On January 12, 2010 a magnitude 7.0 earthquake struck the Caribbean nation of Haiti, devastating the capital city of Port-au-Prince and the surrounding region. The earthquake killed 313,000 people, injured 300,000, and made 1,000,000 homeless (according to government estimates). Not only was Port-au-Prince affected, but many Haitian cities not directly affected by the quake have now swelled in population due to the arrival of earthquake refugees.

Already the poorest nation in the western hemisphere before the quake, Haiti has been crippled by this disaster and is in dire need of reconstruction in numerous fronts, education being a particular area of concern. Over 90% of the schools and universities in the earthquake zone have been destroyed, displacing around 400,000 students. Haiti’s educational standards have been historically low, with a literacy rate hovering around 50%. While free education is dictated by the Haitian constitution, the government is unable to provide this and thus 90% of primary schools are non-public (and thus costly). Thus most Haitians have to choose between and education and working for their families, and those that do send their children to school suffer a great financial burden to do so. Even so, many students that leave their studies to provide for their families return as adults to finish their education. Thus school grades do not always have a homogenous student age, and many schools offer adult classes in an evening shift.

Due to my strong interest in humanitarian design, and in schools as a typology, I propose to build an educational center for both school age children and adults in earthquake ravaged Haiti, one that offers both primary and secondary school education for children and youths, as well as classes and skills training for adults. In using Chris Alexander’s *A Pattern Language* as a starting point I hope to develop a cohesive project language centered on education; from the overall urban level down to the building level and even down to construction.
HAITI
Haiti is a Caribbean nation located in the western portion of the Island of Hispaniola, which it shares with the Dominican Republic. While it has some common links with its Hispano-Caribbean neighbours, it is the only predominantly Francophone independent nation in the Americas (although Haitian Creole, a mixture of French words and West African grammar, is the primarily spoken language), due to Spain seeding the western portion of Hispaniola to France in 1697. Becoming independent due to a slave revolt from France in 1804, Haiti becomes the first Black Republic and the first independent nation in Latin America. In spite of these early triumphs, the last 100 years of Haitian history have been marked by political and social instability as well as mass violence. Haiti is the poorest country in the Americas as per the Human Development Index, and its population is only 53% literate and most Haitians live on $2USD or less a day. As previously stated, the January 12, 2010 earthquake devastated Haiti, killing 313,000 people, injured 300,000, and making 1,000,000 homeless (according to government estimates).

PETIT-GOÂVE
Please note: this is one of a few sites the author is considering for this project. Petit-Goâve is a coastal city, 42 miles (68 kilometers) west of Port-au-Prince with a population is approximately 30,000 people. The town is one of the oldest cities of the country, and was named Goâve by the Amerindians. The Spanish called it Aguava at the end of the 16th century. After French colonization through the releasing of the Spanish, the French divided the city into two halves; Grand-Goâve and Petit-Goâve. Petit-Goâve became a wealthy settlement in the western half of Hispaniola and briefly became the “pre-capital” of Haiti when it was still the French colony of Saint-Domingue. Petit-Goâve was hit hard by the earthquake: 1,297 dead, 5,604 injured, 7,844 homes destroyed, 31,961 homes damaged, 59 schools destroyed, 38 schools damaged, 98,989 people in shelters, 4,800 internally displaced persons, arrived from outside of the area. Government buildings such as city hall and the public library where severely damaged, and with relief and media attention being focused on Port-Au-Prince, it has been largely ignored by rebuilding efforts.

Haitian flag and Coat of Arms.

Location of Haiti in world map, image of Haiti’s border with the Dominican Republic (right) shows the amount of deforestation on the Haitian side, and image of typical urban fabric dense with hand-made dwellings constructed of found materials.

Typical street in downtown Petit-Goâve, Rue Dessalines (proposed site is on this street), typical street in downtown Petit-Goâve. The buildings are dense but the street widths are comfortable.

Place d’Arms Grand Rue / Place Toussaint L’Ouverture, and Petit-Goâve Market are adjacent to the site. Buildings front directly onto the street and are built at the lot line; the “sidewalks” are incorporated into the porch space of the buildings themselves.
Petit-Goâve is a coastal city, 42 miles (68 kilometers) west of Port-au-Prince. The proposed site is on the corner of Rue Dessalines and Rue Républicaine. The site is in downtown Petit-Goâve, near public amenities such as the town square and town market. It is also adjacent to an elementary school destroyed by the earthquake that the author did design work for and is looking at the possibility of linking to this project.
The Haitian people have faced incredible adversity even before the earthquake. As previously stated, only about have of the country’s population is literate and most make only $2USD or less a day.

