Move Analysis of Abstracts
of Agricultural Science Articles

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Abstract

Writing an English research article for writers whose first language is not English seems to be a very difficult task. To overcome this problem, the objective of this study was to investigate the occurrence of rhetorical move structures in abstracts in agricultural science (food science, plant science, and animal science) in order to identify moves and move sequences in abstracts in agricultural science. Two workshops were performed to see the extent to which the proposed move model can be applied. Ninety abstracts from three agricultural research journals were analyzed using the proposed model to identify rhetorical move structures. The analysis revealed the rhetorical move structures in the agricultural research articles consisted of 13 moves. The moves and move sequences are proposed to be used for analyzing abstracts in agricultural science journals. The findings can be applied in analyzing moves and move patterns for training novice writers in writing abstracts for journal articles in agricultural science and other related fields.

Keywords: Genre Analysis; Move Sequence; Move Pattern; Abstracts

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การวิเคราะห์อัตถภาคของบทคัดย่อ
ในบทความวิชาการเกษตร

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บทคัดย่อ

การเขียนบทความวิจัยในภาษาอังกฤษสำหรับผู้เขียนที่ไม่ได้ใช้ภาษาอังกฤษเป็นภาษาแรกนับว่าเป็นงานที่ค่อนข้างยากอย่างมากเพื่อแก้ปัญหาดังกล่าว งานวิจัยนี้มีวัตถุประสงค์ที่จะศึกษาการเกิดขึ้นของโครงสร้างอัตถภาคในบทคัดย่อของบทความวิชาการเกษตร (เทคโนโลยีทางการอาหาร,พฤกษศาสตร์,และสัตวศาสตร์) เพื่อให้ทราบว่ามีอัตถภาคอะไรบ้างและการเรียงตัวของอัตถภาคเป็นอย่างไร ทั้งนี้ได้มีการจัดการประชุมเชิงปฏิบัติการจำนวน 2 ครั้งเพื่อศึกษาว่ารูปแบบอัตถภาคที่พบนั้นสามารถนำไปใช้ได้จริงหรือไม่ การศึกษานี้ได้ทำการวิเคราะห์บทคัดย่อจำนวน 90 บทคัดย่อในวารสารทางวิชาการสาขาวิชาการเกษตรจำนวน 3 วารสาร โดยใช้รูปแบบอัตถภาคที่ค้นพบในการวิเคราะห์ ผลการศึกษาพบว่ามีโครงสร้างอัตถภาคในบทคัดย่อบทความวิชาการเกษตรจำนวน 13 อัตถภาค ซึ่งอัตถภาคและรูปแบบของการเรียงตัวของอัตถภาคที่พบนี้สามารถนำไปใช้ในการเขียนบทคัดย่อบทความทางวิชาการเกษตรและสาขาที่เกี่ยวข้องได้ต่อไป

คำสำคัญ: การวิเคราะห์ประเภทเนื้อหา; การเรียงตัวของอัตถภาค, รูปแบบอัตถภาค; บทคัดย่อ

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Introduction

The number of research articles being published each year increased swiftly, and this consumes a large amount of time for researchers to read their interested articles. In addition, English is used widely in writing, presenting, and publishing research articles, and this burdens teachers, readers, and students whose the first language is not English, or anyone who does not master in English. Therefore, several studies in the past and the present dedicate in finding the ways to help teachers, readers, and students in overcoming the language barriers. Swales (1990) proposed CARs Model which provided a guideline for writing an introduction section in research articles. The model happened to be the very first one that studied how the writers constructed the paper, and this model functions as a guideline for readers to follow the massages which writers intended to convey. Several studies after followed CARs Model including Nwoku (1997) who did extend to 11 moves, instead 3 moves and several steps under each move, to study a whole study (Introduction, Method, Result, and Discussion Sections). Kanoksilapatham (2005, 2012, and 2015) did extend to 15 moves and several steps under each move to study a move patterns in Civil Engineer, Software Engineer, Biomedical. Shi studied moves and lexical bundles in Agricultural Science. Shi (2010) extended to 16 moves to study lexical bundles and moves in agricultural science research articles. Tessuto (2015) studied generic structure and rhetorical moves in English-language empirical law research articles.

