

## Investigation of Effects of Natural Lighting on the Well-Being of Inmates in the Design of a Juvenile Correction Center, Lagos State, Nigeria

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### **Abstract**

*In this paper, I ask whether the admission of light truly affects the inmates of a juvenile correction center in Lagos state. This is an important question to address as it brings to exposure and ascertains the quality of living that inmates are afforded. In juvenile institutions, utilizing natural light has purposes beyond energy conservation or code compliance. In order to successfully reintegrate young criminals into society, juvenile institutions are essential to their rehabilitation. The knowledge and training of the staff members, who look after and support the juvenile offenders, is essential to the efficiency of these institutions. This paper examines the importance of natural lighting in juvenile institutions, looking at important findings, comments, suggestions, and closing thoughts. It involves establishing an environment that is therapeutic, positive, and caring in order to promote growth. The significance of natural lighting in juvenile institutions and its advantages for both inmates and staff are discussed in this article.*

**Keywords:** Correction center, Inmates, Juvenile, natural lighting,

### **1.0 Introduction**

Anyone who works or lives in a correction facility may already know intuitively that the atmosphere inside has an impact on inmates' well-being. This may seem like a no-brainer, but it shows how important the environment is. Many scholars are interested in exploring how it should be changed or rebuilt. When it comes to the design of a correctional facility, many considerations are involved. From an environmental standpoint, the surroundings must be more serene in order to facilitate constructive and encouraging encounters amongst less stressed individuals who can sleep well and who can gain from having access to natural daylight. It is plausible to conclude from several studies that prisons are places where punishment and retaliation are prioritized above rehabilitation. Many times, people assume that because of their bad behavior, inmates are hopeless. (Cengiz, 2022, Reddon, 2019). The article advances the idea that institutional spaces and locations may have several levels of meaning and that the people who live and work there are profoundly impacted psychologically and physiologically by the architecture and design of these places. In contrast to a civilized normal existence, the life of an inmate is subject to strict regulations that limit their capacity to give certain services to people and to respect their rights in a way that may be perceived as restricting their freedom.

Numerous design principles have their meeting place in the field of prison-built environment studies. It makes logical that the activities that the architects specifically plan can organically lead to the constructed environment of the jail. Prison architecture knowledge is only the result of certain techniques, their underlying epistemological presuppositions, and institutional frameworks that support the creation of knowledge. Control architectures have been thought of as ways to guide and/or forbid particular kinds of behavior in a specific area.

When it comes to the rehabilitation and reintegration of young lawbreakers into society, juvenile institutions are essential. Although the services and activities provided by these institutions receive

a lot of attention, juvenile growth and well-being can also be greatly impacted by the physical surroundings. Natural lighting is one of the most important design components; it not only sets the mood but also has an impact on behavior, mental health, and overall rehabilitation results. People are treated differently by others depending on how they are viewed. The way people see their surroundings influences how they act in them. Adopting policies and renovating juvenile institutions with an emphasis on natural light can help facility administrators and policymakers improve resident outcomes and rehabilitation program efficacy. The advantages of natural lighting go far beyond energy savings, from lowering recidivism rates to fostering mental health, making it an investment in our children's future that will pay off.

The juvenile center's inability to satisfy the demands of both reintegration and punishment exposes its contradiction. The purpose of this essay is to provide a sketch of how prison design incorporates natural illumination as a means of regulating behavior. to research how control designs physically prohibit or guide a certain kind of conduct in addition to controlling user behavior through the built environments' psychological impacts.

## **2.0 Literature review**

In order to identify pertinent studies for the literature review and to explain why particular environmental features and design recommendations can be reasonably expected to influence treatment outcomes in juvenile units, the report proposes an evidence-informed design model. The design model incorporates elements that are mostly derived from the author's significant body of work on the design of juvenile facilities and natural lighting. In addition to producing testable predictions, the model is grounded on tenable and logically consistent reasoning.

### **2.1 Objectives of this report**

Determine empirical research that is pertinent to comprehending the relationships between resident stress, aggressive behavior, and treatment outcomes and the physical lighting features of juvenile institutions.

