

Exploring in Logical Thinking through the Use of Logical Connectors

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Background of the Study

➤ Well-organized text in Academic / Research Writing

➤ Logical Thinking

(Wallace & Wray, 2011)

➤ Logical Connectors

(Celce-Murcia & Larsen-Freeman, 1983:1999)

➤ **A Claim: Problem with the logical thinking of Thai researchers.**

(Jaroonkhongdach, Watson Todd, Keyurawong & Hall, 2011)

➤ **Doing in Published Research Paper**

Logical Thinking in Writing

- Cognitive Ability to “Think Carefully”

(Tittle, 2011)

- Academic Writing – Clear connection within an argument.

- Reason and Conclusion

(Cortell, 2005)

- Warranting and Conclusion

(Wallace and Wray, 2011)

Composition of Argument.

- Support = Presented in one or more sentences in the form of several elements

(Stapleton & Wu, 2015)

e.g. facts, data, statistics, an explanation and previous literature and etc.

- Claim = Conclusion

Logical Connectors

- ▶ A type of “Cohesive Devices” to show logical relationship.
(Celce-Murcia & Larsen-Freeman, 1999, p.519)
- ▶ Sentences and Paragraph are well connected

Logical Connectors

➤ **Additive:** addition, introduction or similarity

Ex. Moreover, Additionally,

➤ **Adversative:** conflict, contradiction

Ex. However, On the other hand

➤ **Causal:** logical consequence – reasoning, claim and support

Ex. Because, Thus, Therefore,

➤ **Temporal/Sequential:** a chronology, time

Ex. First, Second, Third, Next

(See Celce-Murcia & Larsen-Freeman, 1983, p.325-329)

Causal Logical Connectors

- ▶ indicates a line of reasoning and a linking claim which supports the idea from the preceding clause

(Biber et al., 1999 & Charles, 2011)

Ex. Because, Hence, Since, Thus, Therefore, So, As a result, Consequently

- ▶ Logical Relationship and Logical Thinking

▶ (Cortell, 2005: Wallace & Wray, 2011)

Previous Studied – Problem in using Logical Connectors

- ▶ Overgeneralization

(Milton and Tsang, 1993)

- ▶ Not making a conclusion

(Baralee, 2011)

- ▶ Use of “Because” for personal opinion

(Prommas and Sinwongsuwat, 2011)

- ▶ Reversing ; Cause and Effect

(Ting, 2003)

- ▶ No relationship and use when it doesn't required.

(Hamed, 2014)

Reflection of the previous studied

- **Misused of Logical Connectors**
- Wrong Connectors: Selection, Position >> Surface form of coherence
- **Problem with thinking**
- **Explore the logical thinking of Thai Researcher**

Research Question

- ▶ Is there any difference in the use of logical connectors between Thai and international research articles?

Data Collection

- ▶ 40 Research Articles – 20 Thai and 20 International in Year 2015
- ▶ Field of English Language
- ▶ Thai = Written By Thai Researchers
- ▶ International = Written By Non-Thai Researchers

Source of Data

► Thai Articles

1. ICLC Proceeding of NIDA (9 Articles)
2. PASAA of Chulalongkorn University (5 Articles)
3. Journal of English Language Thammasat University (6 Articles)

► International Articles

1. Journal of Pragmatic (5 Articles)
2. Journal of the System (5 Articles)
3. Journal of English for Academic Purpose (5 Articles)
4. Journal of English for Specific Purpose (5 Articles)

Data Analysis - Methodology

- Step 1 : Coded the articles into .txt files >> AntConc
- Step 2 : List of 57 Logical Connectors >> Top Three
- Step 3 : 20 concordance lines of each connectors
 - 60 THAI + 60 International = 120 Concordance Lines
 - Exclude : Example, Extract and Personal Judgement
- Step 4 : Reliability Check

Reliability Check

Table 1 Position of logical connectors

Clause Initial	Before clause 1: [Connector] + Clause 1 + Clause 2 Before clause 2: Clause 1 + [Connector] + Clause 2
Clause Medial	Clause 1 + Part of Clause 2 + [Connector] + Rest of clause 2
Clause Final	Clause 1 + Clause 2 + [Connector]

