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SPATIAL ANALYSIS OF SCHOOL USING GEOGRAPHIC INFORMATION SYSTEM (GIS) CASE STUDY AL-JIHAD SCOTER

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Abstract:

Geographical Information System (GIS) is one of the most important tools in urban planning for analyzing the distribution of educational services. In this study based on assessing the spatial distribution of schools (elementary and junior high) using spatial analysis, these analyzes started from collecting quantitative and spatial data through field survey using GPS, these data were processed using ArcGIS and through six analytical methods. The study found that primary and middle schools in the Jihad neighborhood have no equity in spatial distribution, and if schools are distributed regularly, then they do not need additional schools.

Introduction:

As a result of the increase in the population of the city of Baghdad, this led to an increase in the number of students in schools. The population density has a long-term impact on the site plan and the quality of life there, and we need to find solutions to the importance of educational services, by applying criteria for the number of schools and the extent of their impact and choosing the most appropriate sites for the future using an analytical model and producing a digital map based on the expected data, this data is subject to statistical processing using ArcGIS. As (Lynch, 1971) points out in his classical work Site Planning, ‘‘Density has a far-reaching effect on a site plan

and the quality of life within''. Analyzed was the state of schools (primary and preparatory) using GIS through several analyzes (buffer zone and distribution justice, statistical analysis, Moren'sI, and analysis Thiessen polygon analysis).

Iraq suffers from poor educational services for poor future planning and a lack of reliable scientific methods to distribute educational services.

The Field survey for the geographical distribution of school sites using GPS and using projection-type WGS_1984_UTM_Zone_38N Coordinates of school sites Data collected tables during the period (2017-2018), were collected and converted digital data and Insert data into Excel Sheet and send it to a program ArcGIS 10.2And build a database and the same projection, and based on the visuals maps was drawn study area and thus apply the methodology of spatial analysis. The researcher will rely on the analysis of the study data and methods of spatial and statistical analysis.

Geographic Information System (GIS)

Geographical Information Systems involve software that provides storage, retrieval, analysis, visualization, and mapping capabilities for spatial data such as road networks, land use information, census track data, etc.(RichardL, 2002).GIS results reveal that distance is a critical factor(Sung Jae, 2012 p. 20), This system enables the introduction of geographic information (maps, aerial photographs), descriptive information (names and tables), processing, storing, analyzing, displaying, retrieving data, collecting results more quickly, accurately, and lower cost, to devise appropriate decisions and to easily update data.

An important programmer of ArcGIS **is** the ability to generate new information (Orhan and Tosun, 2009).

GIS can support a wide range of spatial queries that can be used to support location studies (Richard L, 2002)

Study Area:

Al-Jihad neighborhood is located in the western part of the city of Baghdad, bordered by the northern region (Al-Amriya district) in parallel with Airport Road and from the south bordered by the (Al-Shurta) To the west is (AL-Furat) as the fig. 1. The total area of Al-Jihad neighborhood is (11,214,238 m3) and the population of this neighborhood is estimated at (285,278 people), the educational services include the service of primary and preparatory schools, the number of schools is (56) divided into (30) primary schools and (26) Preparatory school and will be used several analyses.

Fig. 1. Distribution of Al-Jihad neighborhood

Planning standard in Baghdad of housing density is55-65 %so we applied in case study area and found the most densityarea is (al'amana and al'atebaa) and leases density area is the (almaesayilatwalaedala)as shown in Fig. 2,

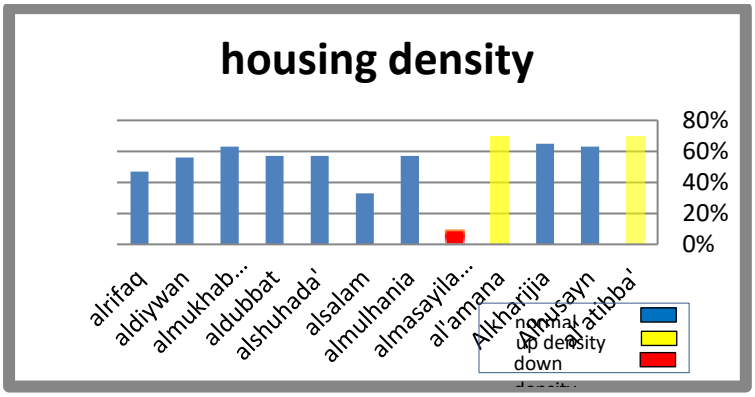

Fig. 2. Housing density in AL-jihad neighborhood

The educational services include the service of primary and preparatory schools we get through the field survey quantitative survey to primary schools as in Table 1, and the data for Preparatory schools in Table 2.

Table 1 Data of primary schools

NO.	Name	No of students	X Coordinate	Y Coordinate
0	alzahrawial'asasia	682	44.32675162	33.26115317
1	almanar	769	44.30895005	33.26199481
2	daral'imar	654	436176.4492	33.26150866
3	yafa	974	44.29274738	33.27211655
4	alhamza	720	44.29241073	33.27050835
5	alwadqalmusarae	500	44.29243909	33.27051448
6	malikalaishtir	492	44.29353256	33.27055053
7	aumemar	664	44.29448543	33.26930245
8	albayda'	520	44.29448887	33.26931619
9	mayathmaltamar	596	44.29445684	33.27002624
10	aum 'ayman	789	44.29250215	33.25617596
11	abnalarqm	759	44.32264813	33.26152037
12	alaibtihal	422	44.32265092	33.26152755
13	alkhandaq	987	44.30420206	33.26588147
14	sulaf	720	44.30530973	33.26591152
15	alaizihar	850	44.29516	33.2804977
16	baykhal	686	44.29067759	33.28232837
17	mawakibaleata'	720	44.29064222	33.28231027
18	tajalmaerifa	300	44.29614464	33.27502782
19	samaalfurat	100	44.29607773	33.28139834
20	tuyuraljana	220	44.30179152	33.25757048
21	ardalsukar	150	44.2978512	33.26882545

