

Journal of Shabwah University

for Humanities and Applied Sciences

(A Bilingual Refereed Scientific Periodical)

Vol. 1, No. 1

June 2023



Shabwah University



Shabwah University Journal for
Humanities and Applied Sciences
(A Biannual Scientific Refereed Periodical)

Volume 1

Issue 1

June 2023

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Deanship of Postgraduate Studies and Scientific Research,
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Two Arabic Translations of Dickens' *A Tale of Two Cities*: Scrutinizing Translation Shift through Techniques and Product Quality

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Abstract

This study addresses the application of translation shift theory and how it is manipulated through the analysis of two Arabic renderings of Dickens' A Tale of Two Cities in terms of translation techniques and products. It draws on the work of J. C. Catford (1956) as a theoretical framework on which the whole analysis is conducted. This classic novel was translated by Muneer Al-Baalbaki (2006) and Sonya Al-Kush (2016). The study reveals that the five categories of Catford's translation shifts occurs, and that there are 181 translation shifts in the two Arabic translations, with class shifts being the most frequent translation shifts with a percentage of 36.46% (= 66 shifts). Unit shifts came at the second in rate, scoring 28.72% (= 52 shifts). This is followed by intra-system shifts 18.23% (= 33 shifts), then structure shifts 11.04% (= 33 shifts), and finally level shifts 5.52% (= 10 shifts). Moreover, it was concluded that Al-Kush is more attentive than Al-Baalbaki in applying translation shifts with a percentage of 96.13%, and 73.48%, respectively.

Paper Information

Received: 25.03.2023

Accepted: 21.05.2023

Keywords

Translation shifts theory, *A Tale of Two Cities*, Arabic translations

1. Introduction

Translation is closely related to progress. All the periods of awakening in the history of nations start with translations movements which lead to the meeting of different cultures and civilizations, and introduces nations to various perspectives while on their paths to modernization and intellectual advancement. Therefore, translation is considered to be a change of form; that is a change of structures from a source language (SL) into a target language (TL). A rather simple definition of translation as “the replacement of textual material (SL) by equivalent textual material in another (TL)” is suggested by Catford (1965, p. 20). Translation, according to Nida and Taber (1969), “consists in reproducing in the receptor language the closest natural equivalent of the source language message first in terms of meaning and secondly in terms of style”, (p.12). Newmark (1988) stated that “Translation is a craft consisting in the attempt to replace a written message and/or statement in one language by the same message and/or statement in another language” (p. 7).

Shifting is a main concept in sentence analysis in translation. The concept of shifting helps to learn how a unit of different level can be brought down to create interesting structures. Catford (1965) stated that by shifts, we mean “departures from formal correspondence in the process of going from the SL to the TL”, (p.73)” Shifts occur when the SL text is translated into a different grammatical or phonological form in the TL text.

The present study intends to provide an insight into the internal structure of Dickens' famous novel *A Tale of Two Cities* from a discourse-stylistic perspective by analysing the translation shifts employed in translating it into Arabic. This study focuses on translation shifts in two Arabic translations of that novel by Muneer Al-Baalbaki and Sonya Al-Kush. Al-Baalbaki's translation was published in 2006 by Dar Al-Ilem Lilmalayin for authoring, translating and publishing, Beirut, while Al-Kush's translation was published in 2016 by Dar Al- Harf Al-Arabi for printing, publishing and distribution, Beirut.

This study aims to identify the expressions which have undergone a type of shift while being translated and to find out the most appropriate shifts that may develop these two translations. In addition, this study intends to find the most frequently used types of shifts in the translation of the novel *A Tale of Two Cities* to overcome the linguistic differences between English and Arabic. This study compares the existing shifts in the two translations of the novel under study. Furthermore, the expressions that need the application of shift technique are identified. More precisely, applying the translation shifts makes their meaning more suitable and in harmony with the source text.

1.2. Questions of the Study

This study is based on the following questions:

1. What are the frequent translation shifts that appeared in Dickens' *A Tale of Two Cities* in the two Arabic translations under study?
2. What are the techniques adopted by the two Arabic translators when translating these shifts in the two translations of the novel under study?
3. How attentive have the Arabic translators of *A Tale of Two Cities* been to the translation shifts in the final product of the original text?

2. Literature Review

Different theories exist in the literature regarding translation shifts; however, the emphasis was on Catford's model.

2.1. Theories of Translation Shifts in Brief

In discussing the theories of translation shift, it is better to have a brief account about the definition of the term shift. Catford (1965) defined shifts as “departures from formal correspondence in the process of going from the SL to the TL”, (p.73). According to Newmark (2006), shift is defined as “a translation procedure involving a change in the grammar from SL to TL”, (p.85). Hatim and Munday (2004) defined it as “the small changes or ‘shifts’ that occur between units in a ST–TT pair”, (p.26). Munday (2016) pointed out that “Translation shifts are linguistic changes occurring in translation of ST to TT”, (p.95) In addition, Bakker, Koster and Leuven-Zwart (2009) defined translation shifts as ““changes which occur or may occur in the process of translating”, (p.269). Palumbo (2009) explained that:

A shift is a linguistic deviation from the original text, a change introduced in translation with respect to either the syntactic form or the meaning of the ST. Considering the differences existing between languages (even close ones such as French and Spanish) at the structural level as well as the different cultural background of audiences in any language pair, shifts can be seen as inevitable features of translations, (p.104).

Throughout history, translation shifts were investigated by a number of scholars. This study concentrates on one of the most known theories about translation shifts. In addition to Catford's Model of translation shifts there are some other common ones that have been proposed over history of translation studies as frameworks of analysis for translation shift from different perspectives. It is impossible to discuss all of them in the present study. These are some of the translation shifts models:

1. Vinay and Darbelnet Model (1958)
2. Leuven-Zwart's Model (1989, 1990)
3. Newmark's Model (1988)
4. Popovich's Model (1970)

2.2. Catford's Model

The concept of shift is crystalized on the hands of Catford (1965) who distinguished between textual equivalence and formal correspondence. A textual equivalence, for him, is any TL text or portion of a text which is observed to be the equivalent of a given SL text or portion of a text. A formal correspondent, for him, is any TL category which can be said to occupy, as nearly as possible, the same place in the economy of the TL as the given SL category occupies in the SL. Therefore, the formal correspondent suggests aiming for textual equivalence which can be carried out through the translation shifts.

He distinguished two types of untranslatability, which he termed linguistic and cultural. At the linguistic level, untranslatability occurs when there is no lexical or syntactical substitute in the TL for an SL item. It is due to a difference in the SL and TL. However, cultural untranslatability occurs due to the absence in the TL culture of relevant situational features for the SL text.

The translator may use a variation of procedures that differ in importance according to the contextual factors of both the ST and the TT. One of the most important elements of these procedures is translation shift. Therefore, shifting is a major concept in sentence analysis in translation. The concept of shifting helps to learn how a unit of different level can be brought down to create interesting structures. Shifts occur when the SL text is translated into a different grammatical or phonological form in the TL text. There are two major types of shifts: level shifts and category shifts.

2.3. Level Shifts

According to Catford (1965, 2000) a level shifts occurs when an SL item at one linguistic level, for example grammar, has a TL equivalent at a different level, for instance, lexis. He states that it is possible for translation to occur between the level of phonology and graphology, or any of them, on the one hand, and grammar and lexis, on the other hand. Moreover, the only possible shifts are from grammar to lexis and vice versa which are quite common in translation between languages. For example, translating the English present progressive into Arabic lexis as الآن.

- What are you doing? ماذا تفعل الآن؟
- I am reading a novel. أقرأ رواية.

In the above example, the continuity aspect can only be translated by adding the word الآن, either in the question or its answer. In addition, the same thing happens when translating from Arabic into English, for instance:

- كانت مرتبكة! ماذا عساها أن تفعل؟
- She was confused! What was she to do/what could she do?

In this example the Arabic word عسى was translated to a grammatical structure.

2.4. Category Shifts

Category shifts, as Catford (1965) stated, are ""departure from formal correspondence in translation", (p.76). The category shifts include structure shift, class shift, unit shift and intra system shift.

a) Structure shift

According to Catford (2000), structure shift is the most common form of category shifts. It implies a change of grammatical structure between the SL and TL. To illustrate, in a translation between English and Arabic there is often a shift from (article + modifier + head) to (article + head + qualifier):

- the green apple (article + modifier + head)
- التفاحة الخضراء (article + head + qualifier)

b) Class shifts

Catford (2000) stated that a class can be defined as “that grouping of member of a given unit which is defined by operation in the structure of the unit next above”, (p.145). Therefore, class shift “occurs when the translation equivalent of a SL item is a member of a different class from the original item”, (Catford, 1965, p.78). That is, class shifts include a change of a part of speech which could occur as a part of a structural shift. For example:

- A medical student طالب طب

The class shift occurred from the English adjectival word 'medical' into the Arabic noun طب.

c) Unit shifts

Catford (2000) pointed out that unit shift means “changes of rank – that is, departures from formal correspondence in which the translation equivalent of a unit at one rank in the SL is a unit at a different rank in the TL”, (p.145). To clarify it more, unit shifts include replacing units of different size; such as a word in the SL may be translated into a sentence or phrase in the TL. For example:

- Linguistic scholar باحث في الدراسات اللغوية / باحث يدرس علم اللغة

In this example the unit shift occurs from adjectival word (linguistic) into adverbial clause يدرس علم اللغة, or to a predicate باحث في الدراسات اللغوية.

d) Intra-system shift

Intra-system shifts, as Catford (1965, 2000) stated, is a change from formal correspondence in which one system in the SL has a different system in the TL. In addition, intra-system is used to indicate that the shift occurs internally within the system of the language concerned. To illustrate, 'He is an engineer' can be translated into Arabic as هو مهندس, where the indefinite article is not translated, another example, translating the plural Arabic word 'نصائح' into the singular English word 'advice'.

- Without your advice, I will fail. لو لا نصائحك لفشلت.

2.5. Related Studies

In this part, the previous studies are arranged chronologically, from recent studies to older ones to portray an up-to-date image of the literature status with regards to Catford's notion of translation shifts. To begin with, Suzani (2019) examined the category shifts applied in the Persian translation of Charles Dickens' novel *Great Expectations* to determine the most frequently used category shift and to check whether there was a significant difference between category shifts in the translation. A two hundred simple declarative sentences from the first 20 chapters of the novel (10 sentences from each chapter) and their Persian translations by Fateme Amini were chosen. Then, types of category shift according to Catford's shift model were found and the frequency and percentage of each category was calculated. Finally, a chi-square test was administered to investigate the possibility of the existence of significant difference between the applied category shifts in the translation. The results revealed that while all Catford's category shifts (i.e. structure, unit, intra system, and class shift) were applied in translation,

structure shift was the most frequent observed shift (102 cases out of 211 total cases, i.e., 48.34 percent) in the translation. Moreover, the difference between the used category shifts in the translation was not statistically significant.

Mobarakeh and Sardareh (2016), examined how Catford's translation shifts affected the level of readability in two Persian translations of the novel *1984* by George Orwell. The main aim of their study was to rank Catford's shifts based on their effectiveness on the level of readability of the two translations of the novel.

Additionally, Kantiastutin (2014) described the category shifts that occur in the English-Indonesian texts of the *Breaking Dawn* movie. The source data was English- Indonesian texts of *Breaking Dawn* movie. The data was analysed using the content analysis technique. The researcher analysed the occurrence of category shifts in the movie. Kantiastutin compared sentence to sentence between the SL and the TL. The findings of the study show that there were four types of category shifts that occur in the subtitling text of the *Breaking Dawn* movie. They were structure shift, class shift, unit shift and intra-system shift.

In the same way of applying Catford's model, Hosseini-Maasoum and Shahbaiki (2013) intended to find the realization of shifts in the Persian translation of Charles Dickens' *A Tale of Two Cities* translated by Ebrahim Younesi. The aim of their study was to find which types of shifts the translator used, to compare the SL and the TL versions, and to investigate how faithful the translator was to the original text. Furthermore, it sought to find the problems translators faced during the translation process.

Akbari (2012) focused upon the types of "structural shifts" in literary translation from English into Persian and their significant role in compensation and explication of meaning. The corpus used for the purpose of the study was a non –automated bilingual English –Persian corpus of children's literature. The researcher used ten Read – Aloud story books written in English for children and samples of their translation in Persian. The story books contained from 40 –60 pages.

Furthermore, Kalantari and Karimnia (2011) pointed out that the shifts introduced to the field of translation studies do not occur with the same rate in the process of translation; some of them come up very often and other very rarely. On the other hand, shifts as already have been assumed to be not just represented among linguistic elements. The cases in which a kind of shift is necessary between an unseen capacity of the SL shown as sign and linguistic elements of the TL. They concluded that: first, the shift types introduced by Catford (2000, as cited in Munday, 2016) were not of the same value concerning affecting the translation; as two of them were more important to the process of translation. Second, there seem to be another type of shift occurred while translating, especially if it is a play where the text needs to be speakable as well as containing the dramatic features. Therefore, there was no room accounted for that in the present models. Consequently, there was a need for paying attention to the degree of importance for each type of shifts in translator training courses and also defining some room for still an unnamed shift as complementary efforts for shift models of translation.

Banhegyi (n. d.) examined Alice Munro's *Boys and Girls* and its Hungarian translation entitled *Fiuk, lanyok*. As part of a contrastive and text linguistic three-stage approach, some types of translation shifts have been identified first. Second, the function of these shifts has been examined with respect to the treatment of culture-specific realia, short story specific vocabulary and idiolect typifying characters and exposing social differences. Finally, the translator's strategies have been explored. It has been concluded that Maria Borbas – the translator – applies a domesticating strategy in *Fiuk, lanyok*. In addition, a novel contrastive and text linguistics-based three-stage approach to the analysis of literary works has also been introduced, described and illustrated.

To sum up, Catford's translation shifts (1965) were not only an appropriate solution to translation problems resulting from the discrepancy between the SL and the TL, but were also motivated by linguistic, cultural and psycholinguistic factors. It was also concluded that the translator aimed at making the text more comprehensible, explicit and coherent for the target readership. The study finally emphasized the importance of including the analysis of translation shifts and their macro effects in translation curriculum.

3. Methodology

The study focuses on the source texts taken from the original work written by Dickens as its primary data. Next it identifies the equivalent texts in the two translations. The two translations are done by two Arab translators at different times and by different publishers as follows:

قصة مدينتين، ترجمة منير بعلبكي، صادرة عن دار العلم للملايين للتأليف والترجمة والنشر، بيروت، عام 2006م

قصة مدينتين، ترجمة سونيا الكوش، صادرة عن دار الحرف العربي للطباعة والنشر والتوزيع، بيروت، عام 2016م

To thoroughly answer the research questions stated above, the study uses the following methods:

- The descriptive method to emphasize the description of translation process in English and Arabic.
- The comparative method to assess the process in the two languages that yielded the translation of shifts.

3.1. Sample of the Study

The sample used for the descriptive analysis in this study was extracted from the novel *A Tale of Two Cities* by Charles Dickens published (CRW publishing limited in 2003). It was divided into three sections and consisted of forty-five chapters as a representative sample to literary texts. Since the novel seemed very long to be analysed for the present study, some texts from the forty-five chapters were selected to represent the entire novel. The published Arabic translation of this sample was obtained from two translations by Muneer Al-Baalbaki (Dar Al-Ilem Lilmalayin for authoring, translating and publishing, 2006) and the second was the translation of Sonya Al-Kush (Dar Al-Harf Al-Arabi for printing, publishing and distribution, 2016).

3.2. Procedures of Data Collection

This part explained the procedures used in the process of data collection to prepare the sample text for analysis. The novel *A Tale of Two Cities* is a big literary work arranged in three sections, consisting of forty-five chapters in 511 pages. To cover all the forty-five chapters, a sample of 182 texts from these chapters were assigned.

The corresponding Arabic texts was extracted from two Arabic translations published in Beirut in the years 2006 and 2016. The first one (2006) was the translation of Muneer Al-Baalbaki and it consists of forty-five chapters in 525 pages as the original text, the second translation (2016) was of Sonya Al-Kush which consists only of forty-two chapters in 320 pages. The English and Arabic selected data were analysed in terms of text numbers manually.

The English and Arabic extracted samples were aligned text by text in a word document to analyse each of these sentences according to Catford's types of translation shifts (1965). All linguistic changes were tracked and tagged with its type as per Catford's model. The frequency of each type of Catford's was counted manually. These procedures were adopted to answer the research questions.

3.3. Data Source: The novel *A Tale of Two Cities*

The novel *A Tale of Two Cities* is a literary work first published in (1859). The novel is composed of forty-five chapters sorted into three sections: book the first (chapters 1-6), book the second (chapters 1-24) and book the third (chapters 1-15).

The original text of the novel was the copy published by CRW publishing limited (2003). The novel *A Tale of Two Cities* was translated into many Arabic versions. The two Arabic translations obtained to be analysed in comparison with the original English text were by Muneer Al-Baalbaki and Sonya Al-Kush versions.

The justification for choosing Catford's model of translation shifts is that the present study focuses on the linguistic changes that take place in the process of translating literary texts from English into Arabic. Furthermore, it tries to bridge the cultural and linguistic gaps between the two languages. To track linguistic changes in translation, an appropriate model had to be employed. Therefore, Catford's translation shifts were selected for the analysis in the present study as to identify the translation changes. It was practical and feasible to meet the study's objectives.

4. Analysis and Discussion of Findings

This section presents a descriptive analysis of two Arabic translations of Charles Dickens' novel, *A Tale of Two Cities*. Each type of Catford's translation shifts is discussed in the following subsections. The examples below cover all fifty-four chapters of the novel. The analysis seeks to answer the research questions and to determine resorting to such translation shifts in the process of translating literary texts from English into Arabic.

A. Level Shifts

Text 1

ST: "Hooray, father! Here's an early job to begin with!" (b. 2, ch. 1, p. 89).

Al-Kush: "أبشر، يا والدي، ها قد جاء العمل باكراً هذا الصباح." ب (2) ف (1) ص (73)

Al-Baalbaki: "بشراك، يا أبت! ها قد جاءك العمل باكراً اليوم!" ب (2) ف (1) ص (81)

This example includes a level shift from a lexical item in the ST into a grammatical item in the TT. The translators rendered the lexical item (Hooray), which is a word in the ST, into the verb (أبشر) and (بشراك) in the TT.

Text 2

ST: "It was an infamous prosecution, grossly infamous; but not the less likely to succeed on that account." (b.2, ch. 4, p. 118).

Al-Kush: "وهالة العار التي تحيط بنوع الاتهام الموجه إليك لم تنقص من احتمال هذا النجاح" ب (2) ف (4) ص (94)

Al-Baalbaki: "لقد كانت التهمة الموجهة إليك تهمة تلبس المرء عاراً – عاراً كبيراً، ولكن ذلك ما كان ليقلل من احتمال نجاحها" ب (2) ف (4) ص (112)

This example includes a level shift from a grammatical item in the ST to a lexical item in the TT. The verb in the ST (to succeed), which is a verb, was translated into a lexical item (النجاح) and (نجاح) in the TT.

Text 3

ST: "His face is **bleeding** and covered with dust." (b. 2, ch. 15, p. 235).

Al-Kush1: "كان التراب قد غطى وجهه ... ونزفت منه الدماء" ب (2) ف (14) ص (171)

Al-Baalbaki 2: "كان وجهه دامياً، وكان يعلوه التراب" ب (2) ف (15) ص (234)

In this example, there is a level shift from lexis to grammar. It occurs when the translator rendered the lexical item (bleeding) in the ST into the grammatical item (نزفت منه الدماء) in the TT. However, in Al-Baalbaki there is no level shift as the lexical item (دامياً) was translated as it is in the ST.

Text 4

ST: " 'They are,' Mr Lorry whispered the words, glancing fearfully round at the locked room, 'murdering the prisoners' " (b. 3, ch. 2, p. 361).

Al-Kush: "همس السيد لوري، مخاطباً صديقه مانيت: " يبدوا إنهم يذبجون المساجين" ب (3) ف (2) ص (239)

Al-Baalbaki: "وهمس مستر لوري ملقياً نظره جازعة على الغرفة الموصدة: "إنهم يذبجون السجناء" ب (3) ف (2) ص (365)

In this example, there is a level shift from grammar to lexis. It occurs when the translators rendered the grammatical item (there are) in the ST into the lexical item (إنهم) in both TTs.

Text 5

ST: " 'It is a thing to thank God for, is it not?' " (b. 3, ch. 9, p. 425).

Al-Kush: "فعلاً، إن هذه نعمة يستحق عليها الخالق كل شكر، أليس كذلك؟" ب (3) ف (9) ص (277)

Al-Baalbaki: "إن ذلك شيء يُشكر الله عليه. أليس كذلك؟" ب (3) ف (9) ص (431)

This example includes a level shift from grammar to lexis. The grammatical item (it is) in the ST was translated into the lexical item (هذه) and (ذلك) respectively in both translations.

B. Structure Shifts

Text 1

ST: "there was a stool, and table, and a straw bed" (b. 2, ch. 21, p. 300).

Al-Kush: "كانت الحجيرة مزودة أيضاً بطاولة محطمة، وكروسي متخلخل، بدون مسند للظهر، وبالإضافة إليهما كان هنالك فراش من القش برزت من قماشه الأثواك." ب (2) ف (19) ص (207)

Al-Baalbaki: "كان ثمة كرسي لا ظهر له، وطاولة، وفراش من قش" ب (2) ف (21) ص (301)

In the example above, there is a structure shift in word order. The modifier + head structure in the ST (a straw bed) was translated into head + modifier (فراش من القش) and (فراش) (من قش) respectively in both translations.

Text 2

ST: "'How many were with him?'

"Two French gentlemen" (b. 2, ch. 3, p. 105).

Al-Kush: "- هل وصل إلى السفينة بمفردة، أم كان مع آخرين، ومن هم؟"

- ' لقد وصل برفقة سيدين فرنسيين' " ب (2) ف (3) ص (86)

Al-Baalbaki: "- كم شخصاً كان معه؟"

- سيدان فرنسيان." ب (2) ف (3) ص (101)

This example includes a structure shift in word order. The modifier + head structure in the ST (two French gentlemen) was rendered to head + modifier structure in the TT (سيدين) (سيدان فرنسيان) and (فرنسيين).

Text 3

ST: "as such I will appeal to Dr Manette, to break up this conference and order us all to our homes" (b. 2, ch. 4, p. 119).

"أرى أننا جميعاً متعبون، لذلك ألتمس من الدكتور مانيت أن يأذن بفض هذا الاجتماع لنسعى إلى منازلنا في سبيل بعض الراحة." ب (2) ف (4) ص (94)

"وبهذا الوصف ألتمس من الدكتور مانيت أن يفض هذا الاجتماع ويصدر أمره بالانصراف إلى منازلنا. Al-Baalbaki: " ب (2) ف (4) ص (113)

In this example, a structure shift in word order occurred. The subject + verb order in the ST (I will appeal to Dr Manette) was changed to verb + subject (ألتمس من الدكتور مانيت) in the TT.

Text 4

ST: "Every stone of its inner wall was covered by inscriptions which **had been carved** by prisoners – dates, names, complaints, and prayers." (b. 2, ch. 6, p. 144).

Al-Kush: "كانت جدران هذه الحجرة مليئة بالنقوش التي حفرها السجناء في أثناء دفعهم إليها، ليروا لمن سيخلفونهم الأسباب التي أدخلتهم السجن." ب (2) ف (6) ص (114)

Al-Baalbaki: "كان كل حجر من حجارة جدارها الداخلي مغطى بنقوش نقشها السجناء فيه: تواريخ، وأسماء، وشكاوى، وأدعية." ب (2) ف (6) ص (141)

This example includes a structure shift from passive to active. The passive voice in the ST (has been carved) was rendered to the active voice in the TT (حفرها السجناء) and (نقشها السجناء).

Text 5

ST: "Death **has done** that!" (b. 2, ch. 9, p. 175).

Al-Kush: "لقد فعل ذلك ملاك الموت" ب (2) ف (9) ص (137)

Al-Baalbaki: "لقد فعل الموت ذلك" ب (2) ف (9) ص (173)

There is a structure shift in tense in this example. The English present perfect tense (has done) in the ST was translated into the Arabic past simple in the TT (لقد فعل). Since there is no equivalence of the English present perfect tense; Ghazala (2008) suggested that English present perfect tense to be translated into Arabic past simple with or without 'قد'.

Text 6

ST: "'You spoke of his daughter. Does his daughter know of the relapse?'

'No. It has been kept from her, and I hope **will always be kept** from it" (b. 2, ch. 19, p. 276).

Al-Kush: " - 'لقد أشرت إلى أن له ابنه، فهل علمت هذه الابنة بأمر النكسة التي أصابته مؤخراً؟ ' -

'- لا. لقد كتمت النبأ عنها وعن الآخرين، وأرجو أن يبقى الأمر طي الكتمان إلى الأبد' " ب (2) ف (17) ص (194)

Al-Baalbaki: " - 'لقد أشرت إلى ابنته. فهل عرفت ابنته بتلك النكسة؟ ' -

'- لا. كُتم النبأ عنها، وأرجو أن يظل مكتوماً عنها دائماً' " ب (2) ف (19) ص (278)

As observed in the example above, there is structure shift in tense. The future tense (will always be kept) in the ST was shifted to the present simple in the TT (يبقى الأمر طي الكتمان) and (يظل مكتوماً).

C. Class Shifts

Text 1

ST: "'You know that you are recalled to life?'

'They tell me so'

'I hope you care **to live?**'" (b. 1, ch. 3, p. 32).

Al-Kush: " - 'لقد بُعثت حياً من جديد إذأ! ' -

' - هذا ما يقولونه، في حين لا أشعر أنا بذلك. ' -

- 'أرجو أن تكون على عهدي بك طلق المحيّا، محبّاً للحياة.' "ب (1) ف (3) ص (33)

Al-Baalbaki: "هل تدري أنك بُعثت؟"

- 'هذا ما يقولونه لي.'

- 'أرجو أن تكون راغباً في الحياة؟' "ب (1) ف (3) ص (23)

In this example there is a class shift from the verb (to live) in the ST into the noun (الحياة) in both TTs.

Text 2

ST: "'Buried¹ how long²?"

'Almost eighteen years.' (b. 1, ch. 3, p. 33).

Al-Kush: "كم من السنين أمضيت² يا عزيزي الدكتور مانيت تحت التراب؟¹"

سمع هاتفاً يجيبه قائلاً:

- 'حوالي ثمانية عشر عاماً.' "ب (1) ف (3) ص (32)

Al-Baalbaki: "كم سنة سلخت² تحت التراب؟¹"

- 'ثمانية عشر عاماً تقريباً.' "ب (1) ف (3) ص (23-24)

In the above example there are two class shifts. The first-class shift was from the verb (buried) in the ST into an adverb (تحت التراب) in both the TTs. The second-class shift was from the adverb (long) in the ST to the verb (أمضيت) and the verb (سلخت) in the TTs.

Text 3

ST: "'Not at all,' returned the ancient clerk. 'Speak well of the law. Take care of your chest and voice, my good friend, and leave the law to take care of itself. I give you that **advice**.'" (b. 2, ch. 2, p. 90).

Al-Kush: "عقد الموظف حاجبيه، وخاطب جيرى بغضب محدراً قائلاً:

- 'لا، إطلاقاً، إياك أن تزدرى أحكام القوانين. واعتن بنفسك، وكن على حذر، ودع القانون لمن يتولاه، إني انصحك، يا جيرى.' "ب (2) ف (2) ص (74)

Al-Baalbaki: "فقال الموظف العتيق: 'لا، على الإطلاق. حذار أن تمتهن القانون. اعتن بصدرك وصوتك، أيها الصديق الطيب، ودع القانون يعتني بنفسه. أنا أمحضك هذه النصيحة.' "ب (2) ف (2) ص (83)

A class shift was observed in the above example. The noun (advice) in the ST was translated into a verb (انصحك) in Al-Kush's translation. On the contrary, there isn't any shift in the translation by Al-Baalbaki as the noun (النصيحة) was translated as it is in the ST.

Text 4

ST: "It was an infamous prosecution, grossly **infamous**." (b. 2, ch. 4, p. 118).

Al-Kush: "وهالة العار التي تحيط بنوع الاتهام الموجه إليك" ب (2) ف (4) ص (94)

Al-Baalbaki: "كانت التهمة الموجهة إليك تهمة تُلبس المرء عاراً – عاراً كبيراً" ب (2) ف (4) ص (112)

In this example a class shift from an adjective to a noun was detected. The translators changed the adjective (infamous) in the ST into a noun (العار) and (عار) in the TTs.

Text 5

ST: "A tall man in a nightcap up a bundle from among the feet of the horses, and had laid it on the basement of the foundation, and was down in the **mud** and wet, howling over it like a wild animal" (b. 2, ch. 7, p. 156-157).