Provide a design model or theory for juvenile residential units with the aim of enhancing natural lighting in order to address the lack of empirically supported architectural theory for the construction of detention facilities. According to the theory, if juvenile physical environments are designed with:

- 1) Well-arranged spaces that ensure inmates' comfort and natural lighting, then aggressive behavior can be reduced and the quality of treatment/rehabilitation outcomes can be improved.
- 2) Multiple distinct, scientifically supported environmental features that reduce stressors like noise and crowding.

Strike a balance in the content between being realistically helpful for the construction of juvenile institutions and, on the other hand, being responsible and supported by science. Communicating with a wide range of people is one of the report's objectives. These people include managers, employees, security and medical professionals, architects, researchers, and the general public.

### **2.2 Case Study of Abdulwazaid's Research**

The journal was developed to promote communication and serve as a model that fosters a special kind of relationship between the locals and minors. Because of how well this encounter went, it was seen as a useful reference for this thesis. Lujain's study examined three juvenile facilities to have a comprehensive understanding of the development of an appropriate and full juvenile detention center

with all the facilities and services that will be required. The first facility is the Sonoma County Juvenile Center in Santa Rosa, California. Its information was sufficient to help with the research into the juvenile detention facility. The second institution, the Boone County Juvenile Justice Center in Boone County, Missouri, contributed information to the center's design as well. The third design is the monolithic domes for the design of prison and juveniles.

### **2.2.1 Sonoma county juvenile center**

This facility is a ranch/camp site program designed especially for young female offenders between the ages of 12 and 18. Given the center's remarkable performance and the fact that there are comparatively less female offenders in the region, it is advised that they also accept male offenders. Since then, in 1981, the Sierra Center has been available to both male and female offenders.

In order to create a special contact between them, the center aims to promote engagement between minors and community members. The creation of the aftercare plan was motivated by the great success of this engagement. In order to encourage young people and their families to have a brighter future and to guarantee a smooth transition back into the family, the aftercare service plan offers assistance, structure, and a feeling of responsibility.



*Figure 1: Sonoma County Juvenile Center (Source: Abdulwazaid, 2020)*

### **2.2.2 Boone county juvenile justice center**

The 13th Judicial Circuit Court selected the Boone County Youth Justice Center as its detention facility. The court's order states that the juvenile evaluation service and the necessary short-term care were located. In order to reduce the facility's personnel needs, the architectural layout is made to maximize visibility. John Simon was the project architect for the Boone County Juvenile Justice Center, which was designed by Simon Associates Incorporated. The Juvenile Justice Center, located at 1900 Prathersville Road in Columbia, Missouri, was originally intended to be expanded and renovated. However, the project concept was modified after considering probable construction interruptions and evaluating if upgrading existing facilities was feasible. The cost analysis showed that the new building can be developed within the construction budget set aside to renovate the existing building, and that the existing center will meet other county needs while the new building is better organized and fully ADA compliant.



Figure 2: Boone County Juvenile County Center (Source: Abdulwazaid et al., 2020)

### 2.2.3 Monolithic domes for the design of jails, prisons and juveniles

The concept of a monolithic dome is well-suited for the design of a jail or prison because it is a large structural dome that is well-designed for prisons and jails. It also specifically satisfies the design requirements for such correctional facilities. The interior plan of the dome is united by a common central space that is surrounded by the cells. A jail or prison that is built in a circular form is more functional in that it is an incarcerating facility because there is a better view of what is going on around. Additionally, because sprayed concrete is widely known to be much stronger than conventional concrete, the monolithic dome concept is ideal for jail or prison design. It also adds to the decrease of the quantity of heating and cooling necessary in the building. Thus, the speed of the building is substantially boosted, resulting in a high speed of the whole development of the monolithic dome, from design to finish



Figure 3: Monolithic domes for the design of jails (Source: Abdulwazaid et al., 2020)

### 2.3 Space Programs

The administrative building, manager head office, housing, education zone, health zone, recreation, dining hall, religious services, control unit, and parking zone make up the aggregated space program for the three buildings. The project's largest zones are the parking and education areas, which make

up around 24.74% and 15.77% of the total. The computed spaces have a total estimated area of 30,320.20 m<sup>2</sup>.

