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

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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.

STRUCTURAL CONTEXT
The typical public school site in Lima has modules of similar construction of varying stories and configurations. 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 were built between the 1980’s-1990’s, before the E.030.NDSR 1997 building code was upgraded in Peru to target seismic vulnerabilities. Architectural characteristics include a rectangular structure of reinforced concrete and masonry, with typical classrooms comprised of 780 cm per side. Usually, the modules have two to five adjacent classrooms per level, with one to two floors. Structurally, the Module 780-Pre features two porches with columns and beams of small dimensions in the longitudinal direction, as well as confined masonry walls and frames in the transverse directions. The roofs are made of lightweight reinforced concrete slabs. 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
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 they 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].

METHOD: CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN
Working in conjunction with the MOE and the Escuelas Amigas Program, the Safe Schools project prompted application of design based violence reduction that relied on concepts of Crime Prevention Through Environmental Design (CPTED).

Crime Prevention Through Environmental Design emphasizes 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]. First generation CPTED emphasizes principles of: Neighborhood Watch, Nonintrusive Access Control, Territoriality; 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 aggressive 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 [4].

DESIGN PROPOSALS (CONT.)
Multi-purpose Retrofitting 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. Many existing schools include make-shift canopies, and Lima’s desert climate attests to the benefits of a unified water catchment system on campuses. Such design interventions are cognizant of local resources and needs, and maintain the vernacular language of many Peruvian communities.

FUTURE WORK
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 CPTED. 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 elaborate on concepts as a design workshop at MIT in Spring of 2015.

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REFERENCES

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