22	albaytalththani	60	44.29770846	33.27060787
23	alfurat	325	44.29564238	33.28436209
24	alfurzdiq	543	44.28888712	33.25926936
25	alwasiti	984	44.28593452	33.25827381
26	alainsam	450	44.6176.4492	33.26150866
27	alwasiti	750	44.31898361	33.27044777
28	alfaw	390	44.31774638	33.27050348
29	qaba	450	44.31774638	33.27050348
30	al'awayil	540	44.28893888	33.26159583

Table 2 Data of preparatory schools

NO.	Name	No of students	X Coordinate	Y Coordinate
0	almunahal	476	44.31489831	33.26373026
1	almutamayizat	604	44.32653382	33.26161751
2	aleiraqaljadid	560	44.31588682	33.26038518
3	shataalearab	842	44.28987081	33.28197214
4	almutamayizin	602	44.32641102	33.26288027
5	althuwwar	750	44.29376796	33.28547475
6	wahran	228	44.30895005	33.26199481
7	alrasulalaezam	359	44.29215143	33.27073658
8	alhusaynalmasayiya	562	44.29215429	33.27073421
9	habib bin madahiral'asadi	246	44.29129102	33.27020367
10	alhusaynaleilmia	300	44.29132658	33.27019791
11	alqirwan	555	44.29445684	33.27002624
12	nuraleilm	502	44.29248957	33.25615083
13	aleiza	430	44.30522111	33.26634059
14	al'iikhwa	375	44.30420206	33.26588147
15	alzaytuna	346	44.29519357	33.28056232
16	ainwarbaghdad	146	44.29958053	33.26174451
17	alqabs	55	44.29386684	33.26053171
18	alfurat	290	44.29555815	33.28388779
19	alfurat	110	44.29562238	33.28416343
20	alasyl	458	44.28631782	33.25874573
21	alaithmar	350	44.28631782	33.25874573
22	aljilalththani	198	44.29563388	33.28368277
23	alrawan	550	44.31900111	33.27044222
24	karbala	275	44.29247138	33.25678533
25	halimatalsaedia	573	44.88260100	33.27858333

Planning standing for Educational Services:

The location of the school is of great importance as it represents the environment in which the school is located and which directly affects its users, which must be commensurate with their needs. Therefore, the environment must be accurately forecasted to suit the user(المقرن، 2000). The standard location for the school should be chosen to get an equal environment. The Planning standing for choosing a school site

are multiple, therefore there are no fixed standards, which differ from country to another and from city to another due to the different nature of the social and topographical area.

1- Primary Schools:

Primary schools serve the ages of (6-11) years for the population. It is necessary to provide easy access and the standard distance to reach according to local Criteria planning is 500 m (الاسكان, 2006),and the international standard distance are (800-1200), and the Arab standard distance including Egypt (1000-1500) m(سرحان, 2002).

2- Preparatory Schools:

Preparatory schools serve the ages of (17-12) years for the population, and the local standard distance for access to the local school equal (800 m) (الاسكان, 2006), and the international standard distance are (1200-1600) m, United States (1500-2000)m, Arab standard distance including Egypt (1500-2000)m (سرحان, 2002).

Spatial Analysis:

Spatial analysis broadly encompasses three main categories of methods: statistics, heuristics and optimization, and simulation (Griffith, 1990; Densham, et al., 1992; Malanson, et al., 1996; Malanson, 1999; Cova, et al., 2000; Krzanowski, et al., 2001; Benenson, et al., 2004; Wang, et al., 2008), and this main of spatial analysis load to make decisions to obtain environmental justice.

Environmental justice is defines by three dimensions: distributive justice, procedural justice and justice as recognition. The first is understood in terms of the distribution of beneficial elements (resources) and negative elements. The second dimension refers to the ways that decisions are made, who is involved, and who has the power to influence such decisions. The third is based on the idea of served for all individuals (Sung Jae, 2012 p. 20)

It is an analytical methodology to design the capacity of a site to support a specific activity. It also works to study the relations between the geographical characteristics of the natural studies of a particular site to identify the potential characteristics (عمرة، 2010).

We apply four analyses in case study (Distribution Justice, Moran's I, Statistical Analysis and Thiessen Polygon):

Analysis of Distribution Justice:

This analysis depends on the buffer zone area, The buffer is a technique used to provide information on the size of the coverage area with a more specific location(Bertha & Lestari, 2018), and out of this coverage mean not serves area. The intersection between buffer zone area for each school (primary and Preparatory)are getshint the bad of justice in the distribution of educational services, as shown in below three type of served area:

A. If the area of intersections of buffer zone is equaled to out of buffer zone (not services area),this means there is no need to establish new schools because of the problem in this case a lack of distribution.

B. If the area of intersections is larger than to out of buffer zone (not services area) there is a problem in increasing the number of schools beyond the required limit that, if schools distributed regularly there will be a surplus in the area covered by the school's neighborhood.

C. If the area of the intersections is less than the out of buffer zone (not services area), the neighborhood needs more schools.

The tree types of distribution depend on the equation of justice (شحاذة, 2010);

Ratio of justice = ((area of intersections - area of not serviced) / total area) * 100

The buffer zone distance to the primary schools (650) and to the preparatory schools is (800) m depending on the local planning standard (الاسكان, 2006).

