Urban Violence Prevention as a Vehicle for Disaster Risk Reduction in Peru

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\textbf{ABSTRACT}

Sustainable mitigative and recovery planning for natural disasters requires both structural and social intervention acute to the contexts within which they are implemented. For the case of public schools in Lima, Peru, providing seismic safety for future disaster mitigation must be paralleled with necessary action for allaying violence affecting youth for holistic resilience and cohesion. The increase of school and gang violence in neighborhoods of Lima has necessitated governmental interventions through community-based partnerships toward crime reduction. This research provides an overview of Crime Prevention Through Environmental Design (CPTED), its applicability to the Peruvian setting, and suggests design proposals addressing both seismic security and violence alleviation. The report concludes by discussing the applicability of CPTED with sensitivity to cultural dynamics and resource availability, and considers future goals which employ social-structural improvements for similar environments in and beyond South America.

\textbf{Introduction}

The MIT Urban Risk Lab in collaboration with the Probabilistic Risk Assessment Program at The World Bank has supported the Lima Safe Schools project to implement techniques for seismic and social resilience in public schools within Lima, Peru. The Technical Assistance Project in Lima focuses on seismic strengthening and violence prevention with the Ministry of Education in Lima and the Ministry of Infrastructure as local clients, in efforts to expand methods and findings to greater Peru. The World Bank’s Disaster Risk Reduction group called on the consultancy of MIT’s Urban Risk Lab for sponsorship of integrated, contextually sensitive and design-based propositions. The objectives include increasing overall community resilience with unique and socially-sensitive strategies for school violence mitigation.

\textbf{Context}

Public schools in Lima are afflicted by both built environment structural concerns and social issues related to youth violence in neighborhoods. Nuances between districts exist, yet the

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presiding structural and social matters are pervasive throughout and beyond Lima.

**Structural Issues**

The typical public school site in Lima has modules of similar construction of varying stories and configurations. The three most common typologies are the Large School Units (c. 1948-1956), Module 780-Pre (c. pre-1997), and Module 780-Post (c. on or after 1997). The most vulnerable of these are the Module 780-Pre. These are described as modular buildings intended for classrooms, administrative and laboratory use, and represent 60% of the educational infrastructure in Lima. Module 780-Pre are built between the 1980’s-1990’s, before the E.030.NDSR 1997 building code was upgraded in Peru to target seismic vulnerabilities. The Module 780-Pre is expected to have poor structural performance due to the lack of rigidity in the longitudinal direction of the porches, as well as to suffer from a short-column effect and cracking walls [1].

**Violence and Crime in Public Schools**

Educational institutions in Lima and Callao, Peru, especially in areas of high poverty and crime rates, experience an increase in violence in both physical and psychological forms. Psychological violence includes beatings, racism, marginalization, harassment, intolerance, sexual violence, cyberbullying, etc. Given these circumstances, there is an increasing need for strategies and methodological work in contexts of risk and violence, which must also address the professional performance of staff and faculty along with the mental and physical conditions of students. The Global School Health Survey found that about half of the students (48%) report being bullied or humiliated within a month’s time, and 38% said have been physically assaulted in the past 12 months. Evidence points that in contexts of violence, the school plays a key role in generating protective factors that promote resilience in children and at-risk adolescents; however, this is not achieved when violence is reproduced within the school context [2].

**Escuelas Amigas**

Such circumstances backed by grave statistics prompted the Ministry of Education in Peru to establish an approach to ameliorate problems of school violence, starting first in Lima with potentials of expanding to greater Peru. The Escuelas Amigas (“Friendly Schools”) program involves working with principals, teachers, tutors, students, families and community members to build a healthy, nurturing and safe institutional atmosphere to promote positive socio-emotional development of students. The success of the Escuelas Amigas program relies on volunteerism and community proactivity, as members running afterschool workshops are generally unpaid. All activities and workshops are monitored by the specialized support team, and fostered by resources and training provided by the Ministry of Education [3].

**Crime Prevention Through Environmental Design (CPTED)**

Violence reduction in school settings and beyond can be influenced by spatial and programmatic factors. Crime Prevention Through Environmental Design addresses situational crime prevention with measures that reduce opportunities for particular types of crimes that may occur.
Programmatic methods address violence in terms of socio-economic and systematic improvements within a given context of urban crime [4].

**CPTED Design Guidelines**

First generation CPTED emphasizes principles of *Natural Surveillance, Natural Access Control, Territorial Reinforcement and Maintenance of Space* to increase opportunities of seeing and being seen as a critical factor over access to a given space as opposed to more intuitive actions such as oppressive fences which also reduce the physical quality of community life and reinforce a local fear of crime. Second generation CPTED extends beyond physical design to include social factors, consisting of risk assessments, socio-economic and demographic profiling as well as active community participation within the traditional CPTED framework. To the design-based principles is added another major aspect, that of *Community Participation* [5].

**Program Based Violence Reduction**

Following assessment of a neighborhood, members of the community with municipal governments can assist in formation of youth-based programs in and outside of local schools. Reducing school based situational violence through a *Pro-Youth Approach* can have significant and progressive impact toward violence reduction [6]. This approach invests in existing positive elements of a community by allowing youth to take lead and offering support to students in creating their own initiatives. Through both physical and programmatic mediations in districts facing violence amongst adolescents, an agenda can be created to increase alliances, security and the well-being of students and families in an area via social interactions and human capital already existing within their environs.

**Design Interventions and Proposals**

Following a site visit to various public schools participating in the Escuelas Amigas program in Lima during August 2013, challenges regarding violence and resource availability on campuses were observed. Using the CPTED guidelines presented previously, design improvements on the site-specific and urban context scales are suggested. An example of a site- or module- specific design proposal for Lima public schools is providing strategies for multi-purpose retrofitting of classroom modules, shown in Fig. 1. As lack of lateral strength proves to be a recurrent issue for seismic safety in school units, it also offers prospects for creative retrofit strategies during module upgrades. Such solutions should be cognizant of local resources and needs, and maintain the vernacular language of many Peruvian communities. Fig. 1. includes columnar support to increase shear force resistance from earthquakes as a basic structural retrofit. Addendums to this are large roof canopies to protect from the elements, inclusive of basic drainage systems to capture rainwater into barrels or garden boxes for potable water and to green the adjacent areas.

**Conclusions**

This study offers solutions that have scalable and incremental interventions for public schools in Lima, with the goal that greater Peru is able to espouse aspects of Crime Prevention Through Environmental Design. Many of these concepts are sensitive to the local construction style and
material availability, and maintain aspects of appropriate technologies per locale. There exists great potential for such proposals to have a far-reaching impact on other vulnerable places of education in Latin and South America. As seismic strengthening is mandated for schools in many regions of the world subject to prevalent earthquake hazards, with proper prescience and planning, social improvement can simultaneously be made possible through stated multi-purpose, technological upgrades. Future work will consider the seismic design and specificities of modular performance and influences of urban dynamics, as well as opportunities for deployment of proposals in varying contexts inter- and intra-Peru.

Figures and Tables

![Figure 1. Design Intervention: Multi-function Retrofit Strategies.](image)

References