

Assessing the Impacts of Environmental Quality on Increasing Security with a Crime Prevention Approach due to Environmental Solutions of a Study in Gonbad Kavous, Iran

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Abstract: The focus on environmental quality is regarded as a key to urban social architecture research. Accordingly, urban social architecture has made considerable efforts to evaluate different residential environments. When spatial inequality arises as a problem of planning that the spatial structure of different areas of a city has obvious differences, the ones that need to be formulated with different planning solutions for different areas and are ultimate goal to create spatial equality in a city. Many sociologists and urban planners agree on the role and impact of urban physics and the design of urban spaces in crime prevention and reduction, and have suggested the principles of design and the necessary solutions. Considering the importance of this discussion in urban planning and architecture of Iranian cities, this study has been aimed to evaluate the impacts of environmental quality on increasing security with a crime prevention approach due to environmental solutions in Gonbad Kavous city in northern Iran. In terms of purpose, the present study is applied, in terms of method, descriptive and survey and the method of data collection is based on library, survey and field studies. The results show that there is a direct relationship between environmental quality and crime reduction and environmental quality criteria have been able to influence the reduction of crime.

Keywords: Environmental Quality, Crime Reduction, Environmental Solutions, Gonbad Kavous City.

Introduction

Today, crime is considered the most serious social problem of any society, and the overall crime rate has grown dramatically in all countries, both industrial and non-industrial (Amouzad & Sharbati, 2010). Security has long been one of the most important concerns of humans and the most important principle of life after water and food. The scope of the need for security is wider than is thought, and in its absence, the possibility of social prosperity and growth will be severely limited. Today, a large percentage of people worldwide live in cities, especially in developed countries, and urbanization is greatly being increased in developing societies, too. The overcrowding of cities on the one hand and the necessity of securing citizens on the other hand necessitate the use of principles and theories in the design and planning of urban environments and theories in order to prevent or reduce crime rates (Hatami Nejad et al., 2013). In 1969, Jeffrey was the first to propose a theory of crime prevention through the environmental design. According to

Jeffrey, sociologists have greatly exaggerated the social factors affecting crime such as deprivation, cultural influences, family, etc., and have overlooked biological and physical factors. He emphasized the opportunities that the environment provides to criminals, and saw the various offenses as a result of environmental opportunities. This theory consists of six components: territoriality, supervision, access control, image of the harsh environment, targeting and support activities (Kalantari & Tavakkoli, 2010).

Security is one of the most important factors of desirable quality in urban design that is effective in the presence of citizens. Neighborhoods are regarded as one of the essential components of the physical construction of the city. Crime is caused by many factors, one of which is the physical factors CPTED, the proper design and the optimal use of the artificial environment to reduce urban crime.

What is important in architectural and urban studies is the relationship between space and urban environment with social behaviors (negative and anomalous). Added to urban studies over the past few decades, this provides a practical framework for local and spatial analysis of crime rates and the study of the relationship of anomalies to space and time within cities (Pishgahifard et al., 2011). On the other hand, focusing on the relationship between security and the structure of cities and enhancing its safety through improvement in environmental design (CPTED approach) is a subject that is overlooked in many plans. In order to achieve a safe and secure city, increasing the security of the urban environment is one of the most important approaches that have been considered by urban planners in recent years (Mousazadeh et al., 2015). For this purpose and considering the importance of the issue in urban planning and architecture, the impacts of environmental quality on increasing security with crime prevention approach due to environmental solutions have been evaluated in this study. The aims of the research are as follows:

- They study of the relationship between environmental quality and crime rate.
- The assessment of the relationship between CPTED principles and environmental quality with crime reduction.

