20 July 2026

Occupied Palestinian Territory Education Cluster

United Nations Satellite Centre - Temporary Learning Spaces Gap Analysis of the Gaza Strip

Gaza Strip, Occupied Palestinian Territory

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Gaza Strip - Overview

Image center:
34.3860557°E
31.3914154°N

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In support of the OPT Education Cluster, the United Nations Satellite Centre conducted a Temporary Learning Spaces (TLSs) gap analysis per population location in the Gaza Strip, Occupied Palestinian Territory.

The analysis is based on dataset including all operational Education Cluster partners' Temporary Learning Spaces (TLSs) from 30 June 2026, with their GPS coordinates and enrolment figures, a Site Management Cluster's IDP Sites list, hereinafter referred to as Sites, from 11 May 2026 with their coordinate points, and a 100-meters gridded population dataset from Real Good Research based on anonymised telecommunications data from 01 March 2026.

A total of approximately **770,422** KG-school-aged children (4 to 17 years old), as of 01 March 2026, was estimated from the gridded population dataset, and **613** Temporary Learning Spaces, including a total of **432,701** enrolled students, were identified in the Gaza Strip, as of 30 June 2026. Based on these data, a Two-Step Floating Catchment Area (2SFCA) approach was used to assess education accessibility to the potential KG-school-aged group. Temporary Learning Space locations and student enrolment were compared against the potential student population within a 300-meters walking distance. And, accessibility scores were calculated for each population location, and areas with high demand and low accessibility were identified as priority zones for the establishment of new, expansion, and optimisation of Temporary Learning Spaces (TLSs) and other structured learning opportunities.

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TLSs gap analysis workflow

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Temporay Learning Spaces (TLSs)	Population estimation	Area of catchment	Accessibility analysis	Priority areas
Capacity TLSs locations + Total enrolled students identification	Demand KG-School-Aged population estimation (population * 0.36) 100 m resolution	300 m walking distance catchment definition	Two-Step Floating Catchment Area (2SFCA) method Accessibility scores measurement	Identification of priority areas for education investments

Key assumptions

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Temporary Learning Spaces (TLSs) Capacity

The number of students enrolled in each Temporary Learning Spaces (TLSs) represents the effective educational supply available at that location.



Population Demand

The population counts within each 100 m cell represent the potential KG-school-aged children (4-17 years old) demand.



Walking Accessibility

A maximum walking distance of 300 meters was assumed around Temporary Learning Spaces (TLSs). This parameter was established to minimise protection risks associated with movement in the evolving security environment. It also reflects the operational reality that most TLSs are situated within displacement sites and are intended to serve children living within a short walking distance.



Equal Accessibility

All individuals within the catchment areas were assumed to have equal access to Temporary Learning Spaces (TLSs).



Static Conditions

The analysis represents a snapshot in time and does not account for future population growth or TLS expansion.

Methodology

The following methodology has been developed by considering the Temporary Learning Spaces (TLSs) coordinate points and the 100-meters gridded population dataset containing an estimated number of people per pixel. The Sites coordinate points data was initially considered, but no information on the Site areas of extension is currently available for this analysis. The analysis methodology was processed by following the steps bellow:

