

**(Al-Maqal Preparatory School for Girls and Al-Maqal Preparatory School for boys as a case study)****A questionnaire study for external open spaces and gardens of school buildings**

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**ABSTRACT**

The school building is considered the most important educational environment because it represents an important center from the education centers. Although most of the architectural studies are limited to studying the design of its external spaces, this research conducted as a study to evaluate the design drawings for the external school spaces with the aim of social, recreational and educational communication for students. Through this study, the researcher hopes to contribute to the availability of a basic base of scientific research information in the design steps for the external open spaces for school buildings and using modern techniques AutoCAD and 3D Max programs.

**Keywords :** External spaces, Design of external spaces for schools, Design of external spaces.

(اعدادية المعقل للبنات واعدادية المعقل للبنين كحالة دراسة)

دراسة استبائية للفضاءات الخارجية المفتوحة وحدائق الأبنية المدرسية

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**ملخص البحث :**

يعد المبنى المدرسي البيئة التعليمية التي تنصدر أهمية كبيرة كونها تمثل مركزا هاما من مراكز التعليم ومن اهم الفراغات وعلى الرغم من اقتصار اغلب الدراسات المعمارية على دراسة تصميم فضاءاته الخارجية جاء هذا البحث كدراسة لتقديم المخططات التصميمية للفضاءات الخارجية المدرسية بهدف إمكانية التواصل الاجتماعي والترفيهي والتربوي للطلبة . وتأمل الباحثة من خلال هذه الدراسة ان تسهم في توفر قاعدة أساسية من المعلومات العلمية البحثية في خطوات تصميم الفضاءات الخارجية المفتوحة المدرسية لمباني المدارس و باستخدام التقنيات الحديثة برامج الاوتوكاد (AutoCAD) والـ 3D (3D Max) .

**الكلمات المفتاحية :** الفضاءات الخارجية , تصميم الفضاءات الخارجية للمدارس , تصميم الفضاءات الخارجية.

**1. INTRODUCTION**

Muslims had could reach the gardens to unprecedented levels of engineering innovation to the extent that they describe the gardens as a

paradise on the ground from the preferred description for the gardens in Quran and to the mindset or personality of the Muslim designer. The Islamic world has witnessed

many school and historic buildings and its external engineering spaces, including the Mustansiriya School, Granada School, and Andalusia School. Where school construction is no longer just a space intended to accommodate students, but it is a group of spaces, each of which plays its role in the integration and coordination with other spaces in order to facilitate the mental, emotional and physical growth for the student. Therefore, the beautification of the place by cultivating trees, supplying classes and yards with flower ponds is a factor of breeding taste in young and helps to create an ambiance of happiness and beauty in the refinement of young (Al-Afifi, 1984). Al-Ghamdi, (1982) mentioned the school buildings that suffer from many problems, such as poor lighting and ventilation in the classrooms and the entry of external noise to them. The study indicated to the suffering from the small size of the external space of the school buildings relative to the number of students and their requirements to go out and entertain during opportunities between lessons. The study aims to evaluate the reality case of the two schools for the selected research sample for Basra city to come up with design indicators.

#### **The importance of external spaces for schools:**

- Raising the efficiency of students' artistic taste and aesthetic sense through

the surrounding plants beautiful complementary to the architectural artistic values for school buildings.

- Providing good health location conditions for all school staff with students such as reducing the intensity of heat, breaking the wind and reducing dust.
- Finding a suitable place to do exercise and leisure.
- Providing a more suitable ambiance for studying and reducing the noise from neighboring regions where the source of noise is the main streets or densely populated regions.
- Creating an aesthetic ambiance and helping students absorb practical lessons related to agriculture, science, and plants (Abdel Hassan, 2015).

#### **Diving external spaces for schools**

The planning and designing of green external spaces directly depend on the size, shape, and assimilation of the school from pupils or students. There are some opinions and suggestions on the prevalence of such kind of gardens that considered the number of students as a criterion or the main factor in calculating the area allocated for the garden in the school and as a proposed rate on the space required for each student (20-15 m<sup>2</sup>) (Abdel Hassan, 2014).

Thus, the external spaces for the schools were divided into two main parts:

- Built spaces.
- Open spaces.

### **Built spaces**

The built spaces are considered all the construction such as booths (school shops), walkways, roofs, a hall for sports activities, a place for theatrical performances and parking.

### **Open spaces**

Open spaces are all lands and areas around the school that is not covered by buildings (such as sports fields, corridors, terraced walkways, parking, and gardens) (Al-Chalabi, 1990) and it is divided into:

### **The space of the National flag-raising area**

No school is free from the pupil gathering space to establish the application of the flag-raising ceremony. There must be an area where students gather in the form of classes and meet each other in the morning or evening, and since each school is a facade of the community that surrounds them, such formal spaces are necessary for the establishment of national or local ceremonies daily, weekly and yearly and often a middle space between classes (Anita, 2006).

- It is preferred establishing multi-purpose yards.

- appropriating type of areas and its areas with the ages and sex of students.

- It is preferable to have a balance between the proportion of sports areas and green areas (Callender and Dechiara, 1980).

There are some types of sports areas preferred to be found in secondary schools, including football area, basketball area, volleyball area, tennis arena and swimming pool.

### **Gardening space**

It is a part used to enjoy the quiet scenery, reading and for the purposes of sitting and rest and some quiet activities for students in leisure and rest between lessons, which are cultivated with trees and variety shrubs with high aesthetic fences and flowers and a variety of shadows and quiet courtyards, the area of this part is calculated based on the number of students (Dechiara and Callender, 1980).

### **School Garden Concept**

It is known as a kind of private gardens, which are a piece of land that surrounds the school or inside it, and belongs to a group of students who have their own needs and conditions. The school garden helps the school to fulfill its mission, instilling in the students a love of order and learning the principles of agriculture

and the spirit of cooperation and partnership between groups as well as other science materials and applications.