Environmental Design Views

This theory that is among the most recent theories related to crime focuses on the role of the housing model, the construction of homes and buildings, the design of built environments, and the physical structure of urban spaces to crime rates. Hence, in the above theory, efforts are made to reduce crime rates through environmental design. One approach proposed by several international organizations related to urban security is the CPTED approach (preventing urban crime rates by using environmental design). This approach can be regarded as a targeted approach to efficiently and intelligently design environmental components by optimally employing an artificial environment in crime reduction, which has a significant effect on increasing citizen satisfaction and, consequently, on social welfare of society. Focusing on this approach in the past decade can be attributed to the crises resulting from widespread crime in public and semi-public spaces that do not deliver the expected results for urban managers in spite of the use of extensive financial resources (Cozens et al., 2001). Over the past 20 years, we have seen increasing attention to environmental design as an instrument against crime rates (Madnipour, 2000). Wood was the first to point out the relationship between crime rates and physical environment. He discussed how the structural features associated with the expansion of public housing construction impede the relationship between its residents (which underlies informal social control). Jacobs, an architecture and urban critic, and member of editorial board of *The Architectural and Contemporary Form Journal* of Wood published the book *Death and Life in Major American Cities* and gave a more detailed view of crime rates and physical design. He believed that eyes were needed to monitor the street, the eyes of those who can be called natural street owners. The effort was made by the street itself and its users. They are the first people to take care of the street as soon as they come to the theory that it is one of the most recent crime-related theories emphasize the role of the housing model, the construction of homes and buildings, the design of built environments, and the physical structure of urban spaces to crime rates. Hence, in the above theory, efforts are made to reduce crime rates through environmental design. One approach proposed by several international organizations related to urban security is the CPTED approach (preventing urban crime by using environmental design). This approach can be regarded as a targeted approach to efficiently and intelligently design environmental components by optimally employing an artificial environment in crime reduction, which has a significant effect on increasing citizen satisfaction and, consequently, on social welfare of society. Focusing on this approach in the past decade can be attributed to the crises resulting from widespread crime in public and semi-public spaces that do not deliver the expected results for urban managers in spite of the use of extensive financial resources (Cozens et al., 2001). Over the past 20 years, we have seen increasing attention to environmental design as an instrument against crime rates (Madnipour, 2000). Wood was the first to point out the relationship between crime rates and physical environment. He discussed how the structural features associated with the expansion of public housing construction impede the relationship between its residents (which underlies informal social control). Jacobs, an architecture and urban critic, and member of editorial board of *The Architectural and Contemporary Form Journal* of Wood published the book

Death and Life in Major American Cities and gave a more detailed view of crime rates and physical design. He believed that eyes were needed to monitor the street, the eyes of those who can be called natural street owners. The effort was made by the street itself and its users. They are the first to take care of the streets and become street guards as soon as they are sufficient (Madnipour, 2000). Whether the physical properties of the environment prevent crime or reduce crime rates, such as fear of crime or the relationships of residents of an area or their neighbors, crime prevention is happening are emphasized and methods are being devised to provide vulnerability reduction in these environments (Taylor & Hareley, 2010). Studies show that environments with more defensive features have residents who are better in control of the outdoors, less fearful, and less victimized. It should be noted here that physical solutions have no decisive influence without focusing on other economic, social and cultural factors, but practical experience has shown that adherence to some principles in design can have an impact on crime rates (Coleman, 1988).

Environmental factors affecting crime in society

Most crimes are committed because the perpetrator can identify the opportunity. Crime opportunity can be an opportunity or a combination of opportunities such as easy access, places to hide, lack of clear definition of public and private space, low light, trees that can hide behind it, and generally the less criminals feel insecure and vulnerable, the more likely they are to commit a crime. Also common places people flee during the day include lonely streets, passageways, gardens and forests, as well as, suburbs and downtowns where young people gather in public places. They can also be intimidating places for others, especially middle-aged and elderly women. Many years of human crime research has found that environmental factors are more effective and more important than others and should be a priority. It can be said that the time of intense activity of the terrible effects of abnormal psychological states and moral traits is when influenced by environmental factors and it can therefore be claimed that environmental factors are complementary and motivating abnormal traits and abnormal psychological states for committing a crime. There is no doubt that most causes of the degeneration of the generation, which can be considered the poverty of civilization, originate from the effects of disorder and dispersal and corruption of the environment (Safavi Moqaddam, 2011). Urban crime is a part of the anomalies, bias, and social violations that emerge as a barrier to urban discipline and equilibrium as a result of urbanization and the resulting problems within the urban system. In other words, urban tilts are the anomalies that at various levels cause structural and functional damage to urban society (Zolfaqari & Shaygan, 2011).

