programing commands and codes in the textbooks could also be demotivating for undergraduates with non-technical backgrounds (Guo et al., 2024).

Concerning teaching and assessment methods, while classroom tutorials with Powerpoint slides remained the most common approach and were perceived as effective by most students, other teaching methods were reported either less inaccessible or less desirable. This could be attributed to the limited availability of alternative resources as discussed before. Students perceived group presentations and situated test as the most effective assessment means, revealing their preference for collaborative, interactive and practical approaches to assessment.

The second research question investigated the difficulties encountered by students in their learning process. Students were predominantly concerned with the insufficiency in authentic projects, hands-on practice and training hours, which underscore the gap between theoretical knowledge and practical skills. Although translation technology training entails learning complex systems, programs, software and processes, which requires ample time and extensive hands-on practice for students to develop proficiency, the current training duration appears to be insufficient.

The third research question examined how students rate their technological competences after the training. Although a considerable number of students were reported to be confident in the areas such as basic computer skills, information searching and MTPE, most students were concerned with their inept competences in CAT tools, terminology management and autonomy. The result might be slightly discouraging, as proficiency with CAT tools have long been regarded as essential for mastering translation technology (Kornacki, 2018). One possible explanation is that students were introduced to a wide range of tools without concentrating on the most widely used ones in the market, resulting in a superficial understanding and application. Furthermore, many students felt ill-prepared to learn

emerging translation technologies independently, as their knowledge acquired from the training was confined to "knowing what" rather than "knowing how, when and why" (Pym, 2013; Bowker, 2015). Teachers should adopt project-based, task-driven and problem-oriented teaching methods (Mohammed & Al-Sowaidi, 2023), which can create a discovery learning context where assignments and activities are deliberately designed to develop higher-order thinking skills (Ganapathy et al., 2017; Cheng & Wei, 2021). Such skills enable students to learn, select, analyze, compare, synthesize and critically evaluate emerging technologies and tools in their translation practice.

The last question probed into students' frequency of using translation technology after training. Although some students reported using translation technology regularly, others felt the training did not significantly influence their behavior. The finding is consistent with the study by Su and Li (2023), which revealed that most students do not utilize CAT tools regularly because the freelance projects they undertake are often small-scale and need minimal technological intervention. Besides, some students expressed a preference for pursuing careers outside professional translation after graduation (Hao & Pym, 2022; Su & Li, 2023), which could result in resistance to regular application.

CONCLUSION

Translation technology training is essential to prepare translators for the ever-evolving translation industry. This study evaluated the effectiveness of undergraduate translation technology training in China. The results showed that although most students perceived the training as effective, they were inhibited from deeper learning due to limited resources, insufficient duration, and constrained teaching methods. This study concluded that the training needs further improvements. It is necessary to reassess and revise the current translation curricula so as to develop students' technological autonomy.

The findings of the study have some implications. First, more resources should be provided to ensure equitable access and affordability of translation technology training (Li et al., 2024). Second, training duration should be extended by offering a cluster of modules in a more systematic manner, which could help to raise the weight of technology in the overall translation curricula (Wang & Li, 2021). This might be feasible by introducing basic modules on translation technology in the first and second years, followed by advanced modules in the third and fourth years. Third, greater emphasis should be placed on fostering students' autonomy. Teachers should begin by familiarizing students with easy-to-use tools before progressing to the latest and more complex CAT tools (Cui, 2019). This could ensure a smooth transition which reduces cognitive overload and technophobia. Moreover, the teachers should adopt blended learning to enhance student engagement, promote autonomy (Suyan & Soon, 2024), and provide a situated learning environment (Wang & Li, 2021) by integrating translation tools into standard coursework that aligns with real-world translation workflow, teaching tools involved in each relevant stage (Sanchez, 2023) and designing role-playing tasks (Liu & Kasuma, 2024) that simulate the professional division of labor. Most importantly, teachers should teach students how to learn and critically assess translation tools (Pym, 2013) to develop life-long autonomy.

It is important to acknowledge the limitations of the study. First, the depth of data might be affected, as it was collected solely through questionnaires without triangulation from other sources, such as teachers or program directors. Second, due to the challenges of data collection, the study did not address the fourth and fifth levels of Kaufman's model, which focus on macro-level institutional and societal evaluations and impacts.

We hope that the findings of the study will offer insights for improving undergraduate translation technology courses in China. The holistic model adopted in this study may also be applied to evaluating translation technology training in similar contexts. Future research could explore the topic from the perspectives of other stakeholders such as trainers and program administrators. It would also be valuable to examine the factors influencing students' reception and adoption of translation technology.

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