### **Design orientations for external spaces**

#### **Design-oriented related to architecture**

This design-oriented takes into account the overlap between the open area network and the architectural structure within the architectural space, so that the space and the architectural structure together is an integrated design painting that is difficult to separate between them and Its axial, circular, or radial designs correspond to the features of the site and are characterized by pivotal, symmetry, and symmetry in the distribution of coordination elements within the space (Smith, 1997).

#### **Design orientations simulating nature**

This directive focuses primarily on the environmental aspects of nature when designing, simulating the land in terms of shape, nature, and constituents. Hence, the main factor in determining the design method and the viewing angles, which positively affects the sense of urban spaces in addition to the exploitation of the elements already exist, It is preferable to cultivating plants in groups forms and in the selection of one group from environmental plants such as palm, Tropical plants are not cultivated adjacent to cold-area plants such as pine, overhanging trees, and

semi-aquatic plants, They are placed near a watercourse, and Succulent plants are also placed in the secluded elevated areas in the garden and the tall trees are located next to the outer boundaries of the garden (Taki, 2000).

#### **Contemporary design orientation**

This directive is in line with the prevailing philosophical and intellectual ideas, it does not adhere to the well-known rules of design that are the result of the perception of cultural content. It focuses on the importance of the cultural and historical dimension for the designed environment, it is more pronounced in areas with a civilized dimension and its meanings with a history and a cultural personality where It has a philosophical subjective dimension that is in line with modernism, postmodernism and deconstructive architecture, which usually entails the benefit of technological development and progress in construction methods (Smith, 1997).

#### **Field Study:**

The field study was conducted in three stages:

**The first stage:** field scanning and comprehensive analysis for the two samples (the two selected schools) and identifying the advantage and disadvantage of them through analyzing the plans related to the two study sites, field visits and personal interviews with stakeholders.

**The second stage:** the program of requirements, opinions, and desires and identifying them through the preparation of the questionnaire.

**The third stage:** the proposed designs placed within the limits of the possibilities and

determinants for the external spaces for the research sample based on the data of the two previous stages.

• **General description of the research sample**

**A- (Al-Maqal region)**



**Figure 1:** shows the location of the two schools in Al-Maqal region (Google Earth)

**1- Al-Maqal Preparatory School for Girls**

This school is located in Al-Maqal region, the number of their students is 546. It has an area of (3000 m<sup>2</sup>). It is a three-story building with a modern design. There is one laboratory with a

store, the number of exploited classes (14 class), and the building facade toward the north, the building was established in 1953 belongs to the Directorate of Education in Basra, it does not contain an area allocated for sports as shown in Figure (2).





**Figure 2:** shows the location of Al-Maqal Preparatory school for girls in Al-Maqal region (Google Earth)

**2- Al-Maqal Preparatory School for boys**

This school is located in Al-Maqal region, the number of their students is 850. It has an area of (8000 m<sup>2</sup>). It has 16 class, the number of exploited classes (14 class), it has one lab,

There is no store, the building facade towards the west, The building was established in 1953 belonging to the Directorate of Education in Basra, with external open spaces, Student gathering area with tiled floor, and There are areas dedicated to sports including basketball and football.

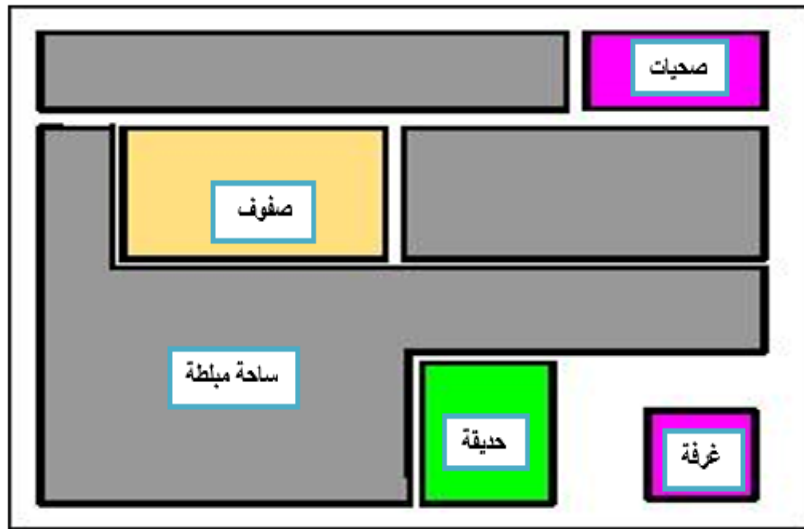


**Figure 3:** shows the location of Al-Maqal Preparatory school for boys in Al-Maqal region (Google Earth).

Descriptive analysis for the general location and external spaces for the research samples of the selected models from the schools of the Basra province based on the collected data during the visits and repeated interviews for the researcher.

- Al-Maqal Preparatory school for girls
- Design pattern

The design pattern for Building of Al-Maqal Preparatory school for girls is characterized by block form as shown in the scheme (1):



**Scheme 1:** shows the design pattern for Al-Maqal Preparatory school for girls.

It is considered one of the oldest distinctive preparatory for girls as shown in (4), currently Al-Maqal Preparatory school, after rebuilding and renewal as shown in (5). Al-Maqal Preparatory school is located in Al-Maqal region on the main street adjacent to residential houses from both sides with a local generator supplying the houses with electricity during the national electricity switch off and behind them also residential houses, which does not make the school building relatively quiet. Al-Maqal Preparatory school for girls contains a space used as a roaming space is a concrete floor, with an exploited area (length 3 m × width 1.5

m) as a small garden cultivated with *Cynodon dactylon* only and fenced with decorated iron as shown in Figure (6). It also contains a rectangular rear space unexploited functional filled with dust and large stones only. It is not suitable for roaming or reading or to spend a quiet and comfortable time during the rest between the lessons, its area amounts to (16.5 m length × 3.5 m width) as shown in Figure (7).

**- Natural and structural components within the school building (advantages and disadvantages)**

**- Natural ingredients**

There are not many natural components because they did not allocate spaces for gardens only at the entrance of the school a small garden composed of mud in addition to the sand that surrounds the building around it.

**- Structural components**

There are not many industrial components in their spaces only water tanks (4 water tanks), with trash containers (2 containers) used for toilets and drinking with iron pieces for building residues.