**Table 1. Space Program of main zones**

Space	Percentage (%)	Approximate Area (m <sup>2</sup> )
Entrance/ Administration Building	1.54	467.5
Manager Head Office and Assistance	0.42	129
Housing (Maximum Security)	12.11	3671
Housing (Medium Security)	14	4243.5
Housing (Minimum Security)	11.67	3540
Academic/ Vocational Education	15.77	4780.5
Health/ Medical and Psychological Treatment	2.12	643.2
Indoor and Outdoor Recreation	9.35	2834.5
Dining Hall and Food Preparation	1.86	564
Religious Services	5.16	1566
Control Unit	1.26	381
Parking Services	24.74	7500
<b>Total Approximate Area of Spaces (m<sup>2</sup>)</b>	<b>100</b>	<b>30320.2</b>

Figure 4: Table of space program of main zones (Source: Abdulwazaid, 2020)

Constructor, circulation, and HVAC are other vital functions that are factored into the overall approximate area of spaces in the center; these are displayed in Table 2.

**Table 2. Space Program of other services**

Service	Percentage (%)	Approximate Area (m <sup>2</sup> )
Constructor	6	1819.2
Circulation	30	9096
HVAC	10	3032
<b>Total Approximate Area (m<sup>2</sup>)</b>		<b>13947.2</b>

Figure 5: Table of space program of others services (Source: Abdulwazaid, 2020)

## 2.4 Juvenile Behavior and the Built Environment

The high number of minors incarcerated in adult jails and the dilapidated condition of juvenile rehabilitation facilities throughout Nigeria continue to be stark realities (Adetula et al. 2010). The juvenile justice system of children and young people's legislation explains that juveniles are punished differently than adult convicts since their needs are quite different from those of adults. This should be taken into consideration. Instead of imposing punitive measures on juvenile offenders, rehabilitation and change are more important. Environmental psychologists have also investigated the role of architectural design in improving human behavior and have found a link between the built environment and human behavior (De Young, 2013). The foundation of behavioral theory and psychology is the notion that all behaviors are learned via contact with the environment, and that our reactions to external cues determine our behavior.

This link was described as architectural determinism by Bell et al. (1996), who explained that architecture immediately improves and remolds the behavior of individuals around and inside its surrounds. This sheds further insight on the idea of environmental determinism, which, in its most extreme version, holds that behavior is solely or mostly caused by the physical environment. Concerning environmental determinism, these notions of environmental probabilities and possibilities. The environmental perspective sees the environment as offering us chances and possibly imposing boundaries on our actions. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) (2000) defines behavior modification as the process through which an individual responds to situations or behaves, leading to the realization that behavior is our actions toward people, things, objects, and circumstances. Items. It may be detrimental or beneficial. Depending on social norms, it may be considered normal or deviant. In addition to trying to normalize activities that seem abnormal or more like abominations, society will constantly want to modify unacceptable behaviors.

By altering the environment in which the behaviors take place and teaching prosocial habits, environmental intervention is proactive and culturally sensitive in nature and aims to stop juvenile offenders from participating in problem behaviors.

In order to assist adolescents develop the social and behavioral competencies necessary to thrive in an inclusive setting, positive environmental interventions can also be used.

It has been observed that the way the architectural environment is perceived and comprehended, particularly in rehabilitation institutions, affects how the convicts behave there. It could have a favorable or negative impact. The constructed surroundings greatly influence how people behave and think as they grow. All human-made structures, such as buildings, roadways, sidewalks, and other utilities, are included in this built environment. It refers to the integrated constructed environment in which people reside, which has a wide range of effects on people's attitudes and behaviors (Mazumdar, 2000). The physical characteristics of colonies, namely the structural, environmental, proximity, infrastructure, and service aspects that constitute the fundamental component of the built environment, are how Rama, Waid & Clement (2001) characterized the built environment. As a result, both positive and negative environments will have a negative impact on people's ability to grow normally through perception (Malekpour, 2007).

## **2.5 Conceptual model for designing youth living units to improve outcomes**

As previously said, the report's primary goal is to offer a conceptual model to address the lack of natural lighting in juvenile detention facilities, which is expected to enhance treatment results and safety. Finding design elements that are sufficiently clearly defined and explained to allow for practical usage by managers, employees, and architects as well as replication or testing by researchers was a key factor in the model's development. A design component must be supported by reliable research to be included in the model. This study should show a connection between quantifiable changes in stress, aggressive behavior, and/or other outcomes and changes in the lighting environment. The design model needs to be able to produce testable predictions and be grounded on reasonable and coherent reasoning. An ordered framework for finding pertinent studies from the literature review and an explanation of why certain environmental characteristics and the design recommendations covered in later sections can be expected to have an impact on outcomes in juvenile centers should be provided by the design model or theory. A significant portion of the design models strongly references earlier studies on related topics. These are some of the model recommendations.

