

Genre Analysis of Experiment-based Dental Research Article Abstracts: Thai and International Journals

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ABSTRACT

Academic dental abstracts play a pivotal role for readers to grasp the essence of scientific development in the world of dentistry as they particularly address on key information designated by dental researchers. However, the generic structures of Thai and international dental research article abstracts have not been investigated as a means of pedagogical implication in terms of English for Specific Purposes (ESP). This study aims to investigate generic structures of Thai and international dental research article abstracts and compare the results with respect to the linguistic features found within the two datasets. Two separate datasets of 120 abstracts were randomly selected and compiled from dental journals certified by Thai-Journal Citation Index (TCI) and Impact Factors (IF), respectively, were analysed by Kanoksilapatham's (2013) BPMRD nomenclature of abstract analysis. A set of linguistic features based on Pho's (2008) and Hyland's (2004) frameworks also reported to show linguistic variation in dental research article abstracts between Thai and international writers. The data shows that Move B is apparently disregarded by Thai writers while the others are comparatively similar. Regarding linguistic features, objective writing is more emphasised by Thai writers through the omission of self-reference pronouns and the lack of modalities. As international publication is a milestone for professional success in higher education, the results from this study can stress on a means of developing writing pedagogy that can be globally used within the academic discourse of dentistry.

Keywords: genre analysis; abstract writing; dentistry; linguistic analysis; English for specific purposes

INTRODUCTION

Research article abstracts function as a key to successful submission to reputable journals. Abstracts facilitate readers to understand the gist of academic content by abridging the whole content (Rowley 1988, Swales 1990). One of the most challenging aspects of abstract writing is the tension between lexical choices and the limited space to maximise text comprehension (Hartley 2002, p. 332). Moreover, the lexical choices included in abstracts ought to be searchable and readable through abstracting and indexing services (Lancaster 1991, Rowley 1988).

Based on genre analysis, abstracts are considered as either a sub-genre of the research article (RA) genre (Swales & Feak 2009), or as an independent genre of RA itself due to its unique rhetorical structure (Biber & Conrad 2009). This present study considers abstracts as a specific genre because of its specific Background, Purpose, Methodology, Results and Discussion (BPMRD) pattern, as discussed by Kanoksilapatham (2013). The BPMRD pattern has been globally accepted regarding RA abstracts, however; it verges on ambiguity in relation to the generic structures of academic writing from the dental research community (Basturkmen, 2012). Though universal instructions for abstract writing have been suggested by commercial handbooks, each discourse community has different means to achieve “communicative purposes” (Swales 1990). Moreover, a number of research article abstracts written by Thai dental researchers were limited due to their author’s English language

proficiency (Sinlarat 2004). This study aims to investigate the generic structures of Thai dental research article abstracts (TDRAAs) and international dental research article abstracts (IDRAAs). As a result, this comparative study aims to highlight the similarities and differences regarding move frequency, move sequences and linguistic features that can help Thai dental writers to display their work effectively through abstract writing.

LITERATURE REVIEW

Generic structure of writing genres can be investigated by move analysis which is grounded upon understanding a particular text segment as “a discursual unit that performs a coherent communicative function” (Swales 2004), while the unit discussed is constructed on linguistic features signalling the content of discourse it contains (Nwogu 1997). Move analysis was developed from Swale’s (1990, 2004) framework that has since been applied to various fields of journal articles, as can be seen from cited works such as Bhatia’s (1993) analysis of business letters or Kanoksilapatham’s (2005) research on rhetorical structures in biochemistry journals. Besides, abstracts across disciplines have been successively analysed using Swale’s concept, and organizational pattern differences are addressed (Salager-Meyer 1990, Nwogu 1997, Samraj 2002, Hyland 2004, Cross & Oppenheim 2006, Kanoksilapatham 2009, 2013, 2015, Tseng 2011, Pasavoravate 2011, Saeew & Tangkiengsirisin 2014, Eak-in 2015). For instance, Samraj (2002) compared twenty abstracts each from the disciplines of wildlife behaviour and conservation biology through move analysis and comparing the linguistic features between the disciplines. The results showed different number of moves and interpersonal metadiscourse (i.e. hedges and first-person pronouns) employed by each discipline. Interestingly, conservation biology abstracts were prone to include more subjectivity than wildlife behaviour abstracts. Despite being relatively close academic disciplines, the difference of rhetorical organizations found within two corpora apparently underlines the significance of exhaustive analysis for each academic discipline. When we analyse a specific discipline through move analysis, we can learn its ‘precise’ generic structure which is useful pedagogically.