**- Advantages**

- Modern design.
- Back spaces can be exploited as rest places and reading after giving it the appropriate design, which exploits them functionally and aesthetically to achieve the benefit of them because they are very neglected being a new design.

- It characterized by suitable corridors for roaming, comfortable and clean.

**- Disadvantages**

- Their spaces are very small and did not allocate areas for play or rest or reading.
- the assembly areas are a small, tiled, and free of seats or roofs.
- There are no areas or spaces allocated to a private garden for students.
- Regardless of the lack of areas allocated to entertainment, reading and play or even suitable for the assembling of students, it is characterized by their narrow and small spaces.
- The presence of the building near the local generator for the region causes inconvenience and noise to students.
- images for the external spaces and gardens for Al-Maqal Preparatory school for girls (prepared by the researcher).





**Figure 4:** shows an old image for Al-Maql Preparatory school for girls.



**Figure 5:** shows the facade of the building opposite the assembly area.



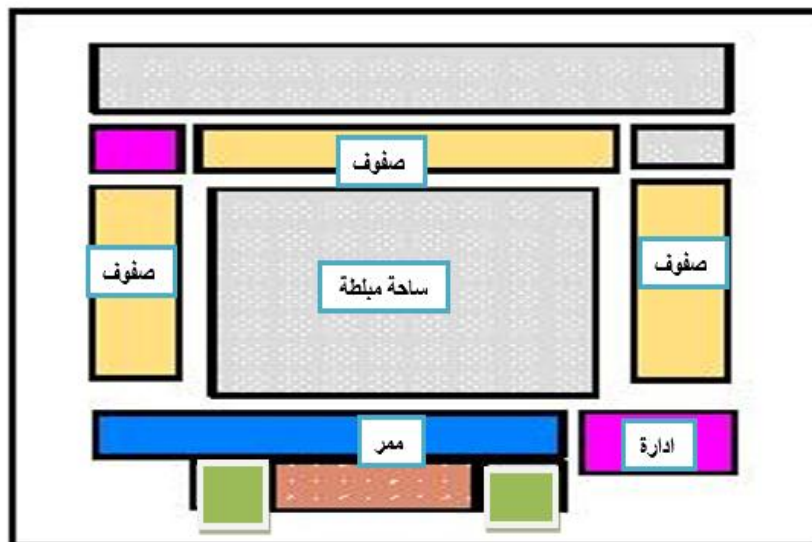
**Figure 6:** Garden of the school building.



**Figure 7:** illustrates the backspace.

- **Al-Maqal Preparatory school for boys**
- **Design pattern**

The design pattern for Building of Al-Maqal Preparatory school for boys is characterized by U letter shape as shown in the scheme (2):



**Scheme 1:** shows the design pattern for Al-Maqal Preparatory school for boys.

Al-Maqal Preparatory school for boys is located in Al-Maqal region, which is surrounded by residential houses on both sides, which makes it a distinct preparatory school with its relative calm that surrounds it. The researcher was not allowed to photograph and take adequate

measurements and information about the spaces in Al-Maqal Preparatory school for boys by a meager of Preparatory school as in the rest of the Preparatory schools, Although an official letter was brought from the Ministry of Education (Planning Division Officer,

Educational Planning Manager and Assistant General Manager for Technical Affairs) to facilitate the task and to the secondary school administrations in Basra province to taking sufficient information for the research project. A picture for the space of preparatory school was taken from other sources. This space is considered as a space to spend time by students during the rest between lessons and also to play sometimes, which is a dusty concrete floor, Its area amounts to (25 m length ×15 m width). There is also a neglected back space filled with dust and stones used by some students to fight or smoking away from the attention of the teaching staff, its area amounts approximately (17 m length × 10 m width). There is a large backspace neglected that is occupied by dust and stones as well, but it closed with a buckle door may return to the school or not back to it, but according to the previous manager, who is now the assistant manager now that this space belongs to the school but not functionally exploited only to throw the school furniture rusty, iron and waste residues. Its total area approximately amounts to (600 m) and it was not included in future design schemes because of the unstable whether it belongs to the school or not.

**- Natural and structural components within the school building (advantages and disadvantages)**

**- Natural ingredients**

They do not contain natural ingredients only sand and stones.

**- Structural components**

They contain broken and isolated school seats, with an external space that its area estimates about (600 m), untapped, left as a closed place far from visible.

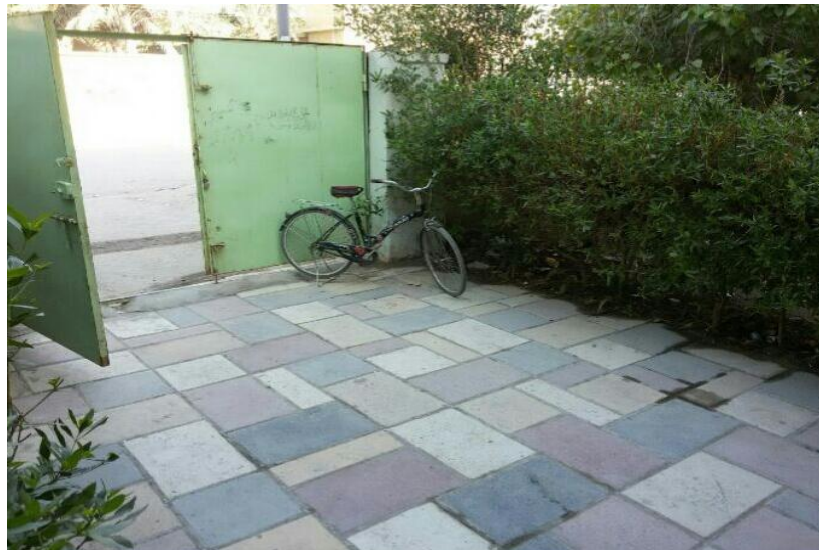
**- advantages**

- Contains wide spaces as areas for student assembling.
- Contains space dedicated to playing football and basketball.
- because of its one-time shift that not shared with another shift, It is considered very important in terms of school maintenance and care.