"كان الرجل الطويل النحيل قد تنبّه إلى الحقيقة التي آلت إليها حالة الطفل المدهوس، وأكبّ على الأرض الموحلة: **Al-Kush:** بندبه بنحيب يمزّق نياط القلب." ب (2) ف (7) ص (124)

"وكان رجل فارغ الطول يرتدي قلنسوة من قلانس النوم قد التقط صرة ما بين قوائم الجياد، ووضعها عند أسفل الفوارة، وانطرح في الوحل والماء يجار فوقها وكأنه حيوان ضارٍ." ب (2) ف (7) ص (154)

In this example there is a class shift from the noun (mud) in the ST into the adjective (الموحلة) in the translation by Al-Kush. However, there is not any shift in Al-Baalbaki's translation as the noun (الوحل) translated into a noun.

Text 6

ST: "You speak so **feelingly**¹ and so **manfully**²." (b. 2, ch. 10, p. 189).

Al-Kush: (145) ص (10) ف (2) ب (2) "إن حديثك، يا ولدي أثر في نفسي بما فيه من عاطفة نبيلة²"

Al-Baalbaki: (187) ص (10) ف (2) ب (2) "إنك تتحدث، يا تشارلز دارني، حديثاً يزخر بالعاطفة¹ والرجولة²"

In the above example there are two class shifts. The first-class shifts occur in the translation of the adverb (feelingly) in the ST into the noun (عاطفة) and the noun (العاطفة) in the two translations respectively in the TTs.

The second-class shift occurred in the translation of the adverb (manfully) in the ST to the adjective (نبيلة) and the noun (الرجولة) respectively in the TTs.

Text 7

ST: "'Why, you're at **it** afore my face!' said Mr Cruncher with signs of angry apprehension." (b. 2, ch. 14, p. 221).

Al-Kush: "لذلك صاح بها بغیظ!"

- 'ماذا! أمرك عجيب! وحق الشيطان إنك تصلّين أمام ناظري!' ب (2) ف (14) ص (164)

Al-Baalbaki: "وقال مستر كرانشر وقد بدت على وجهه إمارات الخوف الغاضب: 'عجيب أمرك! إنك لتفعلين ذلك في وجهي!' ب (2) ف (13) ص (221)

In this example, a class shift was detected from the pronoun (it) to the verb (تصلّين) and the verb (تفعلين) respectively in the TTs.

Text 8

ST: "Defarge and the three glanced **darkly** at one another." (b. 2, ch. 15, p. 236).

Al-Kush: (172) ص (14) ف (2) ب (2) "رنا كل واحد من الرجال الأربعة إلى رفيقه بنظرات يتطاير منها الغضب"

Al-Baalbaki: (235) ص (15) ف (2) ب (2) "وتبادل دوفارج والرجال الثلاثة نظرات مغضبة"

In this example, there is a class shift from the adverb (darkly) in the ST to the noun (الغضب) and the adjective (مغضبة) respectively in the TTs.

Text 9

ST: "You remember a certain famous occasion when I was more drunk than – than **usual**?" (b. 2, ch. 20, p. 284).

Al-Kush: (198) ص (18) ف (2) ب (2) "أنت تذكر تلك المناسبة التي ظننتني فيها ثملاً أكثر من العادة!"

Al-Baalbaki: (285) ص (20) ف (2) ب (2) "وعلی أية حال، أتذكر مناسبة شهيرة كنت فيها ثملاً ... أكثر من العادة؟"

A class shift occurred in the above example where the adjective (usual) in the ST is rendered to the noun (العادة) in both TTs.

Text 10

ST: "Lucie! My own! I am **safe**." (b. 3, ch. 6, p. 393).

Al-Kush: (259) ص (6) ف (3) ب "لقد نجوت" ب (3) ف (6) ص (259)

Al-Baalbaki: (399) ص (6) ف (3) ب "لقد نجوت" ب (3) ف (6) ص (399)

This example includes a class shift from the adjective (safe) in the ST to the verb (نجوت) in both TTs.

Text 11

ST: "looking up at the **light**¹ in the window of **her**² room." (b. 3, ch. 12, p. 472).

Al-Kush: (298) ص (12) ف (3) ب "رفع السيد كارتون بصره نحو غرفة لوسي² المضاءة¹" ب (3) ف (12) ص (298)

Al-Baalbaki: (479) ص (12) ف (3) ب "رافعاً بصره نحو النور المنبثق من نافذة غرفتها" ب (3) ف (12) ص (479)

This example includes two class shifts. The first-class shift was from the noun (light) in the TT to the adjective (المضاءة) in the translation by Al-Kush. Similarly, there is a class shift from the pronoun (her) in the ST to the noun (لوسي) in the same translation. On the contrary, in Al-Baalbaki there is not any class shift. The noun (light) remains as a noun (النور) and the pronoun (her) remain as a suffix pronoun (ها) in the word (غرفتها).

D. Unit Shifts

Text 1

ST: "thieves snipped off diamond crosses from the neck of noble lords at court drawing-rooms; **musketeers** went into St. Giles's, to search for contraband goods." (b. 1, ch. 1, p. 19).

Al-Kush: "ونشطت البقية الباقية في أعمال التهريب، حتى ملكوا القوة التي كانت تؤهلهم لمجابهة رجال الشرطة الماضيين في أثرهم." ب (1) ف (1) ص (24)

Al-Baalbaki: "وكان اللصوص ينتزعون الصلبان الماسية من أعناق النبلاء في احتفالات البلاط الملكي. وكان الجنود يدخلون حي ((سانت غايل)) بحثاً عن البضائع المهربة." ب (1) ف (1) ص (10)

In this example, a unit shift from a word in the ST to a phrase in the TT. The word (musketeers) was translated into the structure of a construct phrase (رجال الشرطة) in the translation of Al-Kush, while there is no unit shift detected in Al-Baalbaki's translation.

Text 2

ST: "Wait Jerry, say that my answer was, **RECALLED TO LIFE**." (b. 1, ch. 2, p. 26).

Al-Kush: (29) ص (2) ف (1) ب "حسن، يا جيرري، على كل أخبرهم أن الميت قد بُعثَ حياً." ب (1) ف (2) ص (29)

Al-Baalbaki: (17) ص (2) ف (1) ب "جيرري، قل لهم إن جوابي كان: ((لقد بُعثَ الميت))." ب (1) ف (2) ص (17)

In the above example, a unit shift occurred from a clause in the ST to a sentence in the TT. The translators translated the English clause (Recalled to life) in the ST to the Arabic sentence (أن الميت قد بُعثَ حياً) and the sentence (لقد بُعثَ الميت) in the two TTs, respectively.

Text 3

ST: "But, **as** an old fellow" (b. 2, ch. 12, p. 204).

Al-Kush: (155) ص (11) ف (2) ب "إذاً، بوصفي رجلاً عجوزاً" ب (2) ف (11) ص (155)

Al-Baalbaki: (203) ص (12) ف (2) ب "أما بوصفي رجلاً عجوزاً" ب (2) ف (12) ص (203)

In this example a unit shift occurred. A shift from the morpheme (as) in the ST to the prepositional phrase (بوصفي) in both TTs.

Text 4

ST: "None. Defarge spoke" (b. 3, ch. 1, p.348).

Al-Kush: (233) ص (1) ف (3) ب "لا أستطيع ذلك، وإلا عرضت روحي للخطر" ب (3) ف (1) ص (233)

Al-Baalbaki:(351) ص (1) ف (3) ب "لا، لست أستطيع مطلقاً"

In this example above, there is a unit shift from the word (None), which is a pronoun in the ST, to the clause (لا أستطيع ذلك) and into the clause (لست أستطيع مطلقاً) in the two TTs, respectively.

Text 5

ST: "I throw up" (b. 3, ch. 8, p.417).

Al-Kush: (273) ص (8) ف (3) ب "إنني أستسلم"

Al-Baalbaki: (423) ص (8) ف (3) ب "إنني أستسلم"

A unit shift was detected in the above example. The word (I), which is a pronoun in the ST, was shifted into a morpheme (ي) in the word (إنني) in both TTs.

Text 6

ST: "He murmured for answer: 'True. I forget what you were accused of?'

Plots. Though the just heaven knows I am innocent of any.'" (b. 3, ch. 13, p.483).

Al-Kush: "أه صحيح، لقد نسيت. ما هي التهمة الموجّهة إليك؟"

- 'تهمة التأمّر على الجمهورية، برغم أن الله العادل، يعلم بأنني بريئة من كل تهمة. ' ب (3) ف (13) ص (303)

Al-Baalbaki: "وغمغم مجيباً: 'صحيح. لقد نسيت التهمة المنسوبة إليك."

- 'تهمة التأمّر. برغم أن الرب العادل يعلم أنني بريئة من كل ذلك. ' ب (3) ف (13) ص (491)

In the above example, there is a unit shift from a word in the ST into a phrase in the both translations. The word (plots), which is a noun in the ST, was rendered into the phrase (تهمة التأمّر على الجمهورية) and into the phrase (تهمة التأمّر) in the two translations, respectively.

Text 7

ST: "I do not understand you" (b. 3, ch. 13, p.487).

Al-Kush: (306) ص (13) ف (3) ب "لا!"

Al-Baalbaki: (496) ص (13) ف (3) ب "أنا لا أفهم كلامك"

In this example, there is a unit shift from the sentence (I do not understand you) in the ST to the word (لا) in the translation by Al-Kush, whereas there isn't any unit shift in Al-Baalbaki's translation.

E. Intra – System Shifts

Text 1

ST: "The **highwayman**¹ in the dark was a City **tradesman**² in the light" (b. 1, ch. 1, p.19).

Al-Kush: (23) ص (1) ف (1) ب "أما صغار التجار فقد عملوا لصوصاً¹ في الليل تجاراً² خلال النهار"

Al-Baalbaki: (9) ص (1) ف (1) ب "وكان قاطع الطريق في الليل هو تاجر المدينة في النهار"

In the above example there are two intra – system shifts. They occurred in the translation of the singular form in the ST into the plural form in the translation of Al-Kush. The first intra – system shift was from singular ST words (high way man) into the plural TT word (لصوصاً) in the TT, whereas there isn't any intra – system shift in Al-Baalbaki's translation.

The second intra – system shift occurred in the translation of the singular ST word (tradesman) to the plural TT word (تجاراً) in the TT. On the contrary, there isn't any intra – system shift in Al-Baalbaki's translation.

Text 2

ST: "The judge, whose **eyes** had gone in the general direction." (b. 2, ch. 2, p.97).

Al-Kush: (78) "ولكن **عيننا** القاضي قد تحولتا إلى حيث ينظر الحضور جميعاً." ب (2) ف (2) ص (78)

Al-Baalbaki: (90) "وكانت **عيننا** القاضي قد انصرفنا إلى حيث انصرفت أعين القوم جميعاً." ب (2) ف (2) ص (90)

In the example above, an intra – system shift from plural to dual was observed. The ST word (eyes) was translated from the plural form to the dual form (عيننا) in the two translations in the TTs.

Text 3

ST: "Sadly, sadly, **the sun** rose." (b. 2, ch. 5, p.132).

Al-Kush: (106) "اشرقت **شمس** صباح اليوم التالي حزينة كئيبة." ب (2) ف (5) ص (106)

Al-Baalbaki: (128) "اشرقت الشمس محزونة ملتاعة." ب (2) ف (5) ص (128)

In the above example, there is an intra – system shift from the definite phrase in the ST (the sun) to the indefinite phrase (شمس صباح اليوم التالي) in the translation by Al-Kush, whereas in Al-Baalbaki's translation there is no intra – system shift, because the ST phrase remains as a definite noun (الشمس).

Text 4

ST: "found only among **women**" (b. 2, ch. 6, p.138).

Al-Kush: (109) "شأنها في ذلك شأن **النساء**" ب (2) ف (6) ص (109)

Al-Baalbaki: (135) "لا تقع عليهما إلا عند **النساء**" ب (2) ف (6) ص (135)

The example includes an intra – system shift from the indefinite noun (women) in the ST to a definite noun (النساء) in both translations in the TTs.

Text 5

ST: "Pardon, Monseigneur; he swung by the chain of **the shoe** – the drag" (b. 2, ch. 8, p.164).

Al-Kush: (128) "عفوك ي مولاي، كان هنالك رجل متعلق بسلسلة **المكايح**." ب (2) ف (8) ص (128)

Al-Baalbaki: (161) "عفوك يا مولاي. كان متعلقاً بسلسلة المكبح." ب (2) ف (8) ص (161)

This type of intra – system shift constitutes a change from a phrase in the singular form (the shoe) in the ST into a phrase in the plural form (المكايح) in the translation of Al-Kush. Yet, the intra – system shift does not exist in Al-Baalbaki's translation, the ST phrase remains singular in the TT (المكبح).

Text 6

ST: "What I suppose, Mr Stryver, I claim to characterise for myself. And understand me, sir," said Mt Lorry, quickly flushing again, "I will not – not even at **Tellson's** – have it characterized for me by any gentleman breathing." (b. 2, ch. 12, p.204).

Al-Kush: "إن ما أفترضه، أو أراه، إنما هو حق من حقوقي، ولن أسمح لأي إنسان، بما في ذلك القائم على شؤون **مصرف** **تلسون**، بأن ينال من صوابية آرائي، يا سيد سترايفر .. أيها المحامي الناجح!" ب (2) ف (11) ص (155)

Al-Baalbaki: "فقال مستر لوري وقد احتقن الدم في وجهة مرّة أخرى: 'ما أفترضه حقّ من حقوقي أصفه لنفسي. وأفهمني، يا سيدي، أنا لن أسمح – لن أسمح حتى في **مصرف تلسون** – بأن يصفه لي أيما إنسان على وجه الأرض.' ب (2) ف (12) ص (204)

In this example, an intra – system shift occurred from the possessive form in the ST to the genitive form in the two translations in the TTs. The possessive word (Tellson's) in the ST was shifted to the genitive form (مصرف تلسون) in both translations in the TTs.

Text 7

ST: "I am supported from above: don't suffer for **me**." (b.3, ch. 11, p.456).

Al-Kush: (289) ص (11) ف (3) ب "ولياخذ الله بيدي، وببهد طفلفتنا، فلا تبتئس من أجلنا." "

Al-Baalbaki: (463) ص (11) ف (3) ب "إن الله يؤيدني بروح من عنده. لا تبتئس من أجلي." "

In the example above, an intra – system shift from singular to plural was identified. The word (me) in the ST which is singular was changed into plural (أجلنا) in Al-Kush's translation, but it was an inaccurate translation, because the pronoun (me) refers to a singular and the suffix pronoun (نا) in the word (أجلنا) refers to the first-person plural. However, the translation by Al-Baalbaki was a correct one, because he translated the pronoun (me) into (ي), which refers to first-person singular, in the word (أجلي).

5. Conclusions of the Study

5.1. Findings Regarding the First Research Question

The Arabic translation of the novel *A Tale of Two Cities* is analysed by adopting a descriptive mixed approach. The model of Catford's translation shifts is applied to the Arabic translated text in comparison with the original English text. All translation shifts in line with Catford's model are traced and manually counted as shown in the table below.

Table 1
Frequency, Percentage and Rank of Catford's Shifts

	LS	SS	CS	US	IS	Total
Frequency	10	20	66	52	33	181
Percentage	5.52%	11.04%	36.46%	28.72%	18.23%	100%
Rank	5	4	1	2	3	

According to Table 1, all five types of Catford's translation shifts were observed in the translation of the novel *A Tale of Two Cities* from English into Arabic scoring a total of 181 shifts. The most frequent type of Catford's shifts was class shifts with the frequency of 66 shifts; representing 36.46% of all observed translation shifts. The second most frequent type of translation shifts was unit shifts scoring 28.72% (52 shifts) of total translation shifts. The third most frequent type of translation shifts was intra – system shifts with the percentage of 18.23% (33 shifts). The fourth most frequent type of translation shifts was structure shifts which were identified 20 times (11.04%). Finally, the least frequent type of translation shifts was level shifts with the frequency of 10 shifts (5.52%).

To conclude, all five types of Catford's translation shifts were observed in the two Arabic translations of the novel *A Tale of Two Cities*. The first two most frequent translation shifts were class shifts (=36.46%) and unit shifts (=28.72%). These were followed by intra – system shifts (=18.23%) then structure shifts (=11.04%). Finally, there was a dramatic drop in the frequency of translation shifts of level shifts with the percentage of 5.52% only.

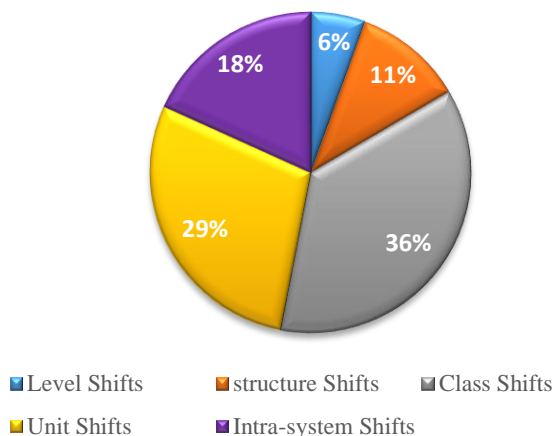


Figure 1. Percentage of Catford's Shifts

5.2. Findings Regarding the Second Research Question

In the present study, the differences in the strategies and techniques used by the two Arabic translators throughout the analysis of the two translations of the novel *A Tale of Two Cities* from English into Arabic were investigated. The data of these strategies and techniques of translation shifts are presented in the tables below.

As Table 2 below explicitly reveals, Al-Kush's translation seems to opt for level shifts with a percentage of 100%, whereas Al-Baalbaki utilized translation shifts with a percentage of 70%.

Table 2
Totals and Percentage of Level Shifts

	Number of shifts	Al-Kush	Al-Baalbaki
Grammar to lexis	5	5	5
Lexis to grammar	5	5	2
Total	10	10	7
Percentage	100%	100%	70%

Table 3 presents the figures related to structure shifts in these two Arabic translations and the reflections on how close are these two translations regarding the product statistics. The difference is not too big regarding the overall percentage. The table illustrates the shifts occurred in tenses, word order and structure voice. Although they are more utilized in Al-Kush's translation than Al-Baalbaki's one, still they do not constitute a considerable difference. As for the total number of shift percentages, Al-Kush is higher in this regard with 90% than Al-Baalbaki who utilized the translation shifts with a percentage of 80%.

Table 3
Totals and Percentage of Structure Shifts

	Number of shifts	Al-Kush	Al-Baalbaki
Word order	9	8	9
Structure voice	7	6	3

Tenses	4	4	4
Total	20	18	16
Percentage	100%	90%	80%

In Table 4, it is obvious that pronoun to noun shift throughout the whole data drawn from the novel has scored the highest percentage. This is the highest number of shifts for both translators although Al-Kush opted for this technique more frequently than Al-Baalbaki did. However, there were no shifts detected for noun to pronoun and noun to adjective in Al-Baalbaki's translation in the data assigned for scrutiny in this study. Other types of shifts reflected some kind of approximate likeness in numbers with a marginal difference. In short, the overall percentages for the shifts in the two translations echo a more or less big discrepancy. Al-Kush's translation shifts scored more than 92%, whereas Al-Baalbaki's translation shifts scored nearly less than 63%.

Table 4
Totals and Percentage of Class Shifts

	Number of shifts	Al-Kush	Al-Baalbaki
Verb to noun	9	8	7
Noun to verb	7	6	5
Pronoun to noun	27	25	14
Noun to pronoun	2	2	-
Noun to adjective	2	2	-
Adjective to noun	7	7	6
Adjective to verb	2	2	1
Verb to adverb	1	1	1
Adverb to verb	2	2	1
Adverb to noun	5	5	4
Pronoun to verb	1	1	1
Adverb to adjective	1	-	1
Total	66	61	41
Percentage	100%	92.42%	62.12%

Table 5 reveals that Al-Kush utilised unit shifts in more than 94% while Al-Baalbaki utilised such shifts in about 81% of the total translation shifts which count 52 units in the assigned data of this study. Again Al-Kush seems to opt for translation shifts in unit shift category more frequently than Al-Baalbaki did in all the previous discussed instances. As a general observation, the two types within this category of unit shift are 'word to phrase' and 'word to sentence' which are used more in the two translations of the novel by both translators as illustrated in the table below.

Table 5
Totals and Percentage of Unit Shifts

	Number of shifts	Al-Kush	Al-Baalbaki
Word to phrase	19	16	15
Word to sentence	13	13	10
Word to morpheme	3	3	3
Phrase to word	4	4	3
Phrase to sentence	4	4	4
Morpheme to word	1	1	1
Morpheme to phrase	1	1	1
Sentence to word	2	2	-
Clause to sentence	1	1	1
Word to clause	3	3	3
Pronoun to clause	1	1	1
Total	52	49	42
Percentage	100%	94.23%	80.76%

As for intra-system shifts, Table 6 illustrates how some particular types are more frequent than others in both of these translations. Al-Baalbaki seems to be less in resorting to these shifts. This is seen in the total numbers of shifts that he is using with almost 64%, while Al-Kush almost uses in higher percentage of a nearly 67 %.

Table 6
Totals and Percentage of Intra – System Shifts

	Number of shifts	Al-Kush	Al-Baalbaki
Singular to plural	12	12	4
Singular to dual	1	1	-
Plural to singular	4	4	4
Plural to dual	6	6	6
Definite to indefinite	4	3	1
Indefinite to definite	3	3	3
Possessive to genitive	3	3	3
Total	33	32	21
Percentage	100%	96.96%	63.63%

Based on the analysis of the texts and the statistics presented in the tables above, it was concluded that both translators used the same strategies and techniques of the translation shifts in most of their translations. Regarding the differences in these strategies and techniques, in the class shifts there was a shift from an adverb into an adjective in text 23, Al-Kush translated the

adverb (darkly) in the ST into the noun (الغضب) in the TT, whereas Al-Baalbaki rendered the adverb (darkly) in the ST into the adjective (مغضبة) in the TT. Regarding the structure shifts (tenses), Al-Kush shifted the present perfect (had done) in the ST into the past simple (استحق) in the TT. However, Al-Baalbaki translated the present perfect (had done) in the ST into the present simple (يستحق) in the TT.

Regarding the unit shifts in text 24 and text 44, Al-Kush shifted the word (Quite) in text 24 and the word (Plots) in text 44 in the ST into the sentence (وهل هناك من هو أسعد مني) and the sentence (تهمة التآمر على الجمهورية) respectively in the TT. In contrast, Al-Baalbaki rendered these two words into the phrase (سعيد جداً) and the phrase (تهمة التآمر) in the TT. In addition, in the text 18 and the text 25 there were shifts from a word into a phrase. Al-Baalbaki rendered the words (concourse) and the word (Tellson) in the ST into the sentence (سيل من الناس) and the sentence (مصالح مصرف تلسون) respectively in the TT. Moreover, in the unit shifts in text 10 Al-Kush shifted the word (Barbarous) in the ST to the sentence (إن مثل هذا الحكم عمل بربري فضيع), on the other hand, Al-Baalbaki shifted it into a phrase (شيء وحشي) respectively in the TT.

5.3. Findings Regarding the Third Research Question

The third question in this study sought to determine the attentiveness of the two translators of the novel *A Tale of Two Cities* using Catford's shift model. The findings in Table 7 illustrate that not all the two translators were completely attentive to the use of Catford's shift model at all when translating the novel from English into Arabic.

Table 7
Totals and Percentages of No Shifts

	LS		SS		CS		US		IS		Total
Number of shifts	10		20		66		52		33		181
Number of no shifts	K	B	K	B	K	B	K	B	K	B	-
	-	3	2	4	4	24	-	5	1	12	55
Percentage	30%		30%		42.42%		9.61%		39.39%		30.38%

Based on the above tables and the statistics presented, it was concluded that out of 181 examples there were 55 without any shift with a percentage of (30.38%). Therefore, the translator Al-Kush did not use the model of Catford's translation shifts in seven examples in texts (17, 19, 6, 41, 29, 31, 11) from 181 shifts. On the contrary, Al-Baalbaki did not use the model of Catford's translation shifts in 48 examples in the texts. To sum up, Al-Kush was more attentive to the translation shifts used in translating the original work *A Tale of Two Cities* into Arabic than Al-Baalbaki. The percentage of using translation shifts in Al-Kush's translation was (96.13%), whereas in Al-Baalbaki's translation the percentage of using translation shifts was (73.48%).

Based on the aforementioned findings, it seems that applying translation shifts was inevitable to make the meaning more suitable and in harmony with the ST. According to the findings related to the frequently occurring translation shifts in the novel, and based on the analysis of the findings, it was noticed that all five types of Catford's translation shifts occurred. Besides, it was demonstrated that 181 translation shifts occurred in the Arabic translation; with class shifts being the most frequent translation shifts with a percentage of 36.46% (= 66 shifts). Unit shifts came second in rank; scoring 28.72% (= 52 shifts). This was followed by intra –

system shifts 18.23% (= 33 shifts), structure shifts 11.04% (= 33 shifts) and finally level shifts 5.52% (= 10 shifts).

The other significant finding was related to the techniques and strategies used by the two Arabic translators in translating these shifts. Based on the findings, it was concluded that both translators used the same techniques and strategies of translation shifts in most of their translations of the SL extracts. However, there were some differences in these techniques and strategies, and those can be observed in class shifts, structure shifts and unit shifts.

Finally, regarding the attentiveness of the two translators, it was concluded that Al-Kush was more attentive in applying translation shifts with a percentage of 96.13%, whereas Al-Baalbaki applied translation shifts with a percentage of 73.48%.

To sum up, this study was designed to be a descriptive content – analysis study focusing on the linguistic shifts that occur in the translation of literary texts from English into Arabic. The study was based on comparing two Arabic translations of the novel *A Tale of Two Cities* by Charles Dickens, in which Catford's (1965) theory of translation shifts was applied to these two translations.

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ترجمتان عربيتان لرواية ديكنز "قصة مدينتين": دراسة استقصائية للتحول الترجمي من منظور جودة الترجمة وتقنياتها

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الملخص

تتناول هذه الدراسة تطبيق نظرية تحولات الترجمة وكيف تم استخدامها ببراعة من خلال تحليل ترجمتين عربيتين لرواية ديكنز "قصة مدينتين" من حيث تقنيات واستراتيجيات الترجمة. وتعتمد هذه الدراسة على أعمال ج. ك. كاتفورد (1965) كأطار نظري يُجرى عليه التحليل بأكمله. وقد تُرجمت هذه الرواية الكلاسيكية من قِبل منير البعلبكي (2006) وسونيا الكوش (2016)، وأوضحت الدراسة أن جميع الفئات الخمس لتحولات الترجمة لكاتفورد قد طُبقت، وأن هناك 181 تحولاً في الترجمة في الترحمتين العربيتين. وأظهرت هذه الدراسة كذلك أن التحولات في الطبقة هي أكثر تحولات الترجمة شيوعاً بنسبة 36.46% (= 66 تحولاً)، وجاءت تحولات الوحدة في المرتبة الثانية من حيث المعدل، حيث سجلت 28.72% (= 52 تحولاً)، ويتبع ذلك تحولات داخل النظام بنسبة 18.23% (= 33 تحولاً)، ثم تحولات البنائية بنسبة 11.04% (= 33 تحولاً)، وأخيراً تحولات المستوى بنسبة 5.52% (= 10 تحولات). كما استنتج أن الكوش كانت أكثر فطنةً من البعلبكي في تطبيق تحولات الترجمة بنسبة 96.13% و 73.48% للبعلبكي على التوالي.

معلومات البحث

تاريخ الاستلام: 2023.03.25

تاريخ القبول: 2023.05.21

الكلمات المفتاحية

نظرية التحولات الترجمية،

قصة مدينتين، الترجمات

العربية



A Syntactic Study of Case Marking Dropping among Arab TV Newsreaders

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Abstract

Inspired by the sustained efforts at preserving the standard form of Arabic language, this study explores the phenomenon of dropping the case markers of Arabic words among TV newsreaders. It focuses mainly on the structural functions of these words within the syntactic structure as well as on the relationship between this phenomenon and the type of TV shows in which it occurs. It is a quantitative-qualitative exploratory study that is based on a corpus of records of different shows collected from different TV channels broadcast in Arabic language. The results of this study show that some structural functions occur more than others during these TV shows, and some of them lose their markers more than others. Adjectives are used without their case endings in the majority of times. In particular, multiple adjectives, adjectives of adnominals and adjectives of objects of prepositions are mostly uttered without their case markers. Results also reveal that live TV shows, in which newsreaders have to improvise, witnessed dropped case markers much more than recorded TV shows. The current study concludes that this phenomenon mostly, and unreasonably, occurs on structural functions which always have fixed case endings irrespective of their position within the syntactic structure.

Paper Information

Received: 25.03.2023

Accepted: 21.05.2023

Keywords

syntax, case marking
dropping, Arab
newsreader.

