

INNOVATION OF THE GAME 'WORD BALANCE' TO DEVELOP STUDENTS' AWARENESS OF DERIVATION IN THE ARABIC LANGUAGE -SECOND-GRADE STUDENTS-

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Abstract:

This study introduces an innovative educational game created by the researcher, called 'Word Balance', which is designed to develop second-grade students' awareness of forming derived Arabic words. To achieve this, the researcher transformed the concept of "morphological balance", devised by Arabic linguists, from an abstract theoretical idea into a tangible, realistic game. The game enables students to improve their cognitive skills, such as attention, perception, analysis, differentiation and synthesis of derived Arabic words. This helps them to become aware of how to generate derived words in the language.

Keywords: *Word Balance Game, Derivation, Morphological Balance, Derived Arabic Word*

Introduction:

Derivation is a distinctive feature of the Arabic language, forming a precise linguistic system that generates words from linguistic roots. According to Hammad (2018, p. 21), it is 'one of the means of linguistic richness, the evolution of means of life and civilisation, and also a means for the growth of the Arabic language and the proliferation of its materials and words'. Words are the cornerstone of any language and are essential for any communicative situation and for the educational scene. Throughout the history of developmental language psychology, research has considered words to be an indispensable condition for acquiring any language. In the Arabic language, the place of word creation and generation is derivation.

According to Al-Khalil ibn Ahmad al-Farahidi, described as the 'Imam of Grammarians' and the 'Genius of Language', the realm of derivation serves as a reference for derivational rules. Until the latter half of the fourth century of the Hijra, no one exceeded words consistent in sound and meaning with the arrangement of letters, known as minor or small derivation (Abu Hayyan al-Andalusi, 1984, p. 13/1). Our study addresses this, considering it to be the type studied by Al-Khalil ibn Ahmad al-Farahidi in a logical, mathematical manner. This approach utilises procedural thinking based on experimentation, restriction and mathematical analysis to interpret the phenomenon of derivation in the Arabic language.

The Arabic language and the Semitic languages are distinguished by vertical derivation, whereby a root is incorporated into a specific form. For example, the root (K-T-B) can be integrated into the 'Fa'al' pattern to form words such as 'عماد', 'سجاد', 'كتاب' and 'قوام', or into the 'Maf'ul' pattern to form words such as 'مكتوب', 'ملعوب' and 'مفهوم'. This is because the derived word in Arabic consists of a root and a pattern (Ribwar Abdullah Al-Khattab, 2014, p. 30).

Psychologists have conducted significant research into how ordinary children acquire derived words, gathering objective information. One of the most important findings is that, during cognitive and linguistic development, children gradually become aware of the structure of language. Children discover the system of relationships that connects phonetic units (phonemes) and written symbols (graphemes) when forming words. According to Professor Abdel Rahmane Haj Saleh, this awareness only emerges once the child has reached a level of cognitive maturity that allows them to analyse the internal structure of language at both the phonetic (spoken) and written levels.

Once they reach this advanced stage, children become capable of inferring the morphological and derivational rules and the underlying syntactic structures of words. This enables them to transform linguistic inputs (heard or read) into abstract patterns and applicable models. These models enable children to generalise derivational rules for generating new words, allowing them to create an unlimited number of new words based on the same templates. This demonstrates their profound comprehension of the derivational system in Arabic and their creative application of derivational principles.

Thus, the child's learning transcends the mere memorisation of words, enabling them to discover the hidden system that organises them. This marks a qualitative leap in their linguistic development, moving them from the memorisation stage to independent cognitive production. A child's vocabulary grows through active and constructive imitation and understanding of word formation processes and components. Professor Abdel Rahmane Haj Saleh also notes that ordinary children easily acquire derived words due to the maturation of their cognitive and intellectual abilities, meaning their natural capacity to observe, understand, learn, think, remember and deal effectively with derived words. This all occurs without clear awareness in ordinary children, as it is implicit knowledge that does not require them to articulate this understanding explicitly. They engage in spontaneous acquisition rather than conscious analysis (Abdel Rahmane Haj Saleh, 2012, pp. 217–219).

When there is a failure in the maturation of cognitive abilities, concepts and representations, difficulties arise in acquiring derived words, leading to deficiencies in the ability to retrieve and use words, and to recognise their functions. This necessitates linguistic cognitive support. A deficiency or disorder in derived words is primarily a phonetic impairment, as well as a derivational and morphological issue regarding the form of the word and its examples. This is evident when students are unable to identify the root or pattern of a word, recognise words with the same root or derivational relationship, or generate words from a pattern or root. These difficulties stem from shortcomings in cognitive abilities and representation (Nuwani, 2018, pp. 104–103).

These deficiencies are particularly evident among students who struggle to learn Arabic, as confirmed by elementary school teachers with substantial knowledge and experience in the field of derivation. Although their expertise is not published, it is relevant to this study. This enabled us to gain insight into the circumstances surrounding the phenomenon of derivation in primary school classrooms and to explore its various aspects. Repeated interviews with teachers confirmed that derivation is one of the most challenging morphological topics. It is not taught as an independent activity, but rather implicitly covered within lessons on simple and derived verbs in the fourth and fifth grades. The only derivational terminology used are the words 'origin' and 'weight' instead of 'root' and 'pattern'. The term 'morphological balance' is not addressed at elementary level.