As for medical science, Zhao and Wu (2013) investigated one section of medical RAs and conducted a comparative genre analysis on abstracts between Chinese and English native speakers. Based on 100 abstracts, with half sampled from an international journal (*Lancet*) and the other half from a local journal (*Chinese Medical Journal*), the results revealed that Chinese writers had a propensity to make greater use of a passive voice and avoid elaborating on the research study background as well use of first-person pronouns. Salager-Meyer (1990) investigated abstracts from both medical text-types and basic research-types that appeared in thirty-seven medical journals and found that only half (52%) of the abstracts were structurally written, suggesting that revision of pedagogical strategies for writing are needed for medical sciences. Salager-Meyer (1992) further found that the rhetorical organizations between medical text-types and basic research-types were stylistically different because the former group tended to depend more on modality, hedges and the selection of tenses. These studies underline the significance of conducting more genre-based research on medical sciences from a holistic perspective, for example macro-level (move analysis) and micro-level (linguistic features). Considering both levels, Saeew and Tangkiengsirisin (2014) studied the generic structure of RA abstracts in the field of environmental science to offer pedagogical insights for genre-based writing and reading instruction. They selected twenty-five RAs from each of the well-established journals used in the research, such as *Water Research*, *Journal of Environmental Sciences*, *Waste Management and Research*, and *Bioresource Technology*. They used Hyland’s (2004) five-move model and found that environmental science RA abstracts were conventional (I-P-M-Pr-C), but the Introduction section was identified in only

52% and considered optional, while M, Pr and C had the most cyclical moves. In addition, they also studied linguistic features (tense markers, deictic items, noun phrases) appearing in each move. Though the findings substantiate the fact that scientific RA abstracts comprised of five moves, the scope of linguistic features explored throughout the analysis was rather unclear. Overall, it is established that generic patterns of abstracts found across disciplines are diverse to a certain degree.

METHODOLOGY

Two datasets representing the genre of RA abstracts of Thai and international dental journals were compiled separately. Each dataset was then analysed by Kanoksilapatham's (2013) BPMRD nomenclature of abstract analysis based on Swales' CARS model (1990, 2004). Co-occurring sets of linguistic features representing each move from the analysis were also reported to address the differences, if any, between each dataset.

THE DATASETS

Two comparable datasets were constructed for this present study. The first dataset consisted of a randomised set of 120 Thai dental research article abstracts (TDRAAs), officially issued by Thai Journal Citation Index (TCI) and distributed by dental schools in Thailand: *Chulalongkorn University Dental Journal (CUJ)*, *Mahidol Dental Journal (MDJ)*, *Chiang Mai Dental Journal (CMJ)*, *Khon Khaen Dental Journal (KKJ)*, *Srinakharinwirot University Dental Journal (SWU)*, and *Songklanakarin Dental Journal (SDJ)*. A randomised sample of 120 international dental research article abstracts (IDRAAs) were drawn from the top five leading international dental journals based on their impact factor (2016) as shown in the ISI Web of Science database: *Journal of Dental Research (JDR)*, *Oral Oncology (OO)*, *Dental Materials (DM)*, *Journal of Clinical Periodontology (JCP)* and *Journal of Endodontics (JOE)*. Both datasets were published and printed between 2012 and 2016.

For the abstract criteria, both datasets comprised only experiment-based dental research abstracts from original contribution sessions of each journal. The number of words used in each abstract ranged from 200 to 300 words. TDRAAs were written by Thai dental students who had studied in Thai dental school international programs, whereas IDRAAs were written by international dental researchers. All the Thai dental students' demographic data was collected to affirm their identity.

DATA ANALYSIS

Dental research abstracts fall into texts within the context of academic discourse where schematic knowledge of dentistry insights was predominantly needed. To conduct move analysis for abstracts, moves were thus identified by the top-down approach suggested by Lieungnapar and Todd (2011), while the identification was subsequently supported by scrutinising the linguistic features (Swales 2004). Kanoksilapatham's (2013) BPMRD generic structure for abstracts was used to reflect the nature of scientific abstracts that is conventionally employed in international journals. To explore more of the linguistic features, Hyland and Tse's (2005) metadiscourse and Pho's (2008) linguistic realizations were referred to as part of the scope of linguistic perspective.

As the move identification was based on individual judgment, another coder specialising in, or with expertise in the corresponding academic field was used to reduce the degree of subjectivity throughout the study (Bhatia 1993). The coder had achieved a PhD from a U.K. university and has worked as a lecturer at a Thai university for five years. The

coder was trained for the coding system as detailed in the coding protocol and where required clarified any disagreements in the move identification. Thus, the coder independently identified moves from 25% of each dataset (sixty randomised DRAAs) (Kanoksilapatham, 2005), and returned their analysis to the researcher for the agreement rate comparison. To compare the results of the inter-coder reliability, Cohen’s kappa was used to calculate if there was a statistically significant difference between the researcher and coder.

