Effectiveness of Translating English Technical and Scientific Terms by Arabicization Strategy in Al-Oloom Li-Omoom Magazine and Syrian Researchers Network on Reader’s Understanding

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ABSTRACT

This research paper is a genuine one since all previous researches discuss Arabicization as a strategy of translation. However, this paper investigates this strategy as a problematic issue that translators of scientific and technical articles face. This study is based on the theoretical frames of scientific and technical terms discussed in Pinchuck (1977) and Olohan (2013). It also includes the lexical borrowing definitions of Catford (1976). Arabicization is also discussed based on Ahmed (2011) and Al-Asal and Smadi (2012) studies. A questionnaire has been conducted to investigate the readers’ understanding of Arabicized terms. 160 respondents have answered the questionnaire. The data are quoted from Al-Oloom Li-Omoom magazine and Syrian Researchers network. The questionnaire’s results are analyzed through using SPSS technique. The study concludes that different level of understanding the technical and the scientific terms depend on the frequency of use. The frequent use of the technical terms in our daily life makes these terms are more grasped than the scientific ones. This study also reveals that translating scientific terms using Arabicization is a problematic issue and makes these terms difficult to be understood by regular people who are not expert in the field. Footnote is a good strategy to solve this problematic issue.

INTRODUCTION

Translating science from different fields online is one of the most attractive points for Arab publishers who are interested in the digital content of Internet. Mawdoo3 is a Jordanian comprehensive website involves a total of 0.89% Arabic content. This increase of the online Arabic content has raised the need for translation in the scientific and technical fields. This problematic issue creates a challenge for translators to convey the same scientific and technical expressions and terms in Arabic. This paper is, therefore, investigates the Arabic translation contents (scientific and technical terms) in Al-Oloom Li-Omoom Magazine (Arabic translation of Popular Science) and the Syrian researchers network and how it may affect the different readers’ understanding of these terms and expressions.

The scientific and technical magazines and networks hire specialist translators to fulfill the needed goals. This issue leads this study to investigate the use of lexical borrowing in translating the technical and scientific terms and expressions into Arabic. These scientific and the technical terms are difficult to render in Arabic language. Consequently, this research discusses Arabic readers’ responses in translating different articles from Al-Oloom Li-Omoom Magazine and the Syrian Researchers network.

Statement of the Problem

This research paper sheds the lights on of the challenging points that face translators of scientific and technical articles even if they are specialist. The core of this problem is that there is no equivalence for hundreds of English STs in Arabic as a TT. As a result, many scientific and technical dictionaries and glossaries have been found at the last decades or at least have been updated many times because of the new added terms. The magazine and the network that are mentioned previously aim to spread the science among ordinary and not specialized people who have only scientific and technical interests. Accordingly, another problem may occur which is the readers’ inability to understand the translated articles because they are not able to understand the loanwords. Therefore, this research investigates if the readers have faced any problem in understanding the information or not. It also investigates if people understanding of such terms differs according to the field that the term belongs to.
Purpose of the Study

Many glossaries and dictionaries have been found for scientific and technical terminology. There are also many researchers have discussed different strategies for translating STTs. However, those that discussed the lexical borrowing in scientific concepts are not many. Lexical borrowing is not discussed as a problematic issue at least in Arabic.

This research paper is initiated to refer to different lexical borrowed terms from the scientific magazine Al-Oloom Li-Omoom and the network Syrian Researchers. It mainly and pointedly analyzes the lexical borrowed words from into Arabic and the effectiveness of the using of these terms on the readers’ understanding.

Research Questions

This research paper attempts to find answers for the following questions:
1) How does lexical borrowing affect common Arab readers’ understanding of scientific and technical terms in online translated scientific magazines and networks?
2) How do the readers’ responses toward the scientific and technical terms differ from a scientific field to another one?
3) How lexical borrowing for scientific terms can be considered as a problematic point in Arabic?

Significance of the Study

Many researchers have discussed lexical borrowing in different languages and different fields like science and technology. The findings and the results of this research will redound to the benefit of translators who translate scientific and technical articles especially when they translate specialized terms that have no equivalences in the target language. This study shows if there is a problematic point in translating some concepts on readers understanding.