At the time of French rule, Haiti (then known as Saint Dominigue) was actually the wealthiest territory in the Caribbean, thanks in large part to the import of African slaves. Haiti was still a lush landscape in the beginning of the 20th century, with 60% of its original forest covering the lands and mountainous regions. Since then, the population has cut down an estimated 98% of its original forest cover for use as fuel for cook stoves, and in the process has destroyed fertile farmland soils, contributing to desertification. This inability to produce crops has ultimately led to massive rural to urban migration stretching Port-Au-Prince well beyond the breaking point. In the worst slum of the capital city, Cité Soleil, the people share their mosquito infested dwell with pigs - even though living in an dirty environment, it is very important for these proud folk to stay clean themselves.

The loss of land due to the rise of poverty and capitalism brought on by globalization have severely disrupted the traditional form of Haitian life. Traditionally a child is raised not only be his or her immediate family, but also by extended family members and supportive members of the community. The social disruptions of poverty have led a steep rise in single mothers.

In both rural and urban areas, men monopolize the job market. Only men work as jewellers, construction workers, general labourers, mechanics, and chauffeurs. Soaring food prices and limited access to food mean that many Haitians go hungry regularly and some resort to eating mud cookies that have little nutritional value.

Tap-taps are the most common means of public transportation - you “tap-tap” your coin on the side of the vehicle to request a stop. Only about 41 percent of the population has access to safe drinking water, and only 25 percent has access to sanitary sewer systems.

While there is much hardships, Haiti is a rich culture and Haitians strive to enjoy life as much they can. Carnival - the most popular and most anticipated cultural event of the year - begins in February and includes music, parade floats and people dancing and singing in the streets. Carnival week is traditionally a time of all-night parties and escape from daily life. Football (soccer) is the most popular sport in Haiti although basketball is catching on as well. Religion is a powerful force in Haiti. While about 85% of the population claim Christian beliefs, and the most professed denomination by far is Roman Catholicism, - an estimated 70% of Haiti’s population practice some form of voodoo.
Due to my strong interest in humanitarian design, and in schools as a typology, I propose to build an educational center for both school age children and adults in earthquake ravaged Haiti, one that offers both primary and secondary school education for children and youths, as well as classes and skills training for adults. I see this center as a possible catalyst for Haitian reconstruction, as children can get the basic education they need, whole adults can be skilled in the proper construction techniques and building trades as to aid in reconstruction efforts. Additional skills training in agriculture can bring personal security and help rebuild Haitian farmland as well as the build environment. Additionally the center can act as a economic incubator offering market space for local farmers and merchants and offering any relevant business classes for small scale Haitian entrepreneurs.

Urbanistically, taking into accounts patterns such as Network of Learning and University as a Marketplace, I propose to embed educational program elements into the surrounding urban context of the center. While I’ve initially studied Petit-Goâve as a possible site; I am also looking at other, more remote, cities for this study. I’m particularly interested at looking at cites that may haven been spare the worst of the direct earthquake damage, but are now dealing with the effects of overcrowcing due to the arrival of earthquake refugees.

As described in the above, the program for this center would be diverse, although all centered around education and teaching Haitians the knowledge and skills they would need in order to be self sufficient. Possible programmatic elements may include:

- Classrooms
- Studio space
- Library space
- Green House (for cultivation)
- Workshop (for electrical tools training)
- Market space

At this point the program is evolving to address different needs based on by ongoing research. While education will be the primary purpose of the facility, other programmatic elements will be introduced based on new information as it is discovered and analysed.

