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Corresponding Author:
Supanee Thanakun, Division of Oral Diagnostic Science, College of Dental Medicine, Rangsit University, Pathum Thani 12000, Thailand
E-mail: supanee.t@rsu.ac.th

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Utilization and Satisfaction with Three Languages of Dental Terminology E-book

Jintanaporn Siripipat[1], Suchada Vuddhakanok[2], Kanyapak Rodjanarattanangkoon[3], Bantita Khananan[3], Nippich Chaowut[3], Oranee Lertdumrongthum[3], Ornwara Lerdthuwanon[3], Pakanut Puwachotpipat[3], Supanee Thanakun[4]

[1]Division of Pediatric Dentistry, College of Dental Medicine, Rangsit University, Thailand
[2]College of Dental Medicine, Rangsit University, Thailand
[3]Dental Student, College of Dental Medicine, Rangsit University, Thailand
[4]Division of Oral Diagnostic Science, College of Dental Medicine, Rangsit University, Thailand

Abstract

Objectives: With the rising number of Chinese residents in Thailand and Chinese becoming a global language, compelling messages and communication in healthcare are crucial for accurate information and optimal treatment. This pilot study investigated Thai dentists' utilization and satisfaction with the developed electronic "Three Languages of Dental Terminology (TLDT)" book.

Methods: Three hundred and thirteen dentists who graduated from the College of Dental Medicine, Rangsit University, were invited to the online survey using Google Forms. Demographic data, translation tool usage data, initial TLDT experience, and objectives in using TLDT were explored. TLDT utilization and satisfaction were assessed. Fisher's exact test and Pearson's Chi-Square were utilized to analyze the data.

Results: Eighty-eight (28.1%) dentists responded to the questionnaire. Respondents met foreign patients monthly, with Chinese patients being the most common group. Most dentists lacked Chinese fluency and relied on translation tools (68.2% use Google Translate). Dentists primarily used TLDT to translate Thai to English (53.4%) and English to Thai (42.0%). Thai, English, and Chinese usage patterns aligned with TLDT's goals, indicating successful implementation ($p<0.05$). Regarding utilization, TLDT was significantly associated with all objectives ($p<0.05$) except for spelling accuracy ($p=0.06$). Most respondents reported high satisfaction scores related considerably to finding words, word pairings, and text accuracy ($p<0.05$). Postgraduate levels respectively correlated with increased TLDT content satisfaction ($p=0.02$).

Conclusions: The TLDT e-book demonstrates promise as a valuable resource for health-care personnel, improving dental terminology communication in English and Chinese and might optimize dental care and postgraduate dental education in Thailand.

Keywords: Chinese, dental terminology, electronic book, English, Thai

Introduction

China's economic boom has propelled Mandarin into the world's second-most-spoken language.[1] An incidence of Chinese migrants seeking opportunities occupies Thailand's major cities. Their diverse motivations, from business ventures and education to lifestyle choices, highlight a growing need for effective communication, both verbal and non-verbal, in various sectors, including healthcare services.[2]

In the field of Dentistry, when Thai dentists meet Chinese-speaking patients, language barriers pose significant challenges. Dental clinics frequently visited by Chinese patients often lack the multilingual interpreters that large hospitals commonly provide.[3] The medical and dental history taking, treatment plan explanation, patient safety, and satisfaction are essential components that need to be clearly addressed. Failure to communicate adequately may cause misinterpretation, place patient health at risk, restrict treatment options, and may lead to litigation.[4] Interpreters, while helpful, can be misinterpreted due to the lack of knowledge of dental terminology.[5,6]

Adding another layer of complexity is the vast and specialized vocabulary of dental terminology. Existing resources in Thailand, like the "Thai Dental Terminology" book and an online version of the Thai-English glossary, provide a foundation but lack Chinese translations.[7] Developing the book "Three Languages of Dental Terminology (TLDT)" by our authors was a groundbreaking trilingual electronic book offering Thai, English, and Chinese translations.[8] The Thai terms originate from the book mentioned above. At the same time, the Chinese equivalents come from the "English-Chinese Dictionary of Stomatology," a bilingual dictionary focusing specifically on dental and stomatology terminology.[9] With over 3703 entries covering diverse topics, the electronic TLDT surpasses most bilingual resources and allows convenient searching for dental terminology in any of the three languages. TLDT, in the form of an e-book, comprised the key importance points for digital books in terms of accessibility, convenience, searchability, instant delivery, and cost-effectiveness. This innovative tool bridges the language gap in dentistry, promoting better communication, both speaking and writing, and ultimately, might improve patient outcomes and satisfaction.