Thus, translators, either freelancers or not, who take into their account the results of this study will hopefully be able to have a better translation. The results of this study might also be helpful for linguists since they can reach new problematic points in their fields related to the idea of lexical borrowing. They can discuss more about the borrowed terms into Arabic and how to form and structure these terms.

LITERATURE REVIEW

The researcher refers to different previous studies about translating scientific and technical terms generally and translating these terms by lexical borrowing specifically. Although the researches that discussed this topic are not wide, scholars have discussed it deeply recently and previously. Catford (1967) emphasizes that it is very difficult to establish translation equivalence between lexical items especially if the terms are technological or scientific ones. This research investigates mainly the process of Arabicization as a way to translate these terms. It is also discussed as problematic point for translators. It discusses the efforts that were made by Arabic Academies to find terminology for such kind of terms.

Lexical Borrowing of Scientific and Technical Terms

Lexical system is flexible one toward any changes between languages this is the reason why we have lexical borrowing between languages. Another reason is that equivalences are not always found for all terms especially in the case of scientific and technical terms. Pinchuck (1977, p. 53) says that “one language will have no words for a concept expressed in the second language”. New scientific and technical glossaries and terminologies show that most of the terms are either borrowings or new applications of words. While reading scientific texts, readers need to read and understand what the author intended to say and nothing else. It is preferable to refer to Pinchuck’s indication that “a text should give readers just enough information for their purposes; no more, no less” (1977, p. 206). Catford suggests in his studies that “the central problem of translation practice is that of finding TL translation equivalents. A central task of translation theory is that of defining the nature and conditions of translation equivalence.” (1967, p. 21). English is considered as the lingua franca of different fields like science and technology. Thus, dividing English terminologies according to the fields enables the readers to understand the terms easily. This is called as English for specific purposes. Olohan states that scientific and technical translators nowadays tend to be “aspired to be inquisitive and knowledgeable in a broad range of disciplines, spanning languages, science and technology” (2013, p. 2). This is because scientific and technical terms need to be clarified within the context so the readers can understand the text.

Arabicization

Lexical system is responsive to any changes between source and target languages in the case of translation. Awang and Salman (2017) indicate in their research papers that the term Arabicization is used when there is a lack of equivalences in Arabic. They also claim that most of new scientific and technical terms (STTs) lack natural equivalents in the target language such as Arabic. Most of Arabic linguists and researchers who investigate lexical borrowing agree on that is phonetic borrowing. However, it is expressed in Arabic as (اتتيريب) (التعريف). Al-Asal and Smadi (2012) state that Arabicization is used to refer to a process of translation where a term form SL is only translated stratification with the Arabic phonological and graph-logical systems. They also indicate that “when a certain English technical term is Arabicized, it means that it is linguistically borrowed from English and used in Arabic with some modification, e.g. ‘filtration’ (فلتر) or without modification, e.g. ‘fitter’ (فترة) (2012, p. 22). However, Darwish has added previously that “the phonetic properties of the source language technical terms are rendered with modifications to suit Arabic pronunciation methods” (2009, pp. 113-114). Arabicization is the process “of translating foreign terms using Arabic forms”; this definition is conveyed...
by Ahmed (2011) who believes that the process of *Arabization* is an adopted strategy to introduce new concepts into Arabic.

**Arabic Language Academies Efforts**

Darwish (2009) has indicated in his research that the most important task that was done by these Arabic Language Academies since foreign languages. These academies spread among Arab countries such as in Damascus 1919, in Cairo 193, in Baghdad 1974 and in Amman 1976. He also has indicated that these Arabic language academies have used resolutions to develop the scientific and technical terminologies. One of the efforts was done by the academy in Cairo when it develops the entries of Arabic language in different fields by establishing a library with more than 40,000 titles related to different fields. In addition to the previous efforts, one of the efforts that highly affect the Arabic terminology is a project done by Arab Organization for Translation (AOT) to collect all the terms that are borrowed from other languages in one glossary. Through most of the researches, books and glossaries, not any of them has studied these lexical borrowed terms as a problem that affect readers’ understanding. However, none of them conveys how readers understanding ranging according to the field from which the term comes.

**Al-Oloom Li-Omoom Online Magazine**

It is an Arabic online magazine. It is publishing translated articles from different fields of science and technology. However, all the articles are translated from the original articles in the original magazine, Popular Science. They are translated by specialist translator in science and technology. The aim of this magazine as it is shown from its name is to spread the science among the common readers.