## **2.6 Maximizing Daylight Penetration**

Despite a reduction in interior quality, the building's lack of use of daylight poses serious problems for design in three areas: the economy, human health and welfare, and the environment. In terms of the economy, it is the reason behind rising electrical energy costs and declining efficiency; in terms of hygiene, it lowers users' physical and mental well-being; and in terms of the environment, it is the source of rising pollution brought on by the burning of fossil fuels.

Juvenile spaces are typically small buildings. Due to their narrow width and utilitarian design, urban jails feature deeply curved areas. One of the main issues with these types of spaces is the non-uniformity of light across the depth of the plan. In actuality, when one gets farther away from the window, the practical depth of daylight seldom grows beyond twice the height of the aperture.

The side window lets in light, which often produces a lot of light near the window and relatively little light at the end of the space. One of the most crucial goals throughout the day is to make the room's light distribution diagram less steep so that more light enters the space from side windows and to make the room brighter overall. Despite the common belief that the southern side of the spaces has adequate lighting, there is no assurance that the quality of the light will be consistent throughout the year and high light in one area does not always indicate a uniform distribution of light across the whole space. (Faizi et al., 2016)

## **2.7 Light reflective surfaces**

Adding light-reflective surfaces to a juvenile center is a smart operational move that maximizes the advantages of natural lighting in the space. These surfaces, which are positioned thoughtfully throughout the facility, are essential in optimizing the distribution and dispersion of natural light, which enhances the atmosphere and wellbeing of both staff and prisoners. By reflecting light back into the interior areas, light-colored walls, ceilings, and floors help make the most of the natural light that is available. This helps achieve sustainability and energy savings objectives by lowering the need for artificial illumination during the day. It has been demonstrated that increases in natural light exposure positively impact mood, productivity, and general well-being. The mental health and emotional fortitude of both personnel and convicts may be improved by adding light-reflective surfaces to juvenile institutions, which will make the environment brighter and more upbeat. It is best to strategically position light-reflective surfaces in regions where they can efficiently catch and disperse ambient light. To optimize their impact, reflective finishes or panels may be placed next to windows, hallways, and other busy areas. To guarantee peak performance throughout time, light-reflective surfaces must be kept clean and in good condition. Frequent maintenance and cleaning aid in preventing the accumulation of dust, grime, and other impurities that may reduce the surfaces' ability to reflect light. Adding light-reflective surfaces to juvenile facilities is a sensible and economical operational way to maximize the benefits of natural lighting. Juvenile facilities may create environments that are lighter, cozier, and more positive by carefully integrating these surfaces into the constructed environment. This will support the rehabilitation and general well-being of both the staff and the inmates.

## **2.8 Outdoor spaces and Landscaping**

The way the environment is arranged is crucial to the design as every section needs to be under faculty supervision but still provide the young people a sense of protection and freedom (Takamine, 2013). A vital part of offering chances for leisure, unwinding, and connecting with nature is landscaping and outdoor areas. Staff and inmate rehabilitation can be improved by these outdoor spaces by utilizing strategically placed plants and natural components. Outdoor areas provide

chances for exercise, exposure to natural light, and fresh air, all of which are critical for preserving physical health and wellbeing. For both staff and convicts, participating in outdoor leisure activities like sports, gardening, or walking may lift spirits, lower stress levels, and increase general fitness. Outdoor areas offer environments for staff and convicts to socialize, work together, and foster a sense of community. In the context of the juvenile center, shared outdoor activities and get-togethers promote cooperation, communication, and the growth of healthy connections. This creates a feeling of support and belonging. It has been demonstrated that being around greenery, trees, and other natural components offers therapeutic benefits. These benefits include lowering emotions of anxiety, despair, and anger as well as fostering a sense of serenity and connectedness to the surroundings.