RESULT

MOVE ANALYSIS

This section begins with the agreement rates of the two coders, followed by the results gained from the move identification. Some examples are extracted to illustrate how linguistic features contribute to the move identification. To begin, Table 1 shows that the agreement rate of move identification by the two coders was high (97.62%). In addition, Cohen’s kappa analysis is at 0.938 shows that the inter-coder reliability is at an excellent level because the value was higher than 0.75.

TABLE 1. Inter-coder reliability between two coders

Moves	Coded Units	Agreement	Disagreement	Percentage
Background	15	14	1	93.34%
Purpose	27	27	0	100%
Methodology	29	29	0	100%
Result	30	29	1	96.67%
Conclusion	25	24	1	96%
Total	126	123	3	97.62%

MOVE IDENTIFICATION

Rhetorical moves not only act as constituents of generic structure represented in the IDRAAs and TDRAAs, but also consist of linguistic features frequently used by writers in dental communities. All rhetorical moves are identified as B (Background), P (Purpose), M (Methodology), R (Result), and D (Discussion). Linguistic features are covered as follows: Tense, Voice, Modal auxiliaries, Epistemic and Attitudinal words, Self-reference words, Reporting verbs, Anticipatory “it” and Existential “there”.

MOVE FREQUENCY

Comparing the two datasets of 120 TDRAAs and 120 IDRAAs based on Kanoksilapatham’s (2013) BPMRD rhetorical structure, the researcher divided the moves into optional, conventional and obligatory categories. A particular move is deemed optional when the frequency is below 60% of the corpora while it is deemed conventional if the frequency is higher than 60%. Obligatory moves are identified when its frequency is found in 100% of the corpora.

TABLE 2. Frequency of the occurrences of moves in IDRAAs and TDRAAs

Moves	Total Move Occurrences: TDRAAs (%)	Total Move Occurrences: IDRAAs (%)
Background	25.8	60.9
Purpose	99.1	94
Methodology	95.8	92
Results	97.5	100
Discussion	90	96.9

BACKGROUND MOVE

A Background move, or Move B, is usually located in the first sentence of the abstracts to establish contexts, background research knowledge, the research significance as well as the research gap for researchers to explore. It is found in 25.8% and 60.9% of the TDRAAs and IDRAAs, respectively. Present simple and present perfect tenses are commonly used in this move to show the recent findings that contribute to generalisable facts related to dental sciences. However, past simple tenses can be seen in a few cases from both IDRAAs and TDRAAs to highlight the prominent history of dental sciences.

The human papillomavirus (HPV) is an important cause of some head and neck squamous cell carcinomas (HNSCCs), but its role in cancer of the lateral tongue is debatable. (OO: 17)

Boesenbergia pandurata has been documented to possess the antimutagenicity and cytotoxicity on a variety of cancer cells but little is known about its apoptotic inductive potential. (MDJ: 31)

Simplified periodontal therapy might be a pragmatic strategy for public health programmes targeting Indigenous Australian adults. (JCP: 14)

At present, there are increasing number of patients receiving oral anticoagulant and/or antiplatelet drugs owing to their systemic diseases who require dental extractions. (KDJ: 2)

Of the most intriguing despite its small quantity, is the appearance of there-clause (1/120) in TDRAAs, while there are none in IDRAAs. In addition, modal auxiliaries can be found among IDRAAs while there is no use of modal auxiliaries in TDRAAs. The use of modal auxiliaries demonstrates the writers' personal evaluation based on various degree of confidence, whereas the use of there-clause signifies the objective utterance by which the existence is only at the centre of attention.

PURPOSE MOVE

Purpose move, or Move P, is found in 99.1% and 94% of the entire corpus of TDRAAs and IDRAAs, respectively. Move P is considered conventional for both datasets. The formulaic sequences are frequently found through reporting verbs and deictic markers “the” to highlight the contribution of each research study. Phrases such as “the aim of”, “the purpose of” and “this study” are frequent collocations for Move P.

This study assessed the impacts of CECs on instrumentation efficacy and axial strain responses in maxillary molars (JOE: 1)

The objective of this study was to investigate the mesio-distal tooth width of Bangkok residents from 1972 to 2008. (MDJ: 10)

The purpose of this study was to evaluate the clinical and radiological findings of elongated styloid processes that appear in panoramic images of the Thai population over 20 years of age. (CDJ: 1)

There are some cases of individual involvement in the experiments (*we, the authors, researchers*) in IDRAAs. The frequent use of first-person pronouns found in IDRAAs are opposed to Hyland's (2009) statement that scientific writing is mostly written with the disappearance of the writers' identity. However, there is no evidence of the singular first-person pronoun “I” being used in the two datasets, which could imply that collaboration between co-researchers is represented through the plural form of pronouns.