**Syrian Researchers Network**

The slogan of this network is “We will write sciences with Arabic letters”. This network is an initiative for encouraging reading sciences. It is established by specialist translators who are in different fields. The articles that are translated and published in this network are from different English resources. However, all of them are documented with each article. The aim of this network is to make science available for all Arab readers from different countries and different fields. The common thing between the readers is science love.

**METHOD**

This study is a descriptive qualitative and quantitative textual analysis analyzing the lexical borrowed terms in Arabic language. It investigates them within their different fields either technical or scientific. The terms are collected from the translated scientific magazine *Al-Oloom Li-Omoom* and the translated articles in the *Syrian Researchers Network*. They are analyzed within the Arabic contexts to investigate whether they are understandable for the common Arab readers or not.

**Instrument and Procedures**

The data were collected in November of 2018. A total of 20 selected lexical borrowed scientific and technical terms are extracted from about 15 articles either from the magazine or the network through the researcher’s reading of the recent published articles. The researcher collected the samples from two different resources because of the shortage of such these terms in Arabic. These samples are first categorized according to their field whether they are scientific or technical. Linguists such as Pinchuck (1977) distinguish between the two fields.

These samples then are examined in the selected contexts based on the strategy of *Arabization* of Al-Asal and Smadi (2012) and Darwish (2009). It also investigates how this strategy may affect the target readers’ understanding.

A questionnaire is designed to measure the responders’ understanding. The questionnaire has different types of questions including yes-no questions and multiple choices. The questions are for investigating the responders’ understanding of 20 chosen lexical borrowed terms in the quoted contexts.

160 Jordanian responders who were chosen randomly have answered the targeted questionnaire. It is not restricted by age since the magazine and the network from where the samples were selected do not limit their readers within a specific age. The survey website also does not put any age restriction that can prevent any one to respond. The responders differ in their educational level; some of them are university graduates and some are still school students.

The questionnaire is a soft copy one that is designed on www.survs.com, a website that offers questionnaire service. It is distributed on social networks such as Facebook, Twitter and WhatsApp so the highest number of responses can be reached. SPSS software has been used by the researcher to analyze the collected data from the questionnaire and giving highly precise data in order to reach accurate findings.

**DATA ANALYSIS**

This chapter analyzes both the samples according to the strategy of *Arabization* and the results of the questionnaire. The results of analyzing the data will lead to the findings of this research paper which will hopefully add new results to the theories of translation field.

**A Model Sample Analysis According to the Strategy of Arabization**

Awang and Salman state that *Arabization* methods include “phonetic borrowing via transliteration, which is generally referred to as Arabization (at-ta‘rib) by many scholars of Arabic, as well as word formation techniques such as derivation and composition” (2017, p.93). The 20 samples that are stated in the following Table 1 are selected from *Al-Oloom Li-Omoom* and *Syrian Researchers Network*. They are translated by using the Arabization strategy. Al-Asal and Smadi indicates that *Arabized* word means that “it is linguistically borrowed from English and used in Arabic with some modification or without” (2012, p.22).
A good example is the word “the photons” that is Arabicized as “الفوتونات”. This term is scientific one and it is translated via transliteration. However, the Arabic features are obvious on the word fotonaat. The features here are how the word is pluralized with the post modifier (ات) aat as alternative of the plural (s). It is also definite by using Arabic pre-modifier (ال) al as alternative for article (the).

The rest of samples are illustrated according to Arabicization strategy in the following Table 1.