After the application of the equation in the program (GIS) we obtained the following maps as the blower, noting that the total area of the Al- Al-Jihad neighborhood is (11214283) square meters equal (4485) acres.

- **Primary Schools:**

A- Appear out that the area serving the primary schools is (8592769 m^2 =3437 acres) with **(76%)** present of the total area, The unserved area is (2621514 m^2 =1084 acres) with **(24%)** present of the total area, the percentage of the area served is approximately three quarters of the area of the Al-Jihad neighborhood and the other quarter of the total area is not serviced, and through this analysis shows the existence of areas that need a number of schools in (al'diwan), see in fig.3.

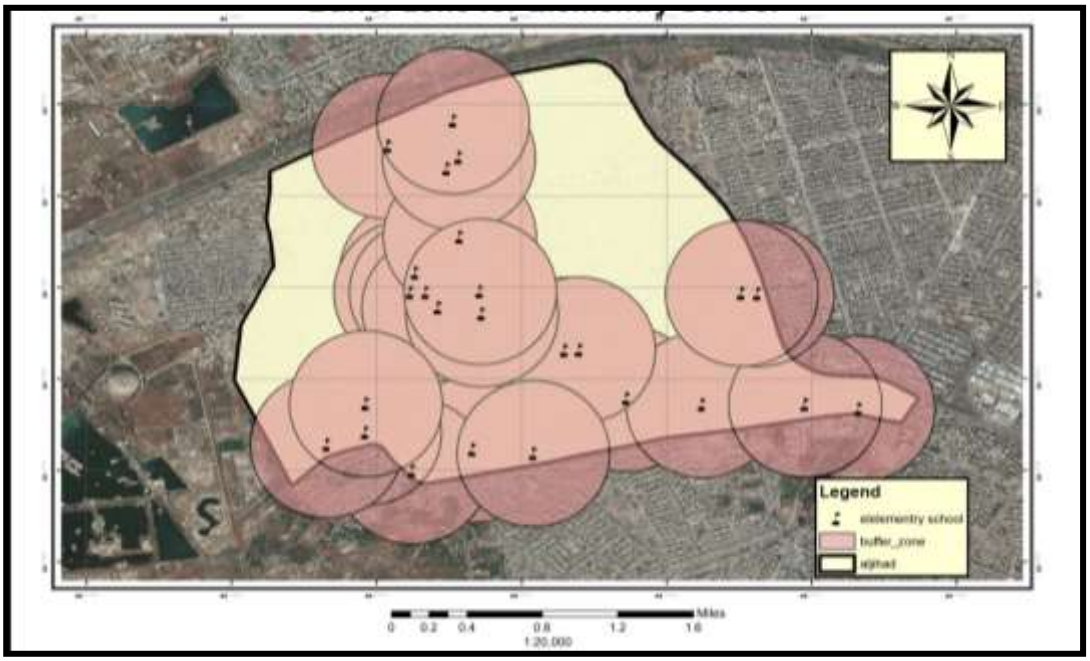

Fig.3. Buffer zone of primary school

B-The total area of Al-Jihad is (11214283m^2), the area of service (buffer zone) is (8592769 m^2), and the area of intersections is (8030336 m^2) with a percent (93%)of the area served, After applying the ratio of justice equation

Area of not service = total area –area of service

=11214283-8592769=2621514 m^2

Ratio of justice = ((area of intersections - area of not serviced) / total area) * 100

= ((8030336-2621514)/112124283*100) = **48%**

The percentage is (48%), meaning that the area of intersections is larger than the area that is not serviced. This means that there is a surplus for the number of primary schools. This percentage is very large. There is a problem in increasing the schools

from the required level. Even if these schools are distributed regularly there will be a surplus in the area covered by the scope of the influence. As shown in fig. 4.

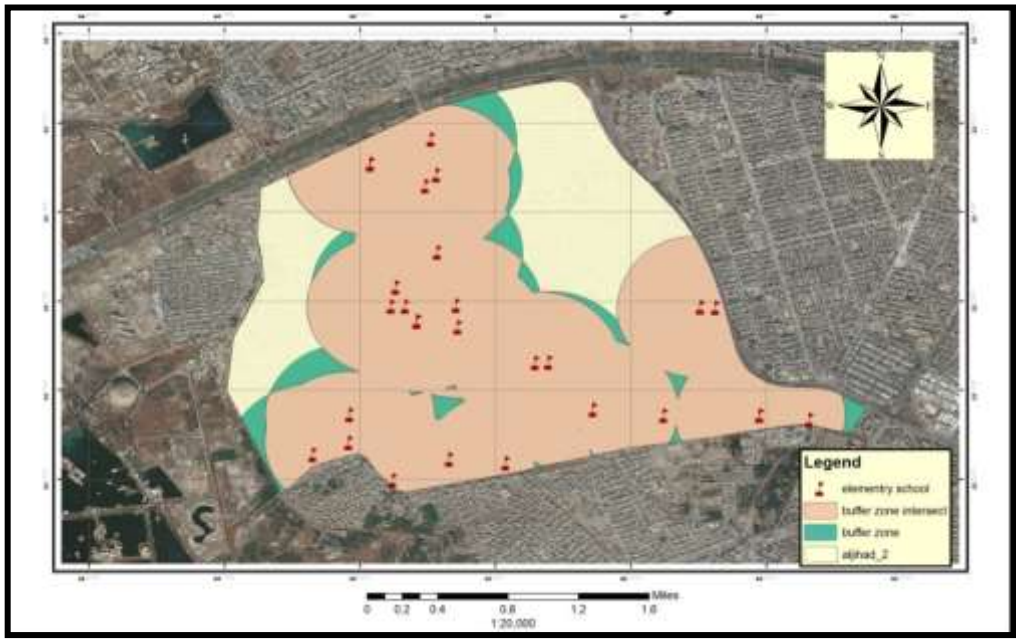

Fig. 4. Intersect of buffer zone for primary school

- **Preparatory Schools:**

A-Appear out that the area of influence of the preparatory schools includes the area of the services area (10506011 m^2), (93%) of the total area, the area not serviced by (708272 m^2) and (7%) of the total area, that is the percentage of occupied area almost of the area of case study, This analysis indicates that there area sufficient number of preparatory schools, as shown in fig. 5.