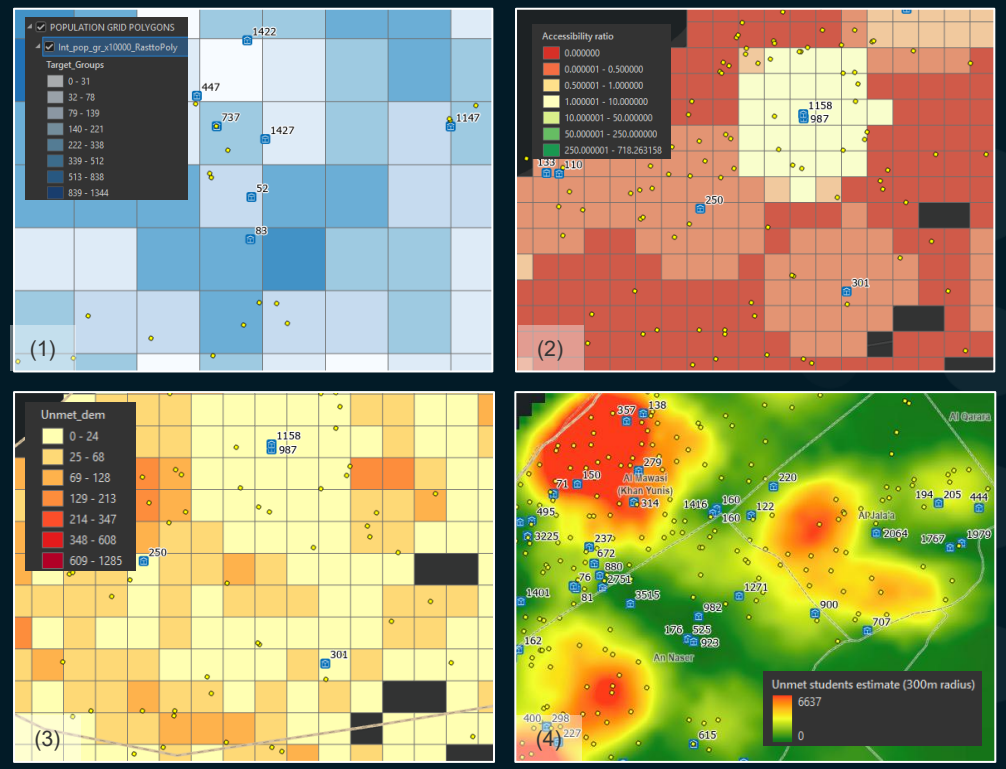
1. Identification of TLSs **supply (enrolment) and population demand**. The Population grid raster was transformed into Population gridded polygons, and each polygon contained the corresponding raster pixel values (population counts). Then, the **population counts was multiplied by 0.36**, equivalent to the estimated target group (KG and school-aged children, 4–17 years).

2. Run the **Two Step Floating Catchment Area (2SFCA) method,** designed to measure the ratio between supply (TLSs enrolment) and demand (KG-school-aged group) within a catchment area (300 m), and interpret the resulting **accessibility scores**. Developed by Luo and Wang (2003), this gravity model of spatial interaction was originally used for health facilities accessibility. This method employs overlapping catchment zones defined by a maximum travel distance (or time), where all services within these zones are considered equally accessible to the target population, while those outside are considered with no access.

3. Estimate the gap and **unmet demand accessibility**, where high values indicates numerous potential KG-school-aged students with poor access to TLSs.

$$Unmet\ Demand = Target\ group \times (1 - Accessibility\ score)$$

4. Identify the **priority areas of intervention**. The Focal Statistics tool allows to identify clusters of unmet demand, rather than isolated cells.



Data

- 100 meters gridded population raster.
- Temporary Learning Spaces coordinate points.
- Sites coordinate points.

Caveats & Limitations



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Distance Simplification

According to the current local context on the ground (security situation, movement constraint, and the high concentration and distribution of the population), an acceptable walking distance threshold of 300 meters surrounding the TLSs has been considered for the accessibility analysis. As Euclidean distance, it may not reflect actual walking routes.

Capacity Proxy

Total students enrolled was used as a proxy for Temporary Learning Spaces capacity. Actual classrooms, teachers, or infrastructure were not considered.

Population Proxy

KG and School-aged group estimates are derived from the 100 meters resolution gridded population data (population value x 0.36).

Equal Accessibility Assumption

All TLSs were assumed equally attractive. No differences in quality or enrolment restrictions were modelled.

Temporal Effects

Analysis does not account for seasonal changes, future population growth, planned TLSs construction.

2SFCA Method Constraints

The 2SFCA method is an accessibility indicator and accessibility scores are not mass-conserving, it measures the spatial accessibility shortfall/overage.

Sites Extent Areas

The sites points data do not give indication on the area of extension of the sites. Therefore, the 100 meters gridded population dataset was taken into consideration for the 2SFCA method instead, as it showed a more informative view on the dispersion of the population in the area of interest.

Sites Points Falling Outside The Population Grid

Some Site coordinate points are not covered by the population grid. There are representing approximately 5% of the Sites located in the area of interest. The total number of listed Sites (as of 11 May 2026) in the Yellow Line is 2149. There are 2049 Sites intersecting with the population grid, and 100 Sites that are not intersecting with the grid, therefore with no population values.