However, this e-book hasn't been publicly tested yet. Therefore, this research aimed to explore its utilization and user satisfaction among Thai dentists who graduated from a private dental school, screening the way for further development and optimization of this valuable resource for bridging language barriers in dentistry.

Materials and Methods

The Rangsit University Ethical Committee, by the Declaration of Helsinki, granted this Ethical approval of the cross-sectional pilot study with reference number RSU-ERB 2023-014. Respondents identified as all Thai dentists who graduated from the College of Dental Medicine, Rangsit University, between 2010 and 2021, were invited and recruited to participate in the study. They were contacted through two main channels: direct phone calls and invitations via the "RSU GRADUATE" LINE group announcement. The Dean of the College of Dental Medicine and the LINE Official Account Administrator permitted us to obtain all contact information.

All participating respondents received the exact formal instructions and informed consent to ensure consistency. Questionnaires were employed as the research's primary data collection method and were collected entirely through online links. These links, sent via QR code, included four components: (1) a consent form with a study explanation; (2) a QR code for the Bookcaze application (Figure 1) and TLDT e-book; and (3 and 4) questionnaires presented in both Thai and English versions (Figure 2) which the respondents could either selected according to the language preference. Google Forms facilitated these questionnaires, which ensured respondent anonymity and data confidentiality. The TLDT e-book was hosted on the Bookcaze company website, and participating respondents were granted free access to download the application and use this free e-book. After downloading the application and signing in, the respondents browsed either the TLDT e-book in the “Medical Science” menu bar category or a “Free” store, then a PDF file of the “Thai-English-Chinese dental terminology” e-book could be downloaded and read or search words needed.

Researchers developed the research questionnaire, reviewed by three experts, and underwent content validity.[10] An item objective congruence index of 0.8 demonstrated acceptable content validity.[11] Item response formats included checklists, dichotomous scales, 5-point Likert scales (1 = least, 2 = few, 3 = moderate, 4

= much, 5 = most), and open-ended options for additional comments. The self-administered questionnaire comprised five sections, covering: Part 1: Demographic data (8 items); Part 2: Translation tool usage data (9 items); Part 3: Initial TLDT experience (4 items) and objectives in using TLDT (6 items); Part 4: TLDT utilization assessment (4 aspects); Part 5: TLDT satisfaction assessment (content and usage, four items each).

Six objectives in using TLDT were explored: finding words in other languages, finding synonyms, finding words that often appear together, checking text and spelling accuracy, and accessing other word information.

Questions for TLDT utilization assessment included:

1. To what extent would you use TLDT if you treated Chinese-speaking patients?
2. How necessary is a read-aloud function in TLDT?
3. How necessary are illustrations in TLDT?
4. How necessary are sentence examples in TLDT?

TLDT satisfaction was assessed in two areas: content and usage.

Content satisfaction was evaluated in four aspects:

1. Finding the searched word(s): Did users successfully find the word they were looking for?
2. Accuracy of meaning: Did the dictionary provide the correct definition for the word?
3. Variety of word choices: Were users offered alternative words or synonyms?
4. Trilingual understanding: Could users simultaneously see the word in Thai, English, and Chinese?

Usage satisfaction was investigated in four areas:

1. Search speed: Could users find words quickly and easily?
2. Symbol clarity: Were the app's symbols understandable and intuitive?
3. Font readability: Was the font size and style easy to read on the screen?
4. Word saving: Could users save and retrieve frequently used words?

A sample size calculation (95% confidence interval (CI), 5% margin of error) established a requirement of 271 responses, accounting for an anticipated 40% response rate.[12] Data collection spanned July-October 2023. All data was entered and analyzed using IBM® SPSS® Statistics version 29.0.1.0. Descriptive statistics (frequency, percentage, and median) were employed after the normal distribution was tested, while Fisher's Exact Test and Pearson Chi-Square tests including odd ratio (OR) explored relationships between objectives, utilization, and satisfaction.