1. Introduction

What is the position of Arabic language among human languages? It is far away sufficient to say that it is the language of the Holy Quran. It is a Semitic language and one of the most spoken languages in the world with nearly half a billion speakers all over the world, and it is one of the six official languages used in the United Nations (Bassiouny & Katz, 2012). Although there are a number of different varieties derived from Arabic spoken in different parts in the Arabic region, Standard Arabic (SA; henceforth) resembles a lingua franca to Arabic speakers whatever their own varieties are (Owens, 2013). Nonetheless, the use of spoken SA is to a great extent restricted to official uses like: teaching, speech delivering and broadcasting (Hallberg and Niehorster, 2021).

Since media, in general and TV channels in particular, constitute platforms that affect people's ideas and experiences (Qumaiha, 1998) besides enriching their culture and knowledge (Al-Dulaymi, 2012), Al-Arjaa (2013) asserted that such platforms have a great and a direct impact on the language of their viewers and the way they use language because these means are available everywhere and can be easily accessed any time. Moreover, media's effect on Arabic language, especially, is immense and can be positive or negative due to the fact that they are oriented to both literate and illiterate people.

To approach the focus of this study, let us first pose this question: is Arabic language spoken on air by newsreaders really standard? For those who have adequate knowledge of how SA should be spoken, the answer is definitely no. This is due to the fact that many newsreaders make different types of mistakes during their presentations. Among these mistakes, one can easily perceive how a lot of newsreaders tend to drop case markers, that should be uttered at the end of Arabic words, during connected speech to the extent that some of them make a short pause almost at the end of each word in strings of connected sentences.

We know only a little about the nature of the phenomenon of dropping case endings by newsreaders during connected speech. In other words, there is a scientific and linguistic need to spot the light on this issue so that we can extensively know more about it. To this end, this study digs rigorously in the course of the Arabic language spoken by newsreaders to discover, particularly, the syntactic aspects of dropping the case markers in Arabic connected speech.

The importance of tackling this problem lies heavily on the fact that it represents a part of the ongoing collaborative efforts put into preserving Arabic language. To put it more forwardly, the majority of Arabic media viewers are profoundly affected by what they receive from these media platforms which broadcast in Arabic. Therefore, Arabic language used in formal mass media should be as standard as possible so that Arabic speakers preserve their language and identity. Further, this study investigates the issue from an angle that has almost been neglected in the existed literature, i.e., it studies the phenomenon of dropping case markers in depth in order to know where exactly it usually occurs and what structural functions it usually affects during speech. Therefore, it represents a novel try that is meant to fill in the gap in the existing body of linguistic knowledge pertaining to using SA in the industry of broadcasting. In particular, this study addresses the two following questions: 1) On what structural functions do Arab TV newsreaders tend to drop case endings? And 2) What is the relationship between this phenomenon and the type of the TV show where it occurs?

2. Literature Review

2.1 Theoretical framework

As this study is dedicated to explore the phenomenon of case endings dropping during Arabic spoken discourse and show their correct manner, it will theoretically follow the traditional Arabic framework of *iʿrāb* ‘parsing’ proposed by classical Arabic grammarians. *Iʿrāb* is a significant feature of Arabic language since it plays a crucial role in understanding the exact meaning of a particular sentence (Mannaa, Azmi and Aboalsamh, 2022). To define the term *iʿrāb*, it reasonably suffices here to adopt Ibn Ājurrūm’s (1276-1327) definition, in his well-known “*Al-Muqaddimah Al-Ājurrūmyyah*”, which has been widely used and accepted in Arabic pedagogical grammar. He defined *iʿrāb* as “the change of word-endings due to the variation of operators which occur before them either explicitly or implicitly” (Hallberg, 2016, p.65). *Iʿrāb* rests on the Arabic word system which is divided into three types: *ʾism* ‘noun’, *feʿl* ‘verb’ and *ḥarf* ‘particle’. The *ʾism* is the type of a word that has a content meaning and does not associate with time while the *feʿl* is the type of a word that has a content meaning and does associate with time; either past, present or future (or imperative in Arabic). The *ḥarf* is the type of a word that has no content meaning and does not associate with time, (Abdulhameed, 2007).

According to Ibn Hishām (1306-1360), there are four types of *iʿrāb* in Arabic namely: *rafʿ*, *naṣb*, *jarr* and *jazm* that is ‘nominative, accusative, genitive and jussive cases, respectively’. The first two of these cases *rafʿ* and *naṣb* are applicable to both nouns and verbs, the third one *jarr* is exclusively used on nouns and the fourth one *jazm* is devoted only to verbs. This infers that particles are not considered in terms of *iʿrāb*. There are markers used to show these four cases of *iʿrāb* on words. These markers are of two types; original and subsidiary. Original markers are: a) ‘*ˆ*’ *ḍammah* which is used to indicate the nominative case on both nouns and verbs, b) ‘*ˋ*’ *fathah* which is used to show the accusative case on both nouns and verbs, c) ‘*ˊ*’ *kasrah* which is used to show the genitive case on nouns, and d) ‘*ˋˋ*’ *sukūn* which is used to show the jussive case on verbs (Ibn-Hisham, 2004).

Orthographically, these markers are presented with diacritics placed atop the last letter of the Arabic word, except for c) which is placed under the last letter. Phonetically, these markers are produced as short vowels at the end of words (Hallberg and Niehorster, 2021).

Specifically, the diacritic *ḍammah* is produced as a short [u], *fathāh* as a short [a] and *kasrah* as a short [e], except for d) which resembles a very short pause at the end of the word (Al-Sharkawi, 2017; Versteegh, 2014). Due to the fact that Classical Arabic has a flexible word order, it is mandatory that its speakers verbalize these short vowels at the end of words in order that the function of each element in a string of constituents could be obviously comprehended by the hearer (Al-Sharkawi, 2017; Bohas, Guillaume, & Kouloughli, 1990).

With regard to the subsidiary markers, they are mostly letters affixed to words to indicate their case marking. *Rafʿ* could be shown by the letter *ʿalif* in dual nouns, by the letter *wāw* in the Five Nouns¹ and in sound masculine plural nouns, and by fixing the letter *nūn* at the end of the Five Verbs². *Naṣb* also could be indicated by letters; by the letter *ʿalif* in the Five Nouns, by the letter *yā* in dual nouns and in sound masculine plural nouns, and by dropping the letter *nūn* at the end of the Five Verbs. Whereas *jarr* can only be indicated by one letter which is *yā* in dual nouns, sound masculine plural nouns and in the Five Nouns. In contrast, what could replace the *sukūn* marker is the deletion of *nūn* in the Five Verbs and the deletion of the vowel letter if it is the verb's final (Abdulhameed, 2007). It is worth noting here that structural functions and semantic notions of words within sentences play vital role in assigning these words their cases which are shown either with original or subsidiary markers.

Depicting the considerations and rules that govern case assignment and the use of overt or covert case endings are far beyond the scope of this paper. It is adequate here to include what the researchers have summarized from Abdulhameed (2007) and Ibn-Hisham (2004) regarding the main rules of *iʿrāb* and the definitions of the structural functions relevant to this study explained in some notes and examples. Table 1 shows how case markers are distributed in Arabic language according to the type of words and their structural function in the syntagm of the sentence.

Table 1
Distribution of Arabic case marking according to iʿrāb properties

Case	Noun	Verb
Nominative	Subject of active voice in verbal sentences Subject of passive voice in verbal sentences Primate Predicate Predicate of <i>inna</i> and its sisters Noun of <i>kāna</i> and its sisters	Present verbs if not preceded by an accusative or a jussive operator
Accusative	Object of verbal sentences Adverb of time or place Adverb of manner Excluded nouns Noun of <i>lā</i> Causative object Accusative of state	Verbs preceded by accusative operators

¹ These are definite five nouns known in Arabic grammar. They are *abū* 'father of', *axū* 'brother of', *hamū* 'father-in-law of', *fū* 'mouth of' and *dhū* 'owner of' (Abdulhameed, 2007).

² These indicate five patterns of Arabic verbs; replacing Cs in these patterns with any three consonantal root of Arabic verbs yields one of these five verbs. The patterns are: *yaCCaCān* 'indicates the 3rd dual subject', *taCCaCān* 'indicates the 2nd dual subject', *yaCCaCūn* 'indicates the 3rd sound masculine plural subject', *taCCaCūn* 'indicates the 2nd sound masculine plural subject' and *taCCaCin* 'indicates the 2nd feminine subject' (Ibn-Hisham, 2004).

	Distinctive noun Noun of <i>inna</i> and its sisters Predicate of <i>kāna</i> and its sisters	
Genitive	Object of a preposition Adnominal	-
Jussive	-	Verbs preceded by jussive operators Imperative verbs

The following are the main structural functions that are closely related to the purpose of this study (most of these items are translated from Al-Daħdaħ (1988)):

Primate and **predicate** are the two components of the nominal sentence in Arabic language. Primate is the nominative noun on which no verbal operators apply while predicate is the nominative noun that is associated to the primate. E.g. *albentu jamilatun* ‘the girl is beautiful’; the first noun is a primate while the second is a predicate.

Noun of *inna* is the primate that is preceded by an emphatic article like *inna*. E.g. *inna alwalada dhakiun* ‘the boy is smart’. In such instance, the primate undergoes a change in its case marker which is rendered accusative instead of being nominative.

Predicate of *inna* is the noun associated with the primate that is preceded by an emphatic article. E.g. the word *dhakiun* in the previous example.

Noun of *kāna* is the primate that is preceded by *kāna* ‘was/were’ (or any of its sisters). *kāna alwaladu dhakiian* ‘the boy was smart’.

Predicate of *kāna* is the noun associated with the primate that is preceded by *kāna*. E.g. the word *dhakiian* in the previous example in which it took an accusative case as a consequence.

Adjective is the noun that modifies another noun and which syntactically and phonologically follows it, i.e., the adjective comes after its noun and takes whatever case marker this noun has. E.g. *ishtaritu saiiaratan jadīdatan* ‘I bought a new car’.

Adnominal is the noun annexed to another noun. It is always in the genitive case. E.g. *lawnu alqalami aħmarun* ‘the colour of the pen is red’.

Object of a preposition is the noun that follows a preposition. It always has the genitive case. E.g. *alwāledu fī albaīti* ‘the father is in the house’.

Coordinate is the noun which is coordinated with another noun using a coordinating conjunction. It takes the same case marker as this preceded noun. E.g. *sharibtu almā’a wa al’aṣīra* ‘I drank the water and the juice’.

Subject is the nominative noun whose verb is mentioned before it. E.g. *akala alwaladu* ‘the boy ate’.

Subject of passive is the object whose subject is not mentioned. E.g. *shuriba almā’u* ‘the water was drunk’.

Object is the accusative noun that is affected by the action. E.g. *sharibtu almā’a* ‘I drank the water’.

Causative object is the accusative noun used to indicate the reason for doing something. E.g. *ḥaḍhartu xawfan* ‘I came because I was afraid’.

Accusative of state is the accusative noun that describes the state of something. E.g. *jāʿa alwaladu māshīan* ‘the boy came walking’.

Distinctive noun is the accusative noun that clarifies what has been obscure before it. E.g. *ʿishtarītu darzanan kutuban* ‘I bought a dozen books’.

Appositive is a noun used after another noun and can either emphasize or replace it (or a verb after another verb), and it follows it in terms of case marking. E.g. *raʿitu sālihan ʿaxūka* ‘I saw Saleh, your brother’.

Adverb of place is the accusative noun that indicates a place. E.g. *wajadtuha taḥta alṭāwilah* ‘I found it under the table’.

Adverb of time is the accusative noun that indicates a time. E.g. *wajadtuha sabāahn* ‘I found it in the morning’.

Past verb is the verb that describes what happened. It is always accusative. E.g. *nabaḥa alkalbu* ‘the dog barked’.

Present verb is the verb that initially has either of the following letters ‘*ʿa, n, y, t*’. It is usually nominative except if preceded by an accusative or a jussive operator. E.g. *nuḥebbu bilādanā* ‘we love our country’.

2.2 Empirical background

In recent literature, there have been a lot of sources and studies that tackled the issue of Arabic language in the discourse of broadcasting media. A substantial part of this body of knowledge is devoted to the mistakes that many newsreaders make while they present different programs. For example, Omar (1993) recorded different mistakes that many newspaper writers and radio newsreaders had been making during the 1980s. In this long-lasting record, Omar focused mainly on the newspaper writings of famous writers at that time and on Cairo Radio for the spoken material, particularly news and politics programs. He also recorded some notes on Arabic linguistic mistakes made by newsreaders of London Radio, America Voice and Kuwait Radio. He divided his book into different chapters each of which pertains to a type of linguistic mistakes. He started listing many phonological and phonetic mistakes like: wrong intonation, wrong stress, change in the phonetic characteristics of some sounds, in addition to resorting to *sukūn* ‘dropping of case endings’ as a strategy to avoid making *iʿrāb* mistakes. The next chapter tackles the morphological issues that pose bewilderment to writers and newsreaders; for instance, mistakes in forming the dual or plural nouns and the derivation of *ism al-fāʿil* ‘the agent’ and *ism al-mafʿūl* ‘the theme’. Then he went on describing the syntactic mistakes that people sometimes listen to or read in media. One issue in this chapter is the problem of the improper insertion of numerical expressions in sentences. Other problems were perceived in the wrong use of case markers at the end of words, e.g., rendering the subject of a sentence accusative while it should be nominative. Eventually, Omar included lexical and semantic criteria to show how writers and newsreaders mistakenly use some words that do not indicate what they really mean; for example, using the word *ṭaraf* ‘an end of something’ while the intended meaning is *ṭarf* ‘the eye’.

In a similar fashion, Abo-Suroor (2012) traced the syntactical and morphological mistakes that many newspapers' writers made during the period from 1990 to 2011. She postulated that mistakes found in different media means, written or spoken, do not substantially differ; therefore, she sampled only written mistakes in newspapers. She divided her book into two chapters: the first one deals with the characteristics of the language that media use and the role of these means in the spreading of linguistics mistakes, whereas the second chapter shows samples of syntactical and morphological mistakes dispersed in different newspapers. For example, there were mistakes in the use of the definite article *al* 'the', wrong structure of negation, wrong form of annexation and mistakes in conditional structures. There were also some mistakes in the derivation of some words, in forming the dual nouns and plural nouns and other mistakes in using *hamzah* [ء] 'glottal stop'.

Recently, Hamdan and Al-Hawamdeh (2020) conducted a study based on the use of SA by TV newsreaders. They analysed a sample of five-minutes tracks recorded from news bulletins which were presented by seventy male and female Arabic native speakers from fourteen Arabic countries. Their study was phonologically oriented and concentrated only on reviewing the literature pertaining to the production of the sound /d/ in Arabic language as well as on examining the way this sound is pronounced by different Arabic newsreaders from different Arabic varieties. It concluded that this sound is recently being realized as an emphatic dental stop; particularly if it is used in SA. The study also revealed that newsreaders often fail to distinguish between the two sounds /d/ and /dh/.

With a broader focus, Daniëls (2021) analysed a corpus of twenty-eight news bulletins, which date back to January 1998, from the Lebanese radio channel of *Şawt Al-Janūb*. Initially, the researcher had no particular purpose of collecting this corpus at that time, yet he used it later in providing Lebanese dialectological examples in sociolinguistic courses. After many years, the researcher realized that the same corpus could be the impetus for a detailed linguistic study that seeks to find out the linguistic, functional and symbolic features of language used by Lebanese news broadcasters. To this end, the researcher analogically analysed SA versions and Lebanese versions of news bulletins from the corpus. The study found that there are syntactic, morphological, lexical and phonological differences in the newsreaders' use of the two varieties. It showed also that the use of SA is impaired by some violations with regard to declensional endings, word order and phonology. Further, the researcher concluded that the use of Lebanese in radio news broadcasting meant to represent the Lebanese identity and reflect some political attitudes.

With even a broader linguistic orientation, Belkhait and Kardoosi (2022) carried out an investigation of the phonological, morphological, syntactic and semantic errors made by radio broadcasters. They devoted their analysis to monitor the linguistic violations and the overlap between the standard and the colloquial variety of Arabic spoken by Algerian radio broadcasters. The study sampled recordings from two radio programs from a single governmental radio channel during the period between April 30, and May 10, 2022. The two researchers concluded that the problem in the language of radio broadcasters does not lie only in their prevailing use of the colloquial variety but also in the fact that their use of SA is distorted by many mistakes across different linguistic levels – phonology, morphology, syntax and semantics. The study found also that there were some examples of code-switching in which the broadcasters mixed between Arabic and French in addition to the presence of different loanwords from languages like: English, French and Persian.

However, most of these previous works were conducted to trace a variety of linguistic mistakes in different media means with no particular attention to any particular type of

mistakes. They were also restricted in focus in different ways: the first sampled mainly one radio channel, the second took its data exclusively from newspapers, the third focused only on the realization of one speech sound, the fourth compared between the use of a local variety and SA, and the fifth of analysed only recordings from two radio programs on one radio channel. Moreover, they all peripherally indicated the phenomenon of dropping the case endings, which is the main concern of the current study.

Nevertheless, the study that is most related to the purpose of the current paper is offered by Hallberg (2016) who presented an empirical and detailed account of the use of Arabic case markers in TV programs. This researcher carried out a quantitative analysis of a corpus composed of seventeen televised interviews which were made with well-educated native speakers of Arabic. Thirty-five thousand words were involved in these interviews that totally lasted more than five hours. These interviews were solely recorded from the program of *liqā' al-yaūm* 'meeting of today' which is aired via Al-Jazeera TV channel. The purpose of the study was to explore how Arabic speakers use case endings during their speech. This study revealed that speakers widely differ in this respect. It showed also that case endings were rarely used in words with the definite article *al-* 'the' and in adjectival attributes. Also, it surfaced that case endings that could appear in written forms of the words are mostly used by speakers in addition to words with enclitic pronouns. However, this study has many limitations. Firstly, it only involved one TV program from a single TV channel. Secondly, it focused only on the language spoken by the seventeen interviewees who took part in the recorded episodes of the aforementioned program. Thirdly and most importantly, it investigated the use of case markers in general during the connected speech. Stating that, the significance and novelty of the current study lies on the fact that it exclusively concentrates on the structural functions where TV newsreaders tend to drop the case endings during the connected speech. Further, it enlarges the recording corpus to encompass speakers, newsreaders in particular, from different Arabic TV channels and during different TV shows.

3. Research Methodology

3.1 Research design

The principal objective of this study is exploratory in nature since it seeks to discern the syntactic characteristics of a phenomenon that has not been thoroughly investigated. Methodologically, researchers may resort to rigorous exploratory studies when there is not much known about a particular phenomenon (Creswell, 2018; Fraenkel, Wallen & Hyun, 2011). According to Abusaleh and Anwar (2022), exploratory research is the type of studies via which researchers attempt to establish a basic understanding of the nature of a problem about which they know only a little.

In terms of its data, this is a mixed-methods study because it first gathers qualitative data and then converts them quantitatively in order to find answers to the research questions. It is the nature of the topic that requires the blending of these two research methods. It is called a mixed method after Creswell (2018) who maintained that, in mixed method studies, researchers need to elicit quantitative data from their collection of qualitative data.

The researchers believe that this exploratory mixed-methods design is the best way of investigating the research problem since it delves deeply into its explorations by means of combining both qualitative and quantitative data. Notwithstanding the time and effort such design requires, the phenomenon of case endings dropping is definitely worth all effort.

3.2 Population and Sample

This study adopts the technique of cluster sampling which was applied in different layers. First, TV channels represent a layer from which a sample was randomly drawn. Second, different TV shows make up another layer of clusters from which a random selection of programs was applied. Thirdly, recordings are another layer where only some parts of some recordings were randomly selected for the analysis process. Moreover, the randomization technique in this study extended to days of recordings as well as to times of the day when the recorded process took place. Doing so, the researchers aim at collecting data from as many different newsreaders as possible in order to increase the sample's representativeness.

3.3 Research instruments

The researchers used only one tool to collect primary data. It is a corpus of recordings from different TV channels. As long as the study is focused on SA spoken by newsreaders, it is logical that having recordings of their speech is the best way to explore the phenomenon under investigation. It is a tool that other researchers, such as Omar (1993) and Hamdan and Al-Hawamdeh (2020), have also utilized. These recordings helped the researchers to answer the two research questions by providing a means that enabled the researchers to listen to newsreaders' utterances thoroughly and analyse them carefully.

3.3.1 Testing the instruments

The researchers initiated the recording phase with pilot recordings from several TV channels. This sample of recordings was initially analyzed and helped the researchers get a brighter idea of how the whole process of recording and analysis would be, and it greatly helped to overcome many issues that rose during the time of conducting the study. For example, this pilot sample guided the researchers that the time of each recorded track should range between thirty to sixty seconds in most occasions. On the one hand, this period is adequate to provide sufficient space for the collection of some sentences. On the other hand, it is not too long to include plenty of sentences which require tremendous effort during analysis.

3.4 Data collection procedures

The researchers started data collection by recording different and random samples of newsreaders' speech from different and random TV channels as well as from different TV programs. The recording process was implemented by two StarSat HD satellite receivers which have the feature of recording via a memory stick. One of the significant features of such devices is that they automatically save the recorded track in a folder holding the name of the TV channel, date and time of recording. This feature enormously helped the researchers by perfectly bearing the burden of tracks referencing. The random selection resulted in recordings from the following TV channels: Al-Araby, Al-Arabyiah, Al-Arabyiah Al-Hadath, Al-Jazeera, Al-Mahryiah, Al-Mayadeen, BBC Arabic, France 24, RT Arabic, Sky News Arabyiah and Yemen Shabab. It is worth noting here that the number of recordings per channel is not the same due to the fact that some of these channels broadcast news all day which made their random recording more appropriate than others.

There were many considerations that the researchers took seriously during the recording phase in order to ensure the randomization of the selection of the recordings. Among these considerations are the following:

- i. There was a pre-determined length for all instances of recordings; ranging between thirty to sixty seconds.
- ii. Times of recordings were different: different times during the day, different times during the week and different times during the month.
- iii. Genres of programs recorded varied.

- iv. The process of recording stretched for more than one month, precisely between June 20, and July 27, 2022.

After finishing the recording phase, the recorded and saved files were transferred to a laptop. During this time, the researchers were able to sort the recordings into five different categories based on the type of the recorded TV show. They were of the following types: headlines, live dialogues, live reports, news and recorded reports. These categories were then given random codes from A to E in the order they were written here. And within each category, each track was given a number rendering the code of tracks labelled as A1, A2, D3, E12, etc.

After that, the researchers started listening and carefully transcribing the contents of all the recorded tracks. Since it was a prerequisite, each word that accepts signs of *iʿrāb* is marked according to what the newsreader uttered. Needless to say, neither words that have *sukūn* by their virtue nor those which do not accept case endings are included in this process of analysis since they are irrelevant. Then, a summary was drawn under each track's transcription showing the different relevant structural functions along with the number of times when they were marked and the number of times when they were not. It is worth mentioning that only full sentences that are uttered in each piece of recording was considered in the process of collecting and analysing data. This is because the syntactic relationships between elements in a single sentence would not be clear if the sentence is fragment.

3.4.1 Ethical considerations and confidentiality

Inspired by Creswell's (2018) guidelines on ethics of research, the researchers paid a considerable attention to the following:

- i. The absolute linguistic purpose of the study.
- ii. The anonymity of the newsreaders: neither their recordings were linked to their names nor were they used in the analysis or reporting phases of the study.

3.5 Data analysis procedures

Since it is an exploratory study, the researchers primarily analysed the obtained data descriptively. The process generally followed Creswell and Creswell's (2023) framework of qualitative analysis. In the first stage, recordings were organised and transcribed. Next, these transcriptions were thoroughly parsed to explore the different structural functions where newsreaders tend to drop case markers. After that, the status of each function was compared with the rules of SA that prescribe the correct use of its case endings. Then, a detailed description was provided to account for the analysed data. Finally, the researchers used many statistical features provided by Microsoft Excel to produce tables and figures that illustrate the common structural functions of dropping of case endings.

4. Results and Discussion

4.1 Syntactic analysis of dropped case markers

Since the focus of this study is on the syntactic features of the phenomenon of case endings dropping, the analysis should depict the different structural functions as found in the recorded tracks. This analysis reveals that there are some structural functions, in Arabic sentence structure, that occur more than others during TV shows. Table 2 details the 2,405 structural functions included in the recordings. It indicates the number of times each function occurred, with or without its case marker, in addition to its percentage out of the total number of functions.

Table 2
The distribution of structural functions in the recorded tracks

Structural function	No.	%	Structural function	No.	%	Structural function	No.	%
Adnominal	566	23.5%	Past verb	76	3.2%	Noun of <i>kāna</i>	16	0.7%
Object of a preposition	560	23.3%	Coordinate	73	3.0%	Predicate of <i>inna</i>	14	0.6%
Adjective	352	14.6%	Adverb of place	40	1.7%	Accusative of state	10	0.4%
Present verb	215	8.9%	Adverb of time	40	1.7%	Distinctive noun	9	0.4%
Object	120	5.0%	Noun of <i>inna</i>	37	1.5%	Appositive	6	0.2%
Primate	114	4.7%	Predicate	27	1.1%	Subject of passive	5	0.2%
Subject	103	4.3%	Predicate of <i>kāna</i>	20	0.8%	Causative object	2	0.1%

As illustrated in Table 2, the structural function of adnominal is used in TV news programs more than any other function. It is followed closely by the object of a preposition function which came second. Third in the list, there is the adjective function. The three totally amount more than 61% of the total number of structural functions found in the recordings. This can be attributed to the nature of these three structural functions since they are all used as modifications to other constituents within the sentence syntagm.

The researchers believe that such structural functions come atop this list probably because news has usually a lot of description and details about the topics under discussion. Therefore, clarifying the picture for the viewer requires that news editors excessively use words that fill in these structural functions since they mostly bear additional semantic indications for the constituents that they modify in the syntagm.

In order to explore on what structural functions TV newsreaders tend to mostly drop case markers of Arabic words, it is essential that the analysis presents a detailed statistical account that shows the structural function, the number of times it occurred and the number of times on which its markers are dropped. Table 3 displays all of these data combined with the relevant percentage.

Table 3
The most structural functions whose case markers are dropped

Structural function	Total	Dropped		Structural functions	Total	Dropped	
		No.	%			No.	%
Adjective	352	295	84%	Adnominal	566	265	47%
Appositive	6	5	83%	Distinctive noun	9	4	44%
Predicate	27	19	70%	Object of a preposition	560	212	38%
Predicate of <i>inna</i>	14	9	64%	Object	120	42	35%
Noun of <i>kāna</i>	16	10	63%	Primate	114	37	32%
Subject of passive	5	3	60%	Accusative of state	10	2	20%
Present verb	215	111	52%	Adverb of time	40	6	15%

Subject	103	53	51%	Adverb of place	40	4	10%
Predicate of <i>kāna</i>	20	10	50%	Past verb	76	5	7%
Noun of <i>inna</i>	37	18	49%	Causative object	2	0	0%
Coordinate	73	35	48%				

It is evident from table 3 that the structural function of adjective is the one whose case markers are mostly dropped by TV newsreaders during their connected speech. As it appears, in 84% of the total number of times where this function is found in the recordings, the case endings on adjectives were not uttered by newsreaders. This is an interesting number since it represents a very substantial portion of a structural function whose case marking system is not complicated. In other words, adjectives in Arabic language come after and take the same case marker as the nouns they modify, e.g., if the noun is nominative, its following and modifying adjective is also nominative. Despite this obvious syntactic rule, it is found that TV newsreaders fail to assign an adjective its deserved case marking. No reasonable justification can be postulated here except that such speakers may find it phonologically exhaustive to utter the case marker of each adjective particularly if there are more than one adjective used to describe a certain noun.

A similar conclusion can be drawn out of the numbers of both adnominals and objects of prepositions. Although it is a syntactic fact in Arabic language that these two structural functions take the genitive case marking wherever they occur in the syntagm, it is found that nearly half 47% of the occurrences of adnominals lack their case markers in these recordings. For the objects of prepositions, more than one third 38% of times were found when newsreaders did not end them with their case markers. Remarkably similar, the structural function of subject took its share from the dropped case endings. More than half of the subjects used by TV newsreaders appeared with no case endings in the recordings though this is a structural function which is always nominative in every Arabic sentence.

Table 3 shows also some other interesting numbers. For example, the structural function of appositive is the second most function that suffers the loss of its case endings. In five out of the six instances of this function, the newsreaders left it without a case mark. Other structural functions like subject of passive and distinctive noun also lost their case endings in a substantial number of utterances. However, such numbers cannot be generalized since their overall totals of uses are relatively small.

According to the findings that have been discussed so far, adjectives took the lead on the list of the most structural functions whose case endings were dropped by TV newsreaders. Thus, a detailed analysis should be provided about this structural function since it follows other different types of functions in the structure of the sentence. Table 4 illustrates the distribution of the 352 adjectival constituents where the case endings were neglected by TV newsreaders.

