Types and Functions of Citations in Native vs. Non-native Written Medical Research Articles

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Abstract

Introduction: Citation is an essential prevalent feature of all academic writings in various fields of knowledge. It is employed by authors and researchers across disciplines for diverse reasons. This study was aimed at comparing types and functions of citations in medical research articles in discussion sections between Iranian medical faculty members and their native counterparts.

Method: To this end, discussion sections of 48 native and non-native written Research Articles (RAs) from credible ISI-indexed journals with good impact factor (about 0.5-1.5) from each group were analyzed in terms of citation types and functions.

Results: The results revealed that non-integral citations were found to be the most frequent citation type both among RAs written by non-native and native researchers. Also, Vancouver referencing style in non-native articles was used more while in native articles APA referencing style was the dominant style. Concerning citation functions, referencing was the most common one in native articles. However, referencing and comparisons were the most two frequent functions among non-native articles. As the results revealed, there were striking differences in citation practices of native and non-native researchers in medical sciences.

Conclusion: This study calls for reevaluation of citation practices among Iranian authors and systematic treatment of types and functions of citations in ESM and EAP writing courses.

Keywords: citation; citation function; citation type; medical research articles; medical writing

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Introduction

A citation is both a signpost and an acknowledgement of cited researcher. As a signpost, it signals the location of your source (1). As an acknowledgement, it reveals that you are indebted to that source. Citation is also an important means that writers use for showing their belonging to a particular discourse community. There is shared knowledge that researcher in every discipline use citations while presenting their studies.

Written academic genres have been investigated by many researchers over the last thirty years, especially research articles (2, 3). There have been extensive number of studies on citation which have explored their pattern of use (4-8).

Swales has categorized citations into two major types, integral and non-integral citations based on

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formal criteria (3). In integral citations, the name of the researcher appears in the sentence with an explicit grammatical role, foregrounding the researcher, while in non-integral citations, the name of the cited author appears outside of the text in brackets, parentheses, or there may be a number referring to the name which is placed somewhere else.

Thompson and Tribble have divided integral citation into three subtypes based on the following formal criteria (9):

Verb-controlling where citation includes an active or passive verb

Example: *White (1998) examined the influences of possessive adjectives and marked third*

Person singular on acquiring new aspects.

Naming where citation is used as a noun phrase or part of a noun phrase

Example: *Still, in spite of its glory, there is scarcely any agreement on meaning and the idea,*

As declared by Borg (2001).

Non-citation where the year of publication does not follow the name of the cited person

Example: *Another research in this genre with reference to excerpt practices has been*

Organized by Tribble and Thompson.

Tribble and Thompson classified non-integral citation into four sub-kinds (9):

a) **Source or attribution** is used to apply an idea, knowledge or a research data to a writer with an outlook to showing the information of the area.

Example: *Learners comprehend the message just by understandable input, and the most crucial thing that causes input to become understandable is an atmosphere with no tension (Krashen, 1985).*

b**) Origin** shows the basis of a product, technique, or theory (Thompson, 2005b).

Example: *The software container used was Wordsmith Tools (Scott, 1996).*

c) **Reference** points to references for more information and it commonly contains the directive 'see' like in:

Example: *DFID has altered its policy currently concerning ELT (see DFID, 1998).*

d) **Identification** is used to recognize specific texts or research assignments cited in the sentence. An instance of this kind is:

Example: *An imitation model has so been improved to include all the crucial aspects in the population dynamics (Potts, 1980).*

In a study of fourteen research papers, Mansourizadeh and Ahmad investigated the citation practices employed by non-native expert and novice scientific writers, belonging to the same discipline (6) They used Thompson and Tribble's typology but excluded *origin* and *non-citation* since no citations were identified with the former function and the latter not being applicable in their corpus. These researchers then combined this typology with two categories in Petrić's study which were applicable to the engineering field named as *comparison of one's own findings with other sources* and *establishing links between sources* (10). They also came up with another category common in their corpus and called it *support*. They labeled *source* as *attribution*, following Petrić in order to avoid confusion with the meaning of source. It was revealed that the citation pattern between these two groups of academic writers were different; novice writers mostly used citations to attribute, while the experts made use of citations to justify and back up their claims.