Figure 1: QR Code for the Bookcaze application and TLDT e-book.

Figure 2: QR Code for the questionnaires presented in both Thai and English versions.

Results

Three hundred and thirteen RSU graduates were invited to participate in the study, and 88 responded (28.1% response rate). All respondents were Thai, with a slight female majority (54 females, 61.4% vs. 34 males, 38.6%). The respondents' ages ranged from 25 to 40 years, averaging 29. Most (84.1%) used Thai and English, while 9.1% used Thai for patient communication. Only five respondents (5.7%) were fluent in all three languages (Thai, Chinese, and English), while one respondent (1.1%) was able to speak Thai, English, and Korean. Two-thirds (68.2%) were pursuing dental specializations in various fields, 17.0% were already specialists, and 14.8% were general dentists.

Regarding respondents' work locations, 67.0% worked in the capital city, Bangkok, 12.5% in surround-

ing areas (Pathum Thani, Samut Prakan, Nakhon Pathom, Nonthaburi), and 20.5% in other provinces. Most of these (71.6%) worked in one setting (either private clinic, hospital, or university), 25.0% in two, and 3.4% in three settings. Eighty-five (96.6%) respondents encountered foreign patients monthly, with only three (3.4%) seeing no foreign patients. Fifty-two respondents (59.1%) met 1-5 foreign patients, eighteen (20.5%) met 6-10, and fifteen (16.9%) met more than 10. Regarding patients' race, 58.0% met Chinese patients, while 42.0% did not. Of those who saw Chinese patients, 82.4% treated 1-5, 15.7% treated 6-10, and only 1.9% treated more than 10 Chinese patients monthly.

Nevertheless, most respondents (93.2%) could not speak Chinese, while only 6 (6.8%) could. Google Translate was the most popular tool for communication, and it was used by two-thirds of respondents (68.2%). The remaining apps used were ChatGPT, MediBabble, and an online dictionary. Three respondents (two in the hospitals and one in a clinic) relied on interpreters. Learning, education, academic writing, vocabulary searches, and novel reading were performed apart from communication from the mentioned apps. English was the primary language used, with translation needed only for occasional interactions with Chinese patients. Twenty-eight respondents (70.0%) were truly satisfied with the mentioned apps, 10 (25.0%) were moderately satisfied, and 2 (5.0%) were somewhat satisfied. Most respondents (83, or 94.3%) preferred smartphones for these translation apps, while the remaining 5 (5.7%) used tablets and computers.

After using the TLDT e-book, most respondents (47, or 53.4%) used it for Thai-to-English translation, followed by English-to-Thai by 37 (42.0%). Furthermore, the median assessment scores of utilization for TLDT were high (Likert scale 4) across all four questions. Overall, the median satisfaction score with the content and usage of TLDT was also high (Likert scale 4). Therefore, we stratified the data according to the median score into two groups (least to moderate versus much to most) for further analysis.

Table 1 shows the statistically significant pattern of TLDT usage related to six objectives in using TLDT, obtained for Thai-to-English (according to the objectives shown consecutively in Table 1, OR=8.5; 95% CI 3.1, 22.8 $p<0.001$; OR=10.8; 95% CI 4.0, 29.4 $p<0.001$; OR=8.8; 95% CI 3.3, 23.6 $p<0.001$; OR=10.2; 95% CI 3.8, 27.5 $p<0.001$; OR=9.1; 95% CI 3.4, 24.2 $p<0.001$; OR=5.7; 95% CI 2.2, 14.7 $p<0.001$, respectively), and English-to-Thai (OR=4.8; 95% CI 1.8, 13.0 $p<0.001$; OR=8.2; 95% CI 3.1, 21.7 $p<0.001$; OR=4.0; 95% CI 1.7, 9.9 $p<0.001$; OR=4.1; 95% CI 1.6, 10.4 $p<0.001$; OR=3.8; 95% CI 1.5, 9.6 $p=0.01$; OR=3.2; 95% CI 1.3, 7.8 $p=0.01$, respectively). A similar pattern was also demonstrated with Thai-to-English-to-Chinese translation across all objectives ($p<0.05$).