Part of the non-intersecting Sites are newly added ‘under construction’ or ‘not yet handed over’ organized locations currently being finalized by UNDP. In these cases, visible tents /building footprints and population grid layers may already exist, while the corresponding Site points have not yet been finalized, resulting in no recorded intersection with the population grid.

For the purposes of this analysis, these areas are excluded from the calculations and statistical analysis.

Accessibility ratio

Image center:
34.3867745°E
31.4180703°N

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This map shows the **accessibility scores per population cell** to all listed Temporary Learning Spaces located in the area of interest. These accessibility scores were obtained with the Two Step Floating Catchment Area (2SFCA) method, by first calculating the ratio of a TLS's capacity to the surrounding population (Step 1) and then adding up these ratios for all reachable TLSs within a reasonable travel distance to the target group population (Step 2).

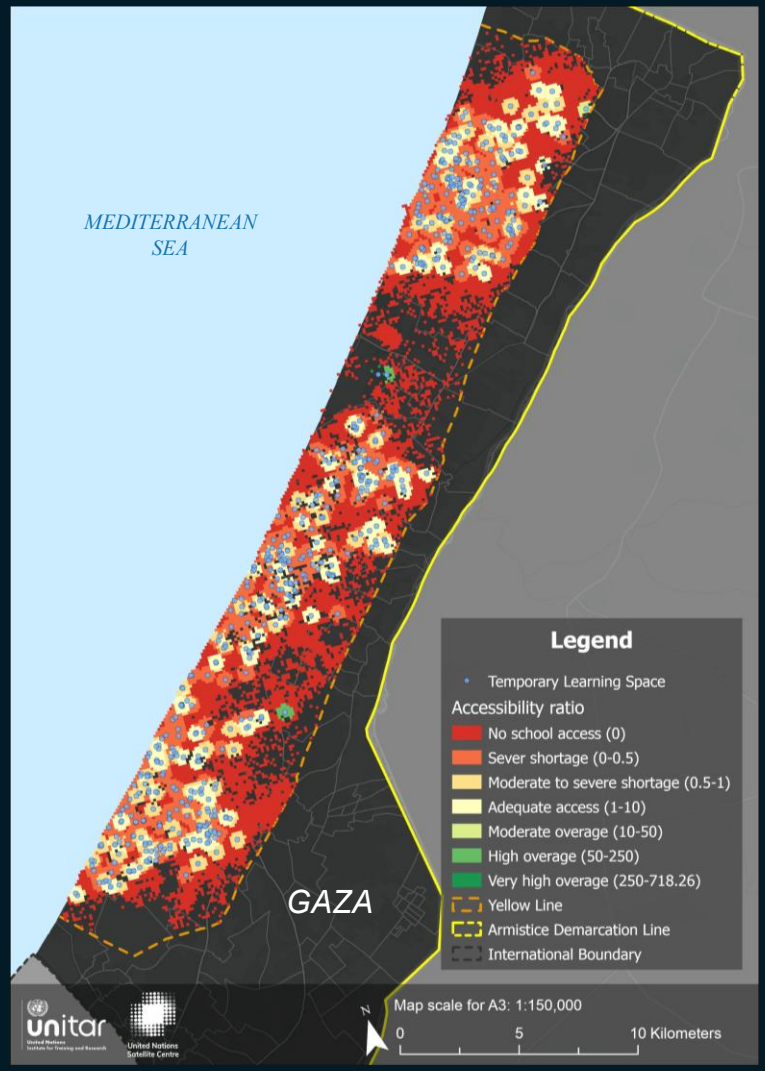
The result is represented by a Supply-to-Demand ratio, and a radius of 300 m was set around every listed TLSs, corresponding to the maximum reachable walking distance to these facilities.

The accessibility score indicates the degree of accessibility shortage/overage to a TLS within a 300 m distance.

When the score is lower than, 1 there is a shortage, and when the score is greater than 1 the TLS capacity exceeds the local demand, and:

- Higher values = better access.
- Lower values = poorer access.

However, **accessibility scores alone do not directly show the magnitude of unmet demand**.