We assessed the cost-effectiveness of retaining FI molars via periodontal treatments versus replacing them via implant-supported crowns (ISCs). (JCP: 11)

We sought to investigate whether there is evidence of field cancerization in patients with oral cavity squamous cell carcinoma (OSCC) enrolled in a betel quid chewing area. (Oral Oncology: 16)

Regarding embedding strategies, IDRAAs have variations through either the use of infinitival phrases (bracketed below) or prepositional phrases (underlined below), while there is no embedding strategy employed in TDRAAs. This strategy not only highlights a means to give details within the limited space provided for abstracts, but it also suggests grammatical dexterity regarding syntactic structures nested by international writers of IDRAAs (Saeew & Tangkiengsirisin 2014).

To evaluate failure loads of teeth restored [by] use of alumina-coping, and to assess the effects of different amounts of residual tooth structure and different cements, standardized artificial aluminol copings were fabricated on seventy-two molars. (DM: 21)

Formulaic sequences frequently used in this move are noticeable since the move is considered conventional in both datasets. TDRAAs frequently use formulaic sequences like; “this study was to” (43); “the purpose of this study” (20); “the aim of this” (12); and “the objective of this study” (11). While IDRAAs frequently featured formulaic sequences such as; “this study was to” (27); “the aim of this” (16); “the purpose of this study” (8); “this study aimed to” (8); and “the objective of this study” (4). IDRAAs more frequently employed phrases driven by the use of first-person pronouns like “we investigated” (5) and “we aimed” (4).

Analysing the formulaic patterns found in both datasets can reveal the frequently used deictic terms and reporting verbs. The use of “this” and “the” could imply the writers’ attempt to integrate the focus of research study to the body of the abstract. This strategy is acknowledged in narratology where determiners are used to decrease the ontological distance between the narrator and narratee, for the case of “this” and, vice versa, to increase the distance for “that” (Semino 1997).

It should be noted that dental journals have fewer inquiry types when compared to softer disciplines, as found in the previous studies by Suntara and Usaha (2013), Pho (2008) and Santos (1996). Throughout Move P, the writers were inclined to narrow down to four lexical choices as follows; “study”; “purpose”; “aim”; and “objective”. Regarding reporting verbs, both datasets tended to use similar lexical choices, albeit with different occurrences, such as “compare”, “investigate”, “aim”, “evaluate” and so forth (see Tables 3 and 4 below). When compared to TDRAAs, the semantic complexity of IDRAAs could be reflected through the verb “evaluate”, which is deemed higher-order thinking in Bloom’s cognitive domain (Anderson et al. 2001).

TABLE 3. Occurrences of Frequent Terms in TDRAAs

Deictic Terms	Inquiry Type	Reporting Verbs (base form)
This (66)	study (53)	compare (26)
The (43)	purpose (21)	determine (18)
	aim (13)	investigate (15)
	objective (10)	study (10)
		aim (8)
		evaluate (6)
		examine (5)
		assess (3)
		analyze (2)

TABLE 4. Occurrences of Frequent Terms in IDRAAs

Deictic Terms	Inquiry Type	Reporting Verbs (base form)
This (28)	study (62)	evaluate (26)
The (22)	aim (28)	investigate (21)
	purpose (9)	aim at/to (15)

objective (6)	assess (10)
aims (2)	compare (10)
	determine (8)
	test (4)
	examine (3)
	study (3)
	explore (2)

METHODOLOGY MOVE

The Methodology move, or Move M, elaborates the research study procedures and highlights the entities of experiment-based research methodology in the dental sciences. This move is considered conventional because the move frequency for TDRAAs and IDRAAs are 92.00% and 95.84%, respectively. In Method move, there are a few cases of cyclical moves in TDRAAs and IDRAAs occurring together with Move R, which is supported by the findings of Santos (1996), Samraj (2002) and Pho (2008). However, they are still considered to be rare (less than 1%) compared to the previous findings. It could be said that the cyclicity of Move M may be used to abridge the research complexity through reappearing patterns and sporadic occurrences of moves (Kanoksilapatham 2013).