| Scientific/technical terms | Arabicized terms (at-ta’rib) | Pre | Root | Post |
|----------------------------|------------------------------|-----|------|------|
| Robot                      | روبوت                        | _   | _    | _    |
| Wi-Fi                      | الواي فاي                    | _   | واي فاي | أندرويد |
| Android                    | أندرويد                      | _   | أندرويد | _    |
| IOS                        | أي أو أس                    | _   | أي أو أس | _    |
| The Internet               | الإنترنت                    | _   | الإنترنت | _    |
| GIF                        | جيف                        | _   | _    | _    |
| iPhone                     | الأيونون                    | _   | _    | _    |
| Google                     | غولغل                      | _   | غولغل | _    |
| Bluetooth                  | البلوتوث                    | _   | _    | _    |
| Mega Pixel                 | ميغا بيكسيل                | _   | ميغا بيكسيل | بروكسي |
| Proxy                      | البروكسي                   | _   | _    | _    |
| Gravitons                  | الغرافيتونات               | _   | _    | _    |
| Ion                        | أيون                        | _   | أيون | _    |
| Neutron                    | نيوترون                     | _   | _    | _    |
| Gamma                      | جاما                       | _   | جاما | _    |
| Argon                      | الأرغون                     | _   | أرغون | _    |
| Ribosomes                  | الريبوسومات                 | _   | _    | _    |
| Mitochondria               | الريبوتريديا               | _   | _    | _    |
| Adrenaline                 | الأدينرينيل                | _   | _    | _    |
| Polymer                    | البلومير                    | _   | _    | _    |

**Table 1: Arabicized scientific and technical terms in Al-Oloom LI-Ooom Magazine and Syrian Researchers Networks**

**ANALYSIS OF QUESTIONNAIRE RESULTS**

**Introduction of the Analysis**

All the terminologies distinguish between the scientific terms and the technical terms. However, this study investigates whether the two main fields differ in their understandability according to the common readers’ assessments. The questionnaire, which is in the Appendices, consists of 6 questions. The questions are sequent in a way that lead the researcher reach the findings clearly. This section of the study analyzes the responses on the questionnaire question by question through analyzing the frequent answer, the mean, the median, the mode and the finding for each question independently.

**Questions Analysis**

- The first question, represented in Figure 1, is about the field on which the responders are keen. The choices for this question are three including the scientific field, the technical field or both of them.

After collecting the 160 responders and analyzing the responses on the SPSS software, the responding frequency on this question is illustrated by the following pie chart:

- In Figure 1, It is obvious that most of the responders are interested in the technical field. They shape 43.1% of the pie. The reason of this could be because of the rapid technical and technological development around the world. However, 34.4% of the responders are interested in both fields but the other 22.5% prefers only the scientific fields. This question is a good introduction for the questionnaire since it divides the responders according to their interests. The mode of this question refers to the technical field. As SPSS shows, the mode and median for this question is technical field.

- The second question investigates which field is more understandable for the readers than another. The answers of this question include either scientific or technical terms. The frequency of answers on each choice is indicated in the following pie chart:

Figure 2 shows that 75% of the responders indicate that the technical terms were more understandable for them when they read them within the context. However, 25% of the responders have found the scientific terms easier to understand than the technical. According to SPSS analysis, most of the 25% responders are more interested in science than technology. This has a good indication which is that interests or specialization can really affect the level of understanding. However, mode and
median for this question also refer to technical terms.

- The third question, represented in Figure 3, is a yes-no question. It investigates whether the frequency of the technical terms in our daily life is the reason behind making it more understandable or not. Responders answers are clarified in the following pie chart:
  - According to SPSS analysis, 95% of the responders have answered with (Yes) as shown in Figure 3. They believe that the frequent using of technical terms in the daily life is the reason why they are more understandable for them. However, only 5% of the responders agree on that the frequency of the technical terms is not related with their understandability. Since 152 out of 160 responders agree on this reason. The research can generalize within these limited selected samples that the frequency of using of the terms raises their understandability. However, Mode and median for this question is (yes).

- The fourth question, represented in Figure 4, investigates whether the scientific terms need specialized readers in specific scientific field to understand them or not. This question is a yes-no question. The clarification of the responders answers is presented in the following pie chart:
  - Figure 4 shows that 75.6% of the responders recognize that the 10 samples that they have read within the selected contexts need readers who are specialized in science fields. However, the other 24.4% responders agree on that these samples are easy to understand and do not need specialized readers. SPSS analysis shows that the 24.4% are interested only in science or in both science and technology and they are maybe specialized in any scientific field. This indicates that scientific terms are not clear enough since they are not used in their daily life. Mode and median here refer to the first choice (yes).