The following images represent examples of Haitian vernacular architecture, so called “gingerbread” houses, and the architecture of Petit-Goâve that could serve as inspiration for the project’s design. A lot of care has to be taken for this project to fit into the existing Haitian building typology, and not seem like a foreign imposition.
04. **PATTERN LANGUAGE DEVELOPMENT**

**REGIONAL LEVEL**
- The Distribution of Towns
- Lace of Country Streets
- Country Towns
- The Countryside

**URBAN LEVEL**
- City Country Fingers
- Community of 7000
- Network of Learning
  - Lakou (House Cluster)
- Life Cycle

**BUILDING COMPLEX LEVEL**
- University as Marketplace
- Educational Communities
- Inter-generational Education
- Master and Apprentice
  - Be Relatable

**CONSTRUCTION**
- Built to Last
- Local Builders
The Haitian capital of Port-au-Prince is severely overpopulated, with the mass exodus from rural to urban areas swelling the metropolitan area’s population to close to 3 million people by the end of the last century.

This overpopulation has completely crippled the capital’s infrastructure, while striping away resources for all other cities and towns in the country. Rural areas have suffered massive deforestation, which leads to mayor ecological and economic problems for the country as a whole. In order to properly rebuild Haiti, population growth within the capital must be stabilized, and Haiti must transition from a being country dominated by a single urban center to one with smaller urban “growth poles”.

**SOLUTION**
Encourage a birth and death process for towns within the region, which gradually has these effects:

1. The population is evenly distributed in terms of different sizes - for example, one town with 1,000,000 people, 10 towns with 100,000 people each, 100 towns with 10,000 people each, and 1,000 towns with 100 people each.

2. These towns are distributed in space in such a way that within each size category the towns are homogeneously distributed all across the region. This process can be implemented by regional zoning policies, land grants, and incentives which encourage industries to locate according to the dictates of the distribution.

   towns of 1,000,000 – 250 miles apart
   towns of 100,000 – 80 miles apart
   towns of 10,000 – 25 miles apart
   towns of 1,000 – 8 miles apart
**04. PATTERN LACE OF COUNTRY STREETS**

**PROBLEM**
Many people want to live in the country, and they also want to be close to a large city. But it is geometrically impossible to have thousands of small farms, within a few minutes of a major city center. To live well in the country, you must have a reasonable piece of land of your own and you must have immediate access to continuous open countryside. To have quick access to the city, you must live on a road, within a few minutes’ drive from city centers, and with a bus line outside your door. It is possible to have both, by arranging country roads around large open squares of countryside or farmland, with houses closely packed along the road, but only one house deep.

**PATTERN**
The suburb is an obsolete and contradictory form of human settlement.

*Uncontrolled urban and sprawl chokes the land of it’s value as farmland, places even more stress on the central urban area, and robs neighbouring rural areas of opportunities for growth.*

**SOLUTION**
In the zone where city and country meet, place country roads at least a mile apart, so that they enclose squares of countryside and farmland at least one square mile in area. Build homesteads (*lakous*) along these roads, one lot deep, on lots of at least half an acre, with the square mile of open countryside or farmland behind the houses.
A constant stream of migration out of rural areas to the nation’s capital leaves those communities behind in disarray and continues to overcrowd Port-au-Prince. The few public schools are located in highly urbanized areas such as the country’s capital of Port-au-Prince and Haiti’s rural areas lack basic infrastructure. Unless steps are taken to recharge the life of country towns, the city will continue to swap these areas, the cycle of poverty will continue, and Haiti will continue to be unable to provide for it’s people.

Preserve country towns where they exist; and encourage the growth of new self-contained towns, with populations between 500 and 10,000, entirely surrounded by open countryside and at least 10 miles from neighbouring towns. Make it the region’s collective concern to give each town the wherewithal it needs to build a base of local industry, so that these towns are not dormitories for people who work in other places, but real towns - able to sustain the whole of life.
PROBLEM
Haiti was still a lush landscape in the beginning of the 20th century, with 60% of its original forest covering the lands and mountainous regions. Since then, the population has cut down an estimated 98% of its original forest cover for use as fuel for cook stoves, and in the process has destroyed fertile farmland soils, contributing to desertification. This inability to produce crops has contributed to the massive rural to urban migration stretching Port-au-Prince well beyond the breaking point.

In order to help reforestation efforts, we must foster a sense of ownership and stewardship towards the land. This will help Haiti not only ecologically, but economically (by kick starting agriculture) and socially (by fostering a return to a traditional agricultural way of life).

PATTERN
I conceive that land belongs for use to a vast family of which many are dead, few are living, and countless members are still unborn. - a Nigerian tribesman

SOLUTION
Define all farms as parks, where the public has a right to be; and make all regional parks into working farms.