Materials and Methods

Considering the literature on the subject and the issues raised in relation to the importance of research in urban planning and architecture, the results are expressed through real-time data analysis. Regarding the extraction of the necessary data from the questionnaire, we use statistical tests to evaluate the relationship between the statistical tests and the regression model. The chart is also used to show some results of the table. Finally, the results of the research are summarized and presented. Two methods of library and field research were used to collect the data. In field method, techniques and tools such as questionnaire and observation were used. The questionnaire was designed to evaluate the impacts of environmental quality on increasing security with a crime prevention approach due to environmental strategies in Gonbad Kavooos. Then, the required information is collected.

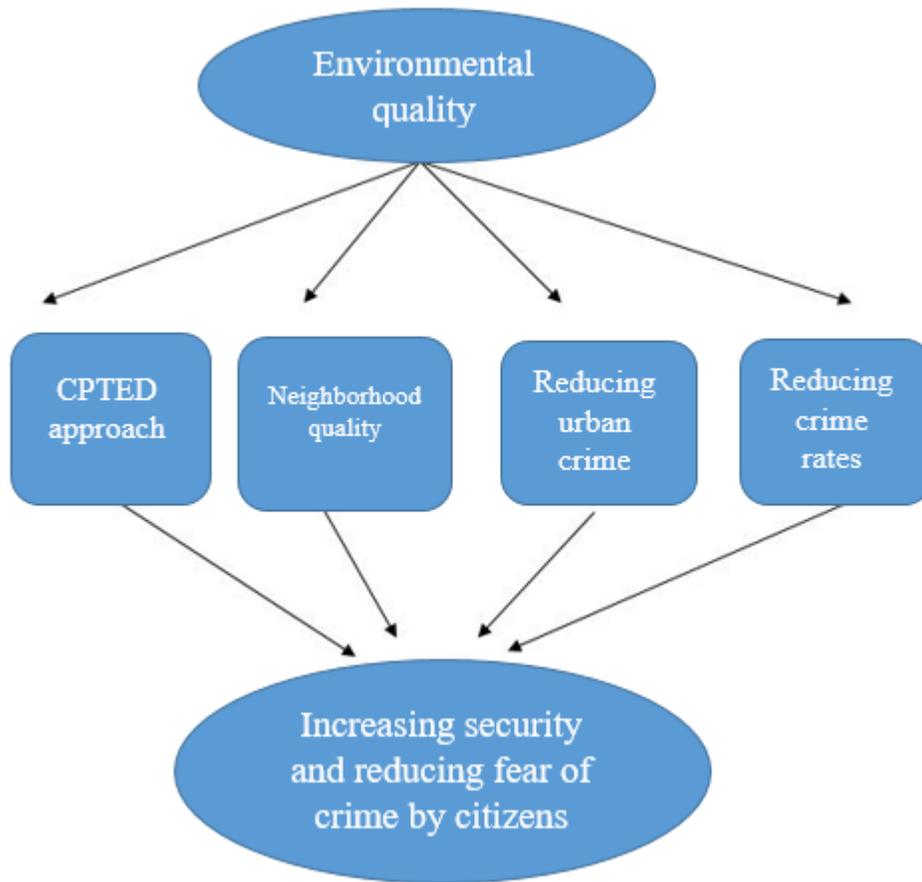


Figure 1. Conceptual model of research

Results

The first argument that is raised regarding the research topic is that there is a relationship between environmental quality and crime rates. In order to achieve the objectives of the study with respect to the type of environmental quality indicators available and the qualitative view of the problem, the environmental quality is measured using the test of Chi Square, and then, in line with the purpose of the study, which is to measure the impact of the environmental quality on the crime rates in Gonbad Kavoos city, linear regression tests are used to determine how effective we can indicate its effect so that we can finally get a clear picture of whether or not it works and can obtain the impact of environmental quality on the crime rates in Gonbad Kavoos city.