Considering the relationship of interested research data, Table 2 shows the respondents' demographic data with TLDT utilization or satisfaction. Age, gender, workplace province, and workplace type had no statistically significant relationship with TLDT utilization or satisfaction. The only exception was the educational level, postgraduate, related to content satisfaction with the TLDT (OR=6.2; 95% CI 1.4, 27.5; $p=0.02$).

Table 3 shows that TLDT utilization was statistically significant with all six objectives in using the TLDT except spelling accuracy (according to the objectives shown consecutively in Table 3, OR=3.7; 95% CI 1.3, 10.6 $p=0.02$; OR=4.6; 95% CI 1.4, 15.3 $p=0.01$; OR=4.1; 95% CI 1.2, 13.6 $p=0.02$; OR=5.3; 95% CI 1.7, 16.3 $p<0.001$; OR=5.5; 95% CI 1.5, 20.6 $p<0.001$, respectively). Interestingly, the content satisfaction levels were significantly related to three objectives: finding words in other languages (OR=6.7; 95% CI 1.3, 34.7; $p=0.03$), finding words that often appear together (OR=7.8; 95% CI 1.1, 36.3; $p=0.04$), and checking text accuracy (OR=5.4; 95% CI 1.1, 27.8; $p=0.04$). A similar pattern was also revealed for usage satisfaction (OR=3.2; 95% CI 1.1, 9.4; $p=0.03$; OR=9.5; 95% CI 2.0, 44.5; $p<0.001$; and OR=3.4; 95% CI 1.1, 10.1; $p=0.03$, respectively).

Regarding unfound words in TLDT, 13 respondents (14.8%) reported encountering some (29 unfound words). Eight words were present in TLDT but were not found with the respondents' search terms. The remaining 21 unfound words were absent as well.

Discussion

This pilot cross-sectional study used an online questionnaire to investigate 88 Thai dentists' utilization and satisfaction with a Thai-English-Chinese dental terminology e-book. The results showed that the developed TLDT e-book is valuable for dentists and postgraduate dental students in Thailand. The e-book is easy to use and con-

Table 1: Relationship between the pattern of TLDT usage and objectives in using the TLDT.