Table 4

Distribution of adjectives according to the nouns they modify

Modified noun	No.	%	Modified noun	No.	%
Adnominal	136	38.6%	Noun of <i>inna</i>	11	3.1%
Object of a preposition	91	25.9%	Predicate	5	1.4%
Subject	27	7.7%	Noun of <i>kāna</i>	3	0.9%
Multiple	23	6.5%	Predicate of <i>inna</i>	2	0.6%
Object	23	6.5%	Distinctive noun	2	0.6%

Primate	16	4.5%	Subject of passive	1	0.3%
Coordinate	12	3.4%			

What can be elicited from table 4 is that adjectives are used to modify adnominals more than any other modified noun; more than 38% of the modified nouns were adnominals. Objects of prepositions appear second in the table making up more than a quarter of the total number of nouns modified by adjectives in the recorded tracks. Other nouns also have been used and modified by adjectives. Subjects and objects made up around 14% of these modified nouns. In more than 6% of instances, multiple adjectives were used to modify a single noun.

Nonetheless, the analysis here focuses mainly on the most two types of nouns modified by adjectives as shown in table 4. These two types are depicted in figure 1 which illustrates the total number of each one alongside the percentage on which each one received case endings and on which it did not.

It is clear from figure 1 that adjectives lose their case endings in the majority of times when they were used to modify adnominals or objects of prepositions even though both types of nouns are always marked genitive (see excerpts 1 and 2, where the uttered markers are underlined while the dropped ones are bracketed). That is, it is unreasonable for newsreaders to drop case endings particularly on structural functions like these two since there is no other way of marking them other than the genitive case; therefore, the risk of making a mistake is eliminated here.

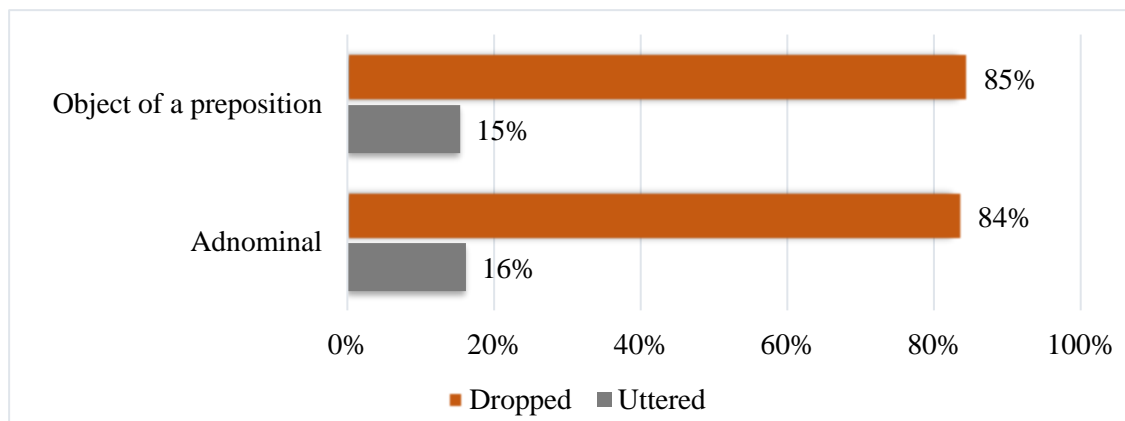


Figure 1. Instances of adjectives modifying adnominals and objects of prepositions

Excerpt 1: “... *muntaqidū addustūrī ljadīd(i)* ...” منتقدو الدستور الجديد ‘critics of the new constitution’

Excerpt 2: “... *menā alʾaṭrāfi lmushārikah(ti)* ...” من الأطراف المشاركة ‘from the participated parties’

Another interesting finding is what the statistics of multiple adjectives show in figure 2 below. Although the total number of utterances that included multiple adjectives was restricted to only twenty-three, all of these excerpts had the case endings of the second successive adjective dropped by the TV newsreaders. It is again unjustifiable that those speakers did so though on some occasions they successfully produced the mark at the end of the first adjective, but they drop it on the second one (as shown in Excerpt 3).

Excerpt 3: “... *beḥukūmatin madanīyatīn dīmūqrāṭīyah(tin)* ...” بحكومة مدنية ديمقراطية ‘by a civil democratic government’

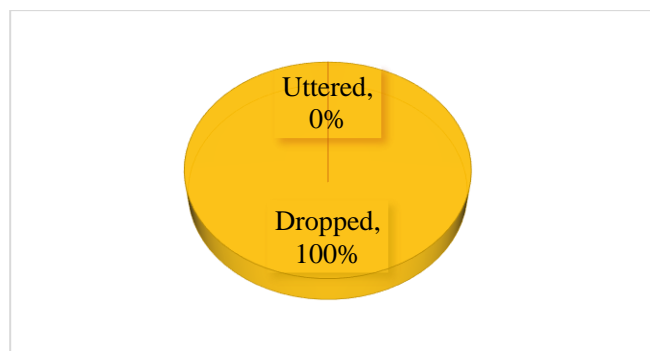


Figure 2. Percentage of both uttered and dropped case markers of multiple adjectives

4.2 Dropped case markers in different news shows

The discussion moves now to depict the data in a way that can show the relationship between the type of the broadcasted program and case endings dropping. First, there is a need to show some general statistics through which the analysis gradually reaches its aim. Figure 3 shows how the total number of 75 recorded tracks is distributed on five different types of news programs; namely: headlines (HL), live dialogues (LD), live reports (LR), news (N) and recorded reports (RR). This categorization is suggested by the researchers on the basis of certain characteristics like: nature of discourse, place of broadcast and spontaneity of the speaker. Such division proves its significance as the following sections of analysis show. It is worth noting that the number of tracks recorded for each category reached these figures at random after being carefully transcribed and coded.

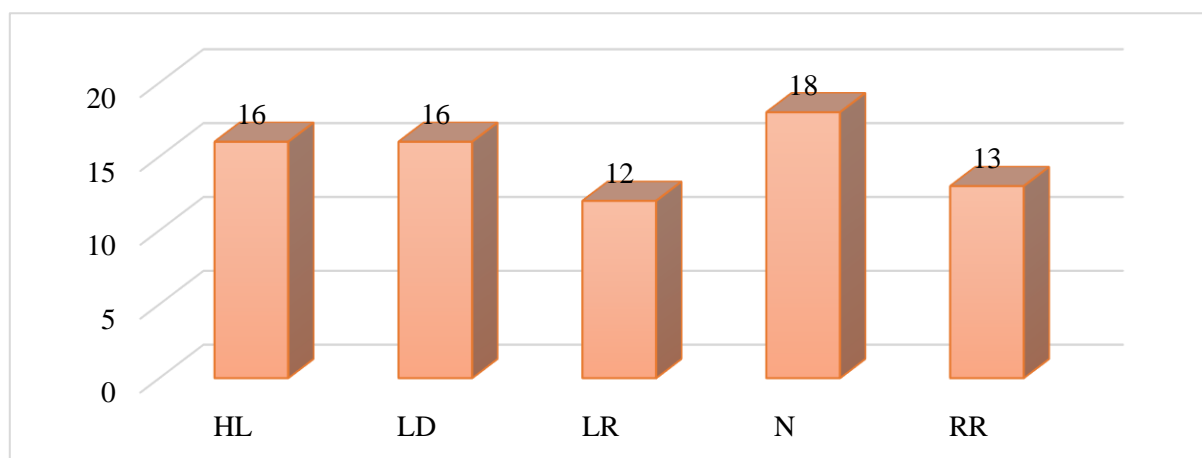


Figure 3. The distribution of different types of the recorded news programs

After such classification, the process of analysis tackled each category per se. The statistics of each category is clearly illustrated in figure 4 which shows how many structural functions were analysed per type of news shows.

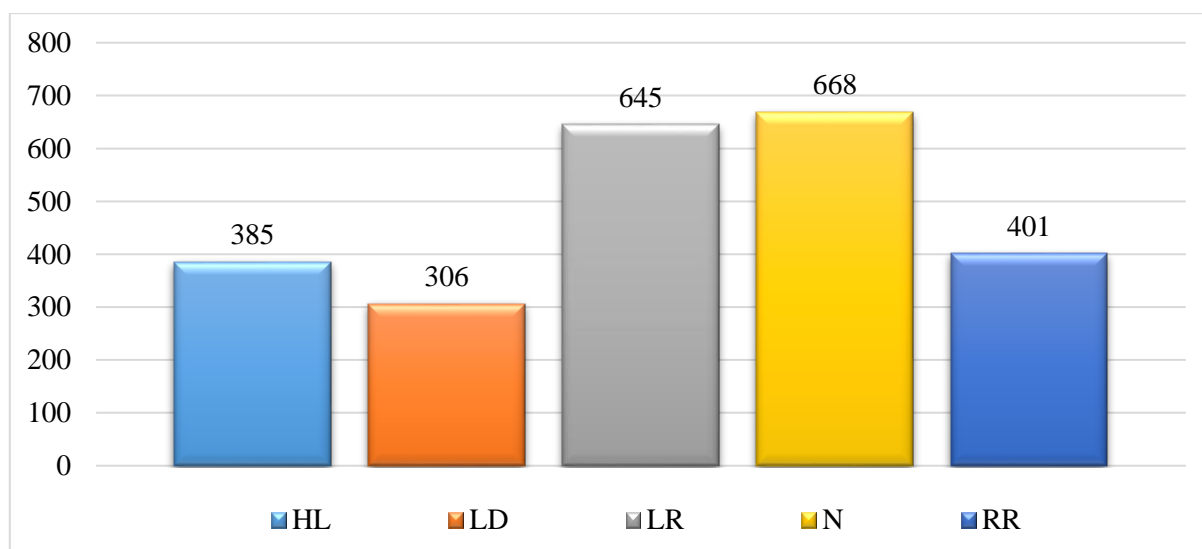


Figure 4. Total number of analysed structural functions according to each category

As figure 4 shows, tracks of news programs had the largest number of the analysed structural functions, followed by tracks of live reports. Recorded reports come third, and headlines and live dialogues appear fourth and fifth respectively. Such difference in numbers is due to the nature of each category. News programs, for instance, include many details and descriptions that the newsreader may spend the whole track speaking, which absolutely increases the chances that many structural functions are targeted among this track. Conversely, live dialogues usually have short utterances produced by the newsreader, and headlines are often worded in short sentences. Consequently, the number of the targeted structural functions that can be found in such categories is substantially smaller than in other types.

The calculations lead to a comparison between the uttered and the dropped case markers in each category so that the researchers can statistically answer the second research question. Figure 5 displays the results of this comparison showing the percentage of both the uttered and the dropped case markers in each category.

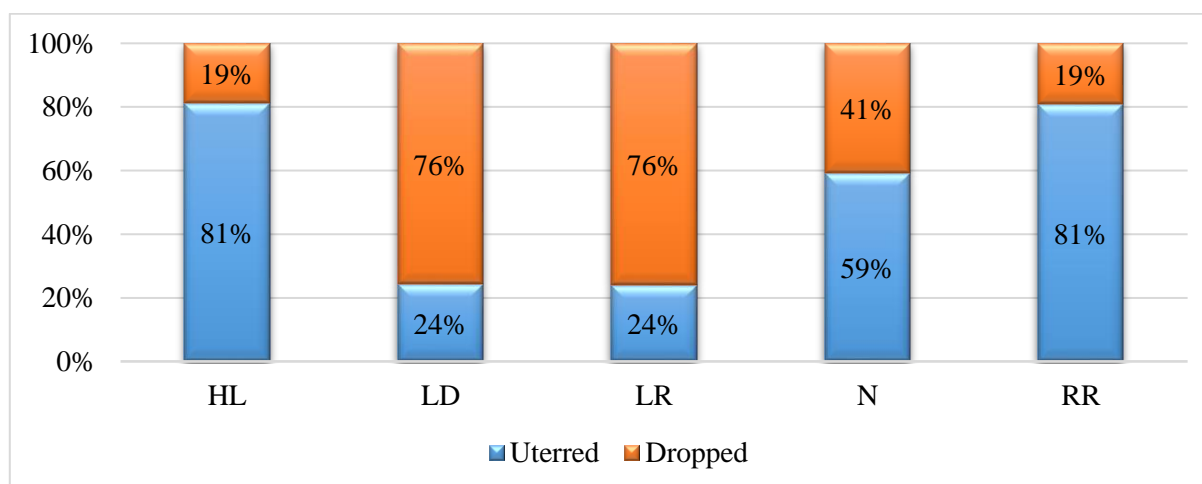


Figure 5. The percentage of the uttered and dropped case markers in each category of TV programs

Figure 5 presents some interesting findings. While news programs had 59% of their markers uttered and 41% of them dropped, the other types of programs had more contrasted

percentages. On the one hand, the percentage of dropped case endings is the least (only 19%) in headlines and recorded reports. On the other hand, live dialogues and live reports witnessed the most occasions of dropped case markers (74% each).

According to these statistics, dropping of case markers by TV newsreaders occurs in both live dialogues and live reports more than the other types of programs. It is shown that more than three quarters of the structural functions where the case markers should be uttered are dropped during the broadcasting of these two types of programs. It is definitely a considerable number that clearly indicates the current state of SA in Arabic TV channels. It is true that one can find some justifications for this issue since the program itself requires that the newsreaders depend on their linguistic repertoire while spontaneously composing their speech. Nonetheless, improvising Arabic questions and statements is not an excuse particularly in the light of the findings of this study which revealed that the majority of such mistakes occur on structural functions that have obvious and static rules.

Another important observation is that TV newsreaders pay more attention to the existence and necessity of uttering the case endings while they are presenting headlines or reading recorded reports. In these two types of programs, newsreaders successfully vowelized the case marker at the end of more than 80% of the occasions. This success is probably attributed to the shortness and structure of sentences, in the case of headlines, and to lesser pressure that newsreaders are under while reading recorded reports because they take their time and record at more ease off-air than they do if the program is on-air. Table 5 presents an excerpt taken from each of the distinguished categories.

Table 5

Excerpts from the recorded tracks according to the type of news program

Type	Excerpt	Gloss
HL	“ <i>inqisāmun fi lmawāqif(i) baīna murahhibīna wa mu‘āridīn</i> ” انقسامٌ في المواقف بين مؤيدين ومعارضين	‘a division in attitudes between proponents and opponents’
LD	“ <i>hal taḍa(u) hādhihi lmunāwarātu tāiwan fi mawqif(i) muājahah(tin) ma‘a aṣṣīn</i> ” هل تضع هذه المناورات تايوان في موقفٍ مواجهه مع الصين	‘does these manoeuvres put Taiwan in a fronting state with China’
LR	“ <i>kayfa sayakūn(u) shakl(u) lhukūmah(ti) ljādimah(ti)...</i> ” كيف سيكون شكل الحكومة الجديدة	‘how the new government will look like’
N	“ <i>innahū yastajīb(u) limutaḥallabāti marḥalti ‘e‘ādati benā(i) ddawlati lawaṭanīyah</i> ” إنه يستجيب لمتطلبات مرحلة إعادة بناء الدولة الوطنية	‘it complies with the prerequisites of the phase of reconstructing the national state’
RR	“ <i>attaḥawwufu hwa min sū‘i ttaqdīr(i) wa lhisābāti lxāṭī‘ah</i> ” التخوف هو من سوء التقدير والحسابات الخاطئة	‘the dread is from underassessment and miscalculations’

Generally, the findings of this study confirmed the peripheral notes that Omar (1993), Abo-Suroor (2012) and Daniëls (2021) made with regard to the fact that many newsreaders resort to drop case markers. Further, the findings of the current study, and more specifically that adjectives are mostly used without their case endings, are in partial agreement with the results of Hallberg (2016) who concluded that case endings were rarely used in words with the definite article *al-* ‘the’ and in adjectival attributes.

5. Conclusion

Generally, this study aimed at investigating the phenomenon of dropping the case markers by many TV newsreaders while they present news programs. Its focus was on exploring the structural functions in Arabic sentences where these newsreaders tend to drop case markers in addition to finding the relationship between the type of news programs and this phenomenon.

This study has revealed that the adnominal, the object of a preposition and the adjective are the most three occurring structural functions in TV news shows. It has also found that these three functions were among the top functions, in addition to the subject function, from which newsreaders mistakenly drop their case endings. On percentage basis, the adjective function has lost its case endings in the majority of times when it is used in sentences. Within this structural function, it has also been found that the adjective of an adnominal and the adjective of the object of a preposition were among the most adjectival constituents affected by the case endings dropping. Moreover, in all the occasions when multiple adjectives were used to modify a single noun, the second adjective has been uttered without its case marker.

Furthermore, the current study has found that TV news shows can be divided into different categories according to their nature. Five categories have been distinguished: headlines, live dialogues, live reports, news and recorded reports. Among these sets, it has been found that newsreaders usually tend to drop case markers during their presentation of live dialogues and live reports, whereas they show their adherence to Arabic case marking system on most of the structural functions that occur during the broadcasting of news and recoded reports.

The findings of this study have some significant implications on the industry of TV news presentation. They can form a solid basis which TV channels decision makers can rely on to integrate Arabic special courses in training programs for their newsreaders. Moreover, Arabic newsreaders will find this study beneficial in that it reveals the common structural functions where they tend to drop case endings so that they become more accurate during speech. It also attracts their attention to the types of different TV programs during which this phenomenon mostly occurs so as to help them be more careful while speaking.

After conducting this study, the researchers can confidently suggest some related topics to be investigated in further research projects. For example, some other aspects, like morphology or phonology, of the structural functions could be the foci of other studies. Moreover, other genres of TV shows, such as sports and economics, would make a fertilized area for conducting research projects. Another promising research area is the relationships between different Arabic varieties to which the newsreaders belong and their tendency to drop case endings during their presentation of connected speech in TV shows.

Key of transcriptions

Let.	Rep.	Let.	Rep.	Let.	Rep.	Let.	Rep.	Let.	Rep.
ا	ā	ب	b	ت	t	ث	th	بُ	bu
ج	j	ح	h	خ	ẖ	د	d	بَ	ba
ذ	dh	ر	r	ز	z	س	s	بِ	bi
ش	sh	ص	ṣ	ض	ḍ	ط	ṭ	بِ	bb
ظ	ḍh	ع	ʿ	غ	gh	ف	f	ء	ʾ
ق	q	ك	k	ل	l	م	m	الـ	al-
ن	n	هـ	h	و	ū	ي	ī	وْ	w
يَ	y	وُ	ūw	عُ	o	ءَ	ʾa	ءِ	ʾi

Note: Let.= Letter, Rep.= Represented by

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دراسة نحوية لتسكين أواخر الكلمات لدى مقدمي الأخبار التلفزيونية العرب

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الملخص

مسترشدةً بالجهود المتواصلة للمحافظة على النمط السليم للغة العربية، تستكشف هذه الدراسة ظاهرة تسكين أواخر الكلمات لدى مقدمي الأخبار التلفزيونية العرب. وبشكل أساسي، تركز الدراسة على الوظائف التركيبية لهذه الكلمات في البنية النحوية وكذا على العلاقة بين هذه الظاهرة ونوع البرامج التلفزيونية التي ترد فيها. وهي دراسة استكشافية تجمع بين الكم والنوع بناءً على مجموعة من التسجيلات من برامج تلفزيونية مختلفة عبر قنوات مختلفة تبث باللغة العربية. وقد أظهرت النتائج أن بعض الوظائف التركيبية تُردُّ أكثر من غيرها خلال هذه البرامج، وأن بعض هذه الوظائف تفقد حركتها الإعرابية أكثر من غيرها؛ فالصفات تستخدم بدون حركاتها الإعرابية في أغلب الأحيان وبالذات الصفات المزدوجة وصفات المضاف إليه وصفات الاسم المجرور. كما أظهرت النتائج كذلك أن البرامج المباشرة، والتي يرتجل فيها مقدمو الأخبار، تشهد إهمال الحركة الإعرابية للكلمات أكثر مما تشهد البرامج المسجلة. وخُصِّصت الدراسة إلى أن هذه الظاهرة تحدث في الغالب، وبشكل غير مبرر، في وظائف تركيبية ذات حركات إعرابية لا تتغير بتغير موقعها في التركيب النحوي.

معلومات البحث

تاريخ الاستلام: 2023.03.25

تاريخ القبول: 2023.05.21

الكلمات المفتاحية

النحو، تسكين الحركة الإعرابية،

مقدمو الأخبار العرب



Multilingualism in the Linguistic Landscape of Yemeni Cities: A Bottom-up Approach

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Abstract

Yemeni society is Arabic-language speaking with very little attendance of minorities. However, English language appeared alongside Arabic in Yemeni linguistic scene due to its importance in commerce, marketing and tourism. This study investigates the phenomenon of multilingualism in LL in three cities, viz. Aden, Mukalla and Sиейun since they are the largest southern cities with the biggest displayed LL, and which are still untouched in relation to LL in general and multilingualism in particular. This bottom-up study adopts Reh's (2004) typology of signage, which is based on three criteria: mobility, visibility and informative aspects of content. This study answered two main questions 1) What are the characteristics of multilingual signage in Aden, Mukalla and Sиейun? And 2) How are these characteristics of multilingual signage distributed in the three targeted cities? It is a mixed-methods study which randomly collected 435 photos of signage from the three cities. The findings showed that (100%) of those signs are overt in terms of multilingualism visibility. As for mobility, it also revealed that fixed signs represent the overwhelming majority of signs (97%). The informative multilingual criterion marked a distribution of signs where most of them are either fragmentary (52%) or duplicated (40%) while only small and equal portions were found as overlapping (4%) and complementary (4%).

Paper Information

Received: 25.03.2023

Accepted: 21.05.2023

Keywords

multilingualism,
linguistic landscape,
a bottom-up
approach, Yemeni
cities.

1. Introduction

Language is the main distinctive and important element in people's daily dealings, which in turn is divided into a spoken and written forms. According to Bousquet (2018), spoken language is the most used among people, but it quickly fades away in the same situation after the task for which it was said; having only its trace remaining forever. As for written language, that has an official and extensional usage, it remains displayed and visible for long periods in books, signs, manuscripts, commercial boards and public places.

The relationship between language and public space is utilitarian and reciprocal. Each of which needs the other to complete the performance of the message. Nash (2016) maintains that "language and landscape are obliged to each other. Language demands landscape, landscape expects language" (p.1). Regarding using multilingualism in specific places, Al-Athwary (2017) postulated that places and upper-class zones where many embassies and foreign companies located are suitable to exhibit multilingualism in signage. So, the motive behind the use of English as the original language of the sign is not only the desire to be more prestigious and fashionable, but also it is oriented to expatriates.

What is the linguistic landscape (henceforth LL) that appeared recently and was highlighted by many researchers? It is "The language of public road signs, advertising billboards, street names, place names, commercial shop signs, and public signs on government buildings combines to form the linguistic landscape of a given territory, region or urban agglomeration" (Landry and Bourhis, 1997, p.25).

LL is considered a new topic in the field of linguistics; therefore, it is worthy of research in all its aspects because it focuses on the written language and the way it is displayed. Moreover, LL explains and interprets linguistic implications as well as it shows the extent of people's interest about it. In addition, LL shows the extent of people's awareness of what these signs carry and reflect (Al-Athwary, 2017).

This study investigates multilingualism in the Yemeni LL in the three cities of Aden, Mukalla and Sиейun by manifesting the types that Reh (2004) authorized in her typology in terms of arrangement and appearance of multilingual writings in the signage. Three different parameters: mobility of multilingualism, visibility of multilingualism and types of multilingualism signage writings were highly displayed in the Yemeni society in a coincidence with Reh's (2004) typology. The researchers adopt this typology since it is more convenient and is based on multilingual LL of a community that has similar characteristics to the context of this study.

The appearance of a tremendous number of signs in cities of different places, some of which appear on the walls of stores and above the shop doors, expresses the extent of people's awareness of the importance of the displayed language to attract the attention of passers-by and perhaps as a commercial marketing (Sayer, 2009). Yemeni cities do not represent an exception; they have immense amount of multilingual LL. It is essential therefore to highlight the existence, characteristics and distribution of multilingualism in the LL of the three Yemeni targeted cities.

Multilingualism in LL has been the focus of many works in literature. In a recent study, Insyirah and Sudarwati (2021) shed light on the phenomenon of multilingualism on the LL in relation to the COVID-19 flyers in Pasuruan district in Indonesia. Their study concentrated on the usage of language on the COVID-19 flyers in Pasuruan, the impression of people regarding these linguistics signs and the preference of linguistics signs used on the COVID-19 flyers. The study revealed that the majority of society positively views the multilingualism phenomena on the COVID-19 flyers since it serves as intelligible, educational and effective means of the campaign to halt the spread of the virus. Moreover, Alomoush (2018) investigated LL in four Jordanian cities (Jarash, Almafraq, Zarka and Irbid) in terms of visual monolingual and multilingual practices enacted on shop fronts. He divided the signs into four categories: supermarkets, groceries, fashion stores and electronics. This study manifested a great presence of English language which constitutes an essential component of the construction of multilingualism in Jordanian LL. Also, Al-Athwary (2012) investigated the monolingual and multilingual signs in the LL of Sana'a city. He traced 1517 signs distributed on three main streets in addition to Sana'a University locality. This study manifested the high rate of Arabic language which was found in (97%) of the signs total, whereas English language was present in (53%). However, LL literature lacks investigating multilingualism in southern areas in Yemen like Aden, Mukalla and Sиейun. This paucity, in accordance with Al-Athwary's recommendation to conduct a comparative study of multilingualism in Yemeni LL, makes the researchers strongly believe that the study of such multilingualism in these cities is one of the urgent exigencies. Basically, this study seeks to answer the following two questions: what are the characteristics of multilingual signage in Aden, Mukalla and Sиейun? And how are these characteristics of multilingual signage distributed in the three targeted cities?

2. Literature Review

The term LL has been used in several ways. The prominent acknowledgement has been given to Landry and Bourhis (1997) whose definition of LL has emerged in multiple global studies. They defined it as “the language of public road signs, advertising billboards, street

names, place names, commercial shop signs, and public signs on government buildings combines to form the LL of a given territory, region, or urban agglomeration” (p.25). Similarly, Ben-Rafael, Shohamy, Amara and Hecht (2006) confirmed that the term ‘linguistic landscape’ is the study of any sign located outside or inside a public institution or a private business in any location.

2.1 LL categorization

There are different characteristics of signs suggested in the LL field. For instance, Ben-Rafael et al. (2006) put the first interesting distinction of linguistic landscape as "top-down" and "bottom-up". They also classified LL into two distinct groups: public and private. In addition, Backhaus (2007) used two similar terms for top-down and bottom-up in alternation with official and nonofficial signs.

2.2 Theoretical framework

The researchers adopt Reh's (2004) typology model of multilingualism for studying the characteristics of multilingual writings in LL in the context of this study. This model includes three parameters of multilingual writings: a) *spatial mobility* of signs in which signs are classified into two types: *stationary* (fixed) signs and *mobile* (moving) signs, b) *visibility of multilingualism* which divides signs into two types: *overt* (in which the same sign shows the text in more than one language) and *covert* (which refers to a sign written only in one language but has another counterpart in another language though in another place), and c) *information arrangement* on signs which distinguishes four types of signs: *duplicating*, *fragmentary*, *overlapping* and *complementary*.

2.3 Empirical background

Several linguistic studies have been conducted to examine the content of public signage and broaden the notion of multilingualism in LL. Some of these studies were international, and some cover regional and local aspects. For example, Backhaus (2007) in his study of multilingualism in Japan focuses only on multilingual signs in Tokyo's LL. He makes a clear distinction between public and private multilingual signs. This study revealed that, in terms of the number of languages and their arrangement on a sign, the two types of signs (i.e., official and non-official) are manifested differently in Tokyo's public sphere. These variations are justified in terms of "power" (expressed largely in official signs) and "solidarity" (expressed largely in non-official ones). Moreover, Brito (2016), in his investigation of multilingualism in Sweden, examines three neighbourhoods in the city of Malmö (Västra Hamnen, Möllevången and Rosengård) in order to investigate how multilingualism, specifically as a consequence of globalization, is negotiated within public space. The results of this study show that multilingualism holds a high value within the linguistic landscape of Malmö, Sweden, and that multilingualism is used in order to provide each neighbourhood with a unique sense of place.

Regionally, the Jordanian researcher Alomoush (2015) carried out a PhD dissertation to investigate the extent to which multilingualism is reflected in Jordanian LL. The researcher selected ten streets in each of six major Jordanian cities, including Irbid, Salt, Zarqa, Amman, Karak and Aqaba. The findings of this study revealed that multilingualism is the most omnipresent in Jordanian LL. Likewise, there is a recent study conducted in Najran, Saudi Arabia, by Al-Athwary (2022) who investigated the multilingualism in bottom-up signs. The study concentrates on the linguistic diversity in 450 shop signs. The analysis reveals that Najran's LL is more multilingual than expected. In addition to Arabic and English, the study manifested some foreign languages such as Malayalam, Bengali, Tamil and Hindi. Arabic language was the most dominant language with both informational and symbolic (cultural) roles. English came second serving the function of commerce and advertisement which shop

owners considered as both fashionable and prestigious. The use of the minorities' languages serves mainly as a psychological tendency to compensate for the feeling of being homesick, and it partially performs an informational function directed to the expatriate groups.

