

To: Chicago Public Schools - Department of Arts Education

From: Haedodam Kim

Subject: PA446 Final Project - Reflection Memo

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1. Executive Summary

This memo examines how neighborhood-level socioeconomic factors, such as poverty rate, racial composition, linguistic diversity, and adult educational attainment, are associated with Creative Schools Certification (CSC) outcomes across Chicago ZIP codes. Using merged data from the American Community Survey (ACS) and ArtLook's dataset, the project conducts ZIP code-level analysis through spatial mapping, regression modeling, an interactive dashboard, and a machine learning decision tree. Findings show that while CSC scores are unevenly distributed across the city, with higher scores concentrated in some northern and central ZIP codes, most socioeconomic variables exhibit weak linear or combinational relationships with CSC outcomes. This suggests that arts education access is shaped less by simple demographic characteristics and more by structural and institutional factors, such as staffing patterns, school resources, partnership networks, and the strength of local arts ecosystems. Based on these insights, this memo outlines key policy implications regarding equitable arts teacher allocation, targeted resource investment, community partnership development, and strategies to support more consistent arts education access across CPS.

2. Civic Problem Addressed

Arts education access within Chicago Public Schools (CPS) has long been shaped by structural and geographic inequities. Although CPS designates the arts as a "core subject," the quality and availability of arts instruction vary considerably across neighborhoods. Several persistent and interrelated problems illustrate this inequity:

2.1. Unequal distribution of arts teachers

- Many schools do not meet the CPS benchmark of "one arts teacher per 350 students."
- Arts teacher vacancies are disproportionately concentrated in South and West Side neighborhoods.
- Small schools and schools in low-income areas face the most consistent shortages.

2.2. Insufficient instructional time and program offerings

- Numerous elementary schools do not meet the required 120 minutes of weekly arts instruction.
- Many high schools offer only one or two arts disciplines, and some offer none at all.

2.3. Facility and resource disparities

- Some schools have dedicated arts spaces, studios, or performance areas.
- Others rely on multipurpose rooms, hallways, or makeshift spaces with limited materials and equipment.

This issue is more than a lack of programming; it is a public and educational equity problem. Arts education supports students' identity development, creativity, emotional well-being, and academic engagement.

Accordingly, this project centers on the following question:

“How are neighborhood-level socioeconomic factors associated with Creative Schools Certification (CSC) outcomes across Chicago ZIP codes, and what do these relationships imply for advancing arts education equity in CPS?”

3. Analysis steps

To understand how neighborhood conditions relate to arts education outcomes, I conducted a four-step analysis. First, I merged ZIP code-level socioeconomic indicators from the American Community Survey with Creative Schools Certification (CSC) data from ArtLook and cleaned the dataset to ensure accurate comparisons. Second, I created a spatial map of average CSC scores to identify geographic patterns in arts education access across Chicago. Third, I ran a regression model to test whether poverty, racial composition, linguistic diversity, or educational attainment were associated with CSC outcomes. To make the results accessible to non-technical users, I also built an interactive Shiny dashboard that allows stakeholders to explore these relationships visually. Finally, I applied a machine learning decision tree to examine whether combinations of socioeconomic variables could distinguish high- and low-performing ZIP codes.

4. Key findings

4.1. Arts educational access is geographically unequal across Chicago.

The spatial analysis revealed a clear North-South divide: ZIP codes in the North and central parts of the city generally had higher CSC scores, while many ZIP codes in the South and West Sides had lower scores.

4.2. Socioeconomic variables show weak relationships with CSC outcomes.

The regression results indicated that poverty rate, racial composition, linguistic diversity, and adult educational attainment did not strongly predict variations in CSC scores. Most effect sizes were small and statistically insignificant.

4.3. Educational attainment showed the connection.

In the decision tree model, the percentage of adults without a college degree emerged as the only meaningful split between High and Low CSC ZIP codes. However, even this relationship was modest and did not substantially improve prediction accuracy.

4.4. Neighborhood demographics alone cannot explain arts education disparities.

Together, the results suggest that ZIP code-level socioeconomic indicators are insufficient to explain differences in arts education access. Instead, disparities likely stem from structural factors, such as staffing patterns, school budget constraints, partnership networks, and historic disinvestment.

5. Ethics & Fairness Reflection

This analysis offers a data-driven view of arts education equity in Chicago, but several ethical and fairness considerations must be acknowledged when interpreting the results. Because the study relies on ZIP code-level data, the findings are subject to *aggregation bias*: a single ZIP code may contain schools with very different resources and student needs, meaning that ZIP averages do not fully represent conditions within

individual schools. CSC data also depends on school self-reporting, and schools with incomplete submissions, often those with fewer staff or limited capacity, may be underrepresented. Additionally, ACS socioeconomic indicators rely on five-year estimates, which may not capture recent changes in rapidly shifting neighborhoods.

There are also limitations in the analytical models. The regression and decision tree simplify arts education into relationships with only four socioeconomic factors, even though CSC outcomes are shaped by many structural elements such as staffing, facilities, partnerships, and budgeting. As a result, the findings should not be interpreted as causal, nor should any individual variable be seen as the sole driver of arts access. Machine learning results, in particular, may appear decisive but must be approached cautiously, as they emphasize patterns rather than underlying mechanisms.

For policymakers, the key message is that these results should be read as *diagnostic signals*, not ratings or judgments of communities. Lower CSC scores do not reflect resident characteristics but structural conditions that require additional support. The analysis should therefore guide investment and resource allocation, not punitive evaluation, and be used with awareness of its data limitations and the need for transparent, equity-centered interpretation.

6. Policy Implementation

The analysis suggests that arts education disparities in Chicago are driven more by structural conditions within schools than by demographic characteristics of ZIP codes. Based on these findings, several policy implications emerge.

First, resource allocation should prioritize structural needs rather than neighborhood demographics. Lower CSC scores should be interpreted as indications of staffing shortages, facility limitations, and insufficient partnerships, not deficiencies within communities. CPS should direct additional arts educators, materials, and operational support to ZIP codes and schools where structural barriers are most concentrated.

Second, investment in partnerships and community-based arts networks is essential. Because CSC outcomes are influenced by the presence of external arts partners, CPS can expand equity by facilitating more partnerships for schools in historically under-resourced areas. Strengthening collaboration between schools, local arts organizations, and teaching artists can help mitigate staffing and facility gaps.

Third, CPS should improve data completeness and transparency. Incomplete CSC submissions undermine accurate assessments of arts access. Providing schools with support for data reporting and integrating additional real-time indicators (e.g., staffing stability, partner engagement, facility usage) would help CPS better monitor inequities and allocate resources strategically.

Finally, policies must explicitly address equity and fairness. Schools with the greatest structural barriers should receive targeted, sustained support, and results should never be used for punitive ranking or accountability measures. Instead, findings should guide supportive interventions aimed at closing long-standing arts access gaps across the district.