- The fifth question, represented in Figure 5, studies whether adding footnote about the scientific terms or defining the terms can help in clarifying the terms or not. This question is a yes-no question. Readers’ responses on this question are illustrated within the following pie chart.
  - In Figure 5, the SPSS results show that 87.5% of the responders need footnotes for the terms to make them understandable. However, 12.5% of them do not need any clarifying information. Footnote might be a good way to clarify these terms but it indicates more information than the ST. The mode for the question is (yes). The mean for this question also is the answer (yes). A clear
indication can be shown from these results. Footnote in such cases and with such terms could be a good solution for misunderstanding.

• The sixth question, represented in Figure 6, is multiple choice one. Where the responders chose the reason that makes some terms more understandable the others. The results of responders’ choices are indicated in the following pie chart (Figure 6):

• The most expected three reasons behind understanding the terms are indicated in this question (Figure 6). SPSS results reveal that 60.6% of responders believe that they understand the terms because of their previous experience. However, 25% of them think that context success in clarifying the terms. The last percentage goes for the clarity of the terms as translated ones. Only 14.4% of them think that translators have success in their translating. SPSS also shows that mode and median for this question go for the second choice.

Results of Analysis

After analyzing the responders’ answers on SPSS, it is obvious that technical and scientific terms differ in their understandability. 75% of responders believe that technical terms are more understandable than scientific. However, 95% think that the frequent use of technical terms make them more understandable. A surprising point is that Al-Oloom Li-Omoom and Syrian Researchers are for common readers. However, 75.6% believes that scientific terms need specialized readers to understand them. In addition, 87.5% of responders think that footnote could be a good way to clarify these terms. Most of them believe in their previous knowledge as a reason for understanding the terms.

CONCLUSION

Review of the Study

This study investigates the scientific and technical terms in Al-Oloom Li-Omoom Magazine and The Syrian Researchers Network. 20 samples are selected from the previous source texts. This study also investigates how these terms translated by Arabicization strategy. Since these terms are lexical borrowing from English and have no equivalence, translators translate them via transliteration.

The study indicates the 20 samples and analyze the applied modifies on them to make them as Arabic terms. In addition, this study goes through different recent and previous studies about lexical borrowing and Arabicization like Catford (1967). It also refers to the translation of scientific and technical terms such as Pinchuck (1977).

This research mainly investigates the different readers’ responses toward these terms. A questionnaire has been conducted to investigate the responders understanding of the terms. However, the questionnaire tends to differ between technical and scientific terms in order to reveal which ones are more understandable for common readers. 160 responders have answered six different questions. SPSS has been used to analyze the results of the questionnaire. Percentages are given precisely using SPSS. In this chapter, the findings of analysis and questionnaire results are revealed.

Research Questions Revisited

This research paper attempts to find answers for the following questions:

1) How does lexical borrowing affect common Arab readers’ understanding of scientific and technical terms in online translated scientific magazines and networks?

2) How do the readers’ responses toward the scientific and technical terms differ from a scientific field to another one?

3) How lexical borrowing for scientific terms can be considered as a problematic point in Arabic?

FINDINGS AND RESULTS

Analyzing the results of the questionnaire using SPSS concludes that there are many researchers do not distinguish between the translated scientific terms and technical terms in terms of understandability. However, the result of the questionnaire reveals that technical terms are more understandable.
The different level of understandability is because of the differences in the frequency of use. Mostly, technical terms refer to things related to technology. We are highly dependent on technology and use the technical terms in our daily lives. As a result, the frequent use of technical terms makes them more understandable than scientific.

Translating scientific terms using Arabicization is a problematic issue. Although the terms are Arabized with modifiers to make it more familiar to Arab readers, they find it difficult to understand. They also believe that these terms need specialists to understand them. However, they think that adding footnotes for the terms could be a solution for this issue.

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تحتوي هذه الاستبانة على مجموعة من المصطلحات العلمية والتقنية المتعلقية باللغة العربية. حيث تدرس هذه الاستبانة مدى فهم القراء العربي للمصطلحات الطبية والتقنية المقتبسة من شبكة الباحثين السوريين ومن مجلة العلوم للعلوم. 