**- disadvantages**

- Neglected spaces.
- most of their areas are barren and dusty.
- There are neglected backspaces used by students for hidden smoking or violent conflicts between students.
- There is no garden or any natural component other than sand in the back of the school.

- images for the external spaces and gardens for by the researcher).  
 Al-Maqal Preparatory school for boys (prepared



**Figure 8:** The main entrance for Al-Maqal Preparatory school for boys.



**Figure 9:** Shows the corresponding and adjacent residential houses.

**Location and adjacent buildings for the school**

**Through the observation, it was shown that:**

- Al-Maqal Preparatory school for Girls is located in the middle of a residential region surrounded by residential houses on both sides, but it is not calm because of its proximity to a local generator supplying the surrounded

houses with electricity when the national electricity is switched off.

- Al-Maqal Preparatory school for boys is located inside the residential neighborhood surrounded by residential houses and characterized by the presence of large gardens and beautiful views in them. Moreover, these regions are characterized by quiet, low noise,

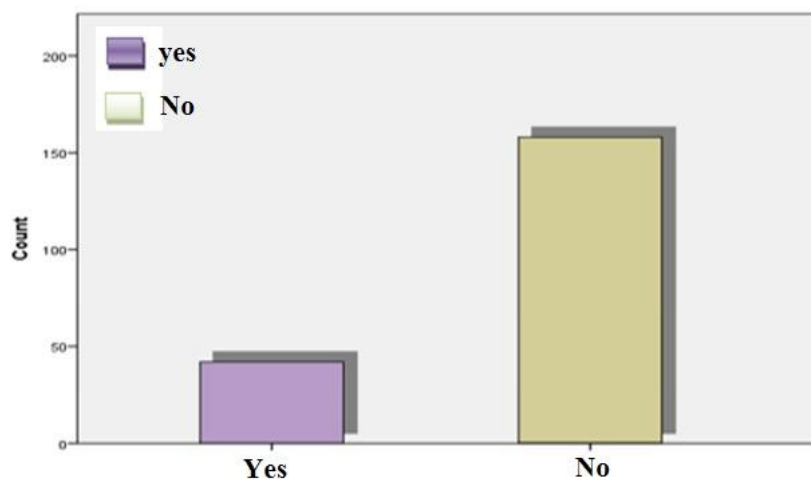


they are far from the main streets, which means relative calm.

• **The Questionnaire:**

The research in the design of the questionnaire was based on questions with specific answers. The answer was identified as (yes-no), while others answered using the (/) sign and others by writing a function statement. At the end of the form, a field was devoted to writing comments and suggestions that may be received from the respondents. The selected samples in these schools are for the purpose of taking the wishes and opinions of the researchers through the questionnaire form of the students and teachers. The obtained results

from the questionnaire were converted to percentage and frequency by using the computer and using The Statistical Package for the Social Sciences program (SPSS) (Al-Mohammadawi and Younis, 2000). Considering the importance of school gardens from environmental, functional and aesthetic aspects, but did not play their role in schools and lack of its cultivated space in spite of the availability of spaces dedicated to the establishment, but we find that they are not well used and most schools did not have the appropriate garden, so 76% of teachers and 80% of Students of both sexes do not have the appropriate garden in their schools as shown in Figure (11).



**Figure 11:** Is there a suitable garden at your school?

The preferred colors of flowers cultivated in school gardens, the red color comes first for students and they represent 47% compared to teachers 15% Because the red color is a symbol of activity and vitality and the most favorite color among young people (White, 2001). The

white color comes in second-order and orange is in the third order. As for Teachers, white color comes in the first order, where their percentage amounted to 56% and then the yellow color in the second-order, red in the third order as shown in Figure (12).

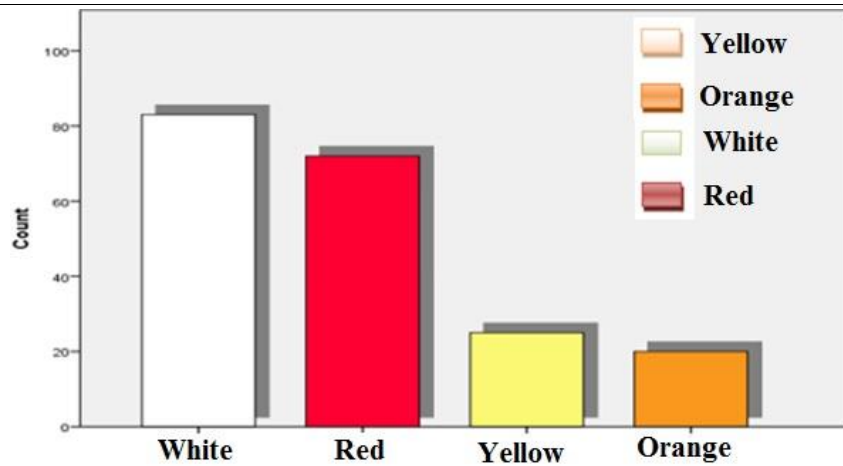


Figure 12: Percentage of favorite flower colors.

Construction umbrellas are a favorite ingredient in the gardens and this is confirmed by 63% of teachers and 89% of students to use them where Basra environment is characterized by high temperatures and strong solar radiation during the summer, which requires the availability of shadows in school gardens in the summer by

cultivating trees, which is more preferred with the percentage of 41% than construction ceilings with percentage of 28%, which also comes after the preference of natural and construction umbrellas with percentage of 30% and this is confirmed by the school staff and students as shown in Figure (13).