Apart from IMRD, several previous studies focused on specific section: an introduction section, Bhatia (1997), Gledhill (2000), Samraj (2002, 2005, 2008), Tucker (2003), Ozturk (2007), Rubio (2011), a method section, Lim (2006) and Bruce (2008), a result section, Brett (1994), Basturkmen (2009),

and Lim (2010), and a discussion section, Homes (1997), Peacock (2002), and Parkinson (2011). Also, many studies focused on an abstract section, among them are Stotesbury (2003), for example, studied research articles abstracts in the narrative and hard sciences and found that abstracts in the humanities and social sciences as a group used more evaluative attributes than in the natural sciences, and Lorés (2004) studied rhetorical structure to thematic organization in linguistic journals and found that a significant percentage, about one third of the samples, display a different structure from CARs model (Swales, 1990). Golebiowski (2009) studied in education and applied linguistics abstracts and found that abstracts in those fields showed different textual organization principles from the disciplines of applied linguistics and education.

In Thailand several studies on abstracts are in scientific fields. Among them are Oneplee (2008); Prabripoo (2009); Aryubken (2011); Pasavoravate (2011); Nakmaetee (2012); Rungnaphawet (2016); Wongwiwat (2016); Saeng-sai and Pramoolsook (2017).

For example, Oneplee (2008) conducted a comparative study of moves in science and nature journals. Prabripoo (2009) studied the abstracts of science students' theses. Aryubken (2011) studied the abstract section in Kasetsart Journal of Kasetsart University. Pasavoravate (2011) studied the structural organization of thesis and dissertation abstracts in linguistics written by students in Thailand and students in England. Rungnaphawet (2016) studied moves, move sequences, and move cycling in computer engineering and electrical engineering and found that moves in these two closely-related engineering sub-disciplines did not conform to the prescribed organizational pattern with none of the moves being obligatory in computer engineering articles. Wongwiwat (2016) conducted a move analysis and lexical bundle

analysis of conference abstracts submitted to Thailand TESOL International Conference. Saengsai and Pramoolsook (2017) studied moves structures of science and engineering PhD abstracts. They found that the two disciplines had different move structures indicating the disciplinary discourse variations.

The closest study to this study is Shi's study. Following Kanoksil-pathum's framework, Shi (2010) studied 30 research articles of agricultural science including Introduction, Method, Result, and Discussion sections. Her study focused on analyzing moves and functions of lexical bundles. This study, although similar to her study in terms of field of study, focuses on identifying moves and move sequences in the abstract section of agricultural science articles, which Shi has left. Therefore, this study was the important piece that fulfilled the whole picture of agricultural science research papers.

This study applied Shi (2010)'s framework in analyzed moves and steps in an abstract section since the abstract is a brief version of the longer research paper (Lorés, 2004 p.281). Moves and steps in an abstract should reflect the whole research paper; however, the moves and move patterns should be existed according to the purposes of researchers who constructed those abstracts and agreed to the moves and patterned preferred by published journals.

Research Questions

This study aims to answer two specific research questions as follows:

1. What are the moves that can be found in the abstract sections of research articles of agricultural science?

2. From question no. 1, what are the obligatory moves and optional moves occurring in the abstract section of research abstracts in agricultural science?

Methodology

Compilation of the corpus

In order to achieve the objectives of the study, the study was proceeded as follows:

1. Related literature and research about genre analysis, move analysis, and lexical bundles were reviewed to gain more understanding.

2. Journals in agricultural science published in 2012, were also selected based on the impact factor (Shi, 2010). They were further categorized into three sub-fields, 3 journals from each subfield: animal science, food science, and plant science.

3. 30 abstracts were drawn, 10 from each journal.

4. The criteria for move analysis based on Shi (2010) were developed. From Shi's findings, 16 moves with steps were firstly established. Lexical bundles were also applied in identifying move boundary. Finally, 13 moves were established as the model for analyzing the abstracts in agricultural science.

5. Then, two workshops were prepared in order to validate the move model. The model was then adjusted for the analysis of 90 abstracts in agricultural science published from 2014-2016. 30 abstracts from each journal in agricultural science published from 2014 - 2016 according to No 2.

6. Moves and move sequences were identified as obligatory moves and optional moves.

After examining through all 90 abstracts, this study found that the rhetorical move in abstract section of agricultural science journals: Food Science, Plant Science, and Animal Science happened to emerge different from what Shi's (2010) purposed in her model. As a result, this study established

the unique moves to meet the moves that existed according to the data which were used in this study (See Table 1).