Create stewardships among groups of people, families and cooperatives, with each stewardship responsible for one part of the countryside. The stewards are given a lease for the land, and they are free to tend the land and set ground rules for its use - as a small farm, a forest, marshland, desert, and so forth.
**PROBLEM**

Port-au-Prince is a dense city, one with the in which rapid urban growth has overtaken the central city, destroying any green space in it’s path and replacing it slums.

For Haiti to rebuild it’s cities and infrastructure, a progressive planning policy incorporating green space into it’s urban areas must be put in place.

**PATTERN**

Continuous sprawling urbanization destroys life, and makes cities unbearable. But the sheer size of cities is also valuable and potent.

**SOLUTION**

Keep interlocking fingers of farmland and urban land, even at the center of the metropolis. The urban fingers should never be more than 1 mile wide, while the farmland fingers should never be less than 1 mile wide.
PROBLEM
People can only have a genuine effect on local government when the units of local government are autonomous, self-governing, self-budgeting communities, which are small enough to create the possibility of an immediate link between the man in the street and his local officials and elected representatives.

PATTERN
*Individuals have no effective voice in any community of more than 5000-10,000 persons.*

SOLUTION
Decentralize city governments in a way that gives local control to communities of 5,000 to 10,000 persons. As nearly as possible, use natural geographic and historical boundaries to mark these communities. Give each community the power to initiate, decide, and execute the affairs that concern it closely: land use, housing, maintenance, streets, parks, police, schooling, welfare, neighbourhood services.
If Haiti is to escape the poverty trap and emerge as a developing nation in the 21st century, it must find new ways to educate its people. Since the traditional European model of education has failed here, it is time to transition to a more hands-on approach that can teach both knowledge and practical skills while having the additional benefits of being an economic driver. In a society which emphasizes teaching, children and students - and adults - become passive and unable to think or act for themselves. Creative, active individuals can only grow up in a society which emphasizes learning instead of teaching.

Instead of the lock-step of compulsory schooling in a fixed place, work in piecemeal ways to decentralize the process of learning and enrich it through contact with many places and people all over the city: workshops, teachers at home or walking through the city, professionals willing to take on the young as helpers, older children teaching younger children, museums, youth groups travelling, scholarly seminars, industrial workshops, old people, and so on. Conceive of all these situations as forming the backbone of the learning process; survey all these situations, describe them, and publish them as the city's “curriculum”; then let students, children, their families and neighbourhoods weave together for themselves the situations that comprise their “school” paying as they go with standard vouchers, raised by community tax. Build new educational facilities in a way which extends and enriches this network.
PROBLEM
A major component of Haitian vernacular dwelling is the lakou. Lakou (creole for backyard) refers to a community space composed of houses arranged around a central garden or gathering space. Multiple generations of the same family live within the lakou, with the garden space providing needed substance to the family as they cultivated what they needed to survive, allowing them to be not completely dependant on the outside world. Lakou also refers to the inhabitants of these dwellings themselves, the extended multi-generational family form prominent in Haitian culture. As this system is heavily intertwined with land ownership; the loss of land due to the rise of poverty and capitalism brought on by globalization have severely disrupted this system, causing a major shift in Haitian family structure and parenting.

PATTERN
You cannot rebuild a country without first reestablishing and strengthen their traditional family structure. Reintroducing and reinforcing traditional dwelling types can help us greatly.

SOLUTION
Encourage the development of lakous in rural areas in tandem with reforestation efforts and agriculture. Develop a network of lakous along country roads that connect larger town and cities (see “Lace of Country Streets”) and develop any new small rural town of village as an agglomeration of lakous (see “Country Towns”).
04. PATTERN LIFE CYCLE

**PROBLEM**
To live life to the fullest, in each of the seven ages, each age must be clearly marked, by the community, as a distinct well marked time.

This passage of time is well accounted for in traditional Haitian society, with multiple generations of one family living in one lakou. This must be understood and accounted for in any project that seeks to provide educational opportunities for people of many varying ages.

**PATTERN**

All the world’s a stage,
And all the men and women merely players:
They have their exits and their entrances;
And one man in his time plays many parts,
His acts being seven ages.
(Infant, Schoolboy, Lover, Soldier, Justice, Old Age, Second Childhood and Death)

(Shakespeare, As You Like It, II.viii.)