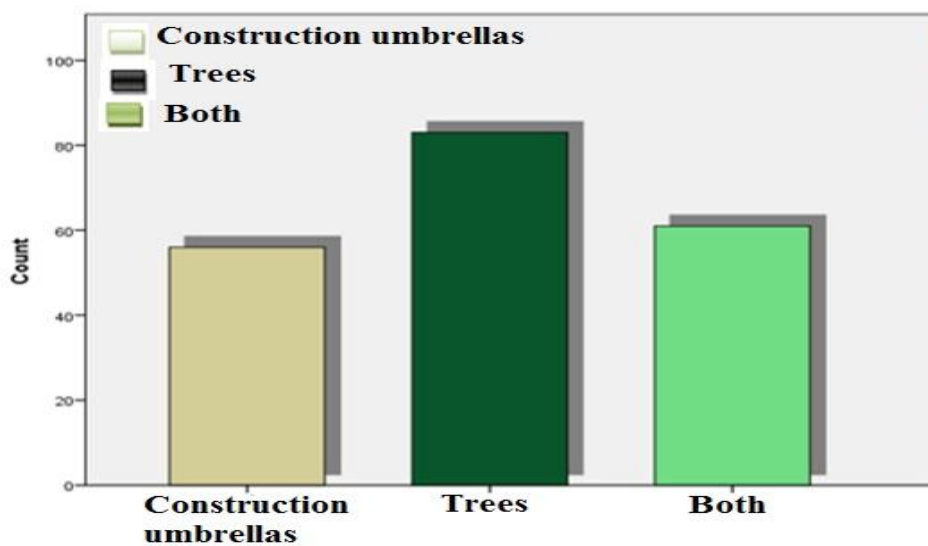


Figure 13: Type of preferred umbrellas.

The water element is one of the natural elements that are not free of many gardens, regardless of design pattern or size, Therefore, 62% of teachers and 69% of students prefer the

presence of water element in school gardens in the form of fountains, which is the most preferred forms compared to other forms such as water gardens for fish and ornamental plants



or swimming pool or howz or drinking water places as shown in Figure (14).

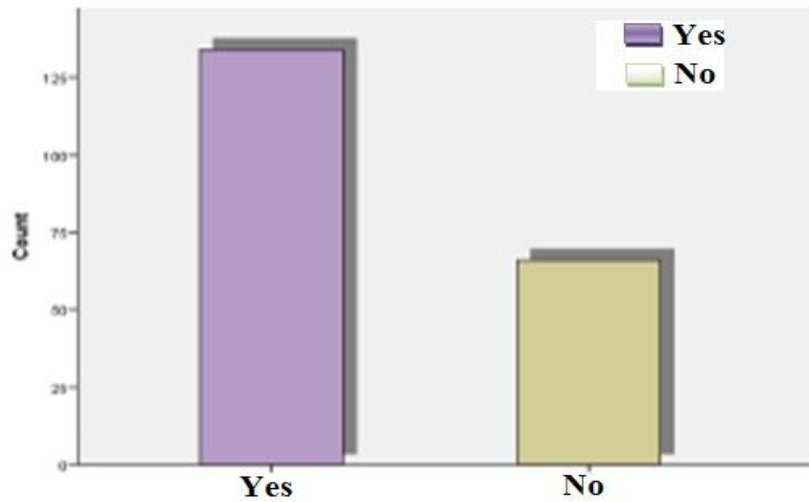


Figure 14: Percentage of preference for Providing water element.

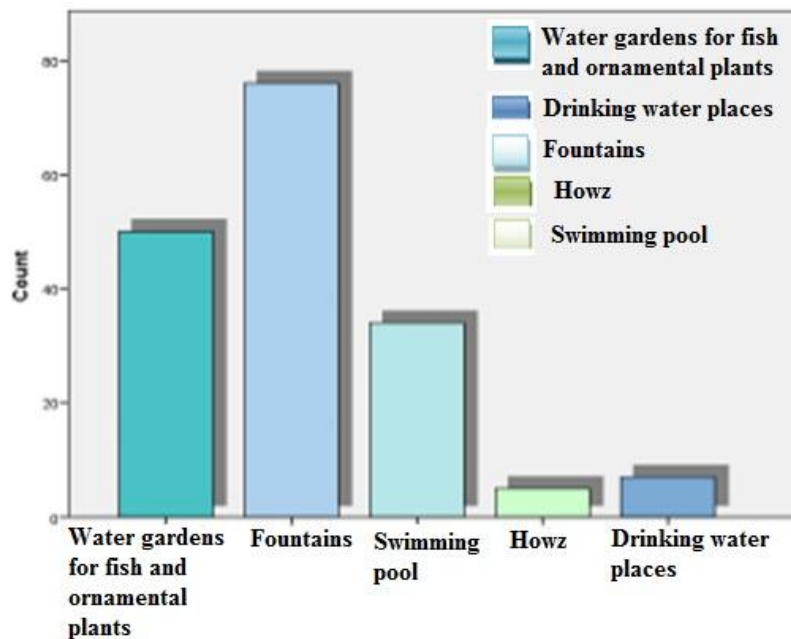


Figure 15: The preferred form that has to use it as a water element.

**1. Al-Maqal Preparatory school for Girls:**

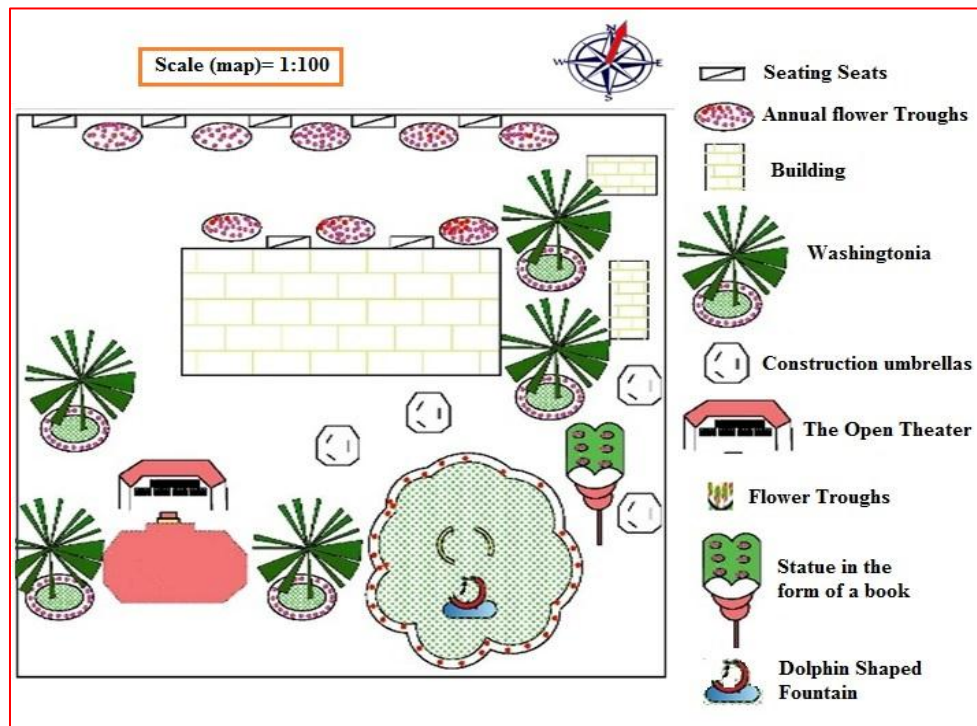
**❖ The most important Design proposals:**