Table 1

Moves of Abstracts of 90 Agricultural Science Research Articles

Moves	
Move 1	Background of study (BG)
Move 2	Reviewing previous research (RP)
Move 3	Research Gap (RG)
Move 4	Aims, Objectives, or Purposes (AOP)
Move 5	Listing materials (LM)
Move 6	Details the sources of the materials (DM)
Move 7	Describing experimental procedures (DX)
Move 8	Detailing equipment (DE)
Move 9	Stating results (SR)
Move 10	Commenting on the results (RD)
Move 11	Stating selected findings (SF)
Move 12	Making overt claims or generalizations (CG)
Move 13	Suggestions for further studies (FS)

Move Identifications

The analysis of moves was proceeded in several steps. First, 90 abstracts were analyzed using Shi's findings. The move was then coded using two capital letters as the code for each move. The moves identifications are illustrated in the following:

Move 1 Background of the study (BG)

This move provides brief background information including the importance of topics, well-known information, or research article structures.

(1) Vranec is one of the most important red grape varieties in Republic of Macedonia, grown in all vineyards, mostly in the Tikveš wine region. (FS_2014_04)

Move 2 Reviewing Previous research (PS)

This move reviews previous studies related to the study.

(2) The HCA2 receptor has not been identified or characterized in cats. (AS_2015_07)

Move 3 Research Gap (RG)

This move indicates that previous studies lack and/or problem/ weakness from the previous studies.

(3) ..., and that few data are currently available on the occurrence of Arcobacter spp. in such foods,... (FS_2016_05)

Move 4 Aims, Objectives, or Purposes (AOP)

This move establishes the objective or aim of the study.

(4) The aim of this study was to evaluate the effects of probiotics on the feed intake,... (AS_2014_04)

Move 5 Listing materials (LM)

This move provided the lists of materials that were used in the study.

(5) Eight Blackbelly rams (40.1 ± 1.4 kg on average) were used in a 2 × 2crossover design. (AS_2014_02)

Move 6 Details the sources of the materials (DM)

This move details the source of the materials where they were gathered or received.

(6) (1) Tissues (n ¼ 6) and primary adipocytes (n ¼ 4) were collected from lean, healthy,... (AS_2015_07)

Move 7 Describing experimental procedures (DX)

This move explains how the experiment was conducted step by step.

(7) In the present study, cheese pies containing increasing amounts of KGM were prepared in such a way that the gum was not fully hydrated. (FS_2015_08)

Move 8 Detailing equipment (DE)

This move provides the details of equipment used in the study.

(8) Peptides were detected by SDS–PAGE and GC–MS was used to determine carbohydrate content of the fractions. (FS_2014_05)

Move 9 Stating results (SR)

This move presented the results which were found in the study.

(9) The laccase-gum Arabic conjugate showed lower activity but higher stability than free laccase in methanol. (FS_2014_01)

Move 10 Research discussion (RD)

This move discusses in details on the result of the study. Also, this move allowed the researcher added their owned opinions into their study.

(10) This suggests lower ANS reactivity (HR response) in social goats. (AS_2015_01)

Move 11 Stating selected findings (SF)

This move summarizes major findings of the study.

(11) Chickpea allergy is associated with lentil and/or pea allergy, but evidently may not present independently. (FS_2014_02)

Move 12 Making overt claims or generalizations (CG)

This move claims the benefit derived from the study and/or a new knowledge gained from the study which was not found in other previous studies.

(12) The results demonstrate the huge potential of the methodology for a wide range of oil authenticity work. (FS_2015_10)

Move 13 Suggestions for further studies (FS)

This move proposes suggestions for further studies.

(13) Results indicate that T. suecica, D. salina, P. salina and I. galbana could be further developed for commercial carotenoid production. (FS_2014_08)

Validity and Reliability of the Analysis

Workshops

Two one-day sessions were prepared to train the participants, who were lecturers and researchers in Kasetsart University. Those participants read and published their papers in national and international agricultural science journals. They were taught about the concept of move and move identification. After all of them understood the concept of moves and move identification, they were assigned to identify moves in 5 abstracts of agricultural science

articles, using the move model developed. After that, the discussion between the participants and the researcher, also with the advisor was performed. Any disagreement of the analysis was discussed until all agreed. After that, all participants were assigned to identify 10 more abstracts and similar session of discussion was followed. At the end of the session, all participants discussed and also provided more feedback. The move identification was adjusted accordingly.

Result

The result answered the 1st research question "1. What are the moves that can be found in the abstract sections of research articles of agricultural science?", and showed that some moves were applied in most abstracts, and some moves were applied in a few abstracts. Table 2 reported the number of moves in 90 abstracts in all three sub-fields. Also, the percentages were reported to show the frequency of the moves.

Table 2

Frequency and Percentage of Moves of Abstracts of each Subfield of Agricultural Science.