## **2.9 Staff training and Awareness**

Creating a friendly and productive atmosphere in juvenile institutions requires staff awareness and training. Training programs may boost rehabilitation results, improve treatment quality, and foster a good workplace culture by arming staff with the information, abilities, and tools necessary to recognize and meet the special needs of juvenile offenders. Education on teenage growth, encompassing cognitive, emotional, and social stages, ought to be a part of staff training programs. Staff members may more effectively support juvenile offenders' rehabilitation and cultivate relationships based on empathy and respect by being aware of the special requirements and difficulties they confront. Adverse childhood experiences (ACEs) or trauma are common among juvenile offenders and can have a negative effect on their conduct and general wellbeing. The fundamentals of trauma-informed care should be included in staff training, instructing personnel on how to spot trauma symptoms, react tactfully to triggers, and establish a secure, encouraging atmosphere that fosters recovery and resilience. Young people from many cultural, ethnic, and socioeconomic backgrounds are served by juvenile facilities. Staff members should be encouraged to appreciate and cherish the distinctive qualities, beliefs, and viewpoints of every person they come into contact with through cultural competency and diversity awareness training.

The value of cooperation and partnership with outside parties, such as families, community groups, and other juvenile justice and rehabilitation agencies, should be emphasized in staff training programs. The juvenile center's programs and services may be made more successful by fostering strong partnerships with outside partners, which will eventually benefit the youth under its care.

## **3.0 Methodology**

Prior reviews on juvenile residential/treatment institutions and previously thorough systematic evaluations on adult correctional facilities offered places to start when looking for pertinent research papers and publications. In order to find pertinent papers, a modified version of the Cochrane methodology for systematic literature reviews was used. The focus of the search was set on juvenile treatment and correctional facilities, with a particular emphasis on natural lighting. The literature search showed that most empirical research with methodological flaws has not looked at the relationship between natural illumination and the physical environment of juvenile institutions. A significant amount of high-quality research is available that may be used to build alternative kinds of residential, custody, and treatment facilities. The most reliable scientific data that may be used in the design of juvenile institutions are from research on residential settings and other forms of therapy. The study's literature review and body of current work serve as the basis for the report's information and design suggestions.



### **3.1 Discussion and Recommendations**

The conversation explores the several ways that staff awareness and training in juvenile institutions are impacted by natural illumination. It looks at how employees' morale, work happiness, and performance may all be improved by having access to natural light, which can eventually improve the lives of juvenile offenders. The relationship between resident outcomes and natural illumination in the physical environment of juvenile institutions has not been extensively studied in empirical research. The majority of the scant studies contains methodological flaws. Luckily, a sizable amount of excellent research pertinent to the design of alternative treatment, incarceration, and residential institutions exists. In order to optimize the advantages of natural lighting, the talk also emphasizes how crucial it is to include daylighting tactics and biophilic design concepts into the layout and management of juvenile institutions. Several suggestions are made to maximize the use of natural lighting in juvenile facilities based on the findings and discussion:

Incorporate the concepts of natural lighting into worker training programs, stressing the value of daylight exposure for mental health and overall wellbeing.

Use biophilic design techniques to improve the flow of natural light and vegetation between interior and outdoor areas, giving staff and prisoners access to these resources.

To reduce dependency on artificial lighting and increase daylight penetration, renovate and remodel juvenile facility buildings.

Encourage cooperation and information exchange amongst all parties involved, such as personnel, architects, lighting designers, and prisoners, in order to create creative ways for bringing natural light into juvenile detention facilities.

### **3.2 Findings and Conclusion**

Research show that natural lighting is essential for fostering a rehabilitative and encouraging atmosphere in juvenile detention facilities. There is evidence that when staff and convicts are exposed to natural light, their mood, conduct, and general well-being improve. Furthermore, because natural lighting creates an atmosphere of openness, connection, and involvement, it improves the efficacy of staff training programs. Additionally, it demonstrates that the prisoners are conscious of their surroundings. For this reason, efforts should be made to create a constructed environment that is favorable to the prisoners and gives them a pleasant impression of the outside world. This will help to ensure that the released juveniles are not worse off than when they were before. If biophilic design is used, the built environment of these institutions can be enhanced taking into account the fact that people have a deep interaction with nature, it may also be described as the direct human tendency to adapt with nature, to the extent that nature still influences people's physical and mental health and well-being in the modern world (Kellert, 2019).