تستخدم هذه الدراسة القراء المتخفيين قراءة المجلات العلمية باللغة العربية والإنجليزية لاختبار فهمهم للمصطلحات المختصرة في المجال العلمي. بعد قراءة هذه المصطلحات ضمن السياق المطروح أجب عن الأسئلة التالية:

| السؤال الأول: هل أنت مهتم بالجانب ( العلمي ( التقني ( كلاهما ( لا
|---|---|---|---|
| السؤال الثاني: الصلاحيات العلمية والتكنولوجية ( المصطلحات العلمية ( المصطلحات التكنولوجية ( لا
|---|---|---|---|
| السؤال الثالث: ما هي المصطلحات العلمية والتكنولوجية ( لا ( نعم ( لا ( لا
|---|---|---|---|
| السؤال الرابع: ما هي المصطلحات العلمية ( لا ( نعم ( لا ( لا
|---|---|---|---|
| السؤال الخامس: هل ترى أن فهم المصطلحات العلمية المختصرة يحتاج إلى شخص متخصص في المجال العلمي الذي ينتمي إليه ( مختلف ( لا ( لا ( لا
|---|---|---|---|
| السؤال السادس: هل ترى أن إضافة معلومة هامشية تتعلق المصطلح أمر ضروري لتفويضفهم المصطلح في حلال عجز السياق ( لا ( نعم ( لا ( لا
|---|---|---|---|
| السؤال السابع: هل يمكن أن تعيش بدون وجود المتوقف؟ ( لا ( نعم ( لا ( لا
|---|---|---|---|
| السؤال الثامن: هل ترى أن كثرة تداول هذه المصطلحات جعلتها م המדינה ( لا ( نعم ( لا ( لا
|---|---|---|---|

**Arabic Questionnaire**

This questionnaire contains a set of scientific and technical terms written in Arabic. It studies the reader's understanding of the terms extracted from the Syrian Researchers Network and Al-Oloom Magazine. After reading these terms within the context provided, answer the following questions:

1. Are you interested in the ( scientific ( technological ( both ( none: after reading the terms, which terms were easiest and clearer?
2. Are the scientific and technological terms that were easier and clearer:
   - The scientific terms
   - The technological terms
   - Both
3. Do you think that the overwhelming use of these scientific and technological terms in our daily life made them popular for everyone, even if they are from another language?
4. Do you think that understanding specialized scientific terms requires a person who is a specialist in the field of science?
5. Do you think that adding a marginal explanation for the term is necessary in case the context fails to explain it?
6. Is the reason for understanding some or all of these terms scientific or technological?
English Questionnaire (the Translation of Questionnaire)

This questionnaire consists of 20 scientific and technical terms in different 20 contexts translated by specialized translator in science. It investigates the readers’ understandability of such these terms. This questionnaire is not only for specialized readers.

The following are 20 scientific and technical terms quoted for the Popular Science magazine and the Syrian Researchers network. Read them and then answer the following questions:

- New engineers at MIT have designed an autonomous robot that can keep pace with foot traffic.
- You can use aluminum foil to strengthen your Wi-Fi signal
- Make Android and iOS work together.
- How to share huge files on the Internet?
- The best ways to make your own GIFs
- 6 reasons to upgrade your iPhone right now
- Google glass, Eye on future
- The glass is consonant with any phone supports Bluetooth.
- The camera’s resolution is 5 mega pixels
- A proxy server sits between your computer and a wider network.
- These events could even uncover the secrets of gravitons, the theoretical particles that could be the source of gravity.
- As photons hit the solar collectors, they nudge them background little by little.
- Upon further investigation using ion beam microscope, the team identified speak as coenocytes.
- Collecting Neutron stars during merging, ejecting and shooting out gamma rays.
- Artifacts can also be placed in a chamber filled with gases like argon.
- Ada E. Yonath will receive the prize in chemistry for her work on Ribosomes.
- Infinitely recyclable polymer shows practical properties of plastics.
- You can’t survive without mitochondria.

| Question | Options |
|----------|---------|
| Q1) Are interested in: | a. Science | b. Technology | c. Both |
| Q2) The terms that are more understandable for you are: | a. Scientific terms | b. Technical terms |
| Q3) Does the frequency of the technical terms make them more understandable? | a. Yes | b. No |
| Q4) Do the 10 selected scientific samples need specialized readers to understand them? | a. Yes | b. No |
| Q5) Do you think that adding a footnote following the terms can raise the readers’ understanding of these terms? | a. Yes | b. No |
| Q6) The reason behind your understanding of some or all terms is: | a. They are clear as translated terms | b. The contexts clarifies these terms | c. I know these terms before |