Alleles for each AXIN2 marker were tested for transmission distortion with clefts by means of the Family-based Association Test. (M) // We observed an association with SNPs rs7224837 and all clefts in the combined populations ($p=0.001$), and with SNPs rs3923086 and cleft lip and palate in Asian populations ($p=0.004$). (R) // We confirmed our association findings in an additional 528 cleft families from the United States ($p<0.009$). (R) // We tested for gene-gene interaction between AXIN2 and additional cleft susceptibility loci. (M) // We assessed and detected AXIN2 mRNA and protein expression during murine palatogenesis. (R) // In addition, we also observed co-localization of AXIN2 with Irf6 proteins, particularly in the epithelium (R). // (JDR: 24)

As can be seen from the extract, the research methodology complexity is condensed due to the limited space (Pho 2008) and is dissected into multiple procedural steps, followed by subsequent results from each procedural step (M-R-M-R). The occurrence is seen once in IDRAAs where Moves M and R are remarked by the pronoun “we” to indicate the borderline of each move.

As with tense and voice, the Methodology move explicitly uses past simple tenses and passive voice. Past tense is employed to recount the research method procedure implemented in the study. The use of past tense is also shifted into the passive voice. Active voice, which is used to underline the significance of the “actor” in a clause, is rarely found in IDRAAs; however, both datasets generally use passive voice to display impersonal involvement, as well as to highlight the objects that received the treatment or objectification (Halliday & Martin 1993). By doing so, readers are inclined to focus on a means of implementation, application, selection or preparation throughout the research method section. It could be inferred that the writers attempt to remain as objective as possible throughout Move M.

The labial surfaces of forty bovine incisor crowns were ground flat, exposing dentin. (CDJ: 4)
Fourteen human canines were prepared according to be a standardized, conventional endodontic treatment protocol and filled with the HEC/calcium silicate sealer. (JOE: 4)

None of the modalities are used in Move M in either dataset. It is relevant to Pho’s (2008) results that first-person pronouns are rarely addressed as the subjects of the clauses as there are only eight cases, which are only found in IDRAAs. Though the first-person pronouns could be seen in previous studies (Pho 2008, Martinez 2001, Saeew & Tankiengsirisin 2014), the first-person pronoun “we” is primarily employed as a

representation of a particular group of dental researchers. The following excerpt shows how first-person pronouns were used in IDRAAs.

We assessed general health, smoking and alcohol drinking habits, use of alcohol-containing mouthwash and periodontal status (community periodontal index of treatment needs). (OO: 12)

RESULT MOVE

The Result move, or Move R, presents significant findings, numeric results and verbal reports based on instigated research methodologies. This move is considered conventional (97.50%) and obligatory (100%) in TDRAAs and IDRAAs, respectively, and is the most frequently found compared to the other moves. Within this move, opening nouns and reporting verbs within the two datasets are relatively similar. However, self-reference words are rare in IDRAAs and there are none in TDRAAs. This is similar to Pho's (2008) findings where the use of self-reference words were uncommon in Move R as it focuses the researchers' attention on facts and figures. Unlike Hyland's (2009) findings, no uses of the singular "I" were found in Move R in either the IDRAAs or TDRAAs, indicating that they prefer to use "we" as a group representative. While social scientists prefer to include their identity in writing, dental writers exclude theirs and prefer to report the results objectively. The uses of the self-referential pronoun "we" in IDRAAs are seen infrequently, as follows.

We found that apically directed travel of the irrigant was caused by disruption of the surface tension at the solution-air interface. (JOE: 16)

We observed increased ALK activity in late-stage human OSCC tumors and invasive OSCC cell lines. (OO: 3)

*In addition, **the authors** identified the molecular circuitry at different stages of tooth development. (JDR: 3)*

One of the foregrounding features found in Move R is the explicit use of that-complement clauses (Hyland 2004, Pho 2008) which demonstrate "promotional aspects" for abstract writing (Hyland & Tse 2005). By using that-complement clause, the writers highlight what is considered vital and adhere their evaluation and judgment with an attempt to convince readers to rely on their findings and that they are contributing to dentistry knowledge. It should be noted that that-complement clause normally submerges in other moves of abstracts (Pho 2008); however, it is fleetingly found in all moves of the present study. It could be said that the discourse community in dental sciences is different as such variations regarding syntactic features can be found in both datasets. The following examples show that both Move R of TDRAAs and IDRAAs are conventionally written through that-complement clause.

*The results from the present study **demonstrate that** an osteoporotic condition significantly increases alveolar bone height loss, and that the therapeutic effects via bone-targeting systems... (JDR: 16)*

*Majority **indicated that**, among all laboratory procedures, posterior teeth arrangement was the most difficult (82%), most time-consuming (93%), and most needing an aiding device (81%). (CDJ: 7)*

*The results **show that**, five major learning themes were identified similarly for students. (SWU: 15)*

Another syntactic structure found in Move R is to use dummy "it" as subject. This is one of the markers found in Hyland and Tse's (2005) metadiscourse where the writers diminish their own identity into an abstract entity. The abstract entity, mostly inanimate objects, acts as a human and conveys the writers' consciousness through the use of the general subject as "it". This is one of the means to hide the writers' identity for the purpose of

objectifying clauses uttered. Similarly, both datasets usually use a dummy “it” to conceal the writers’ identities where their results evaluation becomes more detached.