After taking the views and suggestions of students and teachers for Al-Maqal Preparatory

school for girls, the researcher reached to the following design: Al-Maqal Preparatory school for girls preferred to provide places for reading in the first order with percentage (32%), the provision of places to practice sports activities came in the second-order with percentage of

(24%), but the lack of external open spaces for the Preparatory schools limited the design, The design focused on providing reading places with the provision of water element where the percentage of preference for the inclusion of water element within the design amounted to (76%) and in the first order was the provision of water element in the form of fountains came in the first order, with percentage (44%) as shown in scheme (3). Al-Maqal Preparatory school for girls has uniquely by its choices in designing an open theater according to the desire of the students and the teachers. This is confirmed by (Al - Omari, 2001) on the need to design the theater within the school buildings in

order to hold celebrations and cultural events in the school with the design of shrubs and annual flowers distributed regularly as shown in scheme (4). A statue was constructed in the form of an open book within it an annual flowers, a symbol of science and education as a creative design that contributes to raise the aesthetic value to suit the prestige of the school to achieve the visual view and to be a symbolic element of the school's history, with interest in the school entrance by coordinating a garden with a fountain and surrounded by construction umbrellas. The back open spaces were exploited by terraces seats for reading and coordinating it with the annual flowers.



**Scheme 3:** Design Diagram for the Al-Maqal Preparatory school for girls by AUTOCAD (2D).



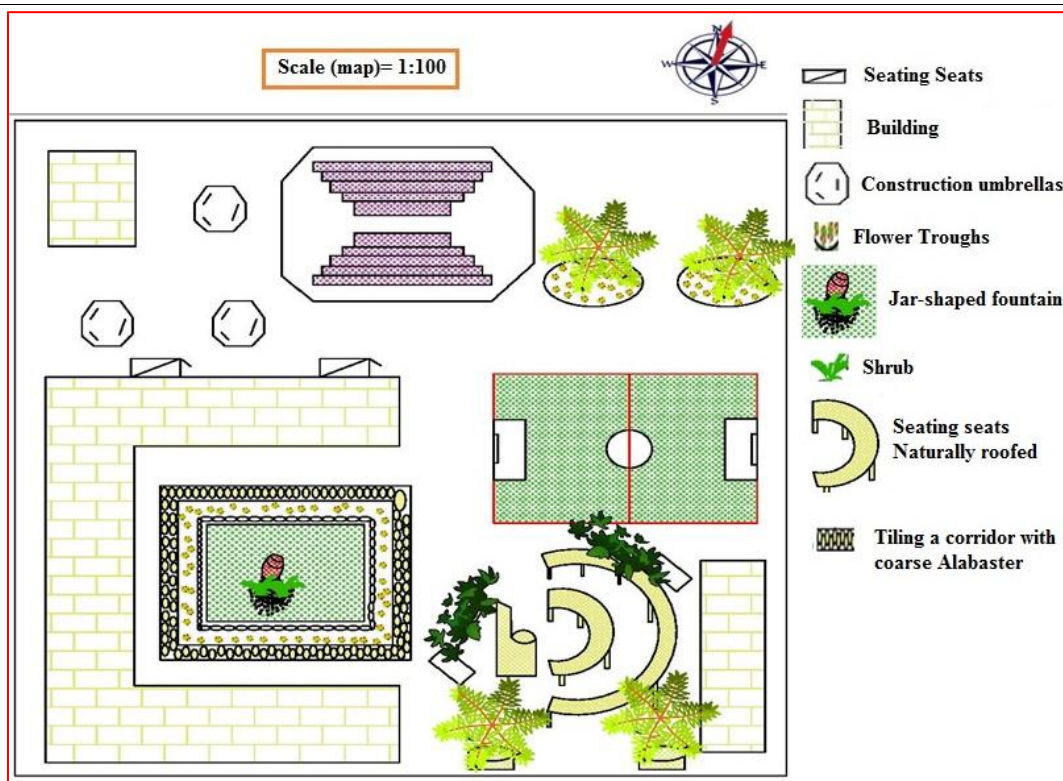
Scheme 4: 3D design using 3D MAX program.

**2. Al-Maqal Preparatory school for boys:**

**❖ The most important Design proposals:**

The design of the engineering style was selected a simple and varied in terms of natural and constructional components, Where Al-Maqal Preparatory school for boys preferred by providing it a places to play games and sports

activities and providing a football field being their favorite game 56% and the percentage of their preference to provide these activities 40% as shown in Scheme (5). The middle courtyard was designed in the form of terraces surrounding a fountain in the form of an Arab jar that irrigates a basin of annual flowers with water and cultivating the floor of the courtyard with the green surface to take the lessons in it as shown in scheme (6).