This paper concludes by saying that natural lighting is a great tool for improving staff awareness, training, and rehabilitation in juvenile detention facilities. Juvenile justice systems may establish environments that promote the well-being and positive development of staff and inmates alike by incorporating natural lighting principles into facility design and operation priority. By employing a comprehensive strategy that prioritizes cooperation, ingenuity, and research-backed methods, juvenile facilities may effectively utilize the transformational potential of natural lighting to foster recovery, development, and adaptability in juvenile offenders.

## References

- Abulzawaid, Lujain M., Ahlam Moustafa, and Harith Al-Dabbagh. (2020). "MAKKAH DISTRICT YOUTH DETENTION CENTER." *Journal of Critical Reviews*, 7(8), 27-32
- Alves, S., Cabras, C., Bellini, D., & Bonaiuto, M. (2024). Perceived Environmental Quality Indicators as Health-Enabling Elements within Prisons. *The Prison Journal*
- Aziz, F., & Kee, W. L. (2022). INFRASTRUCTURE PLANNING AND SPATIAL DESIGN TOWARDS WELL-BEING: AN ENQUIRY ON CUSTODIANS OF YOUTH INSTITUTIONS IN PENANG. *Journal of Architecture, Planning and Construction Management*, 12(2), 1-15
- Bell, P. A., Greene, T. C., Fisher, J. D., and Baum, A. (1996). *Environmental Psychology*. Fourth Edition. Fort Worth: Harcourt Brace College Publishers.
- Cengiz, M. S. (2022). HUMAN-CENTERED ARCHITECTURAL ILLUMINATION DESIGN IN PRISONS. *Light & Engineering*, 30(2).
- De Young, R. (2013). Environmental psychology overview. In Klein, S. R and Huffman, A. H. (Eds.) *Green Organizations: Driving Change with IO Psychology*, pp. 17-33. New York: Routledge.
- Faizi, M., Seraj, F. M., & Gashniani, M. G. (2016). Review of the innovative strategies to improve daylight penetration in buildings. *Journal of Fundamental and Applied Sciences*, 8(3S), 1428-1447.
- Gerton, H. (2021). *Rehabilitation or Punishment: An Analysis of the Goals, Architecture and Effectiveness of Contemporary Prisons* (Doctoral dissertation, University of Oregon).
- Häbuc, O. M. (2019). Optimal conditions required for an afterschool program. *Journal of Architecture, Urbanism, and Heritage*, 2(2). Retrieved from <http://jauh.ro/index.php/JAUH/article/view/24>
- Irving, H. Architecture of Facilities. A review. *Advanced Engineering Informatics*, 24(2), 196-207.
- Kellert, S. (2019). *Kinship to mastery: Biophilia in human evolution and development*. Washington, DC: Island Press.
- Mazumdar, S. (2000). Design professionals and the built environment, In Knox, P. and Ozolins, P. (Eds.), *People and the Built Environment*. Chichester: Wiley. pp 157-169
- McClure, W. R. and Bartuska, T. J. (2007). *The Built environment: A Collaborative Inquiry into Design and Planning*. (Second edition). Hoboken, New Jersey: John Wiley and Sons.
- Moran, D. (2019). *How the prison environment can support recovery*. *Prison Service Journal*, 242, 44-49.
- Reddon, J. R., & Durante, S. B. (2019). Prisoner exposure to nature: Benefits for wellbeing and citizenship. *Medical hypotheses*, 123, 13-18.
- Takamine, L. (2013). Active Youth & Passive Design: Addressing Crime through Design of " Safe Space" in Paukukalo, Maui.
- Ulrich, R. S. (2019). Evidence-informed design recommendations for juvenile facilities in Sweden. Center for Healthcare Architecture, Chalmers University of Technology Gothenburg, Sweden. <https://www.chalmers.se/SiteCollectionDocuments/Centrum/CVA%20Centrum%20%C3%B6r,20>
- UNESCO (2000). Module 2 Counselling. <https://unesdoc.unesco.org/ark:/48223/pf0000130374>
- Waid, C. A and Clements, C. B. (2001). Correctional facility design: Past, present and future, *Compendium*, 26(11):1-29.
- Waitkus, K. E. (2004). The impact of a garden program on the physical environment and social climate of a prison yard at San Quentin State Prison. <https://digitalcommons.pepperdine.edu/cgi/viewcontent.cgi?article=1088&context=etd>