Another set of studies has focused on citation in academic writing produced by students in the form of theses. Dong investigated the use of citations for knowledge transformation in non-native doctoral students' dissertation writing in science (11). It was revealed that these students needed instruction in

citation use for knowledge transformation and construction of new knowledge claims, as an essential requirement for doctoral level. Thompson conducted a study on the features of texts produced for assessment in PhD theses; eight theses from Agricultural Botany department were analyzed in terms of the ways that the writers manipulate focus and position within their texts through an investigation of citation practices (10). It was argued that writers are likely to be seeking to position themselves in relation to members of the research community, and this is most evident in the Conclusions sections. Besides, how they position themselves varies from writer to writer, with varying degrees of confidence.

Yet, another study in this genre in terms of citation practices has been conducted by Thompson and Tribble in which the use of subtypes of integral and non-integral citations in agricultural botany and agricultural economics was compared (9). It was found that source and identification was mainly used by agricultural botanists while integral-naming citations were referred by agricultural economists.

Later, Petrić investigated citation practices in students' theses in gender studies initially using Thompson's typology of citations with a focus on rhetorical functions of citations and proposed a specific typology for that field (10). She came up with nine rhetorical functions named as *attribution*, *exemplification*, *further reference*, *statement of use*, *application*, *evaluation*, *establishing links between sources*, *comparison of one's own findings or interpretation with other sources*, and *other* where the relationship between the citing sentence and citation is vague.

Almost no research has been conducted on research articles in medical sciences as far as their citations are concerned. In this regard, discussion sections of RAs (research articles) have received insufficient attention by the researchers despite their importance as a part in

which the writer tries to convince the readers of the merits of the results. Thus, proper and more informed use of citations in this regard could be of enormous help to academic writers.

The writing of Iranian medical doctors has increased in importance and as publish and perish policy is pursued in Iranian medical schools, more and more Iranian doctors submit their research works for publication in medical journals written in English. However, few studies have investigated the nature of medical research articles especially by Iranian authors regarding their citation practices and its comparison with their counterparts. Discussion sections of RAs are focused in this project since they have received scant attention by researchers despite their importance as a section in which the writer tries to bring out the plus points of results as convincingly as possible and here, a proper and informed use of citations would be helpful to back up his claims.

This study seeks to identify the types of citations, whether integral or non-integral as they are deployed in medical research articles across native and non-native researchers as well as citation functions, that is, the writer's intention of using them in the construction of the text and find out the differences in citation patterns employed by these two groups of writers. To this end, the following research questions were formulated:

1. What citation types characterize the discussion sections of research articles in medical sciences?

2. Are there any significant differences in the types of citations employed by researchers in published research articles in medical sciences between Iranian medical doctors and their English speaking counterparts?

3. What citation functions characterize the discussion sections of research articles in medical sciences?

4. Are there any significant differences in the function of citations in published research articles in

medical sciences between Iranian medical doctors and their English speaking counterparts?

Materials and Methods

The present study is a descriptive, comparative, and heuristic study in the realm of genre and discourse analysis in English for academic purposes. The data is gathered in order to describe and compare citation behavior of non-native medical researchers and their native counterparts across medical research articles.

The corpus consisted of 24 discussion sections of RAs in medical sciences from the faculty members of two notable Iranian medical science universities, namely Tabriz University of Medical Sciences and Urmia University of Medical Sciences and 24 native-written RAs in medical science. Both groups of papers were selected from a certain number of credible journals in medicine and all journals are indexed in Institute for Scientific Information (ISI) with Impact Factors (IFs) ranging between 0.5-1.5.

All the selected papers were written by faculty members of universities and the lead researcher/corresponding authors are assistant, associate or full professors in their respective medically-oriented departments. All papers were also published in ISI journals during years of 2010-2013. In choosing native writers articles, the researcher considered affiliation of the University of the Published Articles and made sure that the authors are from English speaking countries.