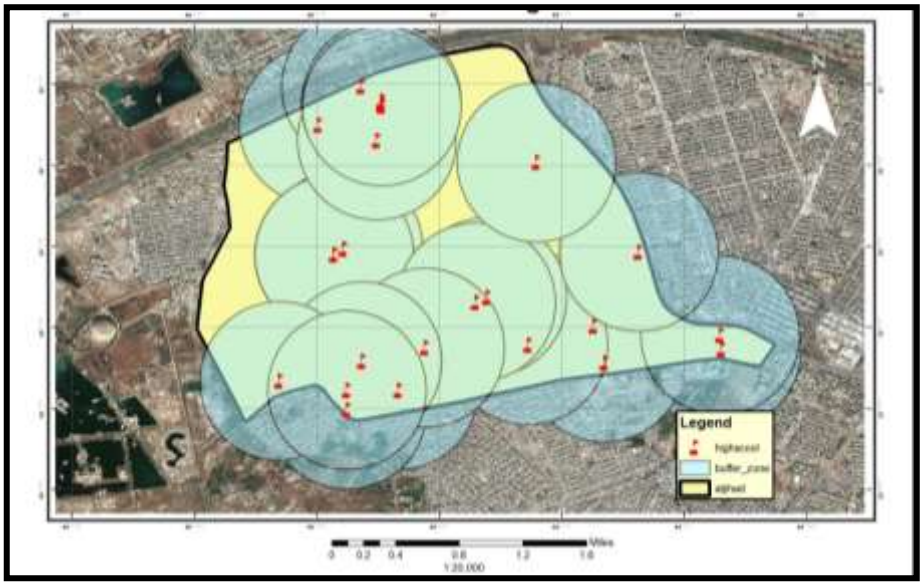

Fig.5. Buffer zone of preparatory school

B- The total area of Al-Jihad is (11214283m^2) and The area of the intersections is (8751421 m^2) of the area of service area, which is the buffer zone which is (10506011 m^2) and (83%) of the area used for the scope of impact and in the neighborhood of Al-Jihad primary schools After applying the ratio of justice equation

Area of not service = total area –area of service

=11214283-10506011=708272 m^2

Ratio of justice = ((area of intersections - area of not serviced) / total area) * 100

= ((8751421-708272)/112124283*100) = **71%**

The percentage is (71%), which means the area of intersections is much larger than the area not serviced and that there is a bad of justice in the distribution of preparatory schools, there is a very large increase in the number of preparatory schools. There is a problem in increasing schools. If Schools regularly there will be a surplus in the number of the school, the problem, see in fig.6.

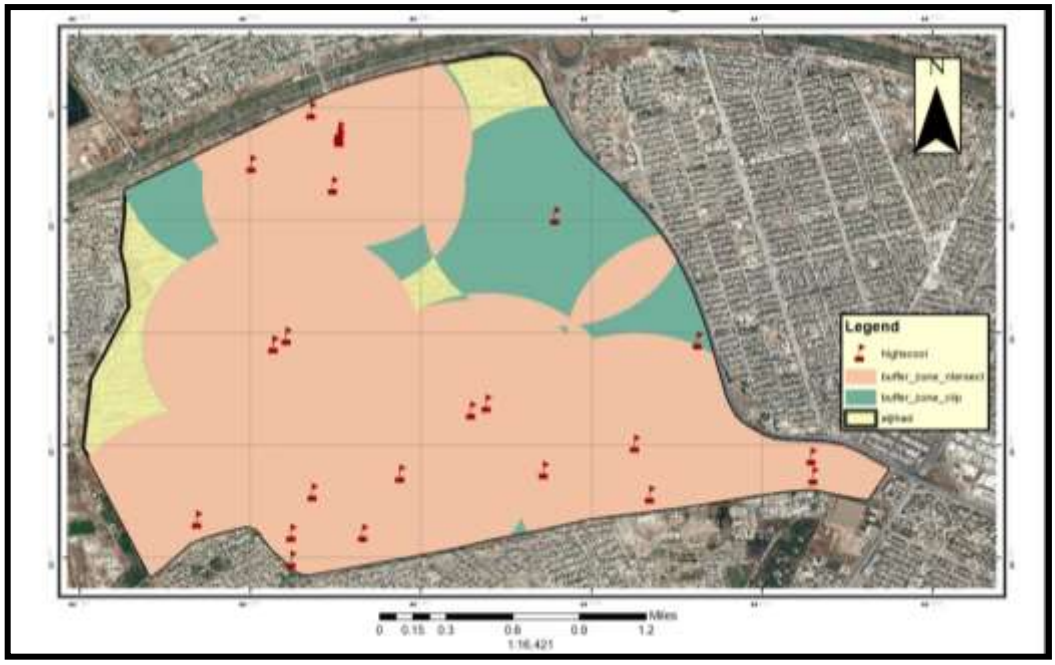

Fig. 6. Intersect of buffer zone for preparatory school

Analysis Moran's I

Moran's I index is one of the methods of spatial analysis and used to test for spatial autocorrelation (Tiefelsdorf & Boots, 1995), and continues to be applied in many fields (Matthews, Diawara, & Waller, 2018),to search for homogeneous data collection in GIS. These techniques are used for the purpose of aggregating spatial phenomena into totals of values that represent the characteristics of the geographical distribution of the phenomenon