		Find words in other languages		*p**	Synonym/Similar words		*p**	Words that often appear together		*p**	Accuracy of text		*p**	Accuracy of spelling		*p**	Other information about the word		*p**
		Least to moderate (n=34)	Much to most (n=54)		Least to moderate (n=46)	Much to most (n=42)		Least to moderate (n=48)	Much to most (n=40)		Least to moderate (n=38)	Much to most (n=50)		Least to moderate (n=37)	Much to most (n=51)		Least to moderate (n=50)	Much to most (n=38)	
Translate Thai to English	Least to moderate	26 (76.5%)	15 (27.8%)	0.00	33 (71.7%)	8 (19.0%)	0.00	33 (68.8%)	8 (20.0%)	0.00	29 (76.3%)	12 (24.0%)	0.00	28 (75.7%)	13 (25.5%)	0.00	32 (64.0%)	9 (23.7%)	0.00
	Much to most	8 (23.5%)	39 (72.2%)		13 (28.3%)	34 (81.0%)		15 (31.2%)	32 (80.0%)		9 (23.7%)	38 (76.0%)		9 (24.3%)	38 (74.5%)		18 (36.0%)	29 (76.3%)	
Translate Thai to Chinese	Least to moderate	28 (82.4%)	33 (61.1%)	0.06	34 (73.9%)	27 (64.3%)	0.36	36 (75.0%)	25 (62.5%)	0.25	29 (76.3%)	32 (64.0%)	0.25	27 (73.0%)	34 (66.7%)	0.64	40 (80.0%)	21 (55.3%)	0.02
	Much to most	6 (17.6%)	21 (38.9%)		12 (26.1%)	15 (35.7%)		12 (25.0%)	15 (37.5%)		9 (23.7%)	18 (36.0%)		10 (27.0%)	17 (33.3%)		10 (20.0%)	17 (44.7%)	
Translate Chinese to English	Least to moderate	31 (91.2%)	44 (81.5%)	0.36	42 (91.3%)	33 (78.6%)	0.13	43 (89.6%)	32 (80.0%)	0.24	35 (92.1%)	40 (80.0%)	0.14	34 (91.9%)	41 (80.4%)	0.22	46 (92.0%)	29 (76.3%)	0.07
	Much to most	3 (8.8%)	10 (18.5%)		4 (8.7%)	9 (21.4%)		5 (10.4%)	8 (20.0%)		3 (7.9%)	10 (20.0%)		3 (8.1%)	10 (19.6%)		4 (8.0%)	9 (23.7%)	
Translate Chinese to Thai	Least to moderate	29 (85.3%)	38 (70.4%)	0.13	37 (80.4%)	30 (71.4%)	0.45	39 (81.2%)	28 (70.0%)	0.32	31 (81.6%)	36 (72.0%)	0.33	29 (78.4%)	38 (74.5%)	0.80	44 (88.0%)	23 (60.5%)	0.01
	Much to most	5 (14.7%)	16 (29.6%)		9 (19.6%)	12 (28.6%)		9 (18.8%)	12 (30.0%)		7 (18.4%)	14 (28.0%)		8 (21.6)	13 (25.5%)		6 (12.0%)	15 (39.5%)	
Translate English to Thai	Least to moderate	27 (79.4%)	24 (44.4%)	0.00	37 (80.4%)	14 (33.3%)	0.00	35 (72.9%)	16 (40.0%)	0.00	29 (76.3%)	22 (44.0%)	0.00	28 (75.7%)	23 (45.1%)	0.01	35 (70.0%)	16 (42.1%)	0.01
	Much to most	7 (20.6%)	30 (55.6%)		9 (19.6%)	28 (66.7%)		13 (27.1%)	24 (60.0%)		9 (23.7%)	28 (56.0%)		9 (24.3%)	28 (54.9%)		15 (30.0%)	22 (57.9%)	
Translate English to Chinese	Least to moderate	27 (79.4%)	41 (75.9%)	0.80	35 (76.1%)	33 (78.6%)	0.81	36 (75.0%)	32 (80.0%)	0.62	31 (81.6%)	37 (74.0%)	0.45	30 (81.1%)	38 (74.5%)	0.61	39 (78.0%)	29 (76.3%)	1.00
	Much to most	7 (20.6%)	13 (24.1%)		11 (23.9%)	9 (21.4%)		12 (25.0%)	8 (20.0%)		7 (18.4%)	13 (26.0%)		7 (18.9%)	13 (25.5%)		11 (22.0%)	9 (23.7%)	
Translate Thai to English to Chinese	Least to moderate	34 (100.0%)	41 (75.9%)	0.00	45 (97.8%)	30 (71.4%)	0.00	45 (93.8%)	30 (75.0%)	0.02	37 (97.4%)	38 (76.0%)	0.01	36 (97.3%)	39 (76.5%)	0.01	48 (96.0%)	27 (71.1%)	0.00
	Much to most	0 (0.0%)	13 (24.1%)		1 (2.2%)	12 (28.6%)		3 (6.2%)	10 (25.0%)		1 (2.6%)	12 (24.0%)		1 (2.7%	12 (23.5%)		2 (4.0%)	11 (28.9%)	

*Fisher's Exact Test/Pearson Chi-Square tests

Table 2: Relationship between demographic data of the respondents and utilization and satisfaction of TLDT