(See *Celce-Murcia & Larsen-Freeman, 1983, p.329*)

AntConc 3.4.4w (Windows) 2014

File Global Settings Tool Preferences Help

Corpus Files

- 1-ENG.txt
- 2-ENG.txt
- 3-ENG.txt
- 4-ENG.txt
- 5-ENG.txt
- 6-ENG.txt
- 7-ENG.txt
- 8-ENG.txt
- 9-ENG.txt
- 10-ENG.txt
- 11-ENG.txt

Concordance Concordance Plot File View Clusters/N-Grams Collocates Word List Keyword List

Concordance Hits 47

Hit	KWIC	File
1	ional education 1. Introduction Since the 1950s, the self-concep	2-ENG.txt
2	< university. 2. Literature review Since the concepts of self and se	2-ENG.txt
3	lso measured in some research since it is argued that ability will	2-ENG.txt
4	both data sources. Furthermore, since in mixed methods studies	2-ENG.txt
5	2006), CA was not suitable here since students were 's broad u:	2-ENG.txt
6	er than to gain knowledge, and, since they experienced no rewar	2-ENG.txt

Reliability Check

However, it appears most often in the Environmental Modeling & Software (EMS) subject area, with a frequency of 241 times, while its frequency is very low or non-existent in other subject areas. This is probably because the Environmental Modeling & Software (EMS) subject area includes a large amount of computer software-related research articles with code as a keyword, which potentially explains this frequency variance. Due to its low frequency in other subject areas, code should not be included in the EAWL”.

Figure 1 Example of full sentence format in “AntConc”

Frequency Count

✚ The frequency counted of using logical connectors between Thai and International

Word (57)	Freq. (133364)	Word (57)	Freq. (179047)
that	1239	that	1794
as	1045	for	1739
for	1029	as	1323
<u>because</u>	<u>128</u>	<u>thus</u>	<u>130</u>
<u>in order to</u>	125	so	118
If	108	<u>because</u>	<u>104</u>
so	101	If	101
<u>therefore</u>	<u>89</u>	Then	95
Then	76	<u>therefore</u>	<u>79</u>
<u>thus</u>	<u>62</u>	<u>in order to</u>	65
Since	48	Since	47

- Ex. He implied that.... / English for..... / As if.... / He think so....

Findings

The overview of the top three used logical connectors in Thai and international research articles in 2015.

Top Three (Thai) 133,364 Words	Total Number of Concordance Hits	Top Three (International) 179,047 Words	Total Number of Concordance Hits
1. Because	128	1. Thus	132
2. Therefore	89	2. Because	104
3. Thus	62	3. Therefore	79
Total	279	Total	315

Findings

Table 5 The total number of logical connectors that are logically or illogically used in published research articles by Thai and international researchers.

Data	Logical	Illogical
Thai	58	2
International	58	2

Table 6 The top three logically or illogically used logical connectors.

Top Three (Thai)	Logical	Illogical	Top Three (International)	Logical	Illogical
1. Because	19	1	1. Thus	20	0
2. Therefore	20	0	2. Because	19	1
3. Thus	19	1	3. Therefore	19	1

Example

- **(S1)** *A written comment is a form of communication between students and teachers, which aims to encourage the students to enhance their learning and improve their work (Hyland & Hyland, 2006).* **(S2)** *Learning can be varied, depending on the students' level, and their work can include written assignments or research projects.* **(S3)Thus,** *written comments can be used with different levels of students; for example, at high school, undergraduate or graduate levels.*

Example

- ▶ People in English-speaking countries tend not to know another language (ABC, 20xx). **Therefore**, this indicates that they are poor language learners.
- ▶ Problem in a claim and support
- ▶ Hasty Generalization
- ▶ No reason to add up
- ▶ English speakers do not see the need to know another languages.

Conclusion and Limitation

- Most of the logical connectors are logically used.
- No difference between research articles published by Thai and Non-Thai researchers.
- A claim “Thai researchers” have been said to be a problem in logical thinking is invalid.

Limitation

- The findings in this study are based on small corpora
- More data is suggested for further studies.
- Logical Thinking can express in several ways including logical connectors, as can fallacies in arguments.