Table 1. One-way nonparametric chi-square test to investigate the effect of environmental quality on crime rates

Row	Environmental quality indicators	Environmental quality components	Chi-square coefficient	Degree of freedom	Significance level
1	Physical indicator	Access	81	4	0.000*
2		Urban facilities	88.36	4	0.000*
3		Lighting	70.56	4	0.000*
4		Urban environment	43.56	3	0.000*
5		Passages	49	3	0.000*

6	Functional - operational indicator	Socio-cultural functions	70.56	4	0.000*
7		Economic functions	21.16	4	0.000*
8		Recreational functions	64	4	0.000*
9	Environmental perceptual indicator	Vitality	77.44	4	0.000*
10		Identity	77.44	4	0.000*
11		Discipline	49.60	3	0.000*
12		Sense of belonging	76.30	4	0.000*
13		Ability	55.70	3	0.000*
14		Human Scale	39.80	4	0.002*

References: Research Findings, 2019 Significance Level up to 99%; (*) Significance Level to 95% (**) No Significance (NS)

In the present study, the effect of the environmental quality on reducing the crime rate in Gonbad Kavoos city was regarded as an acceptable level, so that in all the studied items it was able to achieve a 99% significance level; however, It should be noted that in spite of the same level of meaningfulness of the components, one cannot conclusively state that they were all equally effective. In this regard, it can be seen from the level of Chi-square statistic in different parts of the crime reduction that the highest effect among environmental quality components was the urban facilities component with the square of 88.36.

Table 2. Summarized model and estimated parameters to draw the relationship and environmental quality impact on crime rate

Equation	Independent variables	Dependent variable	Summarized model				Estimated parameter	
			Square regression	Anova coefficient	Df1	Sign.	Fixed	Variable
Linear regression	Environmental quality	Crime rate in worn-out urban tissue	0.311	18.50	1	0.000*	1.292	0.600

Reference: Research Findings, 2019

According to the above table, which measures the relationship between the environmental quality and the influence of the environmental quality on the crime rate of worn-out urban tissue through linear regression model, it can be argued that this relationship can be directly correlated. There was a relationship between the environmental quality and crime rate and the environmental quality had been effective. This effect can be observed at 95% significance level. Finally, to illustrate this relationship and the effectiveness of the linear regression diagram, it is plotted that expresses this problem explicitly and clearly.

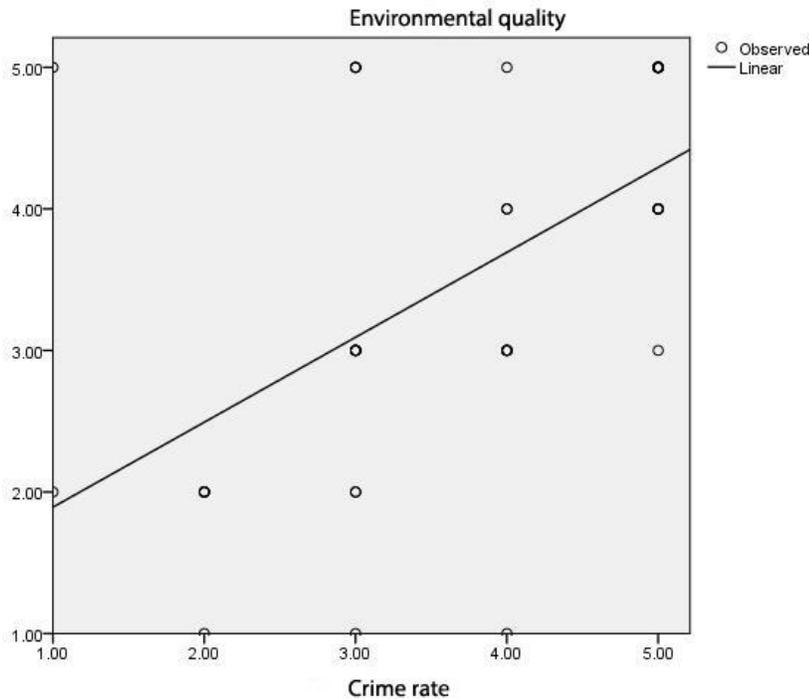


Chart 1. Linear regression to illustrate how environmental quality affects crime rate