It was found that the flexural modulus increase (sic) with an addition of the glass fibers. (CMJ: 9)
For the pattern of resin penetration into enamel during bracket bonding procedure, it was found that subgroups without liquid resin represented less penetration of resin than those with liquid resin. (CDJ: 10)

Another distinctive feature found in TDRAAs was tense discrepancy of the embedded verb in that-clause and the reporting verb [CMJ: 9]. The discrepancy is found in almost 10% of TDRAAs (100 out of 120) while none were found in IDRAAs.

Regarding tense usage in Move R, Santos (1996) and Pho (2008) found that Move R was eminent with the use of past simple tense to elaborate previous studies to which the results were compared and contrasted against [CMJ: 10]. In this study, the past simple tense is used in almost 100% of the TDRAAs and IDRAAs, affirming that this move is overwhelmed by the past narrative.

The results suggest that tumor-derived or immune factors result in the accumulation of phenotypically and functionally diverse populations of CD11b+Gr-1+ cells in mice with oral squamous cell carcinoma. (OO: 4)
The study provides tentative evidence that SES may influence levels of resources such as social support and SOC, which mediate stress and in turn may influence subjective oral health outcomes. (JDR: 11)

Though small in quantity, present tense can be found as shown in [OO:4] and [JDR:11]. This gives readers the impression that the results are establishing new generalisable knowledge. Santos (1996) addressed that the past simple tense is used to signify narrower claims of research results, while present simple tense was used to establish an indisputable argument. In other words, when a text uses the present tense, readers perceive that the utterance is factual, naturally-occurring, habitual and current. The rarity of present simple tense could be seen as another variation, but dental researchers are inclined to use more of the past simple tenses to straightforwardly report the results.

DISCUSSION MOVE

According to the percentage of move frequency, the Discussion move, or Move D, is conventional in both IDRAAs (96.90%) and TDRAAs (90.00%). Opening nouns found in this move are “the study[ies]” and “the results” at the beginning of this move. However, the former opening nouns are more frequently seen in TDRAAs while the latter are more frequently seen in IDRAAs. The following examples demonstrate a means of using such discourse markers.

The results indicate that the modulation of autophagy in P-PDLSCs may provide a novel therapeutic strategy to improve periodontal therapy (JCP: 8)
The study showed that the amount of heavy metals and arsenic in orthodontic elastomeric chains of clear, yellow and pink color... (MU: 37)

Though it is common for writers to repeat references like “paper” and “article” (Suntara & Usaha 2013), these words are rarely used in the datasets as shown in the present study. Whilst those words represent a whole picture of the article, dental researchers opt to avoid those words and focus on the results or findings that were gained from the experiments. Lexical preferences through the opening nouns, such as “results”, “findings” and “conclusion” spell out the differences between soft and hard disciplines.

*In conclusion, **this study** demonstrated that pterostilbene caused autophagy and apoptosis in human oral cancer cells, suggesting that pterostilbene could serve as a new and promising agent for treating human oral cancer. (Oral Oncology: 10)*
*These **findings** provide initial support for health literacy as an important determinant of the meaningful use and cost of oral health care (JDR: 17)*
*The **results** showed only vascular endothelial growth factor was significantly related with clinical attachment level and HbA1c. (SWU: 6)*

Another linguistic feature found in the Discussion move is the use of self-reference pronouns such as “we” or “our” in IDRAAs. According to Hyland (2003), frequent use of self-referential pronouns usually occur at the beginning and the end of an abstract to achieve the stance of self-promotion. Pho (2008) also found the use of self-referential pronouns in the Discussion move of abstracts was to present the writers’ individual judgment. However, no use of self-referential pronouns were found in the TDRAAs, implying a lower level of self-promotion among the Thai writers when discussing their results. Rather, they were inclined to address research implications objectively as follows.

***It might therefore be** useful for enhancing the aesthetic appearance of full-contour zirconia restorations made from this material. (DM: 9)*
***It appears to be** an alternative to MTA as an endodontic biomaterial offering several advantages. (DM: 17)*
*As the results, **it was found that**, for the population of Mueang Khon Kaen District, the proportions of maxillary lateral incisor to maxillary central incisor on the left and right sides related to 70% RED, and shape of maxillary incisors were similar to square. (KDJ: 14)*

Similar to Move R, that-complement clauses are linguistic features of Move D. The clauses co-occur with persuasive verbs such as “suggest”, “demonstrate”, “recommend”, “indicate”, “conclude” and “show” as listed below. The highest co-occurrence verb found was “suggest” which was found in both IDRAAs and TDRAAs.