**SOLUTION**

Make certain that the full cycle of life is represented and balanced in each community. Set the ideal of a balanced life cycle as a principal guide for the evolution of communities. This means:

1. That each community include a balance of people at every stage of the life cycle, from infants to the very old; and include the full slate of settings needed for all these stages of life;
2. That the community contain the full slate of settings which best mark the ritual crossing of life from one stage to the next.
PROBLEM
With Haiti’s currently decimated educational system, a new paradigm must be established to bridge the educational gap. These new institutions must provide free and open education to the any Haitian people, in any of the skills and subjects they need to learn, and do so in an open manner not bogged down by administrative red-tape.

PATTERN
Concentrated, cloistered universities, with closed admission policies and rigid procedures which dictate who may teach a course, kill opportunities for learning.

SOLUTION
Establish the university as a marketplace of higher education. As a social conception this means that the university is open to people of all ages, on a full-time, part-time, or course by course basis. Anyone can offer a class. Anyone can take a class. Physically, the university marketplace has a central crossroads where its main buildings and offices are, and the meeting rooms and labs ripple out from this crossroads - at first concentrated in small buildings along pedestrian streets and then gradually becoming more dispersed and mixed with the town.
**PROBLEM**
While free education is dictated by the Haitian constitution, the government is unable to provide this and thus 90% of primary schools are private (and thus costly). Thus most Haitians have to choose between education and working for their families, and those that do send their children to school suffer a great financial burden to do so. Since education is such a burden, only children that excel in school is considered for continued education. Even so, many choose to come back as an adult to continue their education, so ages at primary grade levels are not homogeneous. Additionally, many schools double as vocational schools at night - teaching things like agriculture, sewing, tailoring, home economics, computer, carpentry, masonry, electricity, and plumbing to adults.\(^{19}\)

**PATTERN**
Education must address the needs of both young and old, simultaneously, and not show a preference of one over the other.

**SOLUTION**
Following the *Network of Learning and University as a Marketplace*, a new paradigm must be established for the education of both children and adults in all new learning centers.

Create all new educational centers with space for both children and adults, keeping them separate but not isolated from each other in order to address their different needs (primary education vs skills training). Design the facility in such a way that it can be open day and night securely in order to meet the needs of all different users.
**PROBLEM**

Learning by assisting a skilled master is the simplest way of acquiring knowledge, and it is powerfully effective. By comparison, learning from lectures and books is dry as dust.

In a society where a typical “book learning” model of education has failed, a return to a traditional master and apprentice model is a welcome change, that has economical as well as educational benefits by employing local artisans to teach each new class of apprentices.

**PATTERN**

The fundamental learning situation is one in which a person learns by helping someone who really knows what he is doing.

**SOLUTION**

Arrange the work in every workgroup, industry, and office, in such a way that work and learning go forward hand in hand. Treat every piece of work as an opportunity for learning. To this end, organize work around a tradition of masters and apprentices: and support this form of social organization with a division of the workspace into spatial clusters - one for each master and his apprentices - where they can work and meet together.
PROBLEM
In far too many examples of post-disaster reconstruction, the work is done quickly and cheaply, with the mentality of getting people into shelter as quickly as possible. This results in structures that are not built for permanence that can fail in the case of another disaster (see Build to Last) and that often disregard local vernacular, culture, and local needs in favor of what the organization that is doing the rebuilding thinks is best. This often leads to the local population abandoning these new shelters and doing the rebuilding themselves.

PATTERN
Reconstruction efforts must not only rebuild buildings and infrastructure; they must also work to strengthen and sometimes rebuild the local culture.

SOLUTION
Therefore; build all new buildings and infrastructure taking into account all local building practices and responding to the local vernacular. Building upon this vernacular allows us to not only have a design to speaks to the local cultural identity (we must avoid at all cost the feeling of something foreign being imposed), but it will also give us a guide to follow in terms of building comfortable structures in the local environment.