Estimated gap

Image center:
34.3867745°E
31.4180703°N

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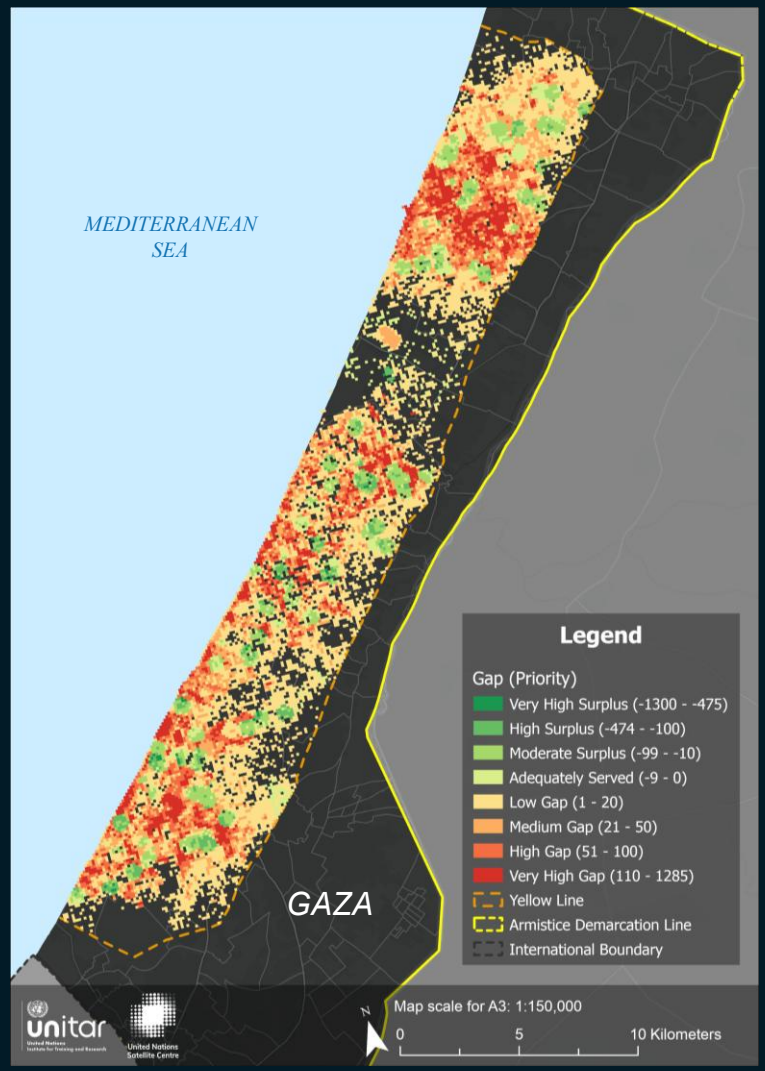
To show the magnitude of unmet demand, the estimated gap map, derived from the accessibility ratio data, shows **spatial accessibility deficit and excess** per population cell, and how much demand is underserved because of poor spatial access, and the surplus capacity as well. It was calculated using the formula below:

$$Gap_i = D_i - C_i$$

Where D is the target group demand, and C is the estimate of available TLS capacity/seats for each population cell (C = A x D, where A is the accessibility score).

Interpretation:

- Gap > 0 → unmet demand.
- Gap = 0 → balanced.
- Gap < 0 → surplus capacity.



Estimated unmet targeted group (kg-school-aged children)

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34.3867745°E
31.4180703°N

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Derived from the accessibility ratio data, as the estimated gap map, the estimated unmet targeted group (kg-school-aged children) map shows **spatial accessibility deficit** per population cell, and how much demand is underserved because of poor spatial access. The map data is only focusing on unmet demands, and the capacity surplus are not considered. It was calculated using the formula below:

$$UnmetDemand_i = D_i \times (1 - A_i)$$

Where D is the target group demand (KG and school-aged group), and A is the accessibility ratio. The higher the values are, the higher the accessibility deficit is.