Moran's I is a correlation coefficient that measures the overall spatial of your data set. In other words, spatial autocorrelation is multi-directional and multidimensional, making it useful for finding patterns in complicated data sets. It is the same to correlation coefficients, it has a value from (-1 to 1) (Illian J, Penttinen A, Stoyan H, Stoyan D, 2008). A positive local Moran's I value refers to the location under study which has similarly high or low values as its neighbours and then the location is called a "spatial cluster". On

the other hand, a negative local Moran's I value indicates a potential spatial outlier which is different from the values of its surrounding locations (Yuan, Cave, & Zhang, 2018)
-1 is a perfect clustering of dissimilar values (dispersion).

0 is no autocorrelation (randomness.)

+1 indicates perfect clustering of similar values (clustered).

This analysis is based on the weight to obtain a more accurate analysis of dispersion patterns where the based on the results of the use of Moran's I in the GIS program rather than in the chart for showing distribution patterns, from the pattern to the accumulated pattern and the random pattern. From this analysis in GISget spatial autocorrelation report, in this reportfind curveand levels of confidence ranging from 0.01 - 0.10 on the right side of the curve, the figure also contains the expected values of the Z score (it's mean in statistical Standard scores) The Z-score was used to verify the nearest neighbour index.

- **Primary Schools:**

Fig.7 shows that the primary school distribution pattern is a random pattern because the value of Moran's I is -0.058567 (Random) it isnearest to the zero and the confidence level is the value of z (0.052203), which is almost equal, and closer to the clustered, Primary schools in the neighborhood of Al-Jihad in the form of blocs and scattered by chance.

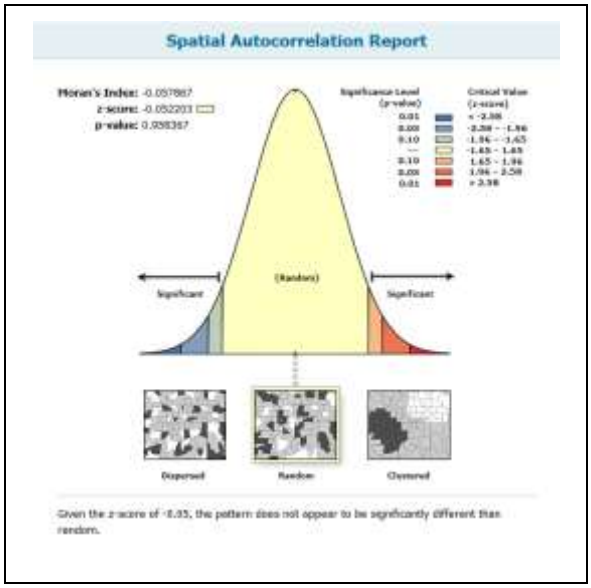

Fig.7. Moran's I Analysis for primary school

- **Preparatory Schools**

Fig.8 shows that the pattern of distribution of preparatory schools is a random pattern because the value of Moran's I is 0.241490 - close to zero and the level of confidence is z (0.365557) - almost equal, primary schools are more widespread than preparatory schools Analysis because the decline factor is close to zero.

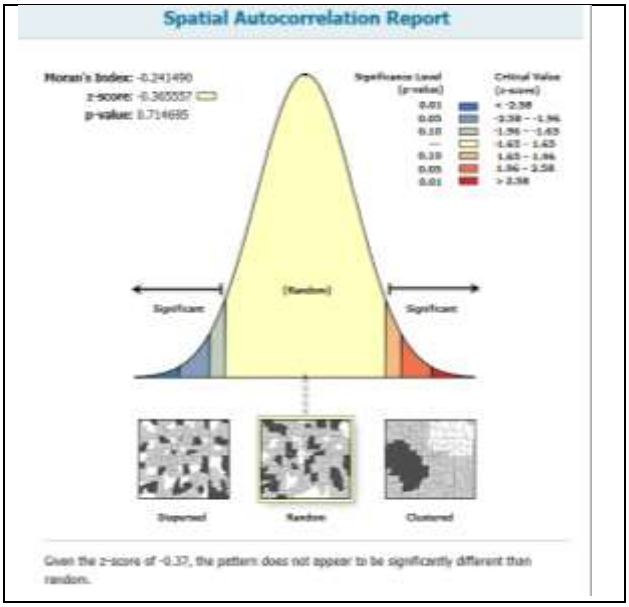

Fig.8. Moran's I analysis of Preparatory schools

3- Statistical Analysis:

Spatial statistical analysis offers tools for identifying the patterns and characteristics of geographic point data.(Hart & Dolbear, 2013) This type of analysis can compute whether school distributions are connected to Basic characteristics of the physical environment and whether a point has a positive or negative effect on the student of additional school.Measuring distribution schools help planners, the spatial direction in the distribution of school centres. GIS spatial statistic can be used to measure extent the distribution of features a pattern. The resulted direction of pattern can be used for several purposes, for example in this paper it examines the inequalities of the services distribution in Al-Jihad neighbourhood.The statistical models of basic graphics and interpolation in the environment of GIS were used.