Data categorization and analysis

In our study, types of citations are defined as integral or non-integral, and integral type of citations are sub-classified into the subtypes *verb controlling*, *naming* or *non-citation* based on Thompson and Tribble (9).

In all discussion sections, the rhetorical functions are deliberated with a view to finding out the reason of citations were used by the writers regardless of whether they were integral or non-integral type. For this examination, Citations in Discussion are analyzed according to the six different citation functions. The following is a short description and examples of each citation function. Examples named A are taken from the literature and example marked B are taken from the present study:

Attribution: the writer used the citation in order to acknowledge the source of the information or research finding. In other words, the writer provides some background information which is attributed to the original source. Besides, if there are no other functions that could be ascribed to citations, they are identified as attribution.

Example A: *According to feminist film critic Laura Mulvey's (1975) analysis of the gaze, in binary looking relations men tend to assume the active role of a looking subject while women tend to be passive objects to be looked at, which in turn supports and symbolizes the patriarchal power relations between the sexes.*

Example B: *In the study of Gholipour et al. in East-Azarbaijan province of Iran prevalence of AC was higher among men and prevalence of SCC was higher among women.*

Support: this citation function is used with different purposes: to support the significance of the topic; to justify the procedures and materials; to support the writer's claim or argument, and to justify the results of the study. The following examples are *related to each case.*

Example A: *In further analysis I will rely on Rosemary Henessy's (1998) theorization of how* 26 *queer visibility can be appropriated for commodity purposes.*

Example B: Although the size of the study was small, these findings may have implications for the utility of currently available HPV vaccines, such as Gardsil in Botoswana and other areas of Southern Africa, as the vaccine covers only oncogenic HPV strains (16 and 18).

a) *to support the topic of the study:* This function of citation shows the significance of the topic and kind of supports it.

b) *to justify the procedures and materials:* Here the citation supports the procedures and materials used in the study.

c) *to support the writer's claim or argument:* The citation supports the claim or argument put forward by the writer.

2d) *to justify the findings:* The citation provides justification for the results of the study.

Reference: a source for further information is introduced by the use of citation, especially when the writer cannot include all the information for lack of space.

Example A: DFID has changed its policy recently with regard to ELT (see DFID, 1998).

Example B: Maltreatment is associated with increased risk of behavior and mental health problems (Gilbert, Browne, Fergusson & Janson, 2009).

Establishing links between sources: the writer points to the links between or among different sources used, by comparison or contrast.

Example A: While Rich argues that men enforce compulsory heterosexuality upon women, Suzanne Pharr claims that both homosexual women and men are perceived as a threat to the normative heterosexual patriarchal order, which is characterized by male dominance and control.

Example B: Data from earlier studies (Yamazaki et al. 1985, Munn et al.2002), as well as data from this study, showed that very high levels of IDO immune staining were found to be selectively present in placental synapse.

a) *Sources with similar research findings:* A similar research finding is attributed to different sources.

b) *Sources with similar focus:* The citation points to a link between different sources which have focused on a similar area.

c) *Sources with similar argument:* Here the citation is used to attribute a piece of information to more than one source.

Identification: When there is a reporting verb and the citation is used to identify the agent in the cited sentence. This case is also defined by reference to syntactic position like integral citations where the citation is not in the subject position, but it is the actor in the sentence.

Example A: A simulation model has therefore been developed to incorporate all the important features in the population dynamics (Potts, 1980).

Example B: One possible functional endpoint of ependymal Angpt 1- vascular Tie2 interaction is modulation of occluding expression (Lizasa et al. 2002, Wakuiet al.2006)

Comparison of one's own findings with other sources: Where the citation is used to compare one's own findings with previous research findings to show the similarities or differences.