*Based on these results, we **conclude that** the serum scaffold can promote efficient repair of large bone defects, but the combination with BM-MSCs accelerates this process, increasing significantly the amount and quality of bone formed. (JCP: 6)*
*These findings **suggest that** composite resin with a bonding agent over MTA can be restored almost immediately after MTA mixing during a single visit. (JOE: 19)*
*Results **suggested that** all fluoride varnishes used are efficiently initiate the remineralization in advance artificial enamel caries... (KDJ: 9) [Thai writers remain to prefer using suggest in past tense]*
*It can be **concluded that** both 2 restorative materials and 3 levels of root canal had not an effect on microleakage between fiber post and root canal wall. (SWU: 10)*

No major difference was found in terms of using co-occurring persuasive verbs in IDRAAs and TDRAAs. However, IDRAAs have more various types of persuasive verbs showing verbal alternatives at the international platform. In other words, the Thai writers tend to use repetitive patterns of that-complement clauses when writing a research article abstract.

As with the perspective of tense used in the Discussion move, TDRAAs particularly maintain the use of past simple tenses throughout the TDRAAs, while there are variations of tenses in IDRAAs. Especially in this move, the tense of the international writers occasionally shifts from past to present. Since scientific research studies are generally perceived as applicable in real the world, the effect of the present simple tense in the Discussion move is to foster generalisable results and to offer universal and timeless statements to readers.

One of the distinctive linguistic features found in the Discussion move is the use of modal auxiliaries, showing the writers’ degree of confidence while addressing statements. These auxiliaries are particularly used to convey a sense of possibility or obligation towards readers as shown below.

Consequently, the polishing procedures **should** be applied to obtain more resistant composite surface to discoloration. (DM: 25)
 The clinician **should** be aware that due to a distinct activation of both initiators, marginal quality **may** be influenced on the long-term. (DM: 1)
 This method **may** be potentially useful as an adjunct to root canal treatment. (JOE: 10)

The Discussion move is considered conventional in both IDRAAs and TDRAAs as both datasets include experiment-based research articles. The use of nominal reference is similar in both datasets; however, types of co-occurring verbs are more diverse in IDRAAs where writing contexts may affect the lexical choices made. TDRAAs are mostly written through past simple tenses, whereas the use of present simple tense could be frequently seen in IDRAAs. Modal auxiliaries are explicitly used by the international writers, showing degrees of confidence while discussing findings through a personal viewpoint on situations uttered.

MOVE SEQUENCES

This section reports the percentages of move sequences appearing throughout the two datasets.

TABLE 5. Move Sequences: IDRAAs

Move Sequences: IDRAAs	
1. B-P-M-R-D	48%
2. P-M-R-D	37%
3. B-P-R-D	6%
4. B-R-D	3%
6. P-M-R	2.5%
7. B-M-R-D	1.67%
8. B-P-M-R-M-R-D	0.83%
9. B-M-R	0.83%

TABLE 6. Move Sequences: TDRAAs

Move Sequences: TDRAAs	
1. P-M-R-D	65.84%
2. B-P-M-R-D	19.17%
3. P-M-R	5%
4. B-P-R	2.5%
5. P-B-M-R-D	1.67%
6. B-P-M-R	1.67%
7. B-P-R-D	0.83%
8. B-M-D	0.83%
9. P-M-D	0.83%
10. P-R-D	0.83%
11. P-M-R-M-R-D	0.83%

According to Tables 5 and 6, move sequences frequently found in IDRAAs were B-P-M-R-D, P-M-R-D, B-P-R-D and B-R-D, respectively. In TDRAAs, the highest occurrences were P-M-R-D, B-P-M-R-D, P-M-R, B-P-R, respectively. Though there are some variations of move sequences, it is apparent that B-P-M-R-D and P-M-R-D are mostly employed across the two datasets. B-P-M-R-D (48%) is the sequence used mostly by IDRAAs, suggesting a favoured style of highlighting the background of the research studies in international journals. The Background move is becoming more popular among academic writers expressing their motives and to familiarise readers with the contexts provided (Hyland 2004). Moreover, the present study also substantiates Suntara and Usaha's (2013) findings that the addition of Move B should have been advised to complement the "absence of well-defined sets of problems" (p. 86). Nonetheless, the trend of the Background move is not emphasised

in TDRAAs and B-P-M-R-D is shown only at 19.17%. P-M-R-D, on the other hand, is frequently used (65.84%) and the disappearance of Move B is uncanny.