GIS spatial statistic tools can find the direction and orientation of points, polygons and lines features(Al-Enazi, Mesbah, & Anwar, 2016), in the statistical spatial distribution analyzed using four basic measures(mean center, center of features, standard distanceand standard deviational ellipse)to detect the mutual exchange between schools in the Al-Jihad neighborhood, types of statistical analysis were used which are:

1- Mean Center:

The statistical tests of basic graphics consist of the mean centre tests,is the most central location and the central attraction of school distributions and compares them, with the spatial distribution the center of spatial gravity to obtain a central point for primary and Preparatoryschools in the Al-Jihad neighborhood.that one of the most stable elements of this evolution relates to the movement of the center of gravity of the urban.(Tellier, V, & Vertefeuille, 1995)

2-Central Feature:

It is a tool identifies the most centrally located feature in a point feature class ، داود) (2012is used to obtain the average schools between the phenomenon in the most common areas.

3-Standard Distance:

Spatially equivalent to the standard deviation, standard distance measures absolute point dispersion relative to the mean centre(Connolly, 2018). It is a tool to create a circle polygon with the radius equal to the standard distance value, If the number of points inside the circle is more than the points outside the circlepolygon, the pattern of the distribution of points is centered or clustered around the center. If the points are outside the circle, however, More than the number of points inside, the pattern of distribution points of the type scattered or divergent.

4- Standard deviation ellipses:

The standard deviation ellipse measures the standard deviation of the features from the mean center separately for the x-coordinates and the y-coordinates (Al-Enazi et al., 2016),it is measured in each direction from the mean canter, the total length of each axis is twice its standard deviation. It is a tool to gate the spatial characteristics of spatial features, including central,see in Fig.9.

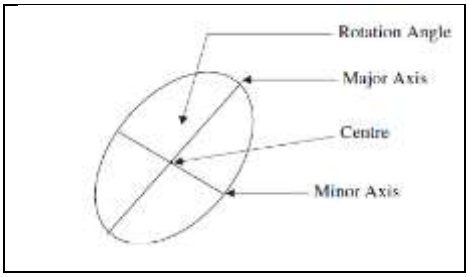

Fig.9 Parameters for the standard deviational ellipse(Ayhan & Mert Cubukcu, 2010)

Where the results of in the Al-Jihad neighborhood shows the following**:**

Primary Schools:

The results pertaining to the mean centers of Primary Schools with in a Al-Jihad neighborhoodare also straightforward and consistent with the patterns in Fig. 10. Al-Suqar Primary School is the actual primary school center in Al-Jihad neighborhood, the distance between the actual center and the center is assumed to be approximately 354 m. In the area of standard distance (circle polygon)is 16 schools and outside the cercal 15 schools, and the area of a standard distance has 57% from total area (2565) acres. The number of schools within the standard distance is greater than outside. The distribution of schools was concentrated or concentrated around the center. This indicates that the primary schools provide service for more than half of the neighborhood. The length of the ellipse axes are calculated in the south-west (x- axis) and north-east (y-axis) directions in. Since the standard deviation is measured in each direction from the mean center the gravity of direction of ellipse towards the center of Baghdad city and ellipse is closer to the circular shape that is mean the education serves was Widespread.

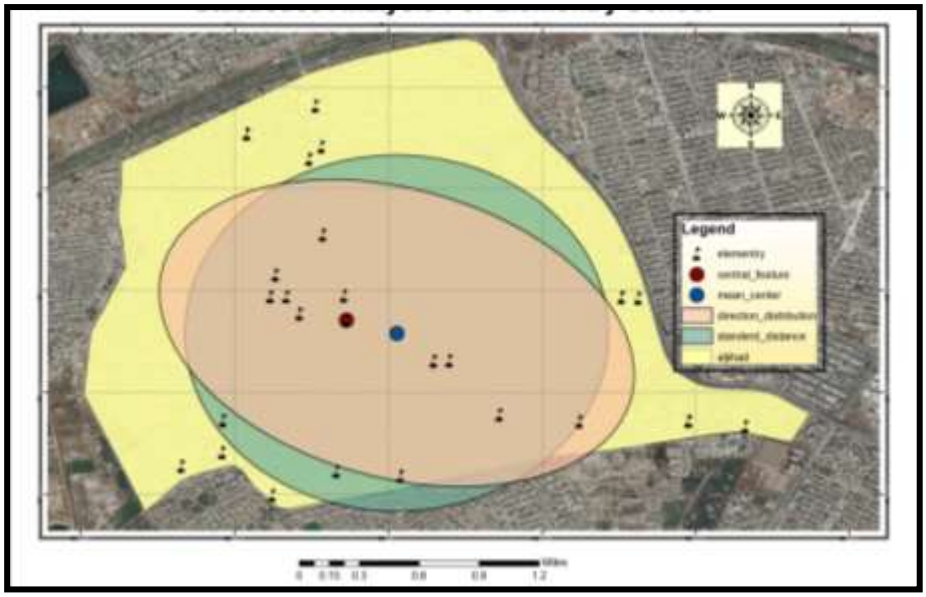

Fig. 10. Statistical Analysis for Primary schools

- **Preparatory Schools:**

The results pertaining to the mean centers of Prepartory Schools with in a Al-Jihad neighborhood are also straightforward with the patterns in Fig. 11.It was found that the preparatory school is AL-Akua center of the preparatory schools in Al-Jihad neighborhood and that the distance between the actual and virtual centers is 556 m. In the standard distance (circle polygon) is (16) schools and outside (10) school. The standard distance occupied 61% (2760) acres out of (4485) acres from total area, the pattern of distribution of preparatory schools within the standard distance is widespread. This indicates that preparatory schools provide service for more than half of the neighborhood. The standard

deviation makes ellipse is closer to the circular shape and direction to the (south-west).