Locally, there is a scarcity in LL studies except Al-Athwary (2012) and (2017) who investigated the LL monolingualism and multilingualism in Sana'a city. The researcher took the capital city of Sana'a as a representative case study. He traced the arrangement of information in the inscriptions of multilingual signs in a given LL using a number of criteria like duplicating, complementary and mimicry writing.

LL in general and multilingualism in particular as a new and recent field of research in sociolinguistics has not taken its fortune of attention in the whole Yemeni territories. Therefore, the researchers become initially satisfied to lay the basement stone of investigating such multilingualism in visible language in LL in the Yemeni sphere especially in the three southern cities (Aden, Mukalla and Sиейun) to manifest the characteristics and the distribution of multilingualism in terms of arrangement of contents according to their mobility, visibility and informative aspects as shown in Reh's (2004) typology.

3. Research Methodology

3.1 Research design

To build upon previous researchers' efforts in using appropriate research designs to obtain accurate and reliable results, the researchers follow Abas (2019), Alomoush (2015) and Brito (2016) who employed both qualitative and quantitative methods to achieve greater accuracy in their findings. The selection of a mixed-methods approach enables the researchers to diversify the data. According to Creswell (2012), when the researcher has mixed qualitative and quantitative data at some stage of the research process within a single study, s/he can resort to use such design in order to understand the research problem more rigorously. Depending on the aforementioned statement, this study adopts both qualitative and quantitative approaches for gathering the required data. In this case, the researchers believe that the mixed-methods design is the most appropriate approach for the current study in accordance with Griffee's (2012) advice of selecting the kind of design that addresses the researcher's purpose and answers the questions of the study.

3.2 Population and Sample

Given that the study focuses on LL, the researchers select 435 photographs representing various multilingual signs in the three targeted cities (Aden, Mukalla and Sиейun) through a random sampling approach. Reasonably, having random photographs from the targeted areas is the best way to ensure the representativity of the sample selected.

3.3 Research instruments

A mobile's high-resolution digital camera of 64 mega pixels F/1.8 is used as an instrument for taking the photographs of multilingual bottom-up signs from the three-targeted cities.

3.4 Data collection procedures

According to Creswell (2012), gathering and doing data require going around to the intended location. For that, the researchers walked around the targeted cities taking random photographs of visible multilingual non-governmental signs in order to obtain the required data. To do this well, the researchers followed the track of previous researchers who used their personal cameras or their mobile phone cameras to collect the intended data of LL such as Al-Na'imat (2015), Brito (2016), Gorter (2006) and Hult (2009). Following this convention, the

researchers used an LT NOTE 30 mobile's camera to pick up the photographs of multilingual bottom-up signage in the three-targeted cities (Aden, Mukalla and Sиейun).

The researchers conducted fieldwork with a predetermined plan which guided the collection of LL bottom-up multilingual signs. This plan follows the procedure of taking a certain number of photos of multilingual signs from each city. Therefore, the researchers started taking photos one by one on a first-to-see manner till reaching the required number. The number of photographs picked from each city was 145. The purpose of taking photographs is to help the researchers find out the characteristics of multilingual signage as well as their distribution in the three targeted cities.

3.5 Ethical considerations and confidentiality

According to Creswell (2012), to respect the research site together with people, the researcher must obtain permission to use the site. Depending on that, the researchers of this study requested a verbal permission from each of the owners to take photos for their signs, and he explained how these photos would be employed in an academic study.

3.6 Data analysis procedures

To facilitate the mission of analysis of this study, the researchers adopted Reh's (2004) model to discover the characteristics and distribution of the collected multilingual signage. Each characteristic was investigated separately to manifest its ingredients in detail in terms of multilingualism displayed. The analysis process started by sorting the photos taken from each city according to three criteria: mobility, visibility and informative content. Then, the segmentation goes further into subtypes under each of these three categories. Mobility is subdivided into stationary and moveable, visibility is subdivided into covert and overt, whereas informative content is subdivided into four sub-types: duplication, fragmentary, overlapping and complementary. Once finishing the classification according to these characteristics, the researchers input the statistical data into Microsoft Excel sheets so as to make numbers and percentages as they are shown in the illustrative tables. In addition, the researchers expanded the analysis by thematic comments on the content of multilingual signages to help readers grasp the notional content of these LL signs.

4. Results and Discussion

This section presents the findings of multilingualism in Yemeni LL in the three targeted cities (Aden, Mukalla and Sиейun), and it answers the research questions adopting Reh's (2004) typology of multilingual signs that is divided into three main sections each of which has subsections. They are (1) *the spatial mobility of writings*, (2) *the visibility of multilingualism*, and (3) *the informative multilingual signs*. In the following lines, LL in each of the three cities will be tackled in detail.

4.1 Aden LL

4.1.1 Spatial mobility of the objects inscribed in Aden city.

As Reh's (2004) spatial mobility encompasses two types of inscribed objects (i.e., fixed and mobile). The fixed or stationary refers to the constant signs which are located on the shopfronts, buildings or large signboards, whereas the mobile indicates the portable inscribed objects and slogans as in the case of newspapers, T-shirts, vehicles and pushcarts. The results of this study displayed the characteristics of spatial mobility of multilingual signs in Aden city with a large difference between stationary signs 144 (99%) and mobile signs that represent only (1%). See Table 1.

Table 1

The distribution of spatial mobility of multilingual signs in Aden city

Type	Number	Percentage
Stationary	144	99%
Movable	1	1%
Total	145	100%

4.1.1.1 Stationary multilingual signs.

The researchers in this study gathered 145 of multilingual signs from Aden city. 144 signs (99%) out of the total number are stationary (see Table 1). This type of multilingual signs is more pervasive, more durable and consequently more expressive in conveying the symbolic message of a given public space than the non-permanent ones (Al-Athwary, 2012) (See Figure 1).

4.1.1.2 Movable multilingual signs.

The LL in Aden city manifests that there is a rare diversity of movable multilingual signs. Out of the total collected signs (145), there is only one movable inscribed object, (i.e., around 1%). This inscribed object manifested on movable vehicles hold multilingual writings. Reh (2004) praised such type of signs asserting that it attains its communicative goals only if the potential readership is mobile or if the text is repeated in a large number of locations. Figure 2 is an example of movable multilingualism signs in Aden.



Figure 1 Stationary multilingual sign in Aden city



Figure 2 Movable multilingual sign in Aden city

4.1.2 Visibility of multilingual writing in Aden.

In her typology, Reh (2004) distinguished between two types of visible multilingual writings: overt and covert. The first one is more pervasive. Therefore, it enables the passers-by to discern the visibility of multilingualism easily while the second one (the covert) needs some efforts to manage the multilingualism because its content is distributed between two segregate signs either at the same place or in two divergence places. This study displays the visibility of overt multilingual writings in Aden city in a high value which reached the peak (100%). However, unfortunately, there is no presence of covert signs in Aden LL.

4.1.2.1 Overt multilingual signs.

LL in Aden city displayed entire visibility of multilingual signs; the study registered the total number of signs (145) as visible or overt (100%). This type of signs almost predominantly outperformed the covert type in many studies. Alomoush (2015) revealed that there were wide ranges of visible languages on bottom-up signs in Jordanian areas under investigation.

4.1.2.2 Covert multilingual signs.

According to Alomoush (2015), *covert multilingual writings* appear when LL items are solely displayed in one different code. Reh (2004) elaborated that if different versions of a text are given on separate carriers, a message is available in more than one language, but its

multilingual nature is not visible to the reader. Based on this, the researchers found no covert signs in the city under investigation (See Table 2).

Table 2

The number of visible multilingual objects inscribed in Aden city

Type	Number	Percentage
Visible or overt	145	100%
Covert	0	0%
Total	145	100%

4.1.3 Informative multilingual signs in Aden city.

This is the third type in the reader-oriented typology of multilingual writings presented by Reh (2004) which relates to the specific combination of languages and information in the text. This type includes four classifications pertaining to the multilingual writings that the signs reflect. These classifications are arranged as follows: duplication, fragmentary, overlapping and complementary. See Table 3 which illustrates the distribution of the four types in Aden city in Yemen.

Table 3

The distribution of the four informative multilingual types in Aden city

Type	Number	Percentage
Duplicating multilingualism	60	41 %
Fragmentary multilingualism	70	48 %
Overlapping multilingualism	8	6 %
Complementary multilingualism	7	5 %
Total	145	100%

The contents of Table 3 exhibit the total number of the four informative multilingual types in Aden city. They are 145 items distributed disparately and respectively as fragmentary (48%), duplication (41%), overlapping (8%), and complementary (7%). These signs are all included under the bottom-up approach. Moreover, the disparate numbers and percentages are attributed closely to the appearance of transcripts on the signs.

4.1.3.1 Duplicating multilingual signs.

In duplicating multilingual signs, the texts on the signs are exactly displayed in more than one language; no more no less items. Reh (2004) affirmed that such signs acknowledge the existence of societal multilingualism; that is, the existence of more than one language in the target community. Similarly, Backhaus (2007) confirmed that duplicating multilingual writings are homophonic signs, which show complete translation or transliteration of two different languages. This means that all codes on the sign are exactly translated. In Aden city, the current study revealed that the duplication multilingual writings gained moderate fortune i.e., it has 60 signs out of 145 (41 %) (See Table 3).

The sign in Figure 3 is an exact example of duplicating multilingual writings in Aden city in which there are two equal texts in Arabic and English languages. This sign displayed distinctly the name of the shop *rukṅ alwahnag littijarah* ‘Al-Wahnag Corner for Trading’. The purpose of selecting equal items in the two languages is to serve both monolingual and multilingual people. The accuracy in translating each single segment from source language (SL)

to target language (TL) appears in the whole sign. Moreover, additional information is also added for contact like telephone and WhatsApp numbers as well as e-mail address.



Figure 3 Duplicating multilingual sign in Aden city

According to Alomoush (2015), shopkeepers may manifest their self-identification in the linguistic environment, paying attention to the local community's distinctive traditions and culture. Therefore, duplicating multilingual writings are sometimes employed for linguistic commodification purposes.

4.1.3.2 Fragmentary multilingual signs.

After sorting the multilingual signs that are related to it, Aden LL revealed that 70 items (48 %) out of 145 could be classified under the second type of informative multilingual signs (fragmentary). According to Reh (2004, p.10) "the term fragmentary multilingualism is used for multilingual texts in which the full information is given only in one language, but in which selected parts have been translated into an additional language or additional languages" (See Figure 4). Here, the fragmentary multilingual signs achieved the first rank in Aden city. This number converges nearly with Al-Athwary's (2017) study in Sana'a which revealed (46.62%).

The sign in Figure 4 is an example of fragmentary multilingual signs in Aden city. It holds two clear texts in Arabic and English. The name of the restaurant and the services it provides are written in Arabic scripts (*mat'am Labeebah lilzurbyan – este'dad taam lilafraah walmunasabaat*). However, only the name of the restaurant is translated into English (LABEBA Restaurant). Such partial conveying for some information might reduce the message. Reh (2004) confirmed that local customers with a restricted knowledge of English will have access to information on such signs. However, the foreigner passers-by will never understand that this restaurant makes and serves only Adeni Zurbyan meal.



Figure 4 Fragmentary multilingual sign in Aden city

4.1.3.3 Overlapping multilingual signs.

In overlapping multilingual signs, only part of sign information is repeated in at least one more language while other parts of the text are in one language only. As Reh (2004)

elucidated that the notional content of the texts in the different languages is identical although their pragmatic form and, hence, their interpersonal meaning is not. For Backhaus (2007), there is no difference between fragmentary and overlapping signs. In Aden city, the overlapping multilingual signs are not frequent like those appeared in Sana'a which were investigated by Al-Athwary (2017). (See Figure 5).



Figure 5 Overlapping multilingual sign in Aden city

Aden city registered eight signs out of 145 (6 %) of this type. The appearance of overlapping multilingual signs in Arabic LL is rare. Al-Athwary (2017) found the same scarcity of overlapping signs in Sana'a LL, i.e., around (0.2 %). In the overlapping multilingual sign in Figure 5 there are three scripts (*mat'am*, *PIZZA ISLAND* and *ai land*). The restaurant's name "*mat'am ai land*" was written in Arabic language on the two terminals of the sign while the notional content of the text "*pizza island*" is placed in the center of the sign in English language. Here the word "*mat'am*" was not translated. However, the word *island* has been transliterated in Arabicized English.

4.1.3.4 Complimentary multilingual signs.

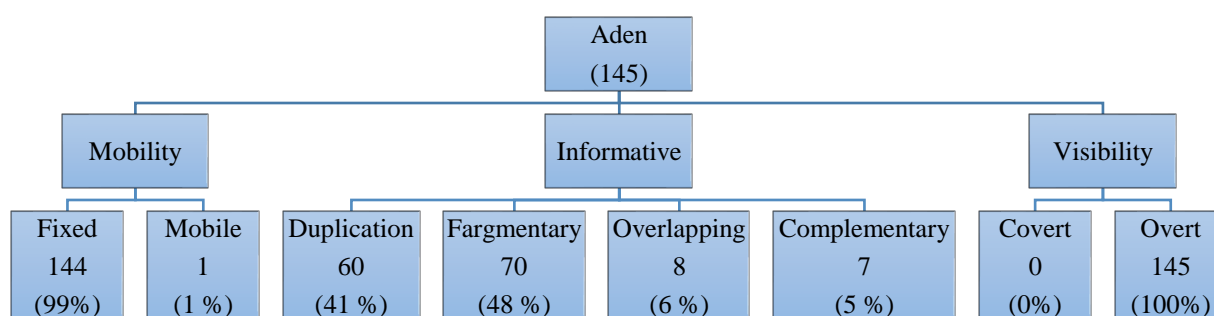
In this type of multilingual signs, the two written texts are used to complete each other. In other words, Reh (2004) clarified that complementary signs display texts in which different parts of the overall information are rendered in a different language. In such a case, one has to be familiar with all used languages in order to understand the sign, (Al-Athwary, 2017). Figure 6 shows an example of complementary multilingual writings in Aden city.



Figure 6 Complimentary multilingual sign in Aden city

Such multifunctional sign is considered the typical example of complementary multilingualism in Aden city. It utilized English and Arabic to complete each other in performing the purpose. Arabic scripts are the master in the sign, so they are written in a thick font to indicate the shopkeeper's name "*ennahdy lil'asal*". However, the completion is in English to give the clients and passers-by more details about the quality of the provided products. In addition, there is exact translation for the upper left side statement *lilmontajat ettabe'ayah* "(for) natural products" to add a strong factor to entice people to buy (See Figure 6).

The LL in Aden city has shown its applicability in all divisions of Reh's (2004) typology according to which a varying share of each type is found. Commencing with the spatial mobility of the writings, it reaped a great number of *fixed* signs 144 (99 %), but only one *movable* sign was registered (1 %). Regarding the second section, the visibility of multilingualism on the signs, the *overt* subsection peaked 145 (100%) while there was no emergence for *covert* signs. For the third type of classification, the informational multilingual signs, the four types appeared in divergent rates: duplication 60 (41%), fragmentary 70 (48 %), overlapping 8 (6%) and complementary 7 (5 %). Flow chart 1 illustrates the whole pertinent information.



Flow chart 1 Distribution of multilingualism in Aden LL

4.2 Mukalla LL

4.2.1 Spatial mobility of the objects inscribed in Mukalla city.

The city of Mukalla views a good percentage of spatial mobility of the multilingual objects inscribed especially movable multilingual signs (5%) in comparison with Aden (1%). The importance of spatial mobility according to Reh (2004) is to fulfil the goal of communication since it has functioning dissemination system. Regarding the fixed division of spatial mobility in Mukalla city, the findings exhibit (95%). Table 4 shows these divisions of the collected photographs from Mukalla city.

Table 4

The distribution of spatial mobility of multilingual signs in Mukalla city

Type	Number	Percentage
Stationary	138	95%
Movable	7	5%
Total	145	100%

4.2.1.1 Stationary multilingual signs.

The current study gathered 145 multilingual signs from Mukalla city. 138 signs (95%) out of a total number are stationary (see Table 4). This type of multilingualism signs is more pervasive, more durable and consequently more expressive in conveying the symbolic message of a given public space than the non-permanent ones (Al-Athwary, 2012) (See Figure 7).

4.2.1.2 Movable multilingual signs.

As Table 4 shows, within the 145 signs taken in Mukalla city, there are seven signs (5%) out of the whole total are considered movable inscribed objects. These inscribed objects were manifested on movable vehicles that hold multilingual signs. Reh (2004) encourages such type of signs asserting that it attains its communicative goals only if the potential readership is mobile, or if the text is repeated in a large number of locations. Figure 8 is an example of movable multilingual signs.



Figure 7 Stationary multilingual sign in Mukalla city



Figure 8 Movable multilingual sign in Mukalla city

4.2.2 Visibility of multilingual writing in Mukalla city.

With regard to visibility, Reh (2004) divided multilingual writings into two main types. The first type is the visible (overt) multilingualism, and the second type is the invisible (covert) multilingualism.

4.2.2.1 Overt multilingual signs.

The LL in Mukalla city exhibits the visibility of multilingual signs. The current study registered the whole number of signs (145) as visible (100%). This type of signs predominantly outperformed the covert type in many studies. It is also in line with Alomoush (2015) findings which revealed that the overt multilingual signs are predominant.

4.2.2.2 Covert multilingual signs.

According to Reh (2004) The presence of covert multilingualism signs in any linguistic sphere reflects the significance of increasing number of inscribed items in one linguistic community, and it also asserts the fact that the majority of readers worldwide prefers reading texts in their most fluent – typically first – language even if they have knowledge of a second. However, unfortunately there is no appearance of such signs in the city under investigation (See Table 5).

Table 5

The number of visible multilingualism objects inscribed in Mukalla city

Type	Number	Percentage
Visible or overt	145	100%
Covert	0	0%
Total	145	100%

4.2.3 Informative multilingual signs in Mukalla city.

This is the third type in the reader-oriented typology of multilingual writing presented by Reh (2004) which relates to the specific combination of languages and information in the text. This type includes four classifications pertaining to the multilingual writings that the signs reflect. These classifications are: duplication, fragmentary, overlapping and complementary. Table 6 illustrates the distribution of these four types in Mukalla city in Yemen.

The contents of Table 6 manifest that the total number of collected signs in Mukalla city is 145 items. The fragmentary type was found in more than half of the total number (51%) followed by duplicating type which has (42%). The other two types complementary and overlapping got only (5%) and (2%) respectively.

Table 6
The distribution of the four multilingual types in Mukalla city

Type	Number	Percentage
Duplicating multilingualism	61	42%
Fragmentary multilingualism	74	51%
Overlapping multilingualism	3	2%
Complementary multilingualism	7	5%
Total	145	100%

4.2.3.1 Duplicating multilingual signs.

This type of informative signs exactly displays the same text in more than one language. In other words, the sign in this type includes the same text translated in more than one language. The current study found that this type of multilingual writings in Mukalla city was displayed in 61 signs out of 145 (42%) (See Table 6).

Figure 9 shows an exact example of duplicating multilingual writings in which there are two equal texts in Arabic and English. This sign holds the name of the shop's owner and it illustrates the type of commercial activity the shop can perform. The accuracy in translating each single segment from SL to TL appears in the whole sign.



Figure 9 Duplicating multilingual sign in Mukalla city

4.2.3.2 Fragmentary multilingual signs.

This is the second type of informative multilingual signs which occurred in Mukalla city LL more than the other types. It has 74 items out of 145 (51%). According to Reh (2004), "the term "fragmentary multilingualism" is used for multilingual texts in which the full information is given only in one language, but in which selected parts have been translated into an additional language or additional languages", (p.10). Figure 10 represents an example of fragmentary multilingual signs in Mukalla city.



Figure 10 Fragmentary multilingual sign in Mukalla city

This sign is an instance of fragmentary multilingual signs in the sense that only one part of the inscription is converted into English (BASMAIL) while the remained parts are still in Arabic language. Reh confirmed that local customers with a restricted knowledge of English will have access to information on such sign. However, foreigners will never grasp what is presented in this shop in spite of its close relation to companies' services where it provides industrial and safety equipment.

According to Al-Athwary (2017), such signs of multilingual writings support the view that English language is used here to fulfil the inclination of being modern, prestigious, successful, but never meant to be directed to tourists or foreigners.

4.2.3.3 *Overlapping multilingual signs.*

In this type of multilingual signs, only a part of the sign information is repeated in at least one more language while other parts of the text are in one language only. As Reh (2004) elucidated that the notional content of the texts in the different languages is identical although their pragmatic form and, hence, their interpersonal meaning is not (See Figure 11).



Figure 11 Overlapping multilingual sign in Mukalla city

Mukalla has evinced three overlapping signs (2%) out of 145. The researchers found that overlapping multilingual signs are seldom repeated in Mukalla as did Al-Athwary in Sana'a LL where only (0.2 %) of signs are overlapping. Figure 11 shows a sign in which the shop's name "ASSALAM" was translated exactly while the other two items are translated notionally. He utilized the word limited to manifest the borders of his shop's services as being for only two sorts: *ood and otoor* 'oud and perfumes'.

4.2.3.4 *Complimentary multilingual signs.*

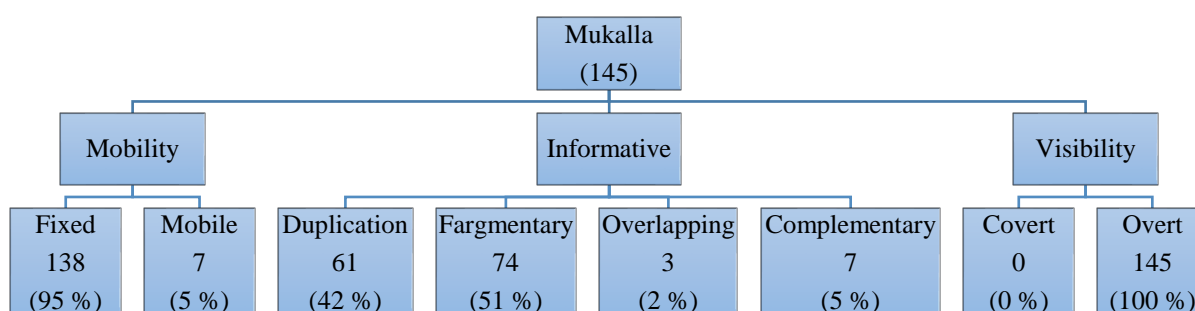
In this type of multilingual signs, the written languages used to complete each other. In other words, Reh (2004) clarified that complementary signs display texts in which different parts of the overall information are rendered in a different language. In such a case, one has to be versed in the utilized languages in order to understand the contents of the sign (Al-Athwary, 2017). Figure 12 is an example of complementary signs in Mukalla city.



Figure 12 Complementary multilingual sign in Mukalla city

This multifunctional sign is the best example of complementary multilingualism. It utilized English and Arabic languages to complete each other and to perform the purpose. The sign involves four portions, each language has two. The English portions on the top “Eat it” are very clear and the transcripts are neat to reflect the shop name. The completion language (Arabic) only refers to some details about the services provided by this place; quick food. Such signs require complete knowledge of the two languages in order to understand and interpret the message reflected by the sign.

The LL in Mukalla city showed the presence of all divisions of the Reh's (2004) classification of multilingualism characteristics, as it achieved a varying share in each of them. The distribution of spatial mobility of the writings found that *fixed* type reached (95%), but the *mobile* signs have only (5%). With regard to the second section, the visibility of multilingualism on the signs, the subsection *overt* reached the peak (100%) while no portion for *covert* type. For the third type of classification, the informational multilingual signs, which contains four sections, the distribution is: duplication (42%), fragmentary (51%), overlapping (2%) and complementary (5%). Flow chart 2 illustrates the completely pertinent information.



Flow chart 2 Distribution of multilingualism in Mukalla LL

4.3 Sieyun LL

4.3.1 Spatial mobility of the objects inscribed in Sieyun city.

Spatial mobility includes two types of inscribed objects i.e., the stationary and the movable. Table 7 shows the distribution of spatial mobility in multilingual signs in Sieyun city.

Table 7

The distribution of spatial mobility of multilingual signs in Sieyun city

Type	Number	Percentage
Stationary	141	97%
Movable	4	3%
Total	145	100%

4.3.1.1 Stationary multilingual signs.

This study gathered 145 of multilingual signs from Sieyun city. 141 signs (97%) out of the total number are stationary (see Table 7). This type of multilingual signs is more widely used, more durable and consequently more expressive in conveying the symbolic message of a given public sphere than the movable ones (Al-Athwary, 2012) (See Figure 13).

4.3.1.2 Movable multilingual signs.

The LL in Sieyun city shows that there is diversity of multilingual signs. Among the 145 collected signs, there are only four movable inscribed objects (3%) out of the whole total. These inscribed objects are manifested on movable vehicles which hold multilingual writings. Figure 14 is an example of movable multilingual signs in Sieyun.



Figure 13 Stationary multilingual sign in Sieyun city



Figure 14 Movable multilingual sign in Sieyun city

4.3.2 Visibility of multilingual writing in Sieyun.

In her typology, Reh (2004) differentiated between two types of visible multilingual writings: visible (overt) invisible (covert). The first one is widely disseminated. Therefore, it enables the passers-by to discern the visibility of multilingualism easily while the second one (the covert) needs some efforts to manage the multilingualism because its content is distributed between two segregate signs either at the same place or in two divergence places. The current study displays the visibility of overt multilingual writings in Sieyun city in a high value which reached the peak (100%). However, unfortunately, there is no presence of covert signs in Sieyun LL.

4.3.2.1 Overt multilingual signs.

Like Mukalla and Aden, the LL in Sieyun city displayed the entire visibility of multilingual signs. The study registered the total number of signs (145) as visible (100%). This type of signs predominantly outperformed the covert type in many studies like (Al-Athwary, 2017 and Alomoush, 2015).

4.3.2.2 Covert multilingual signs.

As Reh (2004) states that if different versions of a text are given on separate carriers, a message is available in more than one language, but its multilingual nature is not visible to the

reader. Based on this, the researchers did not find any of these signs in the city under investigation (See Table 8).

Table 8

The number of visible multilingual objects inscribed in Sieyun city

Type	Number	Percentage
Visible or overt	145	100%
Covert	0	0%
Total	145	100%

4.3.3 Informative multilingual signs in Sieyun city.

This type includes four classifications pertaining to the multilingual writings that the signs reflect. These classifications are: duplication, fragmentary, overlapping and complementary. See Table 9 which illustrates the distribution of the four types in Sieyun city in Yemen.

Table 9

The distribution of the four informative multilingual types in Sieyun city

Type	Number	Percentage
Duplicating multilingualism	52	36 %
Fragmentary multilingualism	82	56 %
Overlapping multilingualism	7	5 %
Complementary multilingualism	4	3 %
Total	145	100%

Table 9 exhibits the total number of the four informative multilingual types in Sieyun city. There are 145 items. These signs are all included under the bottom-up approach. Moreover, the difference in numbers and percentages is due to the fact that the transcripts of the collected signs appear differently. Furthermore, this study revealed that LL in Sieyun approximately resembles those appeared in Aden and Mukalla especially in the sequence of the tow top types fragmentary and duplication.

4.3.3.1 Duplicating multilingual signs.

In this type of multilingual signs, the sign holds a complete translation of its texts. The current study revealed that the duplication multilingual writings in Sieyun city compose (36 %) of the total number of 145 signs (See Table 9).

Figure 15 is an exact example of duplicating multilingual writings in which there are two equal texts in Arabic and English languages. This sign showed the name of “THE SPECIALIZED MEDICAL CENTER”. The purpose of selecting equal items in the two languages is to serve monolingual and multilingual people. The accuracy in translating each single segment from SL to TL appears in the whole sign.



Figure 15 Duplicating multilingual sign in Sieyun city

4.3.3.2 Fragmentary multilingual signs.

Sieyun LL revealed that 82 items (56 %) out of 145 are of the second type of informative multilingual signs (fragmentary) which proved to be the most dominant in Yemeni LL in the three cities under investigation. Figure 16 shows a sign as an example of fragmentary multilingual signs in Sieyun city.



Figure 16 Fragmentary multilingual sign in Sieyun city

This sign is an example of fragmentary multilingual signs in the sense that only one part of the inscription is transliterated into English transcripts (ENSJAM) while the remaining two parts are still in Arabic language *deayah wa e'laan* 'advertisement'. Reh (2004) confirmed that local customers with a limited knowledge of English will understand and interpret the information on such sign. However, the foreigner passers-by may face difficulty to understand and interpret what is presented by this shop because the word *ensjam* is written in Romanized Arabic and the two Arabic words are not translated. Alomoush (2015) praised the use of Romanized Arabic or Arabicized English on signs claiming that it is helpful because it advocates linguistic tolerance and glocal identity, it encourages local names and cultural references, and it creates new functions like lexical needs and euphemisms.