Example A: As in the cases of classical patriarchy *(Kandiyoti, 1988), also in a Chechen family the husband's kin appropriates his wife's labour. (Anezka, A)*

Example B: This result was similar to the study of *Cho et al.(2012) and further indicated that PRMT5was involved in the regulation of ovarian cancer growth and proliferation.*

a) *Similarities:* The citation is used by the writer to reveal similar previous research findings.

b) *Dissimilarities:* The writer compares his/her own findings with previous research to reveal dissimilar research findings.

To ensure reliability of the analysis in the process of data categorization, one third of the data (i.e., 8 articles per group) was rechecked and reanalyzed independently for citation types and functions by another independent researcher (faculty member of Urmia University of Medical Sciences) who was briefed on the data categorization framework adopted in this study. The obtained correlation coefficient (K= 0.93) between the two ratings was high enough to make the analysis reliable.

Results

Table 1 provides a profile of the corpus used in this study. There were 847 citations in the whole corpus, roughly 14 and 28 citations per thousand words in native and non-native written papers, respectively. According to Table 1, in native articles and non-native articles, word lengths in discussion sections are roughly the same. However, there are big differences in numbers of citation between two groups of our corpus. Iranian medical authors have used twice as many citations as their native counterparts.

Table 1. Description of the Corpus in Native and Non-Native Written RAs

RAs	Word Length of DSs of 24 RAs	Mean word length of DSs per RA	Total No. of citations	Means of Citations per RA	Density Per 1000 words
Native	19330	805.41	298	12.41	14.64
Non-Native	20043	835.12	549	22.87	28.18

Based on Tables 2 and 3, and Figure 1, integral citations are used in non-native articles about five times as many as those of native articles. There is a difference in utilizing verb-controlling in integral citation between the two groups in our corpus. The percentage of verb-controlling citation is 80.9% in native articles. However, this digit is 13.1% in the case of non-native articles with a six-fold difference. Another obvious difference is in the extent of non-integral citations. It is 79.4% in non-native and 92.95% in native articles with an eight and half-fold gap.

Table 2. Frequency of Integral vs. Non-Integral Citations in Native and Non-Native RAs

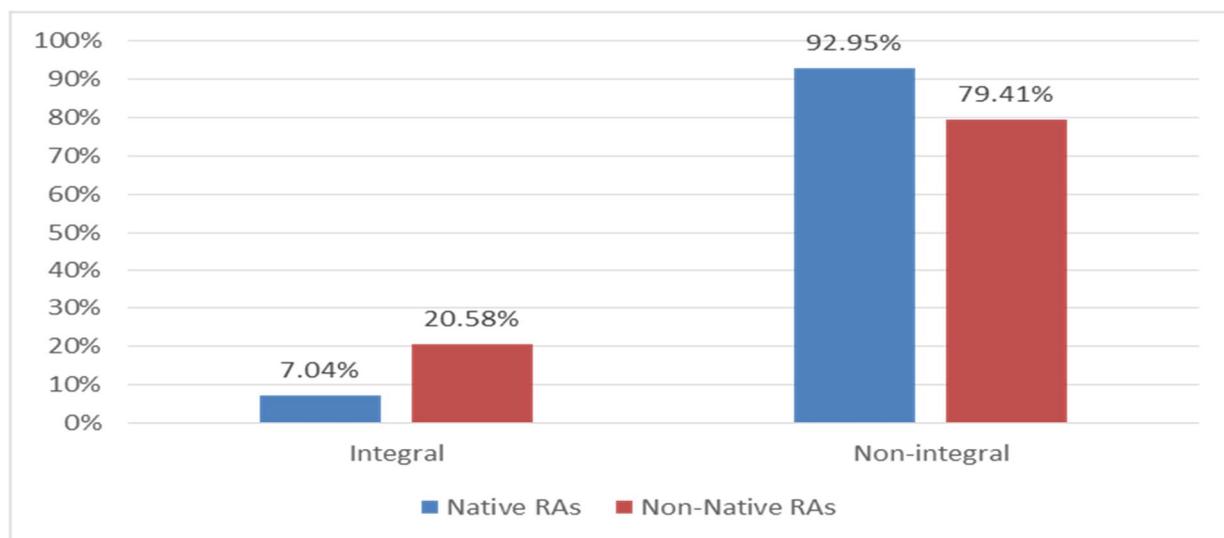| Citation Types	Integral	Non-integral	Total
Native RAs	21	277	298
Non-Native RAs	113	436	549