Dissimilar to Pho's (2008) and Santos's (1996) findings that most of the abstract writings comprise of three moves (P-M-R), the dental abstracts generally comprise at least four moves (P-M-R-D, B-P-M-R-D), showing the difference between soft and hard disciplines. In spite of the differences of generic structures between IDRAAs and TDRAAs, it can be concluded that the inclusion of Background and Discussion moves is of significance for the academic discourse of dentistry. This is in line with Hyland's (2004) findings where the implementation of the Discussion move, elaborating applications and implications, is conventionally applied in broader types of abstracts (Kanoksilapatham, 2013; Suntara & Usaha, 2013; Saeew & Tangkiengsirisin, 2014). As move sequence, embedded, reversal and cyclical moves are associated with the writers' attempts to produce a more cohesive textual construction within limited space, it can be concluded that writers in dental communities somehow avoid writing abstracts in the style of an objective checklist, despite being part of the scientific discipline which usually uses that style (Santos 1996, p. 497).

CONCLUSION

Generic structures of dental abstracts written by Thai and international writers can be reflected through move frequency, move sequence and linguistic features found in both datasets. Both datasets have relatively similar generic structures, except for the Background move which is considered optional only in TDRAAs. As Move B is used for indicating a gap or establishing a niche (Swales 2004), face-saving strategies may be a vivid reflection of the Thai close-knit society. As opposed to western cultures, Thai society is unaccustomed to the practice of criticism, but rather accustomed to the system of reciprocity and seniority. Buddhism and a customary belief of social relationships as a family member (Kanoksilapatham 2007, pp. 199-200) discourage any disrespectful acts against senior fellows. Thus, it is considered inappropriate to identify names and to expose their research gaps or any "shortcomings" in previous research (Taylor & Chen 1991). The results suggest that IDRAAs, where the frequency of the Background move reach approximately 60%, provide schematic context to ensure that readers receive adequate information before proceeding to the other moves. Both datasets affirm that the dental abstracts, considered as a hard discipline, are inclined to provide fewer contexts when compared to the abstracts analysed by Hyland (2004).

With respect to move sequence, the highest occurrences of B-P-M-R-D in IDRAAs and that of P-M-R-D in TDRAAs further highlight the difference between the two datasets. In addition, the reversal of moves such as P-B-M-R-D is rare and only found in TDRAAs (1.67%) which raises more awareness of the importance of teaching ESP courses to Thai students. In addition, it should be noted that a means of using embedded (P+M) moves, which is more frequently found in IDRAAs, could predict a level of higher-order thinking of grammatical dexterity propelled by international writers who intend to grasp the essence of their experiments within the limited space of abstracts, as suggested by Weissberg and Buker (1990). Additionally, cyclical moves (M+R) employed in both datasets can be explained as the writers' attempt to separate results into multiple sessions where each procedure in the research methodology yields subsequent output.

Experiment-based dental research seems to be rigid by nature; however, it is not completely robotic as it has some opening for subjective writing in dental community. The findings of linguistic features fleetingly found within this study are highlighted through the use of the first-person pronoun "we" throughout IDRAAs, whereas the stance of self-mentioning pronouns in TDRAAs is omitted. As for TDRAAs, the authorial stance could be

promoted as it is a stylistic device to show that the abstract writing could have more options beside impersonal and objective-oriented style. This could substantiate the fact that dental writers also include their obligation, judgment or evaluation in their statements. However, modal auxiliaries, showing degrees of confidence, are not found in the Methodology move.

As with pedagogical implications, this study distinguishes between IDRAAs and TDRAAs with respect to generic structures and linguistic features where they can be incorporated into an ESP course that is specifically designed for dental researchers and students. This study reiterates a classic English Language Teaching quote that “one size doesn’t fit all” because the findings pinpointed similarities and dissimilarities and sets out cautious optimism for rhetoric used by Thai and international writers. In a genre-based writing course, Thai dental students should be reinforced through appropriate means of generic structure and linguistic features that are empirically based on IDRAAs. Genre analysis based on our datasets provides empirical evidence for non-native English speaker (NNES) writers. Being mindful of these linguistic differences, they can pave the way for success in writing academic abstracts for international journals. For instance, the discrepancy of tenses appearing in it-complement clause in TDRAAs may result from inexperience of the editorial process. Nonetheless, such a mistake on it-complement clause has pedagogical value because it is an indicator for English teachers to focus more on particular grammatical aspects which may not be highlighted in ESP courses for Thai dental students.

The present study only reports findings through experiment-based dental research in terms of original contributions, while it would also be intriguing to further investigate whether different generic patterns or linguistic features exist across sub-genres. The number of case reports or systematic reviews is also increasing in international dental journals and genre analysis for these types of academic writing. These results of these may differ and yield intriguing results. In due course, these could be used to construct a holistic ESP handbook especially for, but not limited to, dental research abstract writing in the future.

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