Variables	Utilization (N=88)			*p**	Satisfaction of content (N=88)			*p**	Satisfaction of usage (N=88)			*p**
	Least (n=3)	Moderate (n=16)	Most (n=69)		Least (n=0)	Moderate (n=9)	Most (n=79)		Least (n=3)	Moderate (n=16)	Most (n=70)	
Age (years)												
< 29	1 (33.3%)	7 (43.8%)	31 (44.9%)	0.92	0 (0%)	3 (33.3%)	36 (45.6%)	0.48	1 (50.0%)	6 (37.5%)	32 (45.7%)	0.83
≥ 29	2(66.7%)	9 (56.2%)	38 (55.1%)		0 (0%)	6 (66.7%)	43 (54.4%)		1 (50.0%)	10 (62.5%)	38 (54.3%)	
Sex												
Male	3 (100.0%)	5 (31.2%)	26 (37.7%)	0.08	0 (0.0%)	3 (33.3%)	31 (39.2%)	1.00	1 (50.0%)	3 (18.7%)	30 (42.9%)	0.19
Female	0 (0.0%)	11 (68.8%)	43 (62.3%)		0 (0.0%)	6 (66.7%)	48 (60.8%)		1 (50.0%)	13 (81.3%)	40 (57.1%)	
Education												
General dentist	2 (66.7%)	1 (6.2%)	10 (14.5%)	0.09	0 (0.0%)	4 (44.4%)	9 (11.4%)	0.02	0 (0.0%)	3 (18.7%)	10 (14.3%)	0.27
Further study	1 (33.3%)	11 (68.8%)	48 (69.6%)		0 (0.0%)	5 (55.6%)	55 (69.6%)		2 (100.0%)	13 (81.3%)	45 (64.3%)	
Specialist	0 (0.0%)	4 (25.0%)	11 (15.9%)		0 (0.0%)	0 (0.0%)	15 (19.0%)		0 (0.0%)	0 (0.0%)	15 (21.4%)	
Province of workplaces												
Bangkok	2 (66.7%)	9 (56.2%)	48 (69.6%)	0.70	0 (0.0%)	5 (55.6%)	54 (68.4%)	0.62	1 (50.0%)	8 (50.0%)	50 (71.4%)	0.27
Perimeter	0 (0.0%)	2 (12.5%)	9 (13.0%)		0 (0.0%)	2 (22.2%)	9 (11.4%)		0 (0.0%)	2 (12.5%)	9 (12.9%)	
Other provinces	1 (33.3%)	5 (31.3%)	12 (17.4%)		0 (0.0%)	2 (22.2%)	16 (20.2%)		1 (50.0%)	6 (37.5%)	11 (15.7%)	
Workplaces												
Private Clnic	1 (33.3%)	9 (56.2%)	48 (69.6%)	0.47	0 (0.0%)	4 (44.4%)	54 (68.3%)	0.08	1 (50.0%)	9 (56.3%)	48 (68.6%)	0.73
Hospital	1 (33.3%)	4 (25.0%)	15 (21.7%)		0 (0.0%)	2 (22.2%)	18 (22.8%)		1 (50.0%)	5 (31.2%)	14 (20.0%)	
Private Clinic and University	1 (33.3%)	3 (18.8%)	6 (8.7%)		0 (0.0%)	3 (33.3%)	7 (8.9%)		0 (0.0%)	2 (12.5%)	8 (11.4%)	

*Fisher's Exact Test/Pearson Chi-Square tests

Table 3: Relationship between objectives in using TLDT and utilization and satisfaction with TLDT

The objective for using TLDT		Utilization (N=88)		*p**	Satisfaction of content (N=88)		*p**	Satisfaction of usage (N=88)		*p**
		Least to moderate (n=19)	Much to most (n=69)		Least to moderate (n=9)	Much to most (n=79)		Least to moderate (n=18)	Much to most (n=70)	
Find words in other languages	Least to moderate	12 (63.2%)	22 (31.9%)	0.02	7 (77.8%)	27 (34.2%)	0.03	11 (61.1%)	23 (32.9%)	0.03
	Much to most	7 (36.8%)	47 (68.1%)		2 (22.2%)	52 (65.8%)		7 (38.9%)	47 (67.1%)	
Synonym/Similar words	Least to moderate	15 (78.9%)	31 (44.9%)	0.01	7 (77.8%)	39 (49.4%)	0.16	13 (72.2%)	33 (47.1%)	0.68
	Much to most	4 (21.1%)	38 (55.1%)		2 (22.2%)	40 (50.6%)		5 (27.8%)	37 (52.9%)	
Words that often appear together	Least to moderate	15 (78.9%)	33 (47.8%)	0.02	8 (88.9%)	40 (50.6%)	0.04	16 (88.9%)	32 (45.7%)	0.00
	Much to most	4 (21.1%)	36 (52.2%)		1 (11.1%)	39 (49.4%)		2 (11.1%)	38 (54.3%)	
Accuracy of text	Least to moderate	14 (73.7%)	24 (34.8%)	0.00	7 (77.8%)	31 (39.2%)	0.04	12 (66.7%)	26 (37.1%)	0.03
	Much to most	5 (26.3%)	45 (65.2%)		2 (22.2%)	48 (60.8%)		6 (33.3%)	44 (62.9%)	
Accuracy of spelling	Least to moderate	12 (63.2%)	25 (36.2%)	0.06	6 (66.7%)	31 (39.2%)	0.16	10 (55.6%)	27 (38.6%)	0.28
	Much to most	7 (36.8%)	44 (63.8%)		3 (33.3%)	48 (60.8%)		8 (44.4%)	43 (61.4%)	
Other information about the word	Least to moderate	16 (84.2%)	34 (49.3%)	0.00	8 (88.9%)	42 (53.2%)	0.07	14 (77.8%)	36 (51.4%)	0.06
	Much to most	3 (15.8%)	35 (50.7%)		1 (11.1%)	37 (46.8%)		4 (22.2%)	34 (48.6%)	