Areas of priority

Image center:
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31.4180703°N

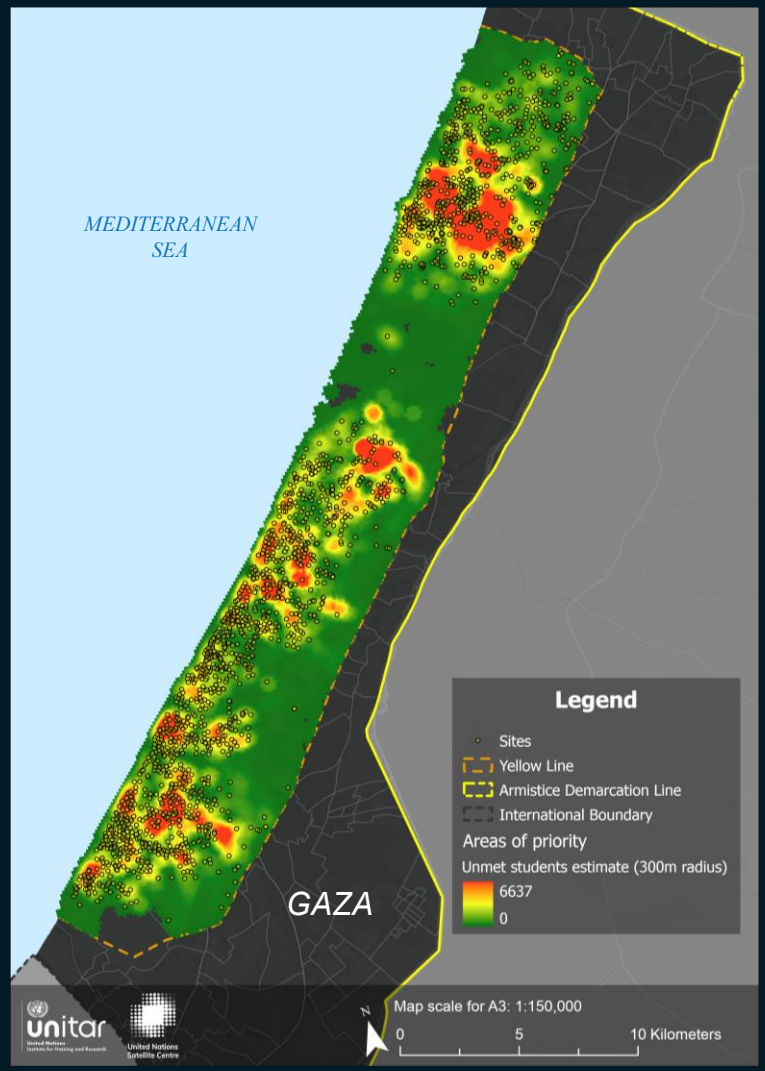
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Derived from the **unmet students results** this map shows the **areas of priority** by highlighting the local estimated unmet population in a 300-meter radius, where each pixel represents the potential number of unmet targeted group (kg-school-aged children) aggregated within a 300-meter radius.

Tool used and parameters:

- Focal Statistics
- Radius 300m
- Circular

This tool allows to smooth local variations and to identify persistent spatial concentrations of poor accessibility. **Areas with high potential students and poor access to Temporary Learning Spaces are classified as high-priority intervention zones and are represented by higher values** (red colours, in the map).



Hot spots analysis

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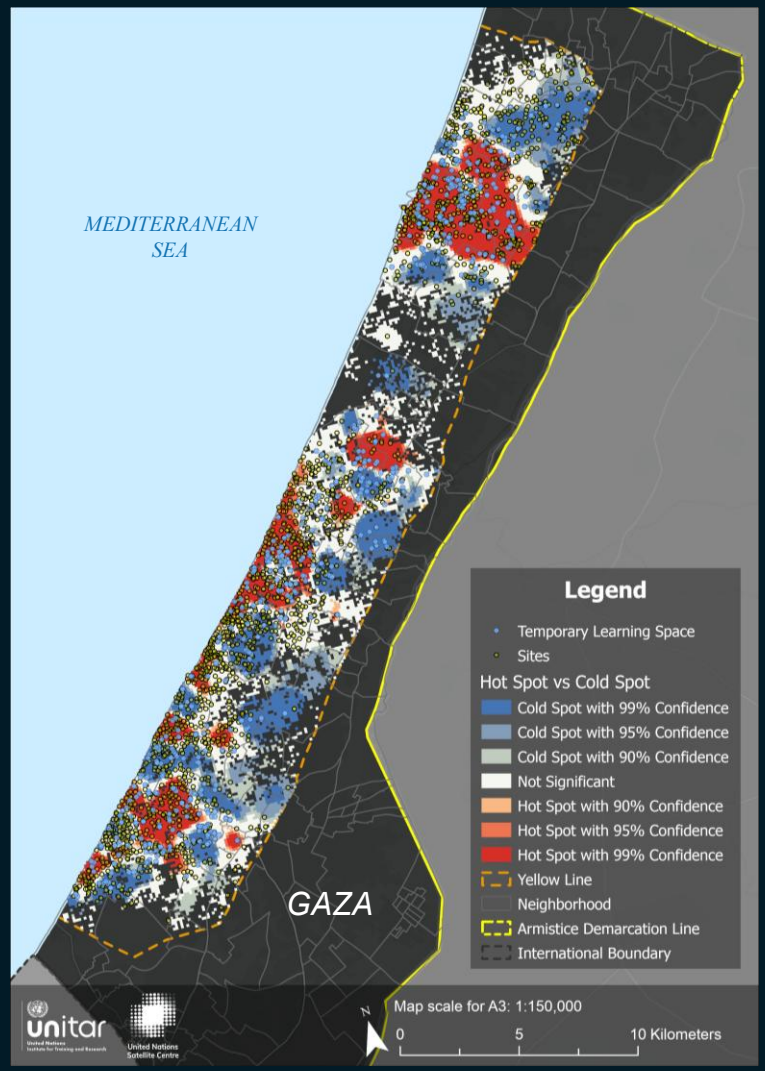
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As the areas of priority map produced by the Focal Statistics approach allows to quantify the unmet demand conectration, the **Hot Spot analysis (Getis-Ord Gi*)** identifies statistically significant hot spots and cold spots, by minimizing the subjectivity, and it allows to validate that clusters are not random. This analysis was based on the gap analysis (inlcuding positive and negative values).