Problem statement:

Despite the vast theoretical legacy left by Arab grammarians regarding the phenomenon of derivation, it is noted that Arabic studies, particularly in morphology, have not leveraged the theoretical aspects of derivation in the educational field. According to the researcher, this presents a scientific gap in the practical educational aspect.

Teachers are compelled to educate students about the rules of derivation in order to provide them with the tools to become independent learners and produce words during oral or written communication. In other words, teachers should not simply teach children a list of words for communicating with others; rather, they should teach them how to be aware of derivational knowledge in order to create an unlimited number of words.

When students can analyse and understand the components of derived words, they possess the 'magic keys' to generating thousands of words. Derivational awareness has a strong impact on students' vocabulary development, which is crucial for success at school. Acquiring words significantly influences a child's social, communicative and cognitive development.

It is this that motivates us to explore the exciting and beneficial field of derivation by proposing a linguistic educational tool in the form of a game that embodies the concept of 'morphological balance' introduced by Arabic linguists. We have named this tool 'Word Balance'. Word Balance serves as a bridge between tradition and modernity in teaching Arabic derivation, transforming abstract concepts into tangible activities and providing a model for integrating linguistic heritage with educational innovation. Enjoyable educational activities have turned theoretical abstract statements into measurable performance indicators, thus filling a scientific void that has persisted for centuries and opening new avenues for research in teaching Arabic derivation.

From this perspective, the study attempts to answer the following question:

What is the importance of the 'Word Balance' game, invented by the researcher, in developing second-grade students' awareness of derivation in the Arabic language?

Hypothesis:

The 'Word Balance' game is significant in developing second-grade students' awareness of Arabic language derivation.

Theoretical framework of the study:

1. Definition of Derivation:

The definition of derivation varies among linguists, but they all agree that it is the generation of a branch from a root.

Starting with the classical scholars, Al-Rummani (d. 384 AH) defines it as follows: 'cutting a branch from a root that revolves in its inflections around the root' (Jouad, 1971, p. 139). Al-Suyuti (d. 911 AH) defines it as follows: 'Taking a form from another with agreement in meaning, original material, and structure to denote the original meaning with a beneficial addition, differing only in letters or structure' (Al-Suyuti, Jalal al-Din Abdul Rahman ibn Abu Bakr, 1907, p. 201).

Among modern researchers, Dr Ibrahim Anis views derivation as follows: 'extracting a term from another with which it agrees in meaning and original letters' (Anis, 1978, p. 62). Dr Tamam Hassan defines it as 'referring one term to another on account of their agreement in original letters' (Hassan, 1990, p. 178).

The contentious issue lies in the idea of the root from which the words are derived, known as the one derived from it or taken from it. We can classify linguists' opinions on the origin of derivation into three categories:

1. The perspective that sees the verbal noun as the origin of derivation, as held by the Basrians and supported by Sibawayh.

2. The view that considers the verb to be the origin of derivation, previously held by the Kufans, including Al-Fara'a (d. 207 AH).

3. The perspective that considers the 'true origin of derivation' to be the three-consonant root. When we say 'from a consonant root', this refers to the fact that the root consists of consonant sounds, not vowel sounds. This is because vowels are added to the root, rather than being part of it (Abdullah Khattab, Ribwar, 2014, p. 14). These vowels are derivational additions that enter the root to form derived words. This can be illustrated by the following equation:

Root + Derivational Additions = Derived Word

For example, the words (كاتب) 'writer', 'writes' (كتب), 'written', 'library' (مكتبة) and (كتاب) 'book' share the root letters 'ت', 'ك' and 'ب'. These three letters form the basis of this family of Arabic words, from which dozens of words branch off. 'On this basis, both the source and the verb are derivations from the same material, regardless of their movements, pauses and additions' (Mohammed Saud Al-Muaini, 1982, p. 164).

Most words in the Arabic language are formed from three letters, accounting for 76% of words, compared to 8.6% for two-letter roots, 14% for four-letter roots and 0.74% for five-letter roots. Al-Zabidi wrote in Mukhtasar Al-Ain that there are 5,626 roots in the Arabic language, categorised as follows: two-letter roots (489); three-letter roots (4,261); four-letter roots (820); and five-letter roots (42) (Abdel Rahmane Haj Saleh, 2012, p. 223).

The real branch of derivation consists of words generated by adding derivational affixes to the root. These words include verbs, nouns and adjectives. For example, from the root (ك-ت-ب), we derive the verb (كتب - wrote), the verb (أكتب - I write), the verb (أكتب - write!), the noun (كتابة - writing), and the adjectives (كاتب - writer, مكتوب - written, كتّاب - writers, كتيب - written work, أكتب - I write, مكتبة - library, كاتبة - female writer, etc.). These derived words are subject to a hypothetical formula and an accurate measure, represented by the 'morphological balance', which identifies the origin, i.e. the root, and what has been added to the word. Arabic linguists have observed an important property of derived words: they are measurable. This can be illustrated with the following equation:

باسل = حامد = فاهم = كاتب = عالم

All of these are in the "فاعل" pattern and form (doer).