**Scheme 5:** a design scheme for the Al-Maqal Preparatory school for boys using AUTOCAD (2D) program.



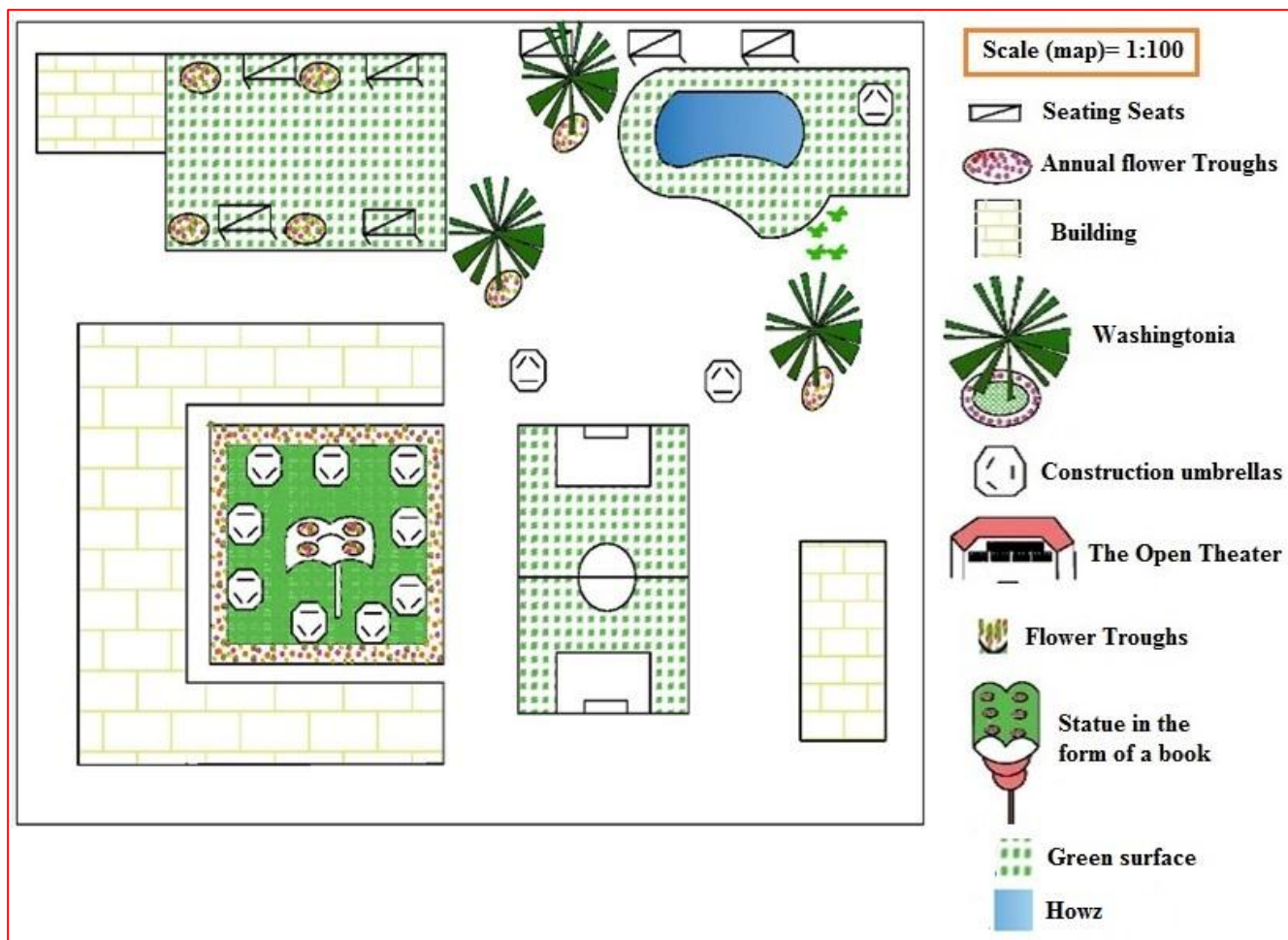
**Scheme 6:** 3D design using 3D MAX software.



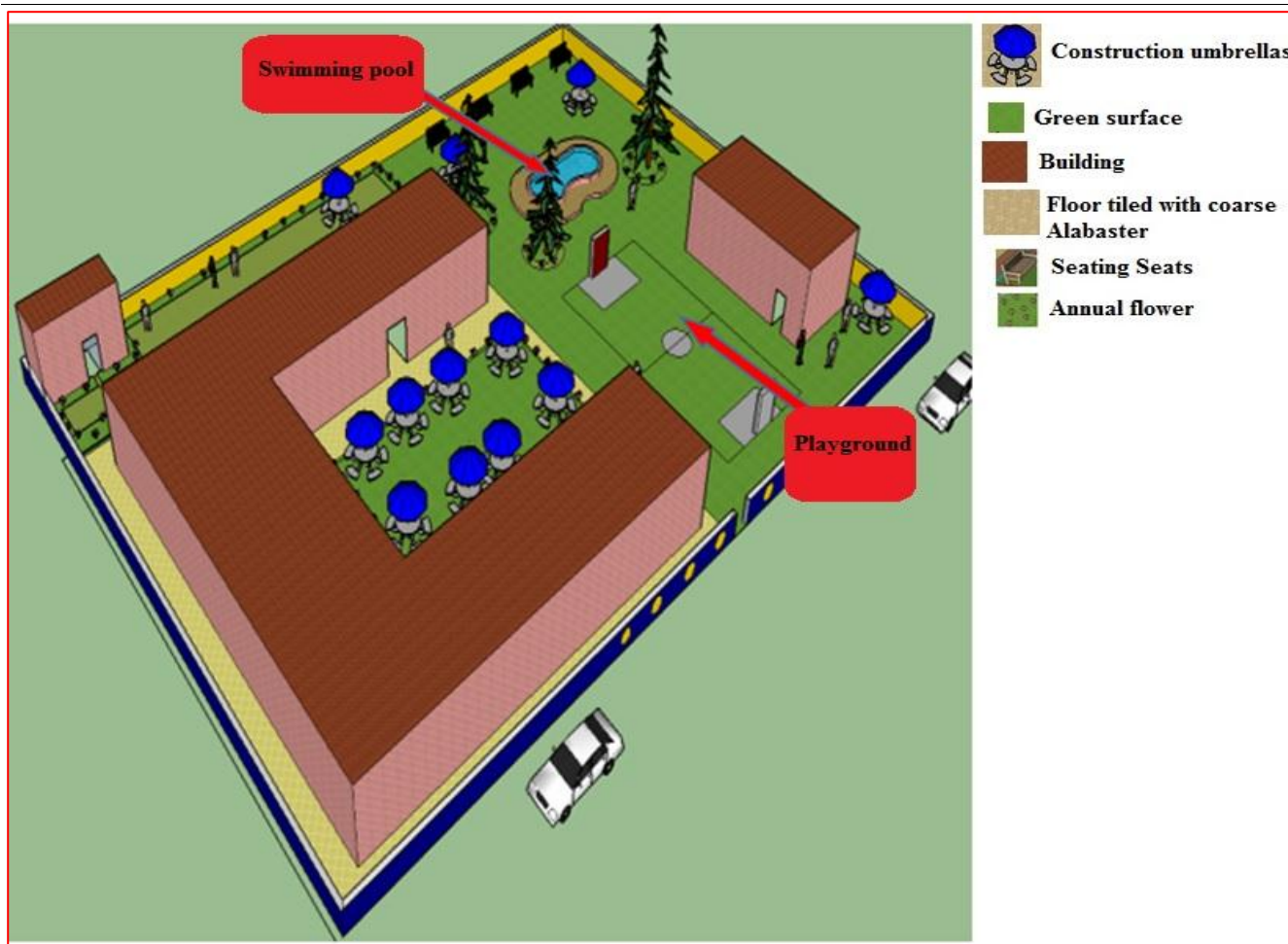
**Al-Maqal Preparatory school for boys: B**