Further, with respect to the type of CPTED principles and the existing environmental quality indicators through a single sample t-test, we evaluate the effectiveness of the CPTED principles and finally in line with the second objective of the study is to evaluate the relationship between the CPTED principles and the environmental quality with reducing the crime rate. We used multivariate regression testing in Gonbad Kavoo to determine the relationship between these principles and components.

Table 3. Single-sample t-test to examine the relationship between CPTED principles and environmental quality with reducing crime rate

Indicators and principles	Components	Sample size	df	T test statistic value	Significance level
CPTED principles	Access control	339	338	21.12	0.000*
	Strengthening the natural realms	339	338	35	0.000*
	Repair and maintenance	339	338	12.36	0.000*
	Natural monitoring	339	338	16.23	0.000*
	Supporting social activities	339	338	35.85	0.000*
Functional indicator	Access	339	338	16.84	0.000*
	Urban facilities	339	338	9.45	0.352 ^(NS)
	Lighting	339	338	12.39	0.000*
	Urban environment	339	338	13.35	0.000*
	Passages	339	338	11.86	0.000*
Functional - operational indicator	Socio-cultural functions	339	338	21.65	0.000*
	Economic functions	339	338	30.85	0.000*
	Recreational functions	339	338	28.92	0.000*
	Vitality	339	338	18.91	0.000*

Environmental perceptual indicator	Identity	339	338	27.72	0.000*
	Discipline	339	338	27.19	0.000*
	Sense of belonging	339	338	35.85	0.000*
	Readability	339	338	37.01	0.000*
	Human scale	339	338	31.91	0.000*

References: Research Findings, 2019 Significance Level up to 99%; (*) Significance Level to 95% (**) No Significance (NS)

From the perspective of individuals, the sample of the CPTED principles and environmental quality measures has been able to influence crime reduction, which can be observed at the 99% significance level of the educational components, indicating a relationship between these principles and the criteria with reducing crime rate. However, the success rate of each component differs from the other components, which can be seen in the amount of t-test statistic. In order to solve problems, it is necessary to balance the provision of facilities between different urban areas equally in order to reduce the inequality existing among urban areas. For this purpose, it is attempted that the relationship between the CPTED principles and environmental quality by reducing the crime rate through testing regression correlation measurement. The results of which can be seen in the Table below.

Table 4. The evaluation of the relationship between CPTED principles and environmental quality with crime reduction

Main variable	Sub-variables	Beta coefficient	T value	Significance level of regression	Regression coefficient	F value	Significance level of ANOVA
CPTED principles	Access control	0.361	26.073	0.000*	0816	61.05	0.000*
	Strengthening the natural realms	0.304	20.148	0.001*			
	Repair and maintenance	0.361	17.81	0.000*			
	Natural monitoring	0.278	19.831	0.005*			
	Supporting social activities	0.205	26.051	0.012*			
Functional indicator	Access	0.342	13.128	0.000*			
	Urban facilities	0.196	10.451	0.034*			
	Lighting	0.261	16.311				
	Urban environment	0.164	20.369	0.000*			
	Passages	0.351	18.024	0.003*			
Functional - operational indicator	Socio-cultural functions	0.243	12.647	0.001*			
	Economic functions	0.275	21.830	0.000*			
	Recreational functions	0.201	26.001	0.000*			
Environmental perceptual indicator	Vitality	0.356	28.146	0.000*			
	Identity	0.316	19.212	0.001*			
	Discipline	0.206	18.57	0.000*			
	Sense of belonging	0.247	16.246	0.001*			
	Readability	0.194	11.125	0.000*			
	Human scale	0.248	12.128	0.008*			

