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Solutions and Obstacles to Civic Education in a Smart City

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A B S T R A C T

Objective: This study aims to identify the strategies and obstacles for implementing civic education in smart cities.

Methodology: The research employs a qualitative approach, utilizing semi-structured interviews with experts, including academic professionals and senior managers from the municipalities of Tehran, Tabriz, and Mashhad. Theoretical coding was used to analyze the data collected from these interviews. MAXQDA software facilitated the analysis, enabling the extraction of relevant concepts and the categorization of strategies and obstacles related to civic education in smart cities.

Findings: The study identified several strategies for civic education in smart cities, categorized into managerial, organizational, individual, and educational strategies. Key strategies include managerial support for civic education initiatives, allocation of necessary budgets, provision of educational facilities, and fostering a learning culture within the municipal community. Additionally, the study highlighted significant obstacles, including the lack of professional trainers, insufficient creativity in educational delivery, inadequate budget allocation, and limited attention to social and economic development in designing civic education programs. Individual barriers such as insensitivity to the quality of education and lack of critical examination of educational values were also identified.

Conclusion: The findings underscore the importance of structured civic education programs in the development of smart cities. Effective civic education can enhance citizens' knowledge of new technologies and innovative processes, contributing to the overall efficiency and sustainability of urban management. Addressing the identified obstacles through targeted strategies can facilitate the successful implementation of civic education in smart cities, ultimately leading to improved social, economic, and political outcomes.

Keywords: *Strategies, Obstacles, Civic Education, Smart Cities.*

1 Introduction

According to Torney-Purta, civic education is the process of transmitting the necessary knowledge, values, and attitudes for participation and political stability from one generation to another (Keramatinezhad, 2021).

From a national perspective, the main philosophy of civic education is to achieve goals such as loyalty to the nation, increasing individuals' knowledge and awareness of history and the structure of political institutions, creating a positive attitude towards power and political authority, submission to laws and social norms, belief in fundamental societal values like equality, interest in political participation, and skills in analyzing political communications (Hudson, 2005).

Civic education is one of the essential pillars of social life in the present era, and in industrial societies, it teaches life skills through diverse planning. Learning the parameters of civic behavior education leads to an increase in the quality of collective life and the strengthening of social capital. These teachings lead to the reinforcement of social ethics and the expansion of social solidarity both locally and globally. Civic education, as a social reality within the cultural structure of society, can be studied in three forms: civic refusal, civic possibility, and civic obligation. Considering that every society, based on its cultural and value backgrounds, nurtures specific citizens with unique characteristics, this ensures the survival and continuity of social life and the level of development of each country. Thus, comprehensive civic education for all segments of society should be widely considered (Leung & Ng, 2014; Susilawati et al., 2018).

Civic education and training are investments for the future vision of the country in all dimensions. Civic education leads to the strengthening and consolidation of the value system of civic skills towards strengthening democracy and sustainable citizen participation (Neundorf et al., 2016; Rahayu, 2024). Civic education should aim at citizen initiatives and self-actualization to meet the sustainable and comprehensive needs of citizenship. A citizen in society should be correctly aware of their duties to be able to perform their tasks using proper and logical methods. Civic education for becoming a smart city must encompass multiple factors and components (Castillo et al., 2021; Hope & Jagers, 2014).

Living in today's world has doubled the importance of civic education, as environmental changes, information technology, and smart city development demand unique behaviors from citizens. A smart city is defined as one that, based on the latest evolved theories of urban management centered on information and communication technology, meets the following six main criteria: smart governance, smart citizens, smart living environment, smart living place, smart economy, smart transportation, and smart energy (Anthopoulos et al., 2019).

The expansion of communication technology at the end of the 20th century began profound transformations in all aspects of human life. These new communication technologies not only created new pages of human interactions and intergroup relationships but also transformed existing communication methods. One of the concepts transformed by advanced communication technologies is the concept of the city. These new communication technologies and virtual interactions have enabled cities to move beyond physical geography and local interactions into a new field and geography. Consequently, cities, like other domains, have the opportunity to become virtual or smart. A smart city is proposed as an innovative method for solving many existing problems in the path of efficient urban management, where civic education plays a crucial role in enhancing citizens' knowledge of new technologies and innovative processes (Hyslop-Margison & Thayer, 2019).