4.3.3.3 Overlapping multilingual signs.

In this type, only a part of the sign information is repeated in at least one more language while other parts of the text are in one language only (See Figure 17).

Sieyun has revealed seven overlapping signs (5%) out of 145. Overlapping multilingual signs seldom appear in this city like Aden and Mukalla. In the signboard (in Figure 17), the shop's name "Qamar Mobile" was transliterated exactly while the rest items are left in Arabic language. The notional exaggeration appears in this sign when displaying "China in Sieyun", "everything related to your mobile is available, only costs you 500 riyals".

4.3.3.4 Complimentary multilingual signs.

In this type of multilingual signs, the written languages used to complete each other. In other words, only some content of the sign is written in one language and the other is written in another language in a way that each part completes the other to give the overall message of the sign. Figure 18 is an example of complementary multilingual writings in Sieyun city.

The multifunctional sign in Figure 18 is the best example of complementary multilingualism. It utilized English and Arabic to complete the purpose. The sign involves two portions; one for each language. They are equal in size and located on the sign top. The English portion is *king* while the Arabic is *boodah* which means 'ice-cream'. The local customer will face difficulty to interpret this sign from the first sight for the fuzzy relation between the two words (*king* and *boodah*). Such signs require complete knowledge of the two languages in order to understand and interpret the reflected message.

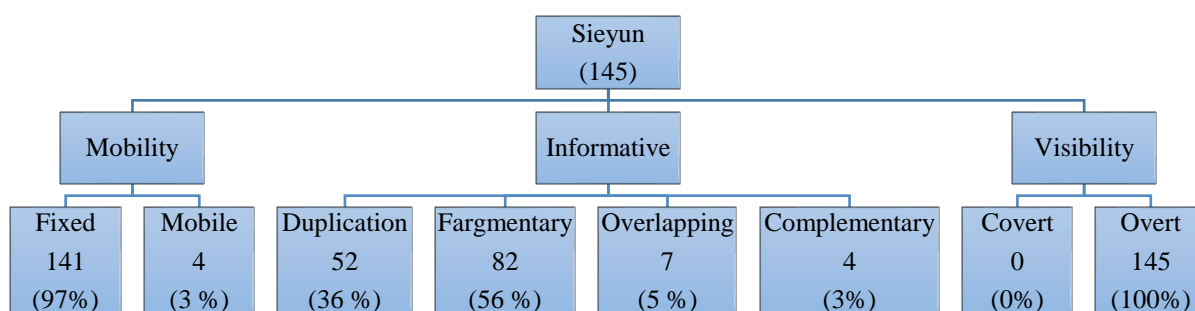


Figure 17 Overlapping multilingual sign in Sieyun city



Figure 18 Complementary multilingual sign in Sieyun city

To sum up, the LL in Sieyun city showed that Reh's (2004) classification of multilingualism characteristics can be applied to sort LL signs. With regard to spatial mobility, Sieyun signs are mostly *fixed* 141 (97 %) while only (3 %) are *movable*. For the second section, the visibility of multilingualism on the signs, the subsection *overt* reached the peak 145 (100%) while there was zero share for *covert* signs. For the third type of classification, the informational multilingual signs, the distribution is: duplication 52 (36%), fragmentary 82 (56 %), overlapping 7 (5%) and complementary 4 (3 %). Flow chart 3 illustrates the whole related information.



Flow chart 3 Distribution of multilingualism in Sieyun LL

To conclude, the current study of the Yemeni LL in the three cities under investigation showed all the types adopted by (Reh 2004) for the division of linguistic diversity. Different

numbers and percentages were exhibited for all sub-sections of multilingualism, except for the *covert* subsection in the visibility branch which did not record any appearance at all. This is in spite of its importance in Reh's (2004) study which illustrated that the presence of covert multilingualism signs in any linguistic sphere reflects the significance of increasing number of inscribed items in one linguistic community, and which also asserted the fact that the majority of readers worldwide prefer reading texts in their first language even if they have knowledge of a second. A total number of 435 signs were collected from the three cities equally (Aden - Mukalla - Sieyun) i.e., 145 sign from each city. The researchers divided these signs, according to Reh's (2004) classification for characteristics of multilingualism, into: 1) visible multilingual signs which included 435 with (100%) in the *overt* section while *covert* type was not present, 2) mobile multilingual signs which included 423 with a rate of (97%) in the *fixed* section and only 12 signs (3%) in the *movable* section, and 3) *informative multilingual signs* which were distributed among the 435 signs with a different proportions between the four sections. Fragmentary was mostly dominant by 226 signs (52%), duplication comes second with 173 signs (40%), whereas both overlapping and complementary reach 18 signs (4%) each.

The findings of this study are in agreement with similar studies such as Al-Athwary's (2017) which investigated the multilingual writings in LL of Sana'a city and showed that the Yemeni LL is free of the *covert* multilingual type. In addition, it also revealed a deficiency in the two types of multilingualism (complementary and overlapping). These two Yemeni studies are not in line with Reh's study in relation to complementary and overlapping types. For instance, complementary and overlapping multilingualism were much more frequent than those of duplicating or fragmentary multilingualism in Lira municipality in Uganda. This is simply because the speech community in Uganda is multilingual while it is monolingual in Yemen. Therefore, readers in that country face no difficulty in reading and interpreting complementary and overlapping multilingual signs because most of them are bilingual in more than one language, but the overwhelming majority of people in Yemen cannot do so. (See Table 10).

Table 10
The distribution of LL multiannual signs in Aden, Mukalla and Sieyun

CITY	MOBILITY		INFORMATIVE				VISIBILITY	
	FX	MO	DUP	FRA	OVL	COM	COV	OVE
ADEN	144	1	60	70	8	7	0	145
MUKALLA	138	7	61	74	3	7	0	145
SIEYUN	141	4	52	82	7	4	0	145
TOTAL	423	12	173	226	18	18	0	435
PERCENTAGE	97%	3%	40%	52%	4%	4%	0%	100%

Note: FX= fixed, MO=movable, DUP=duplication, FRA=fragmentary, OVL=overlapping, COM=complementary, COV=covert, OVE=overt.

5. Conclusion

5.1 Main findings

The current study gathered 435 photos of signs from the three Yemeni cities of Aden, Mukalla and Sieyun; with 145 signs form each. Based on Reh's (2004) classification of multilingualism characteristics, the overall results have shown that multilingualism is overt in all the obtained signs (100%). It has also shown that the vast majority (97%) of LL multilingual signs are fixed or stationary. Furthermore, and regarding the informative multilingual signs, it is found that more than half (52%) of the signs have fragmentary information. (40%) of these

signs were classified as duplication while the remaining (8%) was divided evenly between overlapping and complementary multilingualism.

In addition, it is found that Reh's classification is almost the same in the three cities under investigation. They were identical in the number of overt multilingual signs. They were almost similar in the fact that multilingual LL signs are mostly stationary. For the third criterion, the three cities have the majority of their signs being fragmentary and duplication signs, and only a minor portion was found to be either overlapping or complementary.

5.2 Scope and limitation of the study

This study is carried out in three Yemeni southern cities Aden, Mukalla and Sиейun to learn more about the phenomenon of multilingualism in the Yemeni LL. It traces Reh's (2004) types and distributions of multilingualism in LL in those cities. Needless to say, LL contains two major types top-down and bottom-up. The researchers only focus on bottom-up ones.

5.3 Recommendation and suggestions for further studies

After conducting this study, the researchers recommend that concerned authorities should activate their role in supervising the state of LL in Yemen. They should have some regulations that control the use of signs. They should also emphasise the importance of showing their mother tongue in signs. Linguistic supervision by specialists and translation centres should also be considered.

The researchers can also list some suggestions for further research projects. For example, this study tackled bottom-up multilingualism; therefore, top-down approach could be the basis for other studies. Another way of conducting a similar study could be the focus on a particular neighbourhood per se in order to discover the state of its LL. The language displayed in signage could also be discussed from linguistic perspectives like morphology, syntax, meaning-making and stylistic aspect.

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تعددية اللغة في المشهد اللغوي في المدن اليمنية: منهج تصاعدي

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الملخص

يتحدث المجتمع اليمني اللغة العربية في ظل وجود ضئيل للأقليات. ورغم هذا، فإن اللغة الإنجليزية تظهر إلى جانب اللغة العربية في المشهد اللغوي اليمني نظراً لأهميتها في التجارة والتسويق والسياحة. تستقصي هذه الدراسة ظاهرة تعدد اللغات في المشهد اللغوي اليمني في ثلاث مدن هي: عدن والمكلا وسيئون؛ وذلك كون هذه المدن أكبر المدن الجنوبية ذات المشهد اللغوي الواسع، وكذا لعدم تطرق الدراسات السابقة للمشهد اللغوي بشكل عام والتعدد اللغوي بشكل خاص في هذه المدن الثلاث. تبنت هذه الدراسة التصاعدية تصنيف (2004) Reh's للوحات والذي يركز على ثلاثة معايير: الحركية، إمكانية الرؤية، والجانب المعلوماتي للمحتوى. وجاوبت هذه الدراسة على السؤالين التاليين: (1) ماهي خصائص اللوحات متعددة اللغة في عدن والمكلا وسيئون؟ (2) كيف تتوزع هذه الخصائص في المدن الثلاث المستهدفة؟ وقد احتوت هذه الدراسة الكم-نوعية على 435 صورة للوحات اختيرت عشوائياً من المدن الثلاث. وقد أظهرت النتائج أن كل اللوحات التي شملتها الدراسة احتوت على تعددية لغوية ظاهرة (100%). وفيما يخص معيار الرؤية فقد أظهرت النتائج أن اللوحات الثابتة تمثل أغلبية بنسبة 97%. وبالنسبة للمعيار الثالث، فقد كانت تعددية اللغة في اللوحات جزئية (52%) مكررة (40%) بينما وجد جزء يسير يحوي تعددية لغوية متداخلة (4%) أو متكاملة (4%).

معلومات البحث

تاريخ الاستلام: 2023.03.25

تاريخ القبول: 2023.05.21

الكلمات المفتاحية

تعددية اللغة، المشهد اللغوي،
منهج تصاعدي، المدن اليمنية



The Reality of Using Cloud-Computing Applications in the Educational Process in Yemeni Universities: College of Oil and Minerals – University of Shabwa as a Model

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Abstract

This study examines the reality of using cloud applications and cloud services among students and faculty members at the College of Oil and Minerals as an example of the reality in all the universities of Yemen. It probes the usability of cloud services, attitudes of the study's samples toward these services, and the obstacles that limit the use of cloud services in the educational process. The researcher opted for a descriptive approach with random sampling to conduct this study on students and the faculty of the College of Oil. It is found that cloud computing helps in the educational process through the collective participation of students in the performance of work as well as the use of cloud storage in education and training of the teachers in addition to appraising their awareness about the use of cloud computing applications. Finally, a set of recommendations are proposed to reduce the hindrances in the application of cloud services.

Paper Information

Received:25.03.2023

Accepted:21.05.2023

Keywords

storage, cloud computing, Google drive, reality, obstacles.

1. Introduction

The Internet remains one of the most important and great inventions of the modern era. It has led to the emergence of many programs, applications and means of communication that enabled humanity at different ages, cultures and spatial locations to conduct their life affairs from the simple and necessary daily transactions to government transactions and even their quest to seek knowledge from any place and time and for different educational stages.

Scientific and technical developments accelerated worldwide, and this led to a change in the lifestyle of the individual and society in all economic, social, political and educational aspects. This rapid development also helped bring about fundamental changes in people's concepts and ideas and the way they live with them. There has become almost total reliance on technology in all different areas of life, and this is reflected in the goals of education which are no longer limited to providing students with knowledge and communicating information to them, but rather providing students with self-learning skills and the ability to employ modern technologies to solve life problems facing them (Tashkandi & Al-Jabri, 2015).

This rapid progress has led to finding new horizons for improving and developing education, hence the importance of e-learning, spreading its culture, using its tools and applications and training teachers and learners to interact with it in use and production (Behrend, Wiebe, London & Johnson, 2011). Cloud computing technology has emerged as one of the computing methods in which computer resources are provided as services, and users are allowed to access them via the Internet without the need to possess knowledge, experience or even the infrastructure that supports these services. The demand for information and communication technology has become very high by individuals and institutions because of the many services and advantages it provides to them through applications and software. The benefit of using it was reflected in the various fields of life; whether political, social or economic (Behrend et al., 2011).

One of the most important modern technologies produced by the networking and communications revolution, which has been widely used in the recent period, is the cloud computing technology. It provides many and very distinct services through software, applications and storage via the Internet (Miller-Idriss & Hanauer, 2011).

Cloud computing is one of the modern software through which many services are provided to users and they can access them via the Internet without the need to have technical skills that support these services. The term cloud computing reflects a perception and concept of software, applications and services that rely on the Internet to work on and access them, and it is managed by the service provider company and the beneficiary gets it for free or for a sum of money paid monthly or annually according to his needs and the duration of use (Foster, Zhao, Raicu & Lu, 2019).

The history of cloud computing goes back to John McCarthy who presented its idea and saw that it is possible to organize cloud computing to become a public service that can be used. Moreover, his idea continued in its theoretical framework until the engineer Kariston Peaceflea transferred it to actual application at the beginning of the Third Millennium. Then this concept expanded and Microsoft, which was a pioneer in the field, and other companies such as Apple, Hp, and IBM, multiplied the uses on the Internet. Google was considered the most active company in this field and was able to launch many new services through this modern technology, so it became the most competitive company as it surprised competitors in this field by launching an integrated operating system for computers in 2009 that works in accordance with the concept of cloud computing (Rao, Saluia, Sharma, Mittal & Sharma, 2012)

Cloud computing is the idea of the future that will revolutionize the world in all different fields, most notably the economic, technological and educational fields. It is a new and modern way to replace the use of available technical resources with other resources on the Internet that help store data and build educational or other content. Thus, data and information can be saved and shared with others, which helps in collective and collaborative work without the need for material technical resources, and all you need is an internet connection (Breeding, 2012)

And due to the large number of technical problems that educational institutions face in terms of technical infrastructure, maintenance problems and malfunctions; in addition to the exorbitant costs that they need in training, providing hardware, software and continuous updating. In addition, the divergence of universities and educational institutions as well as the increase in living costs and mobility make the need to use modern technologies such as cloud computing technology become a necessity to overcome all these problems. In addition, to the urgent need to keep pace with technological developments that improve the quality of performance (Agrawal, 2022).

Cloud storage is one of the most important services provided by cloud computing to make cloud backups. Cloud storage is a great way to organize files and have information stored online without cluttering up your computer space, and it is accessible when connected to the Internet. Students can use it to store documents and synchronize files across computers, tablets and smartphones. In addition, a student can write a lecture or lesson plan on his computer at home, put it in a cloud folder and access it from any computer connected to the Internet. The cloud storage service is a smooth, fast and free service (Vilajkat, 2017).

Benefits of cloud computing in varying degrees are contingent upon their level of deployment and extent of service models. However, there is a lack of awareness and interest in using them by students and faculty members of the Faculty of Oil and Minerals and in all departments of Shabwa University. If they become further entrenched and engaged in cloud computing configurations, they will be able to realize greater advantages, such as increasing access to scarce IT expertise and talent, promoting further IT standardization, the transparent matching of IT costs, demand and funding and increasing interoperability between disjoint technologies within and between institutions.

Therefore, there is an urgent need to ensue this study on the reality of using cloud-computing applications in the educational process from the perspective of faculty members and students in Yemeni universities (Faculty of Oil and Minerals - University of Shabwa model)

1.2 The Study Problem

Cloud computing services are important for Shabwa University students and researchers to facilitate study, learning, scientific research, project completion, file archiving, sharing and other features and benefits to save time, effort and ease of tasks. The most important technologies that can be effectively integrated are cloud storage technologies in the field of education techniques. This technology opens wide horizons in the educational process and helps both students and faculty within the institution to learn and communicate effectively. The focus of this study will be on the introduction of this technique and its weak points, in addition to the most important applications and software provided by it. The study problem was chosen through:

First, it is noted that cloud computing services did not receive much awareness, attention and use by many students and faculty; which made many students lose important files. There is also difficulty and lack of knowledge on how to share and upload files or complete tasks and assignments that require using such services. Moreover, delays in the completion of projects and transfer files between the members of the group by other slow means are due to the lack of knowledge of how to share and cooperate and co-edit at the same time by all members of the group using cloud computing services and applications that allow to save a lot of time and effort.

Second, an electronic survey was distributed to a group of students and faculty to measure the extent of awareness and use of cloud computing services. It helped the researcher investigate whether cloud applications or cloud storage as well as potential of cloud computing services benefit the students in learning and scientific research or not. Its results are as follows:

- 14% of the respondents have no access to cloud computing services at all.
- 94% of the sample members were exposed to the loss of electronic files by damage, by failure of traditional storage units/computers, by loss of gadgets or by other reasons.
- 51% of the respondents use cloud storage to save files.
- 10% of the sample respondents do not use cloud-computing services to execute projects in a collaborative and participatory manner.
- 19% of the study sample have no knowledge of what cloud-computing services provide for learning and scientific research.

Among the survey questions, there was an open question about the challenges facing the use of faculty and students of cloud computing services in the course of study, learning and scientific research. The answers spotted light on some challenges such as:

- Lack of speed in file transfer if global network connectivity is poor.
- Lack of knowledge of cloud services.
- Lack of sufficient skills in cloud computing services.
- Mistrust in the cloud storage services and the fear of hacking files.

The field of educational technologies is one of the most important fields that are witnessing rapid development. From this standpoint, the demand for integrating technology into education has increased because of its importance in reducing the burden on the educational institution and building a generation capable of dealing with modern developments. One of the most important of these technologies that can be effectively integrated is the cloud storage technology, which has become one of the most important modern topics for discussion in the field of educational technologies (Tashkandi & Al-Jabri, 2015).

This technology opens wide horizons in the educational process and helps both students and faculty members within the educational institution to learn and communicate in an effective manner. The focus of this study will be on defining this technology and its strengths and

weaknesses, in addition to the most important applications and software that it provides. This will be through studying the reality of its use by postgraduate students to suggest the best ways to activate its use among faculty members and students.

1.3 Research Questions

The problem of the study was determined in the following questions:

- What is the reality of cloud services use by students and faculty members at the College of Oil and Minerals?
- To what extent are students and members of the faculty of oil and minerals aware of the importance and advantages of using cloud services in the educational process?
- What are the obstacles to using cloud storage services in the educational process from the perspective of students and faculty members at the College of Oil and Minerals?

1.4 Importance of the study:

There are many reasons why cloud computing is a necessity in the educational process. It can revolutionize the performance of educational institutions, individuals and departments with its excellent software, applications and services as well as large storage space that stores data securely and at the lowest cost. The importance of this study can be summarized as follows:

- This study may help to enrich the educational system at the University of Shabwa by utilizing its content in training to employ cloud storage services.
- This study may lead to increase the use of students and faculty's use of cloud storage effectively in education.
- The study is consistent with the direction of educational institutions to adopt cloud computing in its infrastructure, teaching and learning.
- Raising the attention of the management board at the university to the need to expand on cloud computing topics in different educational stages and the need for practical application.

1.5 Terminology of study:

Pireva (2018) defined cloud storage as the process of storing each individual's files in a practical cloud that has many advantages. Where you can view your files from any mobile phone, tablet or any computer connected to the Internet. The cloud can also provide backups for files so that they will never be lost if your phone is stolen or lost, or if your computer crashes, you choose the service that is performed for you. This task is one of the services currently available through One Drive, Drop box, Google Drive or Box.

Pireva (2018) defined cloud storage also as a technology that relies on transferring the processing and storage space of the computer to the so-called cloud, which is a server device that is accessed via the Internet.

Procedurally, cloud storage is defined as huge computers that save files in various formats that contain texts, graphics, pictures, drawings, video clips, or presentations, on the Internet without the need to store them in the traditional way in computer memory or hard disks; with the ability of accessing these files anytime and anywhere when we are connected to the Internet.

2. Literature review

2.1 The theoretical framework of the study

The first axis: Cloud computing

There is no doubt that our present era is progressing, growing and accelerating at the technological level, especially with the spread and availability of the Internet and various websites. This development has reflected positively on the lives of individuals, institutions and educational and non-educational organizations. The use of these new technologies has helped, both individually and institutionally, to better organize and facilitate business and tasks; save time, effort and cost; increase productivity and help to gain knowledge in new ways. One of the most important modern technologies produced by the network and communications revolution is cloud-computing technology. It offers many services and is unique through software, applications and storage over the Internet (Lakatos, 2013).

Cloud computing is one of the most modern software programs that provide many services to users and can be accessed through the Internet without the need to have technical skills to support these services. The term cloud computing reflects a perception and understanding of the software, applications and services that rely on the Internet to work on and access to it. It is managed by the service provider and is obtained by the beneficiary free of charge or for a monthly or yearly payment according to its needs and duration of use (Chaudhary, Somani & Buyya, 2017).

2.2 Definition of cloud computing:

Cloud Computing is a technology based on the transfer of processing and storage space of the computer to the so-called cloud, which is a server that can be accessed through the Internet connection, and thus turns IT programs from products to services. The cloud consists of advanced data centres which provide large storage areas for the beneficiaries, and it offers some applications as a service to the beneficiaries. It is dependent on the possibilities provided by the applications of the second generation of the Internet (Pireva, 2018).

- The National Centre for Standards and Technology (NIST) defines cloud computing as a model to provide convenient and continuous access at any time to the network to share a wide range of computerized resources that can be distributed and provided with minimal effort or interaction with the service provider (Mell, 2011).

2.3 Essential Characteristics of Cloud Computing

The following five characteristics, as defined by NIST, are considered inherent in cloud computing services (Mell, 2011).

- On-Demand Self-Service: Customers can automatically provision computing capabilities and resources on their own when needed without necessitating any human intervention.
- Broad Network Access: Access and capabilities are available over the network through standard devices such as cell phones, laptops, PDAs, etc.
- Resource Pooling: Resources such as network bandwidth, virtual machines, memory, processing power, storage capacity, etc. are pooled together to serve multiple customers using a multi-tenant model. That is, virtual and physical resources are dynamically assigned and reassigned based on need and customers' demands.
- Rapid Elasticity: Depending on demand, resources and capabilities can be quickly and automatically deployed and scaled at any quantity and at any time.
- Measured Service: Customer usage of the vendor's resources and services are automatically monitored, controlled and reported offering a high level of transparency for the customer and vendor.
- It is interesting to note that some vendors claim cloud computing as a service, but fail to include one or more of the characteristics listed above. For example, cloud computing vendors which fail to provide transparency (e.g., a detailed report of consumption per service) of your services consumed are not offering true cloud computing services.

NIST also describes three service models:

Cloud Software as a Service;

Cloud Platform as a Service; and

Cloud Infrastructure as a Service (Mell, 2011).

The cloud-computing model is based on basic levels:

1. Provision of software as a service (SAAS)
2. Provision of Service-Oriented Platforms (PAAS)
3. Provision of infrastructure as a service (IMMS)

Cloud computing characteristics:

According to Carter, Greenberg and Walker (2017), there are several characteristics of cloud computing:

- Self-service that allows the user to create, modify and save files in the cloud without interference from the service provider.
- Accessing to services and applications in the cloud through any laptop, mobile phone or tablet at anytime and anywhere.
- Flexibility and speed in meeting the needs of the beneficiary.
- Reducing maintenance costs for hardware and software and constantly update them.

Cloud storage is defined as very large computers that contain huge storage spaces, as users upload and save their files on them. Also, the subscriber to the cloud storage service can use the programs in cloud computing such as Word, Excel and other programs that make him not obliged to carry his personal device with him wherever he goes, but only enters his account with the cloud storage company and accesses all his files that he has stored before as well as doing new business (Hakak et al., 2019)

There are two types of cloud storage services:

The first type: in companies that provide the service, they provide it free of charge to the beneficiaries, but often the services are limited.

The second type: in which the companies that provide the cloud storage service provide services to the beneficiary by subscribing to the service in exchange for a certain amount that he pays on a monthly or annual basis; depending on the space he needs and the duration of use.

There is no doubt that not all files stored on the cloud can be viewed by anyone unless the user shares them with another person, or gives his login data to another person. The company that provides the cloud storage service gives the user a storage space that no one can access or view as it is considered like a private mobile device

Cloud computing services models:

Cloud computing offers a number of services that are categorized based on user needs (Breeding, 2012)

A. Infrastructure as a Service (Saal):

This model is a logistics tool on which organizations rely to get the resources needed to store information, hardware, servers and other network components. It is a space where the service provider has the resources and is responsible for the recruitment and operation and where companies can increase or reduce the resources used according to the needs or requirements of the application.

B. Software as a service model (SaaS):

This model helps the user to access all applications and software without the need for installation and maintenance as well as accessing the Internet and take advantage of them away from the burdens of management software and complex devices. SaaS is called the added applications that run on the server of the service provider where it ensures access to work on the application and ensures the protection of user's privacy.

C. PaaS platform model:

This is the third model of cloud computing models that provides a comprehensive platform for all the applications needed by the user either to develop software or basic applications in the programming process; in addition to the costs of subscription to services provided.

2.4 Types of cloud computing:

There are four types of cloud computing as mentioned by Vilajkat (2017):

1. Public Cloud:

It is a commercial service provided by the service provider to all beneficiaries for a certain amount of money. It saves the beneficiary's time, effort and the cost of hardware and equipment.

2. Private Cloud: This is a service provided to certain parties and which can be accessed with local networks or the Internet. It is provided to the recipient with higher standards of safety and confidentiality as well as quality in the services provided.

3 - Hybrid Cloud: This cloud combines the features and specifications of both the public cloud and private as it enables the recipient to have a private cloud through which services are provided to beneficiaries while benefiting from the cloud solutions in general in terms of security and confidentiality of uploaded files.

4- Community Clouds: This cloud environment has emerged because of collective collaboration among a number of organizations with the same orientation and support for a particular group to achieve common goals such as information security, access to performance and ease of access to data.

2.5 Previous studies

- 1- Pireva's (2018) study was conducted at Applied Sciences in New Zealand that explored students' perceptions of evaluating a cloud-based learning environment. The study focused on examining teacher and student behaviour in participatory work, changing perceptions, student achievement, and confidence in working on the cloud. This study provides a clear insight into students' perceptions of evaluating a cloud-based learning environment. It is hoped that it will help officials in educational institutions to take advantage of the study data to better prepare students, manage future expectations well, and emphasize the positive aspects of a cloud-based learning environment. This study concluded that education through the cloud helps students learn better and helps the teacher to evaluate students better and guide them in sound ways, which are better than traditional methods.
- 2- A study by Mata-López and Tobón (2018) aimed to explain the importance of using cloud-computing technology in universities by presenting a proposed model for using cloud-computing technology in the Technical University of Turkey, which includes a number of branches and colleges in different regions. The researchers concluded through this study that the use of cloud computing technology in higher education is very important to overcome material problems such as the high costs of devices as well as the problems of development and maintenance in addition to the problems of spacing distances for the colleges affiliated to the university. The main objective of this proposal was to provide a good environment for effective management, in terms of providing software and storing data and documents.
- 3- The study of Biasutti, Makrakis, Concina and Frate (2018) aimed to propose a model for an e-learning environment which integrates both cloud computing technology and Web 2 applications, as this proposed system includes a number of various services and applications, and the cloud computing work system Windows Azure (windows Azure). Which includes three different levels, the first level includes the basic technologies of the system such as sheet(css), Rest, Rss, Ajax, Javascript that run Web 2 applications. The second level of the system consists of Web 2 services and technologies, which include tools Wikis, blogs, and social networks, are compatible with the cloud computing operating system. The third level includes the use of cloud computing technology to design and develop applications that run on Web 2. One of the most important findings of this study is the need to activate the use of Web 2 applications that are compatible with Cloud computing to design and develop e-learning environment systems.

- 4- Study of Sivan and Zukarnain (2021) aimed to find out the possibility of employing cloud computing technology in developing self-learning skills, spreading the spirit of sharing among learners and stimulating their motivation with various Internet applications. In this study, the researchers used the semi-experimental approach to achieve the scientific objective of this study. This study concluded that it is necessary to activate the cloud computing technology in e-learning as it helps both the student and the faculty member to share files and data with each other and helps greatly in solving many problems that stand in the way of colleges and universities to achieve their goals. The researcher recommended the necessity of integrating e-learning with traditional education on a larger scale and providing the necessary infrastructure in addition to intensifying training programs and spreading awareness of the importance of e-learning.
- 5- Bagish and Samah (2014) carried out a study to educate engineering students about the use of cloud computing and its importance to meet the challenges and achieve the principle of teamwork and cooperation among students at the university. The researcher also mentioned the interest of the university in providing students and faculty members with free or low-cost tools they can work on. The study recommended the need to apply cloud computing in universities and to raise awareness among students and faculty of the importance of adopting cloud computing and how to work properly.