Al-Istrabadi uses the term 'form' interchangeably with 'weight', 'shape' and 'structure' in his explanation of 'Al-Shafiya' (1/2), where he states: 'The meaning of the structure of the word is its weight and form, which is the arrangement of its letters, its specific movements and pauses, considering both the original and added letters in their proper places.' He clarifies the conditions of derivation, stating that "there must be a correspondence between the root and the branch in the original letters and their arrangement". This is because manipulating the position of the sounds forming the root leads to phenomena such as inversion and substitution, which cannot be part of derivation (Abdullah Khattab, Ribwar, 2014, p. 26).

Modern scholars have not deviated from what the ancients wrote about derivation and how derived words are formed. It has been demonstrated that derivation is fundamentally linked to a basic tool in Arabic morphology, as well as to a hypothetical pattern invented by linguists to measure and analyse words. The aim is to distinguish the root letters from which the derived word is formed, as well as the additional letters on the root, and to understand the changes that occur to the word, such as deletion, inversion or vowel modification. This is known as the 'morphological balance'. The morphological balance is one of the most innovative measures for regulating languages (Al-

Dimij, Khaled Mustafa, 2016, p. 17). It measures words according to a specific weight, even if they have never been heard or pronounced. This balance is a tool for constructing words.

Ibn Jinni states: ‘The people measured the words of the Arabs by their wisdom and found them to be of two types. One must be accepted as it is, without prescription or indication. The other can be deduced by analogy’ (Hendawi, Abdul Hamid, 2006, p. 5). The morphological balance is a verbal standard established by Arabic linguists for analysing words and determining their morphological state. This balance relies on the root ‘f-□a-l’ as a basic model and a standard for measuring all roots of derived Arabic words, where each letter of the measured word corresponds to three original letters: ‘فاء’ (fa), ‘عين’ (ain) and ‘لام’ (lam) (f.□.l). They correspond to the word to be measured.

Morphologists chose the consonant root ‘ف ع ل’ as a morphological model because most Arabic terms consist of three-letter roots. Those exceeding three letters are rare. Additionally, the word ‘f□□l’ (verb) has a general meaning and correct letters, as it does not contain letters that can be deleted, as in معلوم (), عالم () and علم (), where the original letters ‘ف-ع-ل-م’ are present in each word. Furthermore, it includes three sounds that form parts of the speech apparatus: it contains ‘ف’ (fa) with its exit point at the beginning of the speech apparatus (the lips); ‘ع’ (ain) from the end (the back of the throat) and ‘ل’ (lam) from the middle.

All the morphological patterns enumerated for the first time by Sibawayh emerged from these three letters, totalling 308 patterns (Abdel Rahmane Haj Saleh, 2012, p. 224). This means that 308 words can be constructed from every three-letter root. Simple calculations allow us to estimate the number of words that can be formed from a three-letter root in Arabic as follows:

The number of three-letter roots that can be formed from 28 letters without repetition is 19,656:
 $28 \times 27 \times 26 = 19,656$.

If repetition is not allowed for the first letter, there are 28 options. For the second letter, there are 27 options (since the first letter cannot be repeated). For the third letter, there are 26 options (since the first two letters cannot be repeated). Thus, we multiply $28 \times 27 \times 26 = 19,656$.

This method of calculating the number of three-letter roots was discovered by Al-Khalil ibn Ahmad al-Farahidi (Haj Saleh, 2012, p. 222).

To calculate the number of possible derived words, we multiply the number of three-letter roots (19,656) by the number of patterns (308) identified by Sibawayh, a disciple of Al-Farahidi. This results in over six million possible derived words:

$19,656 \times 308 = 6,026,020$.

This figure includes both words used by Arabs and those not used.

Linguists have established rules and foundations to facilitate the memorisation and understanding of how derived words are generated. This involves adding vowels, represented by short movements such as fatha (-), damma (-), kasra (-) and sukun (-), as well as long vowels represented by alif (ا), waw (و) and ya (ي). Some consonants, such as sīn (س), hamza (ء), lam (ل), nun (ن) and ha (هـ), occupy specific positions within each root, not exceeding four positions, as illustrated below:

[1prefixes] -[first letter of the root(ف)- [2internal addition] -[second letter of the root(ع)] - [3internal addition]- [third letter of the root (ل)]- [4suffixes]

For instance, in the pattern ‘مفعول’, the first position (1) is occupied by the prefix ‘م’ (meem), as it precedes the root (ف ع ل). The second position (2) is vacant because no addition has been made there. The third position (3) takes the long vowel ‘و’ (waw), which is known as an internal addition as it is included in the root. The fourth position (4) is empty due to the absence of a suffix, which is an addition at the end of the pattern ‘مفعول’.

Ultimately, we obtain the pattern (م-ف-ع-و-ل).

These four positions are occupied by derivational additions that form derived words, which are branches generated from the root. Prefixes and suffixes occupy the first and fourth positions, respectively, while internal additions occupy the second and third positions. These additions and positions are considered expansions of the root, meaning new forms are generated from it due to these expansions (Ben Ali Al-Zar'i & Hussein, 2013, p. 124, modified).

The morphological balance has one important characteristic: it is based on the mathematical equivalence between a word and its morphological weight. For example: (فاعل = جالس = عامل =) (كاتب). The letter “ج” in “جالس” corresponds to the “ع” in “عامل”, and both the “ج” and “ع” occupy the first position of the three-letter root (fa). The same applies to the second (عين) and third (لام) positions. Meanwhile, the movements, pauses and additional letters are constants, unlike the root letters, which are variables; replacing them with a different movement, pause or letter changes the weight of the word.