Move	Animal Science (N=30)	Food Science (N=30)	Plant Science (N=30)
M1	22 (73.33%)	26 (86.66%)	29 (96.66%)
M2	2 (6.66%)	1 (3.33%)	7 (23.33%)
M3	6 (20.00%)	1 (6.66%)	10 (33.33%)
M4	21 (70.00%)	17 (56.66%)	x14 (46.66%)

Move	Animal Science (N=30)	Food Science (N=30)	Plant Science (N=30)
M5	6 (6.66%)	14 (46.66%)	14(46.66%)
M6	1 (3.33%)	2 (6.66%)	1 (3.33%)
M7	18 (60.00%)	4 (13.33%)	11(36.66%)
M8	3 (10.00%)	0 (0%)	2 (6.66%)
M9	29 (96.66%)	30 (100%)	27 (90.00%)
M10	7 (23.33%)	7 (23.33%)	10 (33.33%)
M11	21 (70.00%)	10 (33.33%)	10 (33.33%)
M12	4 (13.33%)	9 (30.00%)	10 (33.33%)
M13	3 (10.00%)	4 (13.33%)	4 (13.33%)

According to Table 2, it can be seen that only M1 Background of the study and M9 Stating results were conventional moves in all sub-fields of agricultural science abstracts. Of 90 abstracts of animal science research articles, Move 9 occurred in all food science abstracts, and almost 100% in animal science abstracts. The third most frequent move was also M9 which occurred 90 % in plant science abstracts. Interestingly also were Move 4 Aims, Objectives, or Purposes and Move 11 Stating selected findings which occurred 70% in only animal science abstracts. Similarly, M7 Describing experimental procedures occurred 60% in only animal science abstracts.

To answer the 2nd research question "2. What are the obligatory moves and optional moves occurring in the abstract section of research abstracts in agricultural science?", the obligatory moves were M1, M4, M9 and M11. M1 was an obligatory move in all sub-fields of agricultural science abstracts. Both M9 and M11 were an obligatory move in Animal Science abstracts. Move 7, however, was the obligatory move in only Animal Science abstracts. Table 3 illustrates this finding.

Table 3

Obligatory moves and optional moves in Abstracts Section in Animal Science Abstracts

Obligatory moves in Animal Science	Optional moves
M1, M4, M 7, M9, M11	M2, M3, M5, M6, M8, M10, M12, M13

In Food Science abstracts, Table 4, shows that M1 Background of the study and Move 9 Stating results occurred in all 30 abstracts for 100% and 86.66 % respectively. Therefore, both moves are considered as an obligatory move in Food Science abstracts. Thus, the other 11 moves are considered an optional move. However, M4, although cannot be considered as an obligatory move, it is an interesting move as it occurred with quite considerable frequency (56.66%)

Table 4

Obligatory moves and optional moves of Food Science Abstracts

Obligatory moves in Food Science	Optional moves
M1, M9	M2, M3, M4, M5, M6, M7 M8, M10, M11, M12, M13

In Plant Science, according to Table 5, Move 1 Background of the study 96.66% and Move 9 Stating the results occurred as an obligatory move. M1 occurred 96.66% whereas M9 occurred 90.00%. Table 5 illustrates this finding.

Table 5

Obligatory Moves and Optional Moves of Plant Science Abstracts

Obligatory moves in Plant Science	Optional moves
M1, M9	M2, M3, M4, M5, M6, M7 M8, M10, M11, M12, M13

In summary, two moves, M1 and M9, are conventional moves of research abstracts of agricultural science. Interestingly, compared to other subfields of agricultural science, M4, M7, M11 are conventional moves in Animal Science only.

Discussion

The analysis of moves and move patterns demonstrates the differences in moves among the three sub-fields of agricultural science articles: food science, animal science, and plant science. The findings of the current study can be beneficial to ESP's community as follows:

Firstly, this study can help teachers, researchers, and ESP practitioners alike understand how the academic writers present their work in their discourse community.

Secondly, the move sequence patterns revealed in this study benefits both advisors and lecturers of research writing. In teaching academic writing, the moves and move sequence patterns found in this study can be used as a guideline to gather information in preparing for writing an abstract.

Thirdly, move sequence patterns derived from this study can present a clear picture for writers on the number of moves should be employed in an

abstract of agricultural science articles.

Lastly, a writing workshop with explicit teaching and learning of moves could help students understand how an abstract is written.

Recommendation

From the findings of this study, further studies should be carried out to gain more understanding and application Therefore, studies of the abstracts in other related fields of agricultural science are encouraged in order to see more conventional moves and optional moves.

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