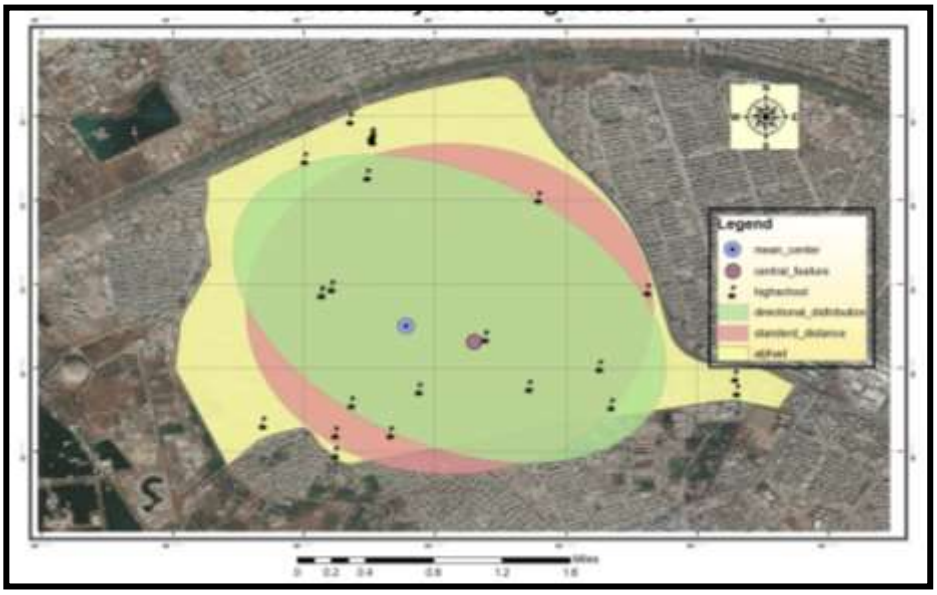

Fig. 11, Statistical Analysis for Primary schools

4-Thiessen Polygon Analyses:

Thiessen polygon analyses are creating polygons from a set of sample points so that each polygon determines the affected area around the sample point (Fetter, 2001). The concept of small Thiessen polygons are defined as follows (Houand Fang, 2007; Lombardo and Prümers, 2010; Hou and Hou, 2014a,2014b; Lock and Pouncett, 2017): Ii=Si/S, where Ii is the Thiessenpolygon index, Si is the actual area (m2) of a certain site in a certaincultural period, and S is the corresponding area (m2) of the polygon ofthat sit. This analysis is based on a point layer. Each point represents a school and transforms it into a polygon. This is the result of each polygon point representing the area of coverage and the area affecting each school by linking all the schools with the other close to them in a straight line, Straight lines, therefore, produce polygons called Thiessen polygon, see fig. 12.

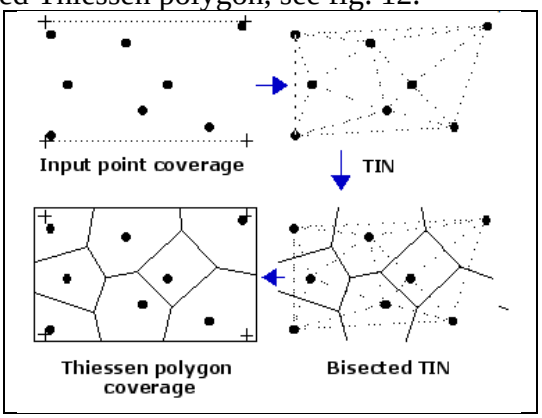

Fig. 12. Thiessen polygon coverage

Through the application of this analysis` on the primary and preparatory schools to determine the actual area served by each school where the study proved the existence of disparity between the areas served by each school as shown below:

- **Primary Schools:**

Depending on the standard distance of service (652) m so each primary school serving an area of (531) acres, and from analyses by program arc GIS we get a table as shows in legend of fig. 13, and the description this information is as flows:

a- **(11-91 acres)** and a number of schools (15), which serves a very small area compared to the area of buffer zone (531) acres, the existence of a large number of schools close to each other with percentage (45%) of the number of schools, that is almost half the number of schools very close especially in the area of Al-Salam, which is acceptable in this region to be considered a vertical housing area, that there is no problem in the zone effected, while in the part of Al-Amanah, part of Al-Atibba', and part of Al-Mukabarat where the problem in buffer zone.

b- **(91-239 acres)** and the number of schools (10) which serves a small space and 38% of the number of schools compared to the buffer zone service which includes areas (Al-Shuhadaa, Al-Karagiaa, Al-Amanaa, Al-Diwan, Al-Rifaq, part of the Al-Atibba') Their effect is small and these areas do not need additional schools.

c- **367-678 acres -** and the number of schools (5), serving an area and (16%) of the number of schools which includes areas (Al-Husain, , Al-Musalayiawaladala Al-Amanaa, Al-Diwan, Al-Rifaq, part of the Al-Atibba'). This ratio is good because

it serves an area within the standard area of (513) acres, may need additional schools in the future.