*Fisher's Exact Test/Pearson Chi-Square tests

tains a comprehensive list of Thai, English, and Chinese dental terminologies. Dentists and postgraduate dental students are satisfied with the TLDT e-book and believe it helps improve communication with foreign patients or writing for academic purposes.

Because of different types of communication, such as written, verbal, or non-verbal communication[13], using TLDT via verbal communication was not prominent in this study. Although most respondents encountered foreign patients monthly, with Chinese patients being the most common, most dentists cannot speak Chinese. English was the primary language used for occasional interactions with Chinese patients. Google Translate is the most popular translation tool, similar to the previous studies.[14,15] Even though the number of dentists using Chinese translation was relatively small, from our results, the pattern of dentist usage from Thai to English, English to Thai, and Thai to English to Chinese revealed a significant relationship to the six objectives of TLDT. This study, therefore, highlights the need for trilingual translation tools for dental terminology.[16,17]

Notably, an interesting finding emerged. Dentists pursuing specialization showed a statistically significant link with higher content satisfaction. Those used them for communication, learning, and academic writing, similar to the published data.[18] Dentists in postgraduate programs are likelier to write educational documents, leading to greater TLDT utilization and satisfaction. This result aligns with previous researches suggesting specialists seek educational resources like e-books for their specialized terminology and complex information needs.[19-21]

Usage patterns involving Thai-English, English-Thai, and Thai-English-Chinese translations were significantly associated with all six TLDT objectives. This result suggests that common usage aligns closely with the e-book's intended purpose. This pattern strongly correlated with key objectives like finding words in other languages, identifying synonyms, and checking text accuracy. Therefore, the e-book primarily serves as a cross-language dental terminology lookup tool between Thai and English.

This study also explored the relationship between TLDT objectives, utilization, and user satisfaction. While utilization was significantly linked to five out of six objectives (excluding spelling accuracy), user satisfaction only correlated with finding words in other languages, identifying words that often appear together, and text accuracy. This suggests that the equivalent finding of the core aim of cross-language terminology lookup and proper word usage primarily drive satisfaction.[18] Additionally, the closer match between utilization and objectives than satisfaction and objectives suggests that respondents used the TLDT effectively for its intended purpose.

Limitations of this preliminary study include a relatively small sample size and a low response rate (28.12%) compared to the expected 40%.[12] This could be due to recent concerns about phone scams in Thailand[22] and difficulty reaching respondents with outdated contact information. Future research could include interpreters or wider dental professional clinicians and utilize diverse contact methods to improve participation and generalizability of the study. Administrations of the questionnaire to calculate test-retest reliability should be performed to strengthen the findings. A few respondents reported encountering unfound words in the TLDT e-book, suggesting potential areas for improvement. The TLDT itself includes incomplete three-language coverage, leading to missing search terms. Additionally, respondents suggested improvements like adding pronunciation, pictures, vocabulary usage examples, translation explanations, and categorizing word lists based on dental departments or difficulty. Further development and public testing are needed to refine and optimize these tools for maximum impact.

Conclusions

This study suggests that multilingual e-books like TLDT can significantly improve the accessibility of dental terminology in Thai, English, and Chinese. The TLDT e-book is a helpful tool for enhancing communication of dental terminologies between Thai, English, and Chinese in Thailand. The e-book is easy to use and contains a comprehensive list of Thai, English, and Chinese dental terminologies. Dentists and dental students who participated in the study reported that they are satisfied with the TLDT e-book and believe it helps improve communication with foreign patients and the writing of academic papers.

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Conflicts of Interest

The authors declare no conflict of interest.

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