References: Research Findings, 2019 Significance Level up to 99%; (*) Significance Level to 95% (**) No Significance (NS)

In order to assess the relationship between the CPTED principles and the environmental quality with the crime reduction in Gonbad Kavoods city, we used multivariate regression model to complete the second objective study because the coefficients of the regression models make it possible to identify relationships between independent and dependent variables. In the regression model, the CPTED principles and environmental quality criteria were included as independent variables and crime rate as dependent variable. Therefore, the appropriate regression model is multivariate regression. Therefore, the results of the regression model show a positive and significant relationship between the CPTED principles and environmental quality with the crime reduction in Gonbad.

Discussion and Conclusion

The focus on environmental quality is regarded as a key to urban social architecture research. Accordingly, urban social architecture has made considerable efforts to evaluate different residential environments. When spatial inequality arises as a problem of planning that the spatial structure of different areas of a city has obvious differences, the ones that need to be formulated with different planning solutions for different areas and are ultimate goal to create spatial equality in a city. On the other hand, the focus on the relationship between the security and the structure of cities and enhancing its safety through improvements in environment design (the CPTED approach) is a subject that is overlooked in many plans. Increasing the security of urban environment in order to realize a safe and secure city is one of the most important approaches that have been considered by planners in recent years. In the present study, the effect of the environmental quality on reducing the crime rate in Gonbad Kavoods city was regarded as an acceptable level, so that in all the studied items it was able to achieve a 99% significance level; however, it should be noted that in spite of the same level of meaningfulness of the components, one cannot conclusively state that they were all equally effective. In this regard, it can be seen from the level of Chi-square statistic in different parts of the crime reduction. Further, linear regression showed that this relationship was direct and there was a relationship between the environmental quality and crime reduction and the environmental quality was effective. This effect can be observed at 95% significance level. Finally, the focus on the environmental quality is key to research in urban studies and architecture. Accordingly, such studies have made a considerable effort to evaluate different residential environments. Since spatial inequality arises as a problem of planning that the spatial structure of different areas of a city has obvious differences, the ones that need to be formulated with different planning solutions for different areas and are ultimate goal to create spatial equality in a city. On the other hand, the focus on the relationship between the security and the structure of cities and enhancing its safety through improvements in environment design (the CPTED approach) is a subject that is overlooked in many plans. Increasing the security of urban environment in order to realize a safe and secure city is one of the most important approaches that have been considered by planners in recent years. In the present study, the effect of the environmental quality on reducing the crime rate in Gonbad Kavoods city was regarded as an acceptable level, so that in all the studied items it was able to achieve a 99% significance level; however, It should be noted that in spite of the same level of meaningfulness of the components, one cannot conclusively state that they were all equally effective. In this regard, it can be seen from the level of Chi-square statistic in different parts of the crime reduction. Further, linear regression showed that this relationship was direct and there was a relationship between the environmental quality and crime reduction and the environmental quality was effective. This effect can be observed at 95% significance level. Finally, to illustrate this relationship and the effectiveness of the linear regression diagram, it is plotted that expresses this problem explicitly and clearly. Further, from the perspective of individuals, the sample of the CPTED principles and environmental quality measures has been able to influence crime reduction, which can be observed at the 99% significance level of the educational components, indicating a relationship between these principles and the criteria with reducing crime rate. It was also found that the CPTED principles and the environmental quality were significantly correlated with the crime reduction and supported in only two measures for social activities and urban facilities significantly lower than 99% at the 95% level. The reason is that in the first case, weakness is in the support of private associations in terms of increasing social activities in the study area, which they have been reduced to a very high level, and in the urban facilities component, the equitable distribution of facilities according to the t-test output in this section also indicates weakness as a result of the decrease in their effect on preventing the crime rate in urban neighborhoods. Therefore, the results of the regression model show a positive and significant relationship between the CPTED principles and the environmental quality with the crime reduction in Gonbad Kavoods.

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