The Hot spots allows the statistic to identify both:

- **Hot spots**: clusters of high positive gaps (areas with persistent shortages, and concentrated unmet demand).
- **Cold spots**: clusters of large negative gaps (areas with concentrated excess capacity).

The combination of both the hot spot method outputs and the focal statistics method output (areas of priority) provides a strong basis for prioritization. And, in the case it can be concluded that the areas of priority map are statistically appropriate.



Areas of priority – closed-up view

Image center:
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31.3743249°N

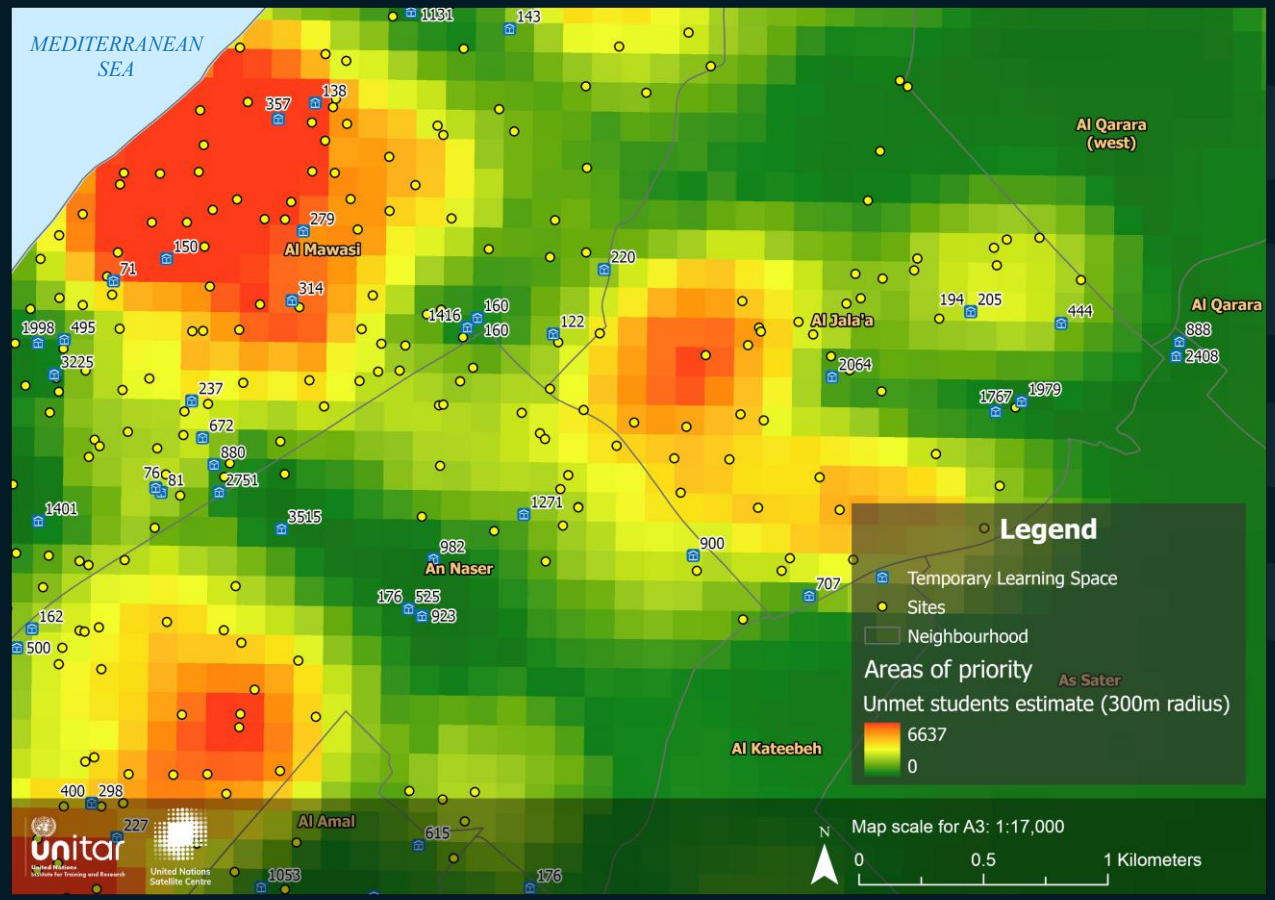
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This map shows a closed-up view of the areas of priority, highlighting the local estimated unmet population in a 300-meter radius, where each pixel represents the potential number of unmet targeted group (kg-school-aged children) aggregated within a 300-meter radius (gridded layer). The other elements displayed in the map are:

- Temporary Learning Spaces: Blue symbol, and the labels show the total enrolment per TLS.
- SMC Sites: Yellow points.
- Neighbourhood boundaries: Grey lines, with neighbourhood names.

The areas with high potential students and poor access to TLSs are classified as high-priority intervention zones and are represented by higher values (red colours).

Then, **the Site locations overlapping pixels with high values should be considered as high-priority of intervention!**



Priority Sites

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Pixel values from areas of priority were added to the SMC Gaza Sites list :

- **Unmet demand values**, within a 300m and a 600 m radius.
- **Gap values**, within a 300 m and a 600 m radius.

The **Gap values i**ncludes the sum of both positive (unmet demand) and negative (surplus capacity) values, while the **Unmet Demand values** contains only the sum of positive values, representing areas where demand exceeds capacity within the indicated radius.

The Focal Statistics tool outputs were used to analyse spatial patterns within a 300-meter radius and a 600-meter radius. **The Sites with high potential students and poor access to TLS are classified as high-priority intervention zones and are represented by higher values**. By looking into the updated SMC Gaza Sites list, priority sites are identified where **both gap and unmet demand values are high** (e.g. purple rectangle and purple circle on the right-hand side of the slide), indicating a **critical need for additional educational resources**.

However, Sites where negative Gap values are observed should not be considered as high priority sites, as TLS surplus capacity was observed within the indicated radius.

As the 2SFCA method is not mass-conserving, and multiple Sites may overlay the same pixel (e.g. light-blue circle on the right-hand side of the slide), extracted Unmet demand values and Gap values do not reflect absolute unmet potential student counts.

AR	AS	AT	AU
Unmet_300m_radius	Unmet_600m_radius	Gap_300m_radius	Gap_600m_radius
2047	7379	2047	6630
760	5655	-333	3606
5650	14567	6212	15343
233	1239	-870	-2182
1582	11837	2809	12376
585	3100	583	2819



SUMMARY OF FINDINGS

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- A total of **770,422 potential KG and school-aged students** were estimated, based on the gridded population dataset, as of 01 March 2026.
- A total of **432,701 enrolled students** were identified among 613 TLSs, as of 30 June 2026. Therefore, approximately **337,721 KG and school-aged potential students remain underserved**.
- A total of **1,603 Sites** appear located **within a walking distance of 300m** from Temporary Learning Space, and **546 Sites** appear located **outside of a walking distance of 300m** from a Temporary Learning Space, as of 11 May 2026.
- Several population clusters remain underserved.
- New learning space investments should focus on identified hotspots. This may include expanding existing Temporary Learning Spaces (TLSs) or establishing new learning spaces where needed.