The results showed that the students' opinions differed in their choices, which led to the preparation of a different design according to their desires in the B scheme design, where the water element was provided in the swimming pool form where their desire came in this form with a percentage of (33%). Their opinion was taken care, with survival providing the football playground as in Design A, Attention in their desire to take lessons in external space by providing Construction umbrellas surrounding

the green surface and protected from sunlight in summer and rain in winter, the shape of the fountain only changed in the form of a book which is considered another symbol of the most important scientific symbols that indicate science and learning as shown in Scheme (7). In the design of B, attention was paid to the Construction umbrellas for the purpose of taking lessons in external space with interest in the establishment of the playground and swimming pool as desired by the respondents as shown in Scheme (8).



**Scheme 7:** a design scheme for the Al-Maqal Preparatory school for boys using AUTOCAD (2D) program.



**Scheme 8:** 3D design using 3D MAX software.

**CONCLUSION**

1- Lack of most of the schools' selected gardens to organize and coordinate it carefully for the natural components and rely on cultivating them randomly in inappropriate locations and for specific plant species such as palm, Christ's thorn jujube and Conocarpus, Most parts of the gardens were left barren free of trees, shrubs and green surfaces except the thickets, which were more covered in the gardens.

- 2- Neglecting the main foundations used in the design and planning of school gardens, the lack of natural and industrial components, which are complementary to the natural components negatively impacted on their aesthetic and recreational efficiency.
- 3- The need to increase the cultivation of green surfaces (*Cynodon dactylon*) because of the lack and deterioration in schools, being one of the most preferred components for students for both sexes



due to its environmental, health, psychological and recreational effects for students in the practice of sports activities or reading.

- 4- The use of trees that need a few attention and maintenance, especially local ones, which are suitable for a hot dry climate such as palm trees, which have a symbolic and historical identity of the city and it is from fruit trees.

## RECOMMENDATIONS

- 1- In order to upgrade the school building, it is necessary to reconsider the level of the design of the building and its external open spaces and not to repeat the old traditional models to keep pace with the educational and cultural developments as a response to concern for the environment and the eradication of desertification.
- 2- No expanding in the construction of buildings attached to the school at the expense of open spaces (playgrounds and gathering yards and gardens), which deprive students from the practicing various activities that develop their mental and physical abilities.

In the name of God

Form number:

Ministry of Higher Education and Scientific Research

Date:

University of Basra/College of Agriculture

Department of Horticulture and Landscape Gardening

For postgraduate studies

Peace be upon you

A/ Questionnaire

Good greeting .....

I hope to help by answering the questions below which are part of the study of Landscape Gardening to complete my master's degree In my research entitled ((Foundations and design standards for external open spaces and gardens of school buildings)), An applied model for secondary schools in Basra city.

It aims to find designs proposed by the researcher for school gardens appropriate to our environment and according to your wish, in an attempt to develop the reality of the state of school gardens in the service of our country in the field of education.

Your cooperation with us by answering questions is a worthy service.

## Researcher

Abrar Ali Khadr

## Supervisors

Sammera Mohamed Salih Al-samaræe / College of Agriculture

1. Is there a suitable garden at your school?

 Yes No

2. For what purposes do you prefer to use your school garden?

- A.** Sit back and rest **B.** Play sports **C.** Reading **D.** Roaming **E.** Eat food and drinks

2. What are your favorite flowers colors?

- a.** White **b.** Red **c.** Green **d.** Yellow **e.** Orange **f.** Other What is it?.....

3. What would you prefer to be the type of umbrellas in your school garden:

- a.** Industrial Umbrellas **b.** Natural umbrellas (climbing plants and trees) **c.** Both **e.** Another What is it?.....

4. What is your favorite sport?

- a.** Basketball **b.** Football **c.** Swimming **d.** Volleyball **e.** Other What is it? .....

5. Do you like providing water element in the garden?

- In any of the following forms: **a.** water gardens for fish and ornamental plants **b.** Fountains **c.** Swimming Pool **d.** Howz.

### The Validity of Arbitrators

The questionnaire was presented in its initial form to a number of specialists and relevant to the field of study, namely:

**Dr. Abdul-Razzak Othman Hassan AL-Chalabi** College of Agriculture, Department of Horticulture, University of Basra.

**Dr. Abdul Razzaq Saker** College of Agriculture, Department of Horticulture, University of Dhi Qar.

**Dr. Amjad Zaki Khalil Al-musaed** College of Engineering, Department of Architecture, University of Basra.

who arbitrated the questionnaire and made their observations and suggestions on the paragraphs of the questionnaire and its fields and the extent to which the paragraphs belong to the fields. The researcher responded to the notes and suggestions of the Arbitrators and conducting the modifications in the light of their proposals of deletion, addition, and amendment.

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