Figure 1. Percentage of integral vs. non-integral citations in native and non-native RAs

Table 3. Types of Citation in Native Articles and Non-Native Written Articles

As	Integral			Non-integral	
	Verb-controlling	Naming	Non-citation	APA	Vancouver
	F (%)	F (%)	F (%)	F (%)	F (%)
Native	17 (80.9)	2 (9.5)	2 (9.5)	201 (78.21%)	56 (21.78%)
Non-native	15 (13.1)	5 (4.3)	93 (81.5)	45 (10.32%)	391 (89.67%)

The quantitative analysis, also, revealed that Iranian medical faculty members have more tendencies to adopt Vancouver referencing style in their research articles, but their native counterparts adhere to APA referencing style mostly. Non-native articles were written in Vancouver and APA styles 89.67% and 10.32%, respectively. On the other hand, native articles were in APA style 78.21% and in Vancouver style 21.78%. The high frequency in the usage of Vancouver style in non-native articles is a good indication of high frequency of non-integral citation in non-native research articles.

According to Table 3, English speaking researchers employed Verb Controlling, Naming, APA, and Vancouver citation types in their articles more than their Iranian counterparts. Moreover, Iranian faculty members employed citation type of Non-citation far

more frequently than their English speaking counterparts who just had a negligible rate of its use. Chi-square analysis showed a significant difference in the distribution of citations across these two groups (X^2= 75.73, df4, p< 0.001).

The findings on the functions of citations are reported in Table 4. This study found obvious differences in the two functions of citations, namely attribution and comparison. The frequency of attribution function in native articles was more than that of non-native articles by two folds. The opposite was found to occur as far as comparison function is concerned. Quite surprisingly, comparison function of citations was employed in Iranian research articles 64 times as many as the ones written by native researchers. Reference function and support function were used almost in the

same frequency in native and non-native research articles. Reference function was used in non-native articles 34.59% and in native articles 35.35%. Support function was used in non-native articles 12.47% and in native articles 15.81%. Identification function was used in non-native articles 1.65% and in native articles 6.98%. Percentage of establishing links with other

sources as one citation function was roughly the same in two types of research articles in this corpus. As Table 4 shows, there were not any instances of citations in two of the analyzed native articles, meaning that their authors have not included any citations from other studies in the literature.

Table 4. Frequency of Citation Functions in Native and Non-Native RAs

Groups	Attribution	Support	Reference	Establishing Links	Identification	Comparison	Total
	F (%)	F (%)	F (%)	F (%)	F (%)	F (%)	
Native Articles	63 (29.3)	34 (15.81)	76 (35.35)	25 (11.63)	15 (6.98)	2 (0.93)	215
Non-Native Articles	44 (10.35)	53 (12.47)	147 (34.59)	45 (10.59)	7 (1.65)	129 (30.35)	425
Total	107	87	223	70	22	131	640

According to Table 4, English speaking researchers use the Attribution (29.3%), Support (15.8%), Reference (35.3%), Establishing Links (11.6%) and Identification (7%) functions in their articles more frequently than their Iranian counterparts whose usage of the same functions are 10.3%, 12.4%, 34.5%, 10.6% and 1.6% respectively. Also, the results of Table 8 reveal that among Iranian faculty members the use of Comparison function (30.3%) is higher than their native counterparts (0.9%). The chi square test of differences between native and non-native articles in the function of citations is again significant ($X2=104.19$, df5, $p<0.001$). Thus, it is concluded that there are significant differences in citation functions used in published research articles in medical sciences between Iranian faculty members and their English speaking counterparts.