Interpretation and recommendations

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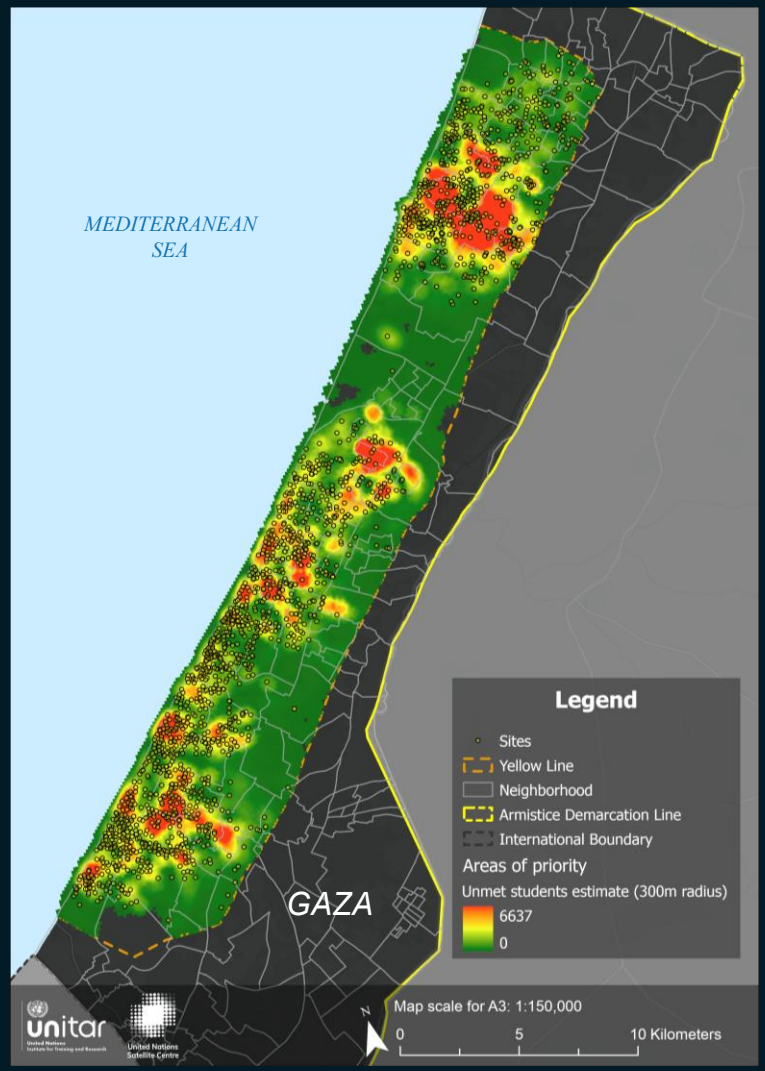
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Interpretation:

- Very high proportion of population clusters fall outside effective service areas.
- Unmet demand increase in high-density areas.
- Priority hotspots indicate candidate locations for future education investments.

Recommendations:

- Target interventions in identified hotspot areas.
- Conduct field validation.
- Assess land availability in priority zones.
- Evaluate candidate Temporary Learning Spaces locations.
- Implement network-based accessibility modelling.



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Data sources:

Temporary Learning Spaces data: oPt Education Cluster
Date: 30 June 2026

Sites data: Site Management Cluster (SMC)
Date: 11 May 2026

Population dataset: Real Good Research
Resolution: 100 m
Date: 01 March 2026

Foundational Literature:
Luo Wei & Fei Wang (2003). Measures of Spatial Accessibility to Health Care.

Resource:
Two Step Floating Catchment Area (using distance buffers) tool. By Soheil Hashtarkhani, The University of Tennessee Health Science Center.

Boundaries: OCHA, PCBS

Analysis: United Nations Satellite Centre (UNOSAT)
Production: United Nations Satellite Centre (UNOSAT)

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United Nations Institute for Training and Research

United Nations Satellite Centre

United Nations Satellite Centre (UNOSAT),
United Nations Institute for Training and Research (UNITAR)
7 bis, Avenue de la Paix, CH-1202 Geneva 2, Switzerland

T +41 022 917 4720
E unosat@unitar.org
www.unosat.org