In this context, the smart city is proposed as a unique solution to solve many current urban problems. Undoubtedly, access to smart technologies has played a very important role in improving citizens' living conditions. With the increasing urban population growth, not only should cities expand, but new cities equipped with the latest smart technologies should also be built. The concept of a smart city and electronic city is an evolving concept and a relative reality. Specific projects in cities and their success in practice influence related concepts and create different definitions of smart and electronic cities for different cities. The large number of existing projects also reinforces this issue. The importance of these cities lies in the fact that all necessary citizen services are provided through information networks, eliminating the need for services to be provided through organizations. In fact, with the implementation of smart city plans, digital offices and organizations will provide the necessary services to people. Given these points, the smart city is proposed as an innovative method for solving many existing problems in the path of efficient urban management. In this context, civic education plays a crucial role in enhancing citizens' knowledge of new technologies and innovative processes. The higher the level of citizens' knowledge, the more their innovation and creativity will be,

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making them more effective in creating a smart city (Anthopoulos et al., 2019; Desdemoustier et al., 2019; Gunesch, 2019).

In fact, one of the important factors in achieving a smart city is the development of electronic services and citizens' ability to efficiently and appropriately access these services and adapt them to the changing environment of service delivery. Education and improvement of citizens' technical skills enable them to effectively continue their activities in line with environmental and service changes, thus increasing their efficiency. As urban affairs become smarter, there must be equal attention to educating the citizens of these new cities. Without providing appropriate education that matches the various needs of different social groups and levels of awareness and information, no matter how advanced the technical aspect of making the city smart, it will remain merely a luxurious and impractical endeavor. The people themselves, directly and indirectly, finance such initiatives. Therefore, any engineering effort towards smart city development must be based on a precise study of the human relationships involved in these programs and an accurate understanding of the overall and general context that makes the smart city possible. The current study aims to elucidate the role of civic education in realizing the smart city.

2 Methods and Materials

The present study is applied in nature and aims to solve issues and ultimately obtain information for decision-making and addressing administrative and even individual needs. In terms of data, this research is qualitative, drawing on the insights of experts in the field to explore the strategies and obstacles of civic education in smart cities.

The statistical population of the qualitative section of the research included academic experts and senior managers of the municipalities of Tehran, Tabriz, and Mashhad. A non-random purposive sampling method was used, with 20 individuals selected based on the principle of saturation. Semi-deep interviews were utilized in the present study.

Validity: To ensure the validity of the research instruments in the qualitative section and to guarantee the accuracy of the findings from the researcher's perspective, the valuable opinions of professors familiar with this field and academic experts who were knowledgeable in this domain were used. Simultaneously, participants were involved in the analysis and interpretation of the data.

Reliability: Reliability refers to the consistency of the research findings. Reliability in interviews is considered in stages such as the interview situation, transcription, and analysis. Additionally, interviewee reliability refers to how the questions are guided. In transcription reliability, attention should be paid to the internal consistency of the transcriptions during typing by two individuals. During the classification of interviews, the reported percentages by two coders provide a method for determining reliability. The intra-subject agreement percentage (which should be 60% or higher) for a single interview (analysis control) is also a method for analysis reliability. In the present study, the test-retest reliability method and the intra-subject agreement method were used to calculate the reliability of the conducted interviews.

The data analysis method in the qualitative section was theoretical coding. Theoretical coding involves operations through which data are decomposed, conceptualized, and reassembled in a new form, forming the main process through which theory is developed based on data. This method includes three main elements: "concepts," "categories," and "propositions." In this method, the theory is shaped based on "raw data".

Data analysis is the central axis of grounded theory. In each study as a whole, data collection, data organization, and data analysis are interdependent. Three types of coding were used for analyzing the obtained data from interviews and theoretical foundations:

- Open coding
- Axial coding
- Selective coding

3 Findings and Results

Question 1: What are the strategies for civic education in smart cities?

Question 2: What are the obstacles to civic education in smart cities?

To answer these questions, the study used theoretical coding. The analysis of the collected responses from expert interviews addressed these questions. The MAXQDA software, a professional tool for analyzing data collected through qualitative and mixed methods, was used to answer these questions.

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Table 1

List of all concepts extracted from the semi-structured interview technique

Construct	Selective Coding	Axial Coding	Open Coding (Indicator)	Interviewee Code
Strategies	-	Managerial Strategy	Support from managers for implementing civic education in municipalities	I6, I8, I10, I17, I4
			Allocating necessary budget for the implementation of civic education programs in municipalities	I10, I8, I1, I3, I4
			Provision of educational facilities by municipal managers	I3, I1, I5, I2, I16
			Reaching a consensus among managers and key individuals for implementing educational programs	I2, I6, I10, I2
			Managers' determination towards providing civic education	I6, I9, I3, I5
		Organizational Factors	Focusing on decentralization in decision-making for implementing civic education	I2, I1, I10, I7
			Reducing formality in the municipality	I4, I2, I8, I15, I9
			Reducing job complexity