In terms of Haitian vernacular, there are two elements to consider including in reconstruction efforts (along with other such as the aforementioned Lakou). One is the galri (the external room or veranda found in many Haitian structures) and the jaden (the small garden adjacent to the house). This elements resurface again and again in the study of Haitian vernacular.
PROBLEM
As demonstrated in earlier patterns, with the failure of the traditional mode of education in Haiti (one that focuses on individual study, with each subject closed off from the other) a new paradigm must emerge in order to educate the Haitian people. This new educational focus should be a community based approach, one that emphasises working together toward common goals as is the traditional way of Haitian life and child rearing (see Lakou). Any new dedicated school should enable this form of communal learning, and complement other non-traditional forms of learning (see Network of Learning, and University as Marketplace).

PATTERN
Education can be a great way to reinforce traditional cultural forms. A community learning together a variety of interrelated skills and subjects works better than the failed model of individuals being taught a series of different subjects.

SOLUTION
Therefore, build all schools in a model following the lakou. Cluster child classrooms and adult skills training around a central courtyard, one that serves both as public plaza and as a classroom for farming and gardening. Have free access from one classroom, shop, and lab to the next, to encourage learning by proxy, and discovery of new interests. Have masters teach new students by doing, and each graduating class teaches the next. Instead of different instructors teaching in a bubble, all course work is to be interconnected, all working toward a common goal of learning. When a student is under performing in one subject over the other, the whole community comes to he student’s aid, not just the core subject instructor.
PROBLEM
Natural disasters alone are not directly responsible for catastrophe, badly planned buildings and infrastructure are. No new building, as great as it may be, is going to be effective if people are going to be afraid to use it, in fear of it being unsafe.

PATTERN
Buildings and infrastructure must be built to last, and survive (or at least better endure) the next catastrophe. But at the same time we must build in a way that the local artisans can understand, in order for it to be easily adopted into future reconstruction efforts.

SOLUTION
Therefore; we must find a way to improve the concrete construction that is typical in Haiti. One way to do this is with confined masonry. Confined masonry construction is practiced in many countries with high seismic risk, and can be built with local materials with minimally trained labor according to regional construction practices. Confined masonry consists of unreinforced-masonry load baring walls surrounded (confined) by slender reinforced tie columns and reinforced concentrate that provide a complete load path to transfer seismic forces to the ground. Masonry walls would be made out of concrete block, and recycled rubble could act as the aggregate. Foundations and ground floor slabs could also make use of recycled concrete debris.21
While the earthquake was a disaster for the Port-au-Prince region and Haiti as a whole, Haiti’s problems began decades before the earthquake struck. Already the poorest country in the Americas before the earthquake, Haiti’s economy is in shambles and there is a great need to jobs as well as reconstruction. Since we can create a sense of ownership when people take a part in own rebuilding, there is a synergy that can be achieved between these needs. Portland’s Mercy Core has implemented a similar program where they provide the funds to remote Haitian villages for them build a projects of their own choosing.24

People feel like they are truly owners of post-disaster structures when they are a pat of the rebuilding efforts themselves.

Therefore; hire local craftsmen to build post-disaster structures under the supervision of the rebuilding team. This provides an economic boost to the local community, while ensuring that there will be skilled labor available for future rebuilding efforts (the construction practices need to be easy to learn, see Build to Last). Use the construction of these structures as an educational opportunity to teach construction to another generation, involving even more stakeholders into the project.
I’ve found this process of using patterns to develop this thesis project extremely helpful; not only in terms of defining the architectural project of the project, but also in helping me define what is I want to achieve with this project. In going through Alexander’s book helped me clarify and strengthen ideas I already had, while linking to other related ideas (patterns) to increase the project’s richness. Often times I sat down and started looking at A Pattern Language with only a vague, and undefined idea of the final result I wanted to achieve, only to find it fully articulated in Alexander’s writing. Network of Education and University as a Marketplace where invaluable patterns in helping me define the urban scope of this project. The study of other work using the pattern language approach, particularly the work of Christopher Andrews in studying Kreyol Haitian Patterns, has been a tremendous help in understanding not just the needs, but also the culture of the people I am designing for. I am eager to advance to the next step and apply what I’ve learned in studying patterns languages into a cohesive project to address the needs of the Haitian people.
26. **ANOTATED BIBLIOGRAPHY**


7. Architecture for Humanity.


11. Architecture for Humanity.

12. Ibid.

13. Ibid.


17. Holl et. all.

18. Edmond et all.


21. Holl et. all.