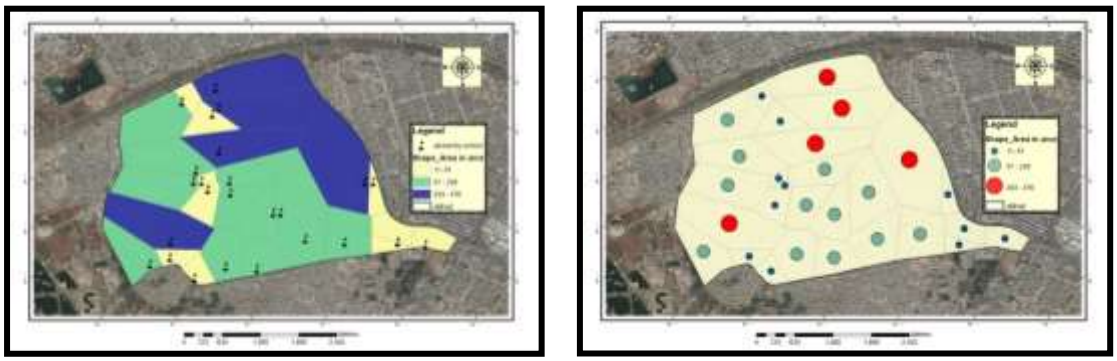

Fig. 13. Thiessen polygon Analysis for primary schools

- **Preparatory Schools**

Depending on the standers distance of the preparatory schools (800) m, so each preparatory school serving an area of (804) acres and from analyses by program ArcGIS we get a table as show in legend of Fig. 14, and the description of this information is as flows:

a- **(6-119 acres)** the buffer zone is very few with number (12) school from the total number of schools (26) which served very little area and proportion (47%) of the total number of schools, include the areas (district of Al-Salam , part of the Al-Karagiaa, And part of the Al-Atibba') for the district of Al-Salam is acceptable because it is a vertical housing, but for other districts should cancel a number of schools because the buffer zone is very low.

b- **(119-240 acres)** the buffer zone is few with number (8) school from the total number of schools (26) which served little area and proportion (30%) of the total number of schools, that include the area (part of Al-Mukhbarat, Al-Amanaa, Al-Rifaq, Al-Shuhadaa, And part of the Al-Atibba', part of Al-Husain, Al-Musalayiawaladala) which is, that in this district the school must be redistributed to have a better effect for preparatory schools.

c- **(240-446 acres)** the buffer zone is acceptable with number (6) school from the total number of schools (26) which served medium space and proportion (23%) of the total number of schools, include the areas (district of Al-Salam, part of the Al-Karagiaa, part of the Al-Atibba' and Al-Diwan) considered the buffer zone is close to acceptable and does not need to be added a new preparatory school.

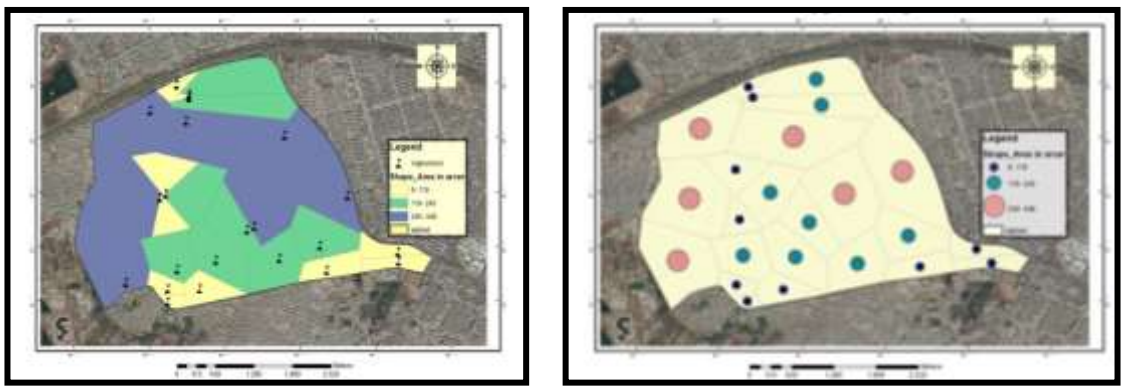

Fig. 14. Thiessen polygon analysis for preparatory schools

Results:

The most important of the research can be explained as follows:

1- **Buffer zone and distribution justice:** This analysis shows that the Buffer zone for primary schools actually serves 76% of the total area of Al-Jihad, and that the distribution justice is 48%. There is unfair distribution, even if schools are distributed regularly in the neighborhood. There was an increase in the number of schools.

   As for preparatory schools, the Buffer zone is 93% Schools serve almost the entire neighborhood. The distribution justice rate is 71%, this indicates a poor distribution of schools and a large increase in the number of schools.

2- **Moran's I analysis:** The dominion of the random pattern of all schools in the neighborhood Al-Jihad (primary and Preparatory) has been shown. This pattern indicates that the distance between groups of schools is concentrated in a small area and few schools spread in the neighborhood, between them.

3- **The method of statistical analysis:** The actual center of primary and preparatory schools is close to high-density areas. The standard distance (area of the circle) of primary schools is 57%, within the standard distance are larger number of schools than outside. This indicates that the distribution pattern of schools is cumulative and provides service for more of the half of the neighborhood. The standard distance of preparatory schools by 61% and the number of schools inside is larger than outside, the pattern of distribution of preparatory schools spread and the availability of service more than half the neighborhood, and the distribution pattern for primary and preparatory schools take the Each axis Ellipse towards the south-west towards the residential block of Al-Salam distract.

4- **Thiessen polygon analysis:** After the implementation of this analysis on primary schools shows that there are only 5 schools within the standard area they serve and other schools serve a small area. As for preparatory schools, there is no school serving space within the standard area and all schools serve very little space.

Recommendations:

After using different analysis processes, we recommend the following

1- When building a new school should not be random and return to various analyzes to get the best results to serve the largest area to reach the right decision.
2- We recommend the addition of a number of primary schools in the regions (part of distract of Al-Hussein, Al-Mulhania, the Diwan) because there are not enough schools.
3- There is an imbalance in the distribution of preparatory schools, which means there is an increase in the number of schools so we recommend changing the type of the preparatory school from primary to secondary.

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