The brilliant grammarian Al-Radi Al-Istrabadi delineated this regarding the weight of the word: ‘It is the form that can be shared with others, comprising the number of its arranged letters and their specific movements and pauses, considering both the original and added letters in their proper places’ (Abdel Rahmane Haj Saleh, 2012, pp. 165–167).

In Arabic, words are constructed by placing constants opposite constants among the letters and additions opposite additions among the movements and pauses. These must agree in number, organisation and arrangement in their designated positions.

The theoretical and complex concept of morphological balance and the application of morphological rules for word formation makes the study of Arabic challenging using traditional teaching methods, which rely on the abstract, theoretical memorisation of weights and words, as well as paper-based tools such as weight tables, and conventional classroom tools like blackboards. These methods have the drawback of making it difficult to convey the concept of morphological balance, visualise the relationship between morphological weight and words, and distinguish roots from additions.

Leveraging the theoretical aspect of derivation and the extensive theoretical heritage of Arab grammarians on the subject of derivation, the researcher has proposed an educational game that embodies the concept of “morphological balance”, as introduced by Arabic linguists. She named this game “Word Balance”.

This game is an educational tool for word formation in the form of a real balance, providing a solution to the problem of learning morphology and constructing words. It uses a physical balance with two pans, with magnetic pieces representing letters and movements. Colour coding distinguishes between roots and additions, enabling us to form words on the right pan that match the weights on the left pan.

To ensure the game’s effectiveness, we conducted trials, the results of which are presented in the study procedures section.

Study Procedures:

This chapter discusses the procedures followed by the researcher to complete the current study. These include the adopted study methodology, identification of the study population and sample size, identification of the study variables, construction of the study tools, verification of their validity and reliability, field application to the study sample and presentation of the statistical methods used in the analysis. This study relied on the experimental method, implemented in two consecutive phases: an exploratory study and a main study.

First: the exploratory study.

This study was a necessary preliminary phase, especially since our knowledge of derivation is superficial and general. The first exploratory study, conducted by the researcher, involved reviewing literature on derivation among linguists. This took two years of research, analysis and scrutiny to understand the differences in how linguists define derivation, its types, conditions and origins. This led to a detailed examination of the modern Khalilian theory by Professor Abdel Rahmane Haj Saleh, which presented derivation in a simple scientific and mathematical way. It defined derivation as the generation of a branch from a root, with the root being a three-letter root. The theory emphasised that true derivation is major derivation and outlined the conditions of derivation manifested in the arrangement of letters and movements, each in its proper place. The morphological balance was identified as the point at which words are formed in the Arabic language.

The theory also confirmed that horizontal derivation, whereby words are generated by adding elements to the root at the beginning or end, is a feature that Arabic shares with most languages worldwide. However, Arabic is distinguished by vertical derivation, whereby a root is integrated into a form to generate words. For example, the root (ل-س-غ) is integrated into the form (فاعل) to produce the word (غاسول). The term 'form' only exists in Semitic languages, including Arabic.

In addition to reviewing previous studies, we conducted interviews with primary school teachers, inspectors and university professors who have substantial knowledge and experience of derivation. This exploratory study enabled us to define the sample and formulate hypotheses for the preliminary test, which we then used to verify their validity or make adjustments. We also developed a linguistic test to measure second-grade students' awareness of derivation based on the principles of the modern Khalilian theory, ensuring its psychometric properties. Furthermore, we incorporated the insights of primary education inspectors and qualified primary and higher education teachers to align the test content with the students' level, thereby ensuring its applicability.

The exploratory study was the first step in the field study, providing reassurance to the researcher and reinforcing her decision to continue the research. Experts confirmed that the topic of derivation in the Algerian school system underwent radical change following the introduction of reforms, specifically the reduction of the primary stage to five years. It is now addressed superficially and incidentally without awareness and is not studied as an independent activity. Consequently, the allocated time has been reduced; previously, there was a dedicated slot for training in the derivation process before the educational reforms enacted by the Ministry of Education. Now, it is only discussed in the fourth and fifth years of primary school, and the terms used in derivation have changed from "جذر" (root) to 'أصل' (origin), and from 'صيغة' (form) to 'وزن' (weight). Teachers confirmed that the concept of morphological balance is not addressed at all in primary school.

Secondly, the main study:

1. The method used:

The methodology of the study is closely related to the research problem and its hypotheses, which led us to use the experimental method. This enables the researcher to control the independent variable. As the sample was not selected at random, we used the sample available at the institution, represented by a Year 3 class. This class is the most suitable for the study, enabling us to achieve the research objectives and control the independent variable by increasing or decreasing it.