A review of previous studies on the advantages of cloud computing in (higher) education has drawn a number of advantages as follows:

1. The student is able to communicate easily with the faculty member through the cloud; in addition to the ease of communication with each other.
2. Helping students to keep up with all the latest technological developments that save time and help them to acquire new knowledge.
3. Helping students in the preservation of all their work, achievements and projects with the ability to access these resources whenever they want.
4. Helping students and faculty members to use applications and software without the need to install on the devices.
5. Enabling students to obtain feedback on all their activities.
6. Both the students and the faculty member can access the cloud at anytime and anywhere if they connected to the Internet.
7. Students and faculty members receive all updates and new releases from the service provider continuously.

The relationship of the current study with previous studies:

- 1- This study is similar to previous studies in that it represents one of the recent trends in reaching knowledge of the impact of using the cloud storage service, which is considered one of the cloud computing services, and which can be used in developing the skills of postgraduate students.
- 2- The current study is similar to some previous studies in using the descriptive analytical approach.
- 3- The current study is similar to the majority of previous studies in the use of statistical treatments of means and standard deviations as well as testing the differences between the means.
- 4- Most of the previous studies used the questionnaire as a tool for collecting information, and it is similar to the current study since the researcher used the same tool to collect data from students.

Aspects of benefit from previous studies:

By looking at previous studies and reviewing their content and findings, the researcher benefited from them in a number of ways:

- 1- Reaching a general and comprehensive perception of the reality of students' use of cloud computing services in general; and cloud storage in particular.
- 2- Through the previous studies, the researcher was briefed on the statistical treatment methods used in order to be utilized on the processing of the data of the current study.
- 3- Previous studies also helped the researcher to choose the appropriate approach for this study; which is the descriptive analytical approach.

2.6 Obstacles to the use of cloud computing technology at the University of Shabwa - College of Oil and Minerals

I-Internet Connection:

Pireva (2018) noted that the most important challenges facing the work of cloud computing services are communications. Cloud computing requires high-quality Internet connectivity. If there is no Internet connection, the user cannot do it, and if the Internet speed is slow, it may impede the cloud.

II- Security and privacy:

Security threats are one of the most important challenging faces cloud computing. Cloud service providers must provide high-quality encryption software and technologies to maintain user data from tampering, piracy and loss. Although service providers claim the data to be safe, they may not be as high as one percent (Millard, 2013).

III-The quality:

The service provider may not provide the required services at the required level as it may not provide all that the beneficiary needs in the image and the ideal speed in processing the data.

IV-The service:

The user, whether a student or a faculty member, may not find all the services needed on the cloud. In addition, some of the applications in the cloud have not yet reached the level of traditional applications such as Microsoft applications on the desktop. For example, if the user uses the Word program on the cloud and compares it to the traditional Microsoft Word function, the difference is very large in the possibilities (Kinyanjui, 2017).

2.7 Cloud Storage Features:

Vilajkat (2017) listed the following features of cloud storage

1- Archiving files:

One of the services provided by the cloud storage provider for the beneficiaries is the ability to retrieve files that were previously uploaded to the cloud and modify or delete them. It also enables the user to retrieve files that he has deleted from the cloud by mistake or otherwise.

2- Integration with other applications:

Companies that offer cloud storage service integrate their services with applications on the computer or software or mobile phone. For example, Drop Box offers a service that enables the user to automatically store images and other types of files.

3- Preservation of information and data:

One of the most important features of the cloud storage service is that it offers different solutions to a number of problems such as file sharing and synchronization. In addition, it provides services related to ensuring the preservation of information such

as securing a way to store backups to reduce the risk of information loss when the personal mobile device is lost.

There are important points of Cloud Storage Features that are considered by the service providers to preserve the information and data as follows:

- Confidentiality:

One of the most important privileges that the service providers have to pay attention to is to maintain the confidentiality of the files and the information contained in the data and not disclosed to any person or other entity.

- User Account Security:

The service provider assures users that no changes or modifications will be made to files uploaded to the cloud.

- Availability:

This feature ensures access to files at anytime and anywhere if you connect to the Internet. The user can also retrieve files that he deleted by mistake.

2.8 Comparison between famous providers of cloud storage service:

Company	Services
Dropbox	It is one of the best sites on the web that offers the cloud storage service. It offers a storage size of 2 GB and can be increased to 16 GB after inviting friends to participate in the service or by sharing a link in other forums. Drop Box enables users to upload files from the Internet browser with a maximum size of 300 MB. Users can purchase 50 GB of storage space for \$ 9.99 per month or 100 GB of space for \$ 19.99 per month.
Google Drive	Google Drive is a cloud storage service provided by Google for users with free space up to 5 GB. It allows the user of the service to share files and modify them collectively as well as integrating with various Google apps like Google plus, Gmail, Google docs, etc. Users can purchase 100GB of storage for \$ 4.99 and 1000 GB for \$ 49.99
One Drive	It's a cloud storage service provided by Microsoft. Its most important feature is that the user can get 15 GB of free storage space. It allows users to create files and share them with others with the possibility of editing them collectively. Users can subscribe to the service monthly for \$ 2 to increase the service space to 50 GB.
Box	As a specialized cloud storage location, it offers 5GB of storage space. It is compatible with Google Docs and Quick office. Users can purchase 25 GB of storage for \$ 9.99 per month and 50 GB for \$ 19.99.
Icloud	This service is provided by Apple and is available to users with iOS devices. Users can share files with others. It allows users to upload different files like pictures, videos, texts and others. It provides users with free storage of 5 GB with the possibility to increase the space by 20 GB for \$ 40 a year, or 50 GB for \$ 100 a year.

2.9 Advantages of activating the cloud storage service in education:

When activating cloud storage service in the educational environment, we will get many advantages the most important of which are:

- The use of this service in the educational process stimulates motivation among learners and increases the positive interaction between them.
- Communication and exchange of files between students and teachers help to increase the awareness and enrichment of information for educational content.
- This service enables the beneficiary to get feedback on his performance through the cloud and according to his response to the educational situation.
- Activation of the service in the educational environment helps to reduce the paper work as the learner stores all his files and what he does on the cloud and can refer to it at any time and from any place.

- The integration of the cloud storage service with other applications helps the beneficiary to work in one environment on the cloud and the immediate storage of its work.
- The learner can upload all files in different formats; whether audio, written, video clips or others.

3. Methodology

The current study is based on the analytical descriptive approach in order to identify: the reality of the use of applications of cloud storage service by students and faculty members in the Faculty of Oil and Minerals - University of Shabwa, their awareness of the importance of its use in education and the barriers that hinder this use.

3.2 Study sample:

The study sample includes a random sample drawn from all students and faculty members of the College of Oil and Minerals. The sample includes 100 students and faculty members.

3.3 Study tool:

The study tool is a questionnaire consisting of a number of questions dealing with different aspects of the subject of the study. It was divided into three axes as follows:

- The first axis measures the reality of the use of students and faculty to implement cloud storage in education.
- The second axis measures the awareness of students and faculty of the importance of using cloud storage service in the educational process.
- The third axis measures the constraints of using cloud storage applications in education.

In the preparation of the axes, the researcher adopted closed questions that identify the possible responses to each question. Each paragraph of the questionnaire corresponds to a list with the following expressions: Strongly Agree / Agree / Neutral / Disagree / Strongly Disagree.

124 questionnaires were distributed to the study sample. 116 copies of the questionnaire were retrieved. 100 copies were valid for analysis, and the remaining 16 were missing or not valid.

3.4 Statistical Methods:

The Statistical Package for Social Sciences (SPSS) was used to calculate the frequencies, percentages, arithmetic averages and standard deviations of the data in the questionnaire and the answers to the questions contained therein.

3.5 The limits of the study:

Objective: This study focused on the reality of the use of cloud computing applications in the educational process from the perspective of faculty members and students in Yemeni universities (Faculty of Oil and Minerals - University of Shabwa model)

Spatial boundaries: Shabwa Governorate - Republic of Yemen - Faculty of Oil and Minerals - University of Shabwa

Human Boundaries: The study was limited to students and faculty members of the Faculty of Oil and Minerals.

Time limits: 18-20 / 03/2018

3.6 Details of the Research instrument

Part 1: This section deals with the independent variables of the study which allows us to identify the characteristics of the sample and to determine the extent to which these characteristics affect the results of the study. These variables are (educational level)

Part Two: Study Questions:

The researcher used in this part a set of objective questions that were carefully selected to achieve the purpose of the study. The standard measure used in the study is Likert five-level scale. This scale is commonly used in measuring scientific trends in educational, psychological and social research. It has high degree of stability and honesty. The values in the scale are as follows:

Strongly agree	agree	neutral	Disagree	Strongly disagree
4.2 : 5	3.40 : 4.19	2.6 : 3.39	1.80 : 2.59	1 : 1.79

The questions in the questionnaire were divided into three axes:

- The first axis: the reality of using cloud storage. It included (11) statements.
- The second axis: the awareness of students and faculty members of the importance of cloud computing services. It included (9) statements.
- The third axis: the obstacles that limit the use of cloud computing in education and scientific research. It included (11) statements.

Internal consistency of statements:

The validity of the internal consistency in each axis of the study tool was verified by finding the extent of the correlation of each statement with the total degree of the axis as well as comparing the total score of each axis with the total score of the study statements using Pearson correlation coefficient in order to ensure that there is no overlap between them.

Table 1

Correlation coefficients between the score of each of the statements of the first axis to the total degree of the axis

First Axis Statements	Correlation coefficient	First Axis Statements	Correlation coefficient
1	0.559**	7	0.592**
2	0.641**	8	0.625**
3	0.664**	9	0.618**
4	0.725**	10	0.653**
5	0.596**	11	0.753**
6	0.635**		

** There is a statistical significance at the level (0.01).

Table 1 shows that the correlation coefficients of the use of students and faculty members of cloud computing services ranged between (0,559-0,753); all of which are high correlation coefficients that indicate the strength of coherence and internal consistency of the terms of this axis.

Table 2

Correlation coefficients between the degrees of each of the statement of the second axis with the total degree of the axis

Statement	Correlation coefficient	Statements	Correlation coefficient
1	0.544**	6	0.599**
2	0.594**	7	0.798**
3	0.730**	8	.687**
4	0.801**	9	0.628**
5	0.634**		

** There is a statistical significance at the level (0.01).

Table 2 shows that the correlation coefficients of students and faculty members' awareness of the importance of the cloud computing services ranged between 0.544 to 0.801 which are high correlation coefficients. This indicates the strength of the coherence and internal consistency of the terms of this axis.

Table 3

Correlation coefficients between the score of each of the third axis statements in the overall degree of the axis

Statement	Correlation coefficient	Statement	Correlation coefficient
1	0.449**	7	0.609**
2	0.513**	8	0.774**
3	0.621**	9	0.816**
4	0.692**	10	0.657**
5	0.655**	11	.559**
6	0.565**		

** There is a statistical significance at the level (0.01).

It is clear from table 3 that the correlation coefficients that limit students' use of cloud applications in education and scientific research ranged between 0.449 - 0.816. All of these are high correlation coefficients which indicate the strength of coherence and internal consistency of the terms of this axis.

Table 4

Correlation coefficients between each axis with the total score of the statements

Axis	Correlation coefficient
First	0.699**
Second	0.659**
Third	0.531**

** There is a statistical significance at the level (0.01).

It is clear from table 4 that when calculating the correlation coefficients of Pearson for each axis of the study with the total number of statements, we find that the values ranged between (0,531-0,699). These are high correlation coefficients that indicate the strength of coherence and internal consistency of all study axes.

Stability of the study instrument:

Cronbach's Alpha is the tool used for assessing the reliability of scales

Table 5

Stability coefficient (Alpha Cronbach) for all axes

Axis No	Axis	Stability coefficient
1	The reality of the using cloud services	%85,5
2	The awareness of the importance and advantages of cloud services	%83,8
3	Constraints that limit the use of cloud services in education and scientific research	%85,0
Total stability coefficient		%81.6

The stability coefficients as shown in table 5 reflect the liability of the tool with a high stability coefficient and the ability of the tool in general to achieve the objectives of the study. It is clear from this table that the coefficient of constant use of cloud services by the study sample was 85.5. The stability coefficient of awareness of the importance and advantages of the cloud storage services was at 83.8%, whereas the stability coefficient for the constraints on using cloud services in education and scientific research was 85.0%. All of these indications give evidence that the results can be consistent. In practice, these figures are ($\text{Alpha} \geq 60.0$) which is acceptable in research in educational and administrative sciences.

4. Results and discussion

Results for personal and functional variables of the study sample:

The researcher calculated the frequencies and percentages of the personal and functional variables of the study. The results were as follows:

Table 6

Distribution of the study sample according to the variable of the study level

	frequency	percentage
Students	82	%82
Faculty Members	18	%18
Total	100	%100

The results of Table 6 indicate that:

- 82% of the sample of the study were students
- 18% of the sample were faculty members.

Results related to answering the study questions:

Presentation of the results related to the answer to the first question: what is the reality of cloud services use by students and faculty members at the College of Oil and Minerals?

In order to answer this question, the researcher calculated the frequencies, percentages, arithmetic averages and standard deviation of respondents' responses on the first axis (the reality of the use of cloud computing applications in the educational process from the perspective of faculty members and students in Yemeni universities)

Table 7

Frequencies, percentages, arithmetical averages and standard deviations of the first axis (the use of students and faculty members of cloud services)

No	Statement	Frequent and percentages	Approval scores					Arithmetic Mean	standard deviation	Order
			Strongly Agree	Agree	Neutral	Disagree	Strongly disagree			
1	Cloud services help to develop collaboration and teamwork skills.	R	48	37	15	0	0	4.33	0.7	7
		%	48.00	37.00	15.00	0.00	0.00			
2	Storage helps save costs compared to traditional storage.	R	52	40	8	0	0	4.44	0.6	2
		%	52.00	40.00	8.00	0.00	0.00			
3	Cloud services help students to acquire technical skills.	R	50	38	12	0	0	4.38	0.7	5
		%	50.00	38.00	12.00	0.00	0.00			

4	Cloud services let me share required files with faculty quickly and easily.	R	48	37	13	2	0	4.31	0.8	8
		%	48.00	37.00	13.00	2.00	0.00			
5	I use cloud storage to transfer and send large files that cannot be sent by regular mail.	R	53	35	9	3	0	4.38	0.8	5
		%	53.00	35.00	9.00	3.00	0.00			
6	I use cloud storage to access my content anytime and anywhere.	R	65	26	9	0	0	4.56	0.7	1
		%	65.00	26.00	9.00	0.00	0.00			
7	Cloud services help me edit files easily.	R	30	47	19	4	0	4.03	0.8	10
		%	30.00	47.00	19.00	4.00	0.00			
8	Cloud storage service are used to upload the required educational files.	R	44	46	7	3	0	4.31	0.7	8
		%	44.00	46.00	7.00	3.00	0.00			
9	Cloud storage services are used to edit files in common with others at the same time from different locations.	R	30	48	15	7	0	4.01	0.9	11
		%	30.00	48.00	15.00	7.00	0.00			
10	Cloud storage help to back up files and data.	R	55	35	7	3	0	4.42	0.8	3
		%	55.00	35.00	7.00	3.00	0.00			
11	Cloud services help me share my files easily with other students.	R	49	42	8	1	0	4.39	0.7	4
		%	49.00	42.00	8.00	1.00	0.00			
The general arithmetic mean of the axis statements								4.32	0.17	

Table 7 shows that the statements of the first axis (the reality of the using of cloud applications in the educational process from the perspective of faculty members and students - Faculty of Oil and Minerals - University of Shabwa) ranged between 4.1 to 4.56 on the scale of five points. The arithmetic mean of the statements of this axis was 4.32 with a standard deviation 0.17 which means that the use of students and faculty members of cloud services is averagely “strongly agree”; indicating that the response levels are very high for this axis.

Results related to answering the second question: to what extent are students and members of the faculty of oil and minerals aware of the importance and advantages of using cloud services in the educational process?

Table 8

Frequency, percentages, arithmetical averages and standard deviations of the second axis (trends of students and faculty members towards the use of cloud storage in the educational process)

No	Statement	Frequency and Percentage	Approval scores					Arithmetic Mean	standard deviation	Order
			Strongly Agree	Agree	Neutral	Disagree	Strongly disagree			
1	Cloud services contribute to the development of students' technical skills.	R	46	44	10	0	0	4.36	0.7	3
		%	46.00	44.00	10.00	0.00	0.00			
2	Knowledge and information are shared through cloud applications in a better way	R	35	49	12	2	2	4.13	0.8	4
		%	35.00	49.00	12.00	2.00	2.00			

3	Using cloud services in education saves time and effort	R	51	40	5	4	0	4.38	0.8	1
		%	51.00	40.00	5.00	4.00	0.00			
4	File sharing through cloud applications is better.	R	44	30	20	4	2	4.10	1.0	5
		%	44.00	30.00	20.00	4.00	2.00			
5	I can handle the cloud services well.	R	34	45	14	5	0	4.10	0.8	5
		%	34.00	45.00	14.00	5.00	0.00			
6	Educators recognize the importance of using cloud services.	R	21	17	33	22	6	3.25	1.2	9
		%	21.00	17.00	33.00	22.00	6.00			
7	I recommend employment of cloud applications to accomplish tasks.	R	33	43	20	3	0	4.07	0.8	8
		%	33.00	43.00	20.00	3.00	0.00			
8	The cloud applications help to activate collaborative teamwork with others at the same time and in a single file.	R	35	40	21	1	1	4.09	0.8	7
		%	35.00	40.00	21.00	1.00	1.00			
9	Cloud services contribute to transfer and send large files that cannot be sent by regular mail.	R	50	39	7	3	0	4.37	0.8	2
		%	50.00	39.00	7.00	3.00	0.00			
The general arithmetic mean of the axis statements								4.10	0.34	

Table 8 shows that the statements of the second axis (the extent of awareness of students and faculty members of the importance and advantages of using the cloud storage service in the educational process) ranged from 3.25 to 4.38 according to the five-pints-scale. The arithmetic mean of the statements of this axis is 4.10 with a standard deviation of 0.34 which indicated that the attitudes of students and faculty towards using the cloud services in the educational process are (agree); meaning that the response levels are high for this axis.

Results related to answering the third question: what are the obstacles to using cloud storage services in the educational process from the perspectives of students and faculty members at the College of Oil and Minerals?

Table 9

Frequency, percentage, arithmetical means and standard deviations of the third axis (constraints on the use of cloud storage in the educational process from the perspective of students and faculty members

No	Statement	Frequency percentage	Approval scores					arithmic mean	standard deviation	Order
			Strongly Agree	Agree	Neutral	Disagree	Strongly disagree			
1	I have difficulty accessing my files in clouds because of the difficulty of connecting to the Internet.	R	11	40	26	18	3	3.39	1.0	7
		%	11.00	40.00	26.00	18.00	3.00			
2	I have not got enough training to use cloud storage services	R	20	34	29	12	4	3.55	1.1	4
		%	20.00	34.00	29.00	12.00	4.00			
3	I was not encouraged to use cloud storage services in previous grades.	R	34	34	18	13	0	3.90	1.0	2
		%	34.00	34.00	18.00	13.00	0.00			

4	I rely on traditional storage units (Hard Disk, CD, Flash Memory)	R	19	33	24	18	5	3.43	1.1	6
		%	19.00	33.00	24.00	18.00	5.00			
5	I actually have not applied cloud storage in the previous stages.	R	20	27	11	29	12	3.14	1.4	9
		%	20.00	27.00	11.00	29.00	12.00			
6	I am afraid of hacking my files in clouds.	R	13	37	25	21	3	3.36	1.1	8
		%	13.00	37.00	25.00	21.00	3.00			
7	I am worried that files will not be accessed if the cloud is not functioning properly.	R	24	45	16	10	3	3.79	1.0	3
		%	24.00	45.00	16.00	10.00	3.00			
8	I do not have the skills to use cloud applications.	R	6	19	20	38	16	2.61	1.2	10
		%	6.00	19.00	20.00	38.00	16.00			
9	I do not know how to employ cloud services in education and research.	R	6	22	14	40	17	2.60	1.2	11
		%	6.00	22.00	14.00	40.00	17.00			
10	There is remarkable lack of hardware in the learning environment to deal with cloud storage.	R	17	43	19	13	7	3.51	1.1	5
		%	17.00	43.00	19.00	13.00	7.00			
11	There is lack of advertising programs for the importance of using cloud services.	R	39	36	13	8	3	4.01	1.1	1
		%	39.00	36.00	13.00	8.00	3.00			
The general arithmetic mean of the axis statements								3.39	0.46	

Table 9 shows that the deviations in the use of cloud services in the educational process from the point of view of students and faculty members ranged from 2.60 to 4.01 according to the five-point-scale. The arithmetic mean of the statements of this axis is 3.39 with a standard deviation 0.46. According to this mean, the axis of the constraints of using cloud services in the educational process from the point of view of students and faculty members is neutral; meaning that the response levels are average for this axis.

5. Conclusions and recommendations

The following is a highlight of the most important conclusions of the study:

First, results related to the characteristics of the sample of the study showed the following:

- 82% of the study sample were students while 18% were faculty members.

Second, results related to answering the study's questions:

- Results related to answering the first question: what is the reality of cloud services use by students and faculty members at the College of Oil and Minerals?

- The arithmetic mean of students and faculty members implemented cloud services was "strongly agree" (4.32) which confirms that the degree of response of the study sample members on this axis is very high.

The results also indicate that there is a convergence of the views of the study sample on the reality of using cloud storage and cloud services by students and faculty members; the responses were in two degrees (strongly agree *and* agree).

Results of the second question: to what extent are students and members of the faculty of oil and minerals aware of the importance and advantages of using cloud services in the educational process?

- The arithmetic mean of study sample' awareness of the importance and advantages of using the cloud services in the educational process is 4.10. That is (agree) which confirms that the degree of response of the sample members on this axis is high.

The results also indicate that there is a convergence of the views of the study community on this axis where the responses were in two degrees (strongly agree *and* agree).

- Results related to the answer to the third question: what are the obstacles to using cloud storage services in the educational process from the perspectives of students and faculty members at the College of Oil and Minerals?

- The arithmetic mean of the attitudes of students and faculty toward using the cloud services in the educational process was neutral at 3.39. This confirms that the degree of response of the sample members on this axis is neutral.

The results also indicate that there is a convergence of the views of the study sample about the obstacles of using cloud services in the educational process from the point of view of students and faculty members. The answers were in two degrees (agree *and* neutral). The main obstacles that limit the use of cloud services in the educational process from the point of view of students and faculty are: there is a remarkable lack of programs to spread the awareness on the importance of using cloud services among the study sample, they were not encouraged to use cloud services in the previous school stages, there is a worry about not accessing files in the event of failure of the cloud, the sample members did not receive sufficient training programs to use cloud services and the lack of hardware required in the learning environment to handle the cloud services.

Recommendations:

Salient recommendations of this study are:

1. There is great need of employing cloud-computing technology as an educational strategy to help cooperative education through the participation of members of the sample in the performance of teamwork.
2. There is a need of developing courses in public education based on building the skills of students learning on the Internet environments.
3. Some concrete measures should be taken to implement cloud storage and cloud services in the educational process because of its importance in the development of students' technical skills.
4. There is need of great attention to provide the infrastructure and technologies necessary to activate the use of cloud storage service.
5. Intensive training programs for students and faculty members should be developed to employ cloud applications and services in education and scientific research.
6. Academic leadership should train students of public education on the use of applications of cloud computing education.
7. Training and awareness programs in public as well as educational institutions should be organized to increase the awareness of how to use the cloud services.

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واقع استخدام تطبيقات السحابة الإلكترونية في العملية التعليمية في الجامعات اليمنية: كلية النفط والمعادن – جامعة شبوة كنموذج

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الملخص

تتناول هذه الدراسة واقع استخدام التطبيقات السحابية والخدمات السحابية بين طلاب وأعضاء هيئة التدريس بكلية النفط والمعادن كمثال للواقع في جميع الجامعات اليمنية. كما تهدف الدراسة إلى تحقيق الأهداف التالية: التعرف على واقع استخدام التخزين السحابية والخدمات السحابية الأخرى ومواقف الطلاب وأعضاء هيئة التدريس تجاه الخدمات السحابية وتنفيذها في العملية التعليمية وكذلك التركيز على المعوقات التي تحد من استخدام الخدمات السحابية في العملية التعليمية. لتحقيق هذه الأهداف تم استخدام المنهج الوصفي. تم أخذ عينة عشوائية من طلاب وأساتذة كلية النفط، ووجدت الدراسة أن أهم معوقات استخدام الخدمات السحابية في العملية التعليمية، من وجهة نظر عينة الدراسة، هي: برامج توعوية حول أهمية استخدام الخدمات السحابية لتشجيع الطلاب على استخدام التخزين السحابية، واهتمام المستخدمين بعدم الوصول إلى ملفاتهم في حالة عدم تقديم الخدمة السحابية، ونقص الأجهزة في البيئة التعليمية للتعامل مع الخدمات السحابية. هناك مجموعة من التوصيات التي يمكن أن تساعد في تقليل الصعوبات والعقبات التي تعيق تطبيق الخدمات السحابية؛ بما في ذلك استخدام تقنية الحوسبة السحابية كاستراتيجية تعليمية تساعد على التعليم التعاوني من خلال المشاركة الجماعية للطلاب في أداء العمل، والحاجة إلى استخدام خدمة التخزين السحابية في العملية التعليمية والحاجة إلى تدريب الطلاب وأعضاء هيئة التدريس في التعليم العام وزيادة وعيهم بالخدمات السحابية بشأن استخدام تطبيقات الحوسبة السحابية المطورة للأغراض التعليمية.

معلومات البحث

تاريخ الاستلام:

2023.03.25

تاريخ القبول:

2023.05.21

الكلمات المفتاحية

التخزين، السحابة الإلكترونية،

محرك قوئل، الواقع،

المعوقات



Extension of Exton's Quadruple Hypergeometric Function K_{14}

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Abstract

The main object of this paper is to introduce an extension of Exton's quadruple hypergeometric function K_{14} by using the extended Euler's beta function obtained earlier by Özergin, Özarslanand and Altin (2011). For this extended function, we investigate various properties such as integral representations, recurrence relations, generating functions, transformation formulas and summation formulas. Some special cases of the main results of this paper are also considered.

Paper Information

Received:31.03.2023

Accepted:21.05.2023

Keywords

Extended beta function, Extended Exton's function, Integral representations, Recurrence relation, Generating function, Transformation formula, Summation formula.

MSC2010: 33B15, 33C05, 33C15, 33C65.

1. Introduction

Exton (1976) defined the quadruple hypergeometric function K_{14} by the following series:

$$K_{14}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, t) = \sum_{m, n, p, q=0}^{\infty} \frac{(a)_{m+n+p} (c_3)_q (b)_{m+q} (c_1)_n (c_2)_p x^m y^n z^p t^q}{(d)_{m+n+p+q} m! n! p! q!}, \quad (1)$$

where $(a)_n = \frac{\Gamma(a+n)}{\Gamma(a)} = a(a+1)\cdots(a+n-1)$ denotes the Pochhammer symbol.

The following integral representations of the function K_{14} is also given by Exton (1976):

$$K_{14}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, t) = \frac{\Gamma(d)}{\Gamma(a)\Gamma(b)\Gamma(d-a-b)} \int_0^{\infty} \int_0^{\infty} u^{a-1} v^{b-1} (1-u)^{d-a-b} (1-v)^{d-a-b-1} \times (1-ux)^{c_3-b} (1-uy)^{-c_1} (1-uz)^{-c_2} (1-ux-vt+uvt)^{-c_3} dudv, \quad (2)$$

where $\text{Re}(a) > 0, \text{Re}(b) > 0, \text{Re}(d-a-b) > 0, |x|+|t| < 1, |y| < 1$ and $|z| < 1$.

Özergin et al. (2011) introduced the following extended beta function:

$$B_p^{(\alpha, \beta)}(x, y) = \int_0^1 t^{x-1} (1-t)^{y-1} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt, \quad (3)$$

$$(\operatorname{Re}(\alpha) > 0, \operatorname{Re}(\beta) > 0, \operatorname{Re}(p) > 0, \operatorname{Re}(x) > 0, \operatorname{Re}(y) > 0).$$

The special case of (3) when $p = 0$, yields the classical beta function $B(x, y)$ (see Srivastava and Manocha (1984))

$$B(x, y) = \int_0^1 t^{x-1} (1-t)^{y-1} dt, \operatorname{Re}(x) > 0, \operatorname{Re}(y) > 0. \quad (4)$$

Using the extended beta function given in (3), Özergin et al. (2011) introduced the following extended Gauss hypergeometric function:

$$F_p^{(\alpha, \beta)}(a, b; c; z) = \sum_{n=0}^{\infty} (a)_n \frac{B_p^{(\alpha, \beta)}(b+n, c-b)}{B(b, c-b)} \frac{z^n}{n!}, \quad (5)$$

$$(\operatorname{Re}(c) > \operatorname{Re}(b) > 0, |z| < 1)$$

and obtained the following integral representation for the extended Gauss hypergeometric function given in (5):

$$F_p^{(\alpha, \beta)}(a, b; c; z) = \frac{1}{B(b, c-b)} \int_0^1 t^{b-1} (1-t)^{c-b-1} (1-zt)^{-a} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt, \quad (6)$$

$$(\operatorname{Re}(p) > 0; p = 0 \text{ and } |\arg(1-z)| < \pi; \operatorname{Re}(c) > \operatorname{Re}(b) > 0).$$

The special case of (5) when $p = 0$ yields the Gauss hypergeometric function ${}_2F_1(a, b; c; z)$ (see Srivastava and Manocha (1984))

$${}_2F_1(a, b; c; z) = \sum_{n=0}^{\infty} \frac{(a)_n (b)_n}{(c)_n} \frac{z^n}{n!}, \quad c \neq 0, -1, -2, \dots \quad (7)$$

Recently various extensions of some hypergeometric functions of two and three variables are considered (see Çetinkaya et al., 2016; Liu, 2014; Özarslan and Özergin, 2010; Shadab and Choi, 2017). In terms of the extended beta function given in (3), Liu (2014) defined the extended Appell's function $F_{1,p}^{(\alpha, \beta)}$ and the extended Lauricella's function $F_{D,p}^{(3, \alpha, \beta)}$ as follows:

$$F_{1,p}^{(\alpha, \beta)}(a, b, c; d; x, y) = \sum_{m, n=0}^{\infty} \frac{B_p^{(\alpha, \beta)}(a+m+n, d-a) (b)_m (c)_n}{B(a, d-a)} \frac{x^m}{m!} \frac{y^n}{n!} \quad (8)$$

$$(\operatorname{Max}\{|x|, |y|\} < 1; \operatorname{Re}(p) \geq 0)$$

and

$$F_{D,p}^{(3, \alpha, \beta)}(a, b, c, d; e; x, y, z) = \sum_{m, n, r=0}^{\infty} \frac{B_p^{(\alpha, \beta)}(a+m+n+r, e-a) (b)_m (c)_n (d)_r x^m y^n z^r}{B(a, e-a) m! n! r!} \quad (9)$$

$$(\operatorname{Max}\{|x|, |y|, |z|\} < 1; \operatorname{Re}(p) \geq 0).$$

The following integral representation of the extended Appell's function $F_{1,p}^{(\alpha,\beta)}$ and the extended Lauricella's function $F_{D,p}^{(3,\alpha,\beta)}$ are also given by Liu (2014):

$$F_{1,p}^{(\alpha,\beta)}(a,b,c;d;x,y) = \frac{1}{B(a,d-a)} \int_0^1 t^{a-1} (1-t)^{d-a-1} (1-xt)^{-b} (1-yt)^{-c} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt \tag{10}$$

and

$$F_{D,p}^{(3,\alpha,\beta)}(a,b,c,d;e;x,y,z) = \frac{1}{B(a,e-a)} \int_0^1 t^{a-1} (1-t)^{e-a-1} (1-xt)^{-b} (1-yt)^{-c} (1-zt)^{-d} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt. \tag{11}$$

The special case of (8) and (9) when $p = 0$ yields, respectively, Appell function F_1 and Lauricella function $F_D^{(3)}$ (see Srivastava and Manocha (1984))

$$F_1(a,b,c;d;x,y) = \sum_{m,n=0}^{\infty} \frac{(a)_{m+n} (b)_m (c)_n}{(d)_{m+n}} \frac{x^m}{m!} \frac{y^n}{n!} \tag{12}$$

and

$$F_D^{(3)}(a,b,c,d;e;x,y,z) = \sum_{m,n,p=0}^{\infty} \frac{(a)_{m+n+p} (b)_m (c)_n (d)_p}{(e)_{m+n+p}} \frac{x^m}{m!} \frac{y^n}{n!} \frac{z^p}{p!}. \tag{13}$$

2. Extended Exton's Hypergeometric Function $K_{14,p}^{(\alpha,\beta)}$

Here, we use the extended beta function given in (3) to define the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ as follows:

$$K_{14,p}^{(\alpha,\beta)}(a,a,a,c_3;b,c_1,c_2,b;d,d,d,d;x,y,z,u) = \sum_{m,n,r,s=0}^{\infty} \frac{B_p^{(\alpha,\beta)}(a+m+n+r,d-a+s)(b)_{m+s}(c_1)_n(c_2)_r(c_3)_s x^m y^n z^r u^s}{B(a,d-a)(d-a)_s m! n! r! s!}. \tag{14}$$

The extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ given in (14) can be written as follows:

$$K_{14,p}^{(\alpha,\beta)}(a,a,a,c_3;b,c_1,c_2,b;d,d,d,d;x,y,z,u) = \sum_{s=0}^{\infty} \frac{(c_3)_s (b)_s}{(d)_s} F_{D,p}^{(3,\alpha,\beta)}(a,b+s,c_1,c_2;d+s;x,y,z) \frac{u^s}{s!}. \tag{15}$$

Remark 2.1. The special case $c_3 = d - a$ of (14) yields the following extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$:

$$K_{14,p}^{(\alpha,\beta)}(a,a,a,d-a;b,c_1,c_2,b;d,d,d,d;x,y,z,u) = \sum_{m,n,r,s=0}^{\infty} \frac{B_p^{(\alpha,\beta)}(a+m+n+r,d-a+s)(b)_{m+s}(c_1)_n(c_2)_r x^m y^n z^r u^s}{B(a,d-a) m! n! r! s!}. \tag{16}$$

Remark 2.2. The case $p = 0$ of (14) yields the original function K_{14} given in (1)

$$K_{14,0}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = K_{14}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u). \quad (17)$$

3. Integral Representations

Theorem 3.1. The following integral representations for the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ hold true:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = \frac{1}{B(a, d-a)} \int_0^1 t^{a-1} (1-t)^{d-a-1} (1-xt)^{-b} (1-yt)^{-c_1} (1-zt)^{-c_2} \times {}_2F_1\left(c_3, b; d-a; \frac{u(1-t)}{1-xt}\right) {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt \quad (18)$$

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = \frac{1}{B(a, d-a)B(b, d-a-b)} \times \int_0^1 \int_0^1 t^{a-1} s^{b-1} (1-t)^{d-a-1} (1-s)^{d-a-b-1} (1-xt)^{-c_3-b} (1-yt)^{-c_1} (1-zt)^{-c_2} \times (1-xt-us+ust)^{-c_3} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt ds \quad (19)$$

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = \frac{1}{B(a, d-a)B(b, d-a-b)} \times \int_0^1 \int_0^1 t^{a-1} s^{b-1} (1-t)^{d-a-1} (1-s)^{d-a-b-1} (1-yt)^{-c_1} (1-zt)^{-c_2} \times (1-us)^{-c_3} \left(1 - \frac{x-us}{1-us}t\right)^{-c_3} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt ds \quad (20)$$

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = \frac{2}{B(a, d-a)} \int_0^{\frac{\pi}{2}} \sin^{2a-1} \theta \cos^{2d-2a-1} \theta (1-x \sin^2 \theta)^{-b} (1-y \sin^2 \theta)^{-c_1} (1-z \sin^2 \theta)^{-c_2} \times {}_2F_1\left(b, c_3; d-a; \frac{u \cos^2 \theta}{1-x \sin^2 \theta}\right) {}_1F_1\left(\alpha; \beta; -\frac{p}{\sin^2 \theta \cos^2 \theta}\right) d\theta \quad (21)$$

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = \frac{1}{B(a, d-a)} \int_0^\infty \xi^{a-1} (1+\xi)^{b+c_1+c_2-d} (1+(1-x)\xi)^{-b} (1+(1-y)\xi)^{-c_1} (1+(1-z)\xi)^{-c_2} \times {}_2F_1\left(b, c_3; d-a; \frac{u}{1+(1-x)\xi}\right) {}_1F_1\left(\alpha; \beta; -\frac{p(1+\xi)^2}{\xi}\right) d\xi. \quad (22)$$

Proof. of (18). Using (3) on the right-hand side of (14) and interchanging the order of summation and integration, we have:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, u)$$

$$= \frac{1}{B(a, d-a)} \int_0^1 t^{a-1} (1-t)^{d-a-1} \sum_{s=0}^{\infty} \frac{(b)_s (c_3)_s (u(1-t))^s}{(d-a)_s s!} \left(\sum_{m=0}^{\infty} \frac{(b+s)_m (xt)^m}{m!} \right) \\ \times \left(\sum_{n=0}^{\infty} \frac{(c_1)_n (yt)^n}{n!} \right) \left(\sum_{r=0}^{\infty} \frac{(c_2)_r (zt)^r}{r!} \right) {}_1F_1 \left(\alpha; \beta; -\frac{P}{t(1-t)} \right) dt,$$

which on using the following result (Srivastava and Manocha (1984)):

$$\sum_{n=0}^{\infty} (a)_n \frac{x^n}{n!} = (1-x)^{-a}, \tag{23}$$

yields the desired result (18). The integral representation (19) can be obtained easily from (18) by using the following integral representations of ${}_2F_1(a, b; c; x)$ (Srivastava and Manocha, 1984):

$${}_2F_1(a, b; c; x) = \frac{1}{B(b, c-b)} \int_0^1 t^{b-1} (1-t)^{c-b-1} (1-xt)^{-a} dt. \tag{24}$$

Also, the integral representation (20) can be obtained directly from (18) if we use the following relation:

$$(1-xt-z(1-t))^{-a} = (1-z)^{-a} \left(1 - \frac{(x-z)t}{1-z} \right)^{-a}. \tag{25}$$

Finally, the integral representations (21) and (22) can be easily obtained by taking the transformations $t = \sin^2 \theta$ and $t = \frac{\xi}{1+\xi}$ in (18) respectively. This completes the proof of Theorem 3.1.

Remark 3.1. The special case $c_3 = d - a$ of (18), (21) and (22) yields the following results:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, d-a; b, c_1, c_2, b; d, d, d, d; x, y, z, u) \\ = \frac{1}{B(a, d-a)} \int_0^1 t^{a-1} (1-t)^{d-a-1} (1-xt-u(1-t))^{-b} (1-yt)^{-c_1} (1-zt)^{-c_2} \\ \times {}_1F_1 \left(\alpha; \beta; -\frac{P}{t(1-t)} \right) dt, \tag{26}$$

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, d-a; b, c_1, c_2, b; d, d, d, d; x, y, z, u) \\ = \frac{2}{B(a, d-a)} \int_0^{\frac{\pi}{2}} \sin^{2a-1} \theta \cos^{2d-2a-1} \theta (1-x \sin^2 \theta - u \cos^2 \theta)^{-b} (1-y \sin^2 \theta)^{-c_1} \\ \times (1-z \sin^2 \theta)^{-c_2} {}_1F_1 \left(\alpha; \beta; -\frac{P}{\sin^2 \theta \cos^2 \theta} \right) d\theta \tag{27}$$

and

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, d-a; b, c_1, c_2, b; d, d, d, d; x, y, z, u) \\ = \frac{1}{B(a, d-a)} \int_0^{\infty} \xi^{a-1} (1+\xi)^{b+c_1+c_2-d} (1+(1-x)\xi-u)^{-b} (1+(1-y)\xi)^{-c_1} \\ \times (1+(1-z)\xi)^{-c_2} {}_1F_1 \left(\alpha; \beta; -\frac{P(1+\xi)^2}{\xi} \right) d\xi. \tag{28}$$

Remark 3.2. The case $p = 0$ of (19) yields the integral representation given in (2).

4. Recurrence Relations

Theorem 4.1. The following recurrence relations for the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ holds true:

$$(i) \quad (\beta - \alpha) K_{14,p}^{(\alpha-1,\beta)} - \alpha K_{14,p}^{(\alpha+1,\beta)} + (2\alpha - \beta) K_{14,p}^{(\alpha,\beta)} - \frac{pB(a-1, e-a-1)}{B(a, e-a)} \times K_{14,p}^{(\alpha,\beta)}(a-1, a-1, a-1, e-a-1; b, c, d, b; e-2, e-2, e-2, e-2; x, y, z, u) = 0 \quad (29)$$

$$(ii) \quad \beta K_{14,p}^{(\alpha,\beta)} - \beta K_{14,p}^{(\alpha-1,\beta)} + \frac{pB(a-1, e-a-1)}{B(a, e-a)} \times K_{14,p}^{(\alpha,\beta+1)}(a-1, a-1, a-1, e-a-1; b, c, d, b; e-2, e-2, e-2, e-2; x, y, z, u) = 0 \quad (30)$$

$$(iii) \quad (\beta - \alpha - 1) K_{14,p}^{(\alpha,\beta)} + \alpha K_{14,p}^{(\alpha+1,\beta)} - (\beta - 1) K_{14,p}^{(\alpha,\beta-1)} = 0 \quad (31)$$

$$(iv) \quad (\alpha - 1) K_{14,p}^{(\alpha,\beta)} + (\beta - \alpha) K_{14,p}^{(\alpha-1,\beta)} - (\beta - 1) K_{14,p}^{(\alpha,\beta-1)} - \frac{pB(a-1, e-a-1)}{B(a, e-a)} \times K_{14,p}^{(\alpha,\beta)}(a-1, a-1, a-1, e-a-1; b, c, d, b; e-2, e-2, e-2, e-2; x, y, z, u) = 0, \quad (32)$$

where $K_{14,p}^{(\alpha,\beta)} = K_{14,p}^{(\alpha,\beta)}(a, a, a, e-a; b, c, d, b; e, e, e, e; x, y, z, u)$.

Proofs. To prove our results in Theorem 4.1, we require the following recurrence relations of the confluent function ${}_1F_1$ (Luke, Y. L., 1969):

$$(\beta - \alpha) {}_1F_1(\alpha - 1; \beta; z) - \alpha {}_1F_1(\alpha + 1; \beta; z) + (2\alpha - \beta + z) {}_1F_1(\alpha; \beta; z) = 0 \quad (33)$$

$$\beta {}_1F_1(\alpha; \beta; z) - \beta {}_1F_1(\alpha - 1; \beta; z) - z {}_1F_1(\alpha; \beta + 1; z) = 0 \quad (34)$$

$$(\beta - \alpha - 1) {}_1F_1(\alpha; \beta; z) + \alpha {}_1F_1(\alpha + 1; \beta; z) - (\beta - 1) {}_1F_1(\alpha; \beta - 1; z) = 0 \quad (35)$$

$$(\alpha + z - 1) {}_1F_1(\alpha; \beta; z) + (\beta - \alpha) {}_1F_1(\alpha - 1; \beta; z) - (\beta - 1) {}_1F_1(\alpha; \beta - 1; z) = 0. \quad (36)$$

Proof. of (29). Replacing z by $-\frac{p}{t(1-t)}$ in (33), multiplying both sides by

$t^{a-1} (1-t)^{e-a-1} (1-xt-u(1-t))^{-b} (1-yt)^{-c} (1-zt)^{-d} / B(a, e-a)$ and integrating the resultant equation with respect to t between the limits 0 to 1, we get

$$\begin{aligned} & \frac{\beta - \alpha}{B(a, e-a)} \int_0^1 t^{a-1} (1-t)^{e-a-1} (1-xt-u(1-t))^{-b} (1-yt)^{-c} (1-zt)^{-d} {}_1F_1\left(\alpha - 1; \beta; -\frac{p}{t(1-t)}\right) dt \\ & - \frac{\alpha}{B(a, e-a)} \int_0^1 t^{a-1} (1-t)^{e-a-1} (1-xt-u(1-t))^{-b} (1-yt)^{-c} (1-zt)^{-d} {}_1F_1\left(\alpha + 1; \beta; -\frac{p}{t(1-t)}\right) dt \\ & + \frac{2\alpha - \beta}{B(a, e-a)} \int_0^1 t^{a-1} (1-t)^{e-a-1} (1-xt-u(1-t))^{-b} (1-yt)^{-c} (1-zt)^{-d} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt \\ & - \frac{p}{B(a, e-a)} \int_0^1 t^{a-2} (1-t)^{e-a-2} (1-xt-u(1-t))^{-b} (1-yt)^{-c} (1-zt)^{-d} {}_1F_1\left(\alpha; \beta; -\frac{p}{t(1-t)}\right) dt = 0, \end{aligned}$$

which on using the integral representation (26), yields the desired result (29).

The results (30), (31) and (32) can be proved by a similar method as in the proof of (29) and we use here the recurrence relations (34), (35) and (36).

5. Generating Functions

Theorem 5.1. The following generating functions for the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ hold true:

$$\sum_{k=0}^{\infty} \frac{(c_3)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3 + k; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = (1-t)^{-c_3} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, z, \frac{u}{1-t}\right) \tag{37}$$

$$\sum_{k=0}^{\infty} \frac{(b)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b + k, c_1, c_2, b + k; d, d, d, d; x, y, z, u) = (1-t)^{-b} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; \frac{x}{1-t}, y, z, \frac{u}{1-t}\right) \tag{38}$$

$$\sum_{k=0}^{\infty} \frac{(c_1)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1 + k, c_2, b; d, d, d, d; x, y, z, u) = (1-t)^{-c_1} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, \frac{y}{1-t}, z, u\right) \tag{39}$$

$$\sum_{k=0}^{\infty} \frac{(c_2)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2 + k, b; d, d, d, d; x, y, z, u) = (1-t)^{-c_2} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; x, y, \frac{z}{1-t}, u\right). \tag{40}$$

Proof. of (37). Using (14) in the L.H.S. of equation (37), we get

$$\begin{aligned} & \sum_{k=0}^{\infty} \frac{(c_3)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3 + k; b, c_1, c_2, b; d, d, d, d; x, y, z, u) \\ &= \sum_{m,n,r,s,k=0}^{\infty} \frac{B_p^{(\alpha,\beta)}(a+m+n+r, d-a+s)(c_3)_{s+k}(b)_{m+s}(c_1)_n(c_2)_r x^m y^n z^r u^s t^k}{B(a, d-a)(d-a)_s m! n! r! s! k!} \\ &= \sum_{m,n,r,s=0}^{\infty} \frac{B_p^{(\alpha,\beta)}(a+m+n+r, d-a+s)(c_3)_s (b)_{m+s}(c_1)_n(c_2)_r x^m y^n z^r u^s}{B(a, d-a)(d-a)_s m! n! r! s!} \sum_{k=0}^{\infty} \frac{(c_3+s)_k t^k}{k!}, \end{aligned}$$

which on using (23), we obtain the desired result (37).

The generating functions (38), (39) and (40) can be proved by a similar method as in the proof of (37).

Remark 5.1. Setting $p = 0$ in (37), (38), (39) and (40), we get a known results of Chandel and Tiwari (1991).

Theorem 5.2. The following generating functions for the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ hold true:

$$\sum_{k=0}^{\infty} \frac{(\lambda)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, -k; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = (1-t)^{-\lambda} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, \lambda; b, c_1, c_2, b; d, d, d, d; x, y, z, \frac{-ut}{1-t}\right) \tag{41}$$

$$\sum_{k=0}^{\infty} \frac{(\lambda)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; -k, c_1, c_2, -k; d, d, d, d; x, y, z, u) = (1-t)^{-\lambda} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; \lambda, c_1, c_2, \lambda; d, d, d, d; \frac{-xt}{1-t}, y, z, \frac{-ut}{1-t}\right) \quad (42)$$

$$\sum_{k=0}^{\infty} \frac{(\lambda)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, -k, c_2, b; d, d, d, d; x, y, z, u) = (1-t)^{-\lambda} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; b, \lambda, c_2, b; d, d, d, d; x, \frac{-yt}{1-t}, z, u\right) \quad (43)$$

$$\sum_{k=0}^{\infty} \frac{(\lambda)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, -k, b; d, d, d, d; x, y, z, u) = (1-t)^{-\lambda} K_{14,p}^{(\alpha,\beta)}\left(a, a, a, c_3; b, c_1, \lambda, b; d, d, d, d; x, y, \frac{-zt}{1-t}, u\right). \quad (44)$$

Proof. of (41). In the L.H.S. of equation (41) expressing $K_{14,p}^{(\alpha,\beta)}$ as in (14) and using the results (Srivastava and Manocha, 1984)

$$(-n)_k = \frac{(-1)^k n!}{(n-k)!}, \quad 0 \leq k \leq n, \quad \sum_{n=0}^{\infty} \sum_{k=0}^n A(k, n) = \sum_{n=0}^{\infty} \sum_{k=0}^{\infty} A(k, n+k), \quad (45)$$

we obtain:

$$\begin{aligned} & \sum_{k=0}^{\infty} \frac{(\lambda)_k t^k}{k!} K_{14,p}^{(\alpha,\beta)}(a, a, a, -k; b, c_1, c_2, b; d, d, d, d; x, y, z, u) \\ &= \sum_{m,n,r,s,k=0}^{\infty} \frac{B_p^{(\alpha,\beta)}(a+m+n+r, d-a+s) (\lambda)_{k+s} (b)_{m+s} (c_1)_n (c_2)_r x^m y^n z^r (-u)^s t^{k+s}}{B(a, d-a)(d-a)_s m! n! r! s! k!} \\ &= \sum_{m,n,r,s,k=0}^{\infty} \frac{B_p^{(\alpha,\beta)}(a+m+n+r, d-a+s) (\lambda)_s (b)_{m+s} (c_1)_n (c_2)_r x^m y^n z^r (-ut)^s}{B(a, d-a)(d-a)_s m! n! r! s! k!} \\ & \quad \times \sum_{k=0}^{\infty} \frac{(\lambda+s)_k t^k}{k!}, \end{aligned}$$

which on using (23), we obtain the desired result (41).

The generating functions (42), (43) and (44) can be proved by a similar method as in the proof of (41).

6. Transformation and Summation Formulas

Theorem 6.1. The following transformation formula for the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ holds true:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, d-a; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = (1-u)^{-b} F_{D,p}^{(3,\alpha,\beta)}\left(a, b, c_1, c_2; d; \frac{x-u}{1-u}, y, z\right). \quad (46)$$

Proof. Using (25) in (26), we have

$$\begin{aligned} & K_{14,p}^{(\alpha,\beta)}(a, a, a, d-a; b, c_1, c_2, b; d, d, d, d; x, y, z, u) \\ &= \frac{(1-u)^{-b}}{B(a, d-a)} \int_0^1 t^{a-1} (1-t)^{d-a-1} \left(1 - \left(\frac{x-u}{1-u}\right)t\right)^{-b} (1-yt)^{-c_1} (1-zt)^{-c_2} {}_1F_1\left(\alpha; \beta; -\frac{P}{t(1-t)}\right) dt, \end{aligned}$$

which by using (11), yields the desired result (46).

Remark 6.1. The special case $u = x$ of (46) yields the following result:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, d - a; b, c_1, c_2, b; d, d, d, d; x, y, z, x) = (1 - x)^{-b} F_{1,p}^{(\alpha,\beta)}(a, c_1, c_2; d; y, z). \tag{47}$$

Remark 6.2. For $p = 0$, equation (46) reduces to a known result Exton, H. (1976)

$$K_{14}(a, a, a, d - a; b, c_1, c_2, b; d, d, d, d; x, y, z, u) = (1 - u)^{-b} F_D^{(3)}\left(a, b, c_1, c_2; d; \frac{x - u}{1 - u}, y, z\right). \tag{48}$$

Theorem 6.2. The following summation formulas for the extended Exton's hypergeometric function $K_{14,p}^{(\alpha,\beta)}$ holds true:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; 1, 1, 1, 1) = \frac{\Gamma(d)\Gamma(d - a - b - c_3)}{\Gamma(a)\Gamma(d - a - b)\Gamma(d - a - c_3)} B_p^{(\alpha,\beta)}(a, d - a - b - c_1 - c_2) \tag{49}$$

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, 1 - b; b, c_1, c_2, b; d, d, d, d; 1, 1, 1, \frac{1}{2}) = \frac{\Gamma(d)\Gamma(\frac{1}{2}d - \frac{1}{2}a)\Gamma(\frac{1}{2}d - \frac{1}{2}a + \frac{1}{2})B_p^{(\alpha,\beta)}(a, d - a - b - c_1 - c_2)}{\Gamma(a)\Gamma(d - a)\Gamma(\frac{1}{2}d - \frac{1}{2}a + \frac{1}{2}b)\Gamma(\frac{1}{2}d - \frac{1}{2}a - \frac{1}{2}b + \frac{1}{2})}. \tag{50}$$

Proof of (49). Setting $x = y = z = u = 1$ in (18) and using the following formula

Rainville (1960):

$${}_2F_1(a, b; c; 1) = \frac{\Gamma(c)\Gamma(c - a - b)}{\Gamma(c - a)\Gamma(c - b)}, \tag{51}$$

we get:

$$K_{14,p}^{(\alpha,\beta)}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; 1, 1, 1, 1) = \frac{\Gamma(d)\Gamma(d - a - b - c_3)}{\Gamma(a)\Gamma(d - a - b)\Gamma(d - a - c_3)} \int_0^1 t^{a-1} (1 - t)^{d-a-b-c_1-c_2-1} {}_1F_1\left(\alpha; \beta; -\frac{P}{t(1-t)}\right) dt, \tag{52}$$

which by using (3), yields the desired result (49).

The proof of (50) is similar to that of (49) and we use the following formula (Rainville, 1960):

$${}_2F_1(a, 1 - a; c; \frac{1}{2}) = \frac{\Gamma(\frac{1}{2}c)\Gamma(\frac{1}{2}c + \frac{1}{2})}{\Gamma(\frac{1}{2}c + \frac{1}{2}a)\Gamma(\frac{1}{2}c - \frac{1}{2}a + \frac{1}{2})}. \tag{53}$$

Remark 6.3. Setting $p = 0$ in (49) and (50), we get respectively the following known summation formulas of Exton's function K_{14} (Atash and Bellehaj, 2020):

$$K_{14}(a, a, a, c_3; b, c_1, c_2, b; d, d, d, d; 1, 1, 1, 1) = \frac{\Gamma(d)\Gamma(d - a - b - c_3)\Gamma(d - a - b - c_1 - c_2)}{\Gamma(d - a - b)\Gamma(d - a - c_3)\Gamma(d - b - c_1 - c_2)} \tag{54}$$

and

$$K_{14}(a, a, a, 1 - b; b, c_1, c_2, b; d, d, d, d; 1, 1, 1, \frac{1}{2})$$

$$= \frac{\Gamma(d)\Gamma(d-a-b-c_1-c_2)\Gamma(\frac{1}{2}d-\frac{1}{2}a)\Gamma(\frac{1}{2}d-\frac{1}{2}a+\frac{1}{2})}{\Gamma(d-a)\Gamma(d-b-c_1-c_2)\Gamma(\frac{1}{2}d-\frac{1}{2}a+\frac{1}{2}b)\Gamma(\frac{1}{2}d-\frac{1}{2}a-\frac{1}{2}b+\frac{1}{2})}. \quad (55)$$

7. Conclusion

In the present paper, we have extended the known Exton's quadruple hypergeometric function K_{14} by using the extended Euler's beta function obtained earlier by Özergin et al. (2011). For this new extended function $K_{14,p}^{(\alpha,\beta)}$, we have obtained various properties such as integral representations, recurrence relations, generating functions, transformation formulas and summation formulas. Furthermore, some known results for the quadruple hypergeometric function K_{14} are also given as special cases of our main formulas. The method used in this paper can be applied to extend many other hypergeometric functions given in the literature.

Acknowledgements:

The authors are thankful to anonymous referees for their helpful comments.

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تمديد دالة اكستون الرباعية الفوق هندسية K_{14}

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الملخص

الهدف الأساسي لبحثنا هذا هو إدخال تمديد جديد لدالة اكستون الرباعية الفوق هندسية K_{14} باستخدام تمديد دالة اويلر بيتا المعطى سابقاً بواسطة الباحث Özergin, Özarlan and Altin (2011) قمنا بمناقشة واستنتاج العديد من خواص هذه الدالة الجديدة مثل التمثيلات التكاملية والعلاقات التكرارية والدوال المولدة والصيغ التحويلية والجمعية، وتم أيضاً عرض العديد من النتائج المعروفة سابقاً وذلك كحالات خاصة لنتائج بحثنا الرئيسية.

معلومات البحث

تاريخ الاستلام: 2023.03.31

تاريخ القبول: 2023.05.21

الكلمات المفتاحية

دالة اكستون الممدة، دالة بيتا الممدة، التمثيلات التكاملية، العلاقات التكرارية، الدوال المولدة، الصيغ التحويلية، الصيغ الجمعية