Discussion

This study found obvious differences in two functions of citations, namely attribution and comparison. The frequency of attribution function in

native articles was more than that of non-native article by two folds. The opposite was found to occur as far as comparison function is concerned. Quite surprisingly, comparison function of citations was employed in Iranian research articles 35 times more than the one among native research articles.

The chi square test of differences between native and non-native articles in the function of citations is statistically significant, suggesting that there are significant differences in the function of citations in published research articles in medical sciences between Iranian faculty members and their English speaking counterparts. the function of citation in scientific discourse is not only to acknowledge the work of others but also to promote the writer's own knowledge claims (10). Berkenkotter and Huckin eloquently point this out by the title of their article "*You are what you cite*" in research publication industry similar to *you are what you eat* in food sciences (12). Latour consider citations as weapons researchers employ or even exploit previous literature in the field to their advantage (13). This study compared citation practices of native and non-native

medical researchers in published research articles. It delved into enumerating citation types and functions in a sizable number of research articles in credible journals with a good impact factor. To the best of the researchers' knowledge, there was not any similar study in the literature on native and non-native medical researchers' citation practices. However, the findings of this study are analyzed in light of some relevant studies in the literature. Regarding the rate of citations among the analyzed research papers, we found that Iranian non-native medical authors had a higher frequency of citations in their papers as it was similarly reported in Petrić (14). Using textual analysis and interviews with student writers, Petrić (14) probed into English as a Second Language (ESL) graduate students use of direct quotations in their theses by comparing direct quotations in high-rated and low-rated master's theses. The findings showed that there is a positive correlation between the number of citation and the rating each thesis received. The more the number of citations, the higher the rating a thesis had.

One plausible justification for the high frequency of comparison functions of citations in non-native medical RAs can be attributed to publish and perish policy fervently pursued at Iranian universities. The researcher had an interview with one-third of the non-native authors of corpus and according of their claims, to get promoted in Iranian universities, one has to publish an exceeding number of research papers. Thus, there is great pressure on the faculty members to publish fast and profusely produce and publish research output. To do so, Iranian medical authors probably conduct more confirmatory and replicated research studies which may enjoy less originality. Such studies may lend themselves more easily to comparison function citations and that may be why other functions of citations are less common in their research articles.

Moreover, one posit that compared to other functions of citations such as attribution, comparison

use of citations is an assembly line method to boost the number of citations in the discussion section of a paper, thereby promoting publishablity of an RA in the respective journals. These two possible interpretations may account for the high frequency of citations in general and comparison citations in the RAs of Iranian medical researchers.

The discrepancy in the types of functions of the citation between native and non-native authors in one macro discipline, namely medical sciences, indicate that more instruction on various types of citations as well as rhetorical functions of citations should be provided to non-native authors to enhance their writing skills and generic awareness in producing quality academic papers.

Experienced researchers usually cite their peers, while novice ones make references to the studies carried out by those with a superior status, where issues of power are not similar and this might affect their evaluations of others and the confidence with which they do so. Wenger (2000) explains that new comers need to align their activities with the established practices of that community to be fully accepted as members of the community (15).

In this study, native researchers and their citation practices act as a yardstick. As the results revealed, there are significance differences between native and non-native research articles. The non-native writers in our study did not use similar patterns of citation as seen in native writers. Therefore, guidelines can be developed for non-native researchers to help them to learn more on the types and functions of citations as important issues in composing high quality articles with a good chance for publishing in international journals with high impact factor. Introducing standardized pattern in scientific writing and subsequently research articles is another implication of the study. The way of employing citation and purpose of citation is important in research articles and can be a standard indicator.

The findings of the study can provide insights into the design and instruction of advanced academic writing courses. In the case of advanced research students who are learning to write up their research, EAP instructors could raise awareness of all possible types and rhetorical functions of citation in scientific communication. Finally, the findings of this study can be applied in tailoring EAP courses and pedagogical materials and activities to foster Iranian medical researchers' and faculty member's understanding on the recurrent patterns of citations in medical genre and approximating their practices with those of their counterparts in English speaking countries where they normally submit their research output for evaluation and publication.

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