According to Dr Ghazi Inaya's studies and analyses of natural and human phenomena, the experimental method shares similarities with other scientific research methods in that it involves

conducting experiments on phenomena and study samples to verify the reality of the phenomenon or prove the validity of the hypothesis (Inaya, 2008, p. 45). However, it differs in that it is a deliberate method; it does not simply conduct experiments related to phenomena as mere occurrences, but rather initiates changes through its experiments and uses influences that affect the phenomena and study samples in order to obtain the expected and hypothetical results and effects. Of the available designs in the experimental method, we chose a pre-test/post-test design for a single group. In the pre-test/post-test experiment, a single group of students aged between 7 and 10 are observed and measured for their awareness of derivation (the first measurement). The students are then exposed to the experimental stimulus (the independent variable), represented by the game 'Word Balance', after which their attitudes are measured. If a significant change is found, we will conclude that the game is the main reason for the development of their awareness. The key to this experiment is to conduct the second measurement as soon as possible after exposing the students to the motivational factor (the independent variable), represented by the 'Word Balance' game, to ensure that they are not exposed to other experiments or influences in the meantime. This also ensures the participation of group members in the second post-test, as a long time lapse may result in some students moving to another city or losing interest in the experiment.

2. Study group:

The study group was selected from "Saris" school in Bouzaréah, Algiers, during the 2019/20 academic year, specifically between January and February 2020. The group consisted of 14 male and female second-grade students.

The study was conducted at the private Saris school in Bouzaréah, Algiers. We chose a private institution for the practical part of the study due to the exceptional circumstances surrounding the 2020/21 academic year, resulting from the Coronavirus outbreak. Various preventive measures were implemented to prevent its spread, including delaying students' return to school until 21 October 2020.

Public schools were affected by numerous teacher stoppages for protests and strikes throughout the academic year, a situation not encountered in private schools.

Due to the high density of children in public school classes compared to private schools, conducting tests and training children on the 'Word Balance' game in small groups would enable the researcher to obtain accurate results and benefit the children.

The reliance on a staggered system with alternating morning and afternoon sessions in public school classes would impact the research process and consequently the results. Furthermore, the reduction in class time from 60 to 45 minutes in public schools led us to consider a private school. Based on these considerations, to avoid hindering progress, ensure credibility, complete the research on time and minimise obstacles, and manage the data and accuracy of the results, we chose to conduct the practical research in a private school.

A. Age of sample members:

The researcher aimed to stabilise this variable by selecting students at the same educational level specifically, second-grade students. The ages of the students were limited to exclude repeat students. Based on the automatic promotion of students to subsequent grades, the results indicated that there were no repeat students among the selected sample for the study group. Fourteen children participated in the test: eight males and six females. The youngest child was 86 months old and the oldest was 99 months old.

Prior to the pre-test, the researcher asked the children to write the Arabic alphabet on a blank sheet of paper to confirm that they had all acquired the letters of the Arabic language, which was

essential for the study. Derivational awareness follows awareness of the sounds that make up words.

B. Economic and Social Level:

Through reviewing the students' records and the fact that the sample was from the same school and social environment, the researcher confirmed that the students' social and economic levels were similar.

D. Training duration for the study group:

Training on the 'Word Balance' game was conducted within the same timeframe. Training began between the derivational awareness pre-test, which took place on 04/10/2020, and the post-test, which took place on 15/11/2020. There were four training sessions, averaging one hour each, held twice a week.

E. Physical Conditions and Location of the Test and Training:

The pre-test, post-test and training for the 'Word Balance' game were all conducted in the same classroom. Consequently, the same natural ventilation and lighting conditions were present.

Study tools and implementation:

First: The Achievement Test 'Derivational Awareness':

Before discussing how the test was constructed, it is important to recall the concept of an achievement test. Al-Fakhri (2018) defined it as follows: 'An organised process for measuring a sample of student behaviour (learning outcomes) and evaluating or discovering the degree of mastery of that behaviour.' It is also a means of revealing the effects of education or training.'

Accordingly, there are several criteria and conditions that must be met when constructing an achievement test, including the following:

1. Defining the purpose of the test.
2. Setting objectives through content analysis.
3. Preparing a specification table.
4. Choosing appropriate item types.
5. Preparing test instructions.
6. Reviewing the test and finalising its format.
7. Administering the test and conducting the necessary procedural analyses on the items, including extracting difficulty, ease, discrimination, validity and objectivity coefficients.

A. Defining the purpose of the test:

The test aims to measure the extent to which students have acquired derivational concepts and skills, such as recognising roots and forms, understanding derivational relationships and constructing derived words. It was specifically designed for this purpose: 'Tests that require direct responses using multiple-choice options to avoid subjectivity in marking.' Most of the questions in the concept test were multiple-choice, chosen for reasons including suitability for measuring most behavioural objectives, ease of correction, reduction of guessing and coverage of a large portion of the curriculum. They also have a high degree of validity and reliability.

A written performance test was prepared to measure the extent to which students have acquired the targeted skills in this study. This includes a list of skills for recognising the root, form and derivational relationships, as well as how to construct words, along with indicators for each skill.

When formulating the items, the researcher ensured that they were:

- Comprehensive of the educational objectives to be measured.
- Represented by a validated specification table.
- Clear and free from ambiguity and linguistic errors.

- formulated in a procedural manner.

Test instructions:

The test instructions provide important guidelines on how students should respond to the test questions. If students do not know how to write their answers within the specified time, the test questions become ineffective, which highlights their importance and effectiveness (Malham, 2011, p. 230).

Before the test, the researcher prepared clear and simple instructions outlining how to answer the test items:

Write your name in the designated space.

Read each item carefully.

Test items:

The test consists of four tasks:

1. Task One: Recognising the Root in a Derived Word

Students are given a list of words and must identify their roots.

Instructions: Circle the root of the word.

Example: (1) صدَحَ حَ (2) (د ح ص) (3) (د ح ص) (4) (د ص ح) (5) (ص د ح)

2. Task Two: Recognising the Derivational Relationship

The aim of this task is to establish whether the child can identify a shared root between the derived words, since words with the same root belong to the same derivational family.

Instructions: Identify the intruder among the following words and circle it.

Example: مكتبة, مكبوت, كاتب, مكتوب, كتاب

3. Task Three: Extracting the form of a derived word

Show the child 18 derived words and ask them to select the correct form from the options given. The aim of this task is to assess the child's understanding of the relationship between a derived word and its form.

For example, show the child the word (جالس) and ask them to select the form that matches its pattern from the options given (فَاعِل or فُعَال فِعَال، فَعَال، فَعَال).

4. Task Four: Generalising the Derivational Rule to Produce Various Words from a Given Form

Instruction: Create three words with the same form.

Second: the 'Word Balance' game.

1. Definition of the game:

It is an educational tool that analyses Arabic words according to known morphological patterns. It is based on the principle of matching words with their patterns. For example, the pattern (فَاعِل) gives us words such as (جَمَلٌ، كَتَبَ، جَلَسَ).

2. How the 'Word Balance' game works:

It presents a variety of words to learners, whether they are verbs or derived nouns.

Classifying the words according to their morphological patterns.

- Comparing the words to discover derivational relationships.

Extract the roots of derived words.

- Constructing words based on a specific root or pattern.

The 'Word Balance' game is an educational tool that addresses the difficulty of learning morphology and constructing words. It makes the abstract concepts of Arabic morphology tangible and easier to understand by providing a tool for word formation.

3. Description of the 'Word Balance' Game:

The game consists of a wooden balance with a circular base. There are 10 numbered slots at the top of each side, with the numbers 1–2–3–4–5 written in this order — from right to left on the right side and from left to right on the left side. These slots serve as positions for letters and diacritics.

There are 42 wooden pieces shaped like rectangles: 31 of these are the same length and colour. These are used to construct the root with 28 alphabetical letters, and three are green to distinguish them from the white pieces representing affixes that are added to the roots to form words. The white pieces representing affixes number 16 (8×2), with 8 dedicated to morphological patterns on the left and 8 for words on the right. These affixes include the fatha, damma, kasra, sukun, shadda, sin, lam, ta, hamza, mim, nun, ha and the elongation diacritics (a, w, y).

The pieces for short diacritics (َ ِ ُ) are magnetic to facilitate placement on letters of varying lengths to achieve different weights. The heavier the piece, the longer it is: the damma is heavier than the kasra; the kasra is heavier than the fatha; and the fatha is heavier than the sukoon. The remaining affixes, which are represented by letters and elongation diacritics, are the same length as the alphabetical letters and the root (فَعْل), but differ in colour. These affixes can occupy positions at the beginning, middle or end of the root.

When letters and diacritics representing a specific morphological weight are placed randomly in the left slot, the balance becomes unsteady. To restore balance, the letters and diacritics must be placed on the same weight, respecting the position and order of each letter and diacritic. This will ultimately produce a word on the right that matches the morphological weight on the left.

3.3 Principles of the ‘Word Balance’ Game:

The ‘Word Balance’ game is based on two fundamental principles.

First: The Principle of Play:

This educational approach utilises the ‘Word Balance’ game as an effective means of acquiring knowledge of derivational rules and of forming Arabic words. It is an activity that the student performs with the aim of accomplishing a specific task. In this case, the task involves recognising the roots and patterns of derived words in the Arabic language. Students realise that an enormous number of words can be constructed using a single three-letter root or a specific pattern based on certain rules. The game provides motivation and reinforcement to encourage continued participation, helping students to understand the world of derived Arabic words. Through ‘Word Balance’ activities, students recognise the origins, i.e. the three-letter roots, and the branches, i.e. the patterns, in derived words. They also learn the distinguishing characteristics of derived words and the relationships that connect them. This helps them to develop the ability to differentiate between the phonetic level associated with letters and the morphological level related to words.

Second: the principle of sensory learning.

This principle involves sensory engagement in the learning process. Learning derivational rules using the ‘Word Balance’ game is more effective when multiple senses are engaged. Sensory stimuli enhance students’ understanding of derivational rules and how to construct Arabic words, as well as aiding information retention. The more senses that are used for learning, the more neural connections are formed, thereby reinforcing memory and understanding.

4. The objective of the ‘Word Balance’ game:

4.1. Enhancing Derivational Understanding:

The game helps students realise that Arabic words are not formed randomly, but follow a precise system based on roots and patterns. Through continuous practice, students will be able to identify the three-letter root of a word, recognise different morphological patterns and understand how words are derived.

4.2. Developing analytical skills:

The game relies on logical thinking to deconstruct and reconstruct words, thereby improving the ability to analyse words into their morphological components. For instance, students analyse the word 'مَكْتُوبٌ' into the root 'ك-ت-ب' and the affixes represented by the letter 'م' and the short and long vowels. It also helps students to distinguish between derived words such as 'كاتب' and 'مكتب', and to discover derivational relationships among words derived from a single root.

4.3. Learning Language in an Interactive Way:

Rather than relying on traditional memorisation, the game provides an enjoyable learning environment that encourages self-directed learning through trial and error. It promotes positive competition among students to achieve the best results. It also encourages the practical application of derivational rules rather than relying solely on theoretical knowledge.

4.4. Enhancing Linguistic Memory:

Studies have shown that educational games enhance information retention due to active interaction with the content. When students play the 'Word Balance' game, they more easily remember morphological patterns, automatically link derived words and develop a rich vocabulary through continuous exposure to various morphological patterns.

Method of conducting the study:

To understand the importance of the 'Word Balance' game in developing derivational awareness, we first conducted a written test to assess the derivational awareness of 14 second-grade students at a school in Algiers. Both male and female students took part in the study, and their morphological awareness of Arabic words was unknown. To determine this, we applied a derivational awareness test prepared by the researcher for this purpose.

The test was conducted twice: once before and once after training on the 'Word Balance' game, with an interval of approximately 15 days between the two tests. We then began training the students collectively on the 'Word Balance' game in four sessions, averaging 45 minutes per session.

First: Presenting and discussing the results of the study and interpreting them:

After collecting the study data through the application of the 'Word Balance' game, we will discuss whether the distribution of this data is normal, followed by a descriptive reading of the research results according to the variables being dealt with. This will be followed by presenting and interpreting the results of the hypotheses based on theoretical literature and empirical studies. We will conclude with a general summary of the most important findings.

After administering the test to the experimental group, providing training on the 'Word Balance' game and taking pre- and post-test measurements, we compiled the data into statistical tables and analysed it using the appropriate statistical methods in the Statistical Package for the Social Sciences (SPSS23). This was done to confirm the distribution of our research data and determine the most suitable parametric or non-parametric statistical methods for analysing the results, applying the Shapiro–Wilk and Kolmogorov–Smirnov tests. The results are as follows:

Table 1: Determining the normality of the distribution of our research data in the experimental group.

Tasks	Measurement	Kolmogorov-Smirnov	Shapiro-Wilk
Task One	Pre-Test	0.168	0.454
	Post-Test	0.168	0.574
Task Two	Pre-Test	0.079	0.248
	Post-Test	0.200	0.321
Task Three	Pre-Test	0.180	0.454
	Post-Test	0.077	0.077
Task Four	Pre-Test	0.168	0.574
	Post-Test	0.168	0.572
	Post-Test	0.200	0.526

As can be seen from the above table, none of the Kolmogorov-Smirnov or Shapiro-Wilk test values for assessing data distribution normality were statistically significant, meaning that all Sig values for both tests were greater than 0.05. This indicates a normal distribution and shows that the pre-test and post-test data are normally distributed. This permits the application of parametric statistical methods.

Having confirmed the normality of the distribution of our research data in both the pre-test and post-test, we can test the hypotheses using parametric statistical methods.

Presentation and discussion of the results related to the derivational awareness test before and after training on the ‘Word Balance’ game:

First: Results related to the first task of the derivational awareness test before and after training on the ‘Word Balance’ game:

To determine the differences in the pre-test and post-test results for the first task of the derivational awareness test among second-grade students, the researcher used a paired samples t-test to identify the significance of the differences in mean scores for the experimental group in the pre-test and post-test after playing the ‘Word Balance’ game.

Table 02 shows the significance of the ‘t’ differences between the pre-test and post-test for the experimental group in the ‘Word Balance’ game.

Group	Measurement	Mean	Standard Deviation	T-Test	Value (SIG)	Statistical Significance
Experimental	Post-Test	14.41	3.23	2.91	0.01	Statistically Significant
	Pre-Test	12.41	4.23			

Table 02 shows that there are statistically significant differences in the mean scores of second-grade students in the derivational awareness test after the experimental group played the “Word Balance” game. These differences are evident in the pre-test and post-test results of the first task. We observe that the value of ‘t’ was 2.91, with a significance level (sig) of 0.00, which is statistically significant at 0.05. This indicates that there are differences in the mean pre- and post-

test scores of second-grade students in the derivational awareness test after playing the ‘Word Balance’ game in the experimental group.

Second: results related to the second task of the derivational awareness test before and after training on the ‘Word Balance’ game:

To determine whether there were statistically significant differences in favour of the post-test results in the second task of the derivational awareness test among Year 3 students after the application of the ‘Word Balance’ game, the researcher used a paired samples ‘t’ test to identify the significance of the differences in mean scores in the experimental group in the pre-test and post-test following application of the ‘Word Balance’ game.

Table 03 shows the significance of the ‘t’ differences between the pre-test and post-test for the experimental group in the second task of the derivational awareness test.

Group	Measurement	Mean	Standard Deviation	T-Test	Value (SIG)	Statistical Significance
Experimental	Post-Test	9.66	3.22	4.18	0.00	Statistically Significant
	Pre-Test	6.08	1.78			

Table 03 shows that there are statistically significant differences in the mean scores of second-grade students in the derivational awareness test after the experimental group played the “Word Balance” game. These differences are evident in the pre-test and post-test results of the second task. We note that the “t” value was 4.18, with a significance level (sig) of 0.00, which is statistically significant at 0.05. This indicates that there are differences in the mean pre- and post-test scores of second-grade students in the derivational awareness test after playing the ‘Word Balance’ game in the experimental group.

Third: results related to the third task of the derivational awareness test before and after training on the ‘Word Balance’ game:

To determine whether there were statistically significant differences in favour of the post-test results in the third task of the derivational awareness test among Year 2 students after playing the ‘Word Balance’ game, the researcher used a paired samples ‘t’ test to identify the significance of the differences in mean scores in the experimental group in the pre-test and post-test after playing the ‘Word Balance’ game.

Table 04 shows the significance of the ‘t’ differences between the pre-test and post-test for the experimental group in the ‘Word Balance’ game for the third task of the derivational awareness test.

Group	Measurement	Mean	Standard Deviation	T-Test	Value (SIG)	Statistical Significance
Experimental	Post-Test	14.33	4.030	5.30	0.00	Statistically Significant
	Pre-Test	7.75	4.69			

Table 04 shows that there are statistically significant differences in the mean scores of second-grade students in the derivational awareness test after the experimental group played the “Word Balance” game. These differences are evident in the pre-test and post-test results of the third task. We observe that the value of ‘t’ was 5.30, with a significance level (sig) of 0.00, which is

statistically significant at 0.05. This indicates that there are differences in the mean pre- and post-test scores of second-grade students in the derivational awareness test after playing the ‘Word Balance’ game in the experimental group.

Fourth: Results related to the fourth task of the derivational awareness test before and after training on the ‘Word Balance’ game:

To determine whether there were statistically significant differences in favour of the post-test results in the fourth task of the derivational awareness test among Year 2 students after playing the ‘Word Balance’ game, the researcher used a paired samples ‘t’ test to identify the significance of the differences in mean scores in the experimental group in the pre-test and post-test after playing the ‘Word Balance’ game.

Table 05 shows the significance of the ‘t’ differences between the pre-test and post-test for the experimental group in the ‘Word Balance’ game for the fourth task of the derivational awareness test.

Group	Measurement	Mean	Standard Deviation	T-Test	Value (SIG)	Statistical Significance
Experimental	Post-Test	8.66	4.37	4.65	0.00	Statistically Significant
	Pre-Test	3.66	2.57			

Table 05 shows that there are statistically significant differences in the mean scores of second-grade students in the derivational awareness test after the experimental group played the ‘Word Balance’ game. These differences are evident in the pre-test and post-test results of the fourth task. We observe that the “t” value was 4.65, with a significance level (sig) of 0.00, which is statistically significant at 0.05. This indicates that there are differences in the mean pre- and post-test scores of second-grade students in the derivational awareness test after playing the ‘Word Balance’ game in the experimental group.

Discussion of the results:

The results of the field study revealed statistically significant differences in favour of the post-test in the first, second and third derivational awareness tasks among second-grade students after the application of the ‘Word Balance’ game. After analysing and interpreting the results in light of the values obtained, we found statistically significant differences in the mean derivational awareness scores of second-grade students in the experimental group between the pre-test and post-test in the first, second, third and fourth tasks, favouring the post-test due to the application of the game.

Conclusion:

From the findings of the current study, it is clear that the “Word Balance” game, developed by the researcher, plays an important role in enhancing derivational awareness among second-grade students.

The results of the “Word Balance” training programme indicated that the four areas of derivational knowledge in the Arabic language are distinct yet simultaneous. This is because they require different cognitive abilities and collectively contribute to derivational awareness. A student’s weakness in one area of knowledge indicates a deficiency in their overall derivational awareness. Second-grade Algerian students develop different aspects of derivational awareness at various times. While our results do not enable us to identify the age at which each aspect of knowledge is acquired, they confirm that students initially develop an awareness of the root and pattern before understanding derivational relationships and producing words, reflecting the superficial nature of

this awareness. Awareness of derivational relationships develops slowly, as does awareness of word production, representing the most advanced level of derivational awareness and the last to be acquired.

Prior to their training on 'Word Balance', students had a superficial understanding of how derived words are formed in Arabic. They recognised the root and pattern of derived words but did not develop a deep awareness of the derivational relationships that connect a group of words sharing the same root, nor the ability to form different words based on a pattern. However, the "Word Balance" training programme enabled children to acquire a deeper derivational awareness.

Additionally, the results indicated that the duration of training and the need for some children to spend more time grasping the concept of "morphological balance" were significant factors. Furthermore, the psychological factor was evident, as their performance in the third-term examinations clearly impacted their results.

Conclusion:

The 'Word Balance' game, invented by the researcher, has helped Year 2 students to become more aware of how derived Arabic words are formed and has familiarised them with the rules of word formation. It has also provided speech therapists with a diagnostic and assessment tool for disorders affecting the word level. The game's ability to assist children in both the communicative and educational spheres is significant, as the earlier children develop derivational awareness, the more opportunities they have to improve their language skills.

Recommendations:

There is a need for rehabilitative tools that can be used to assess disorders affecting language levels, especially if they are presented in the form of educational games.

Researchers and specialists should be made aware of the importance of derivation and its potential to assist children in communicative and educational contexts. The earlier children develop derivational awareness, the more opportunities they will have for language development.

Efforts should be made to improve the 'Word Balance' game, with the aim of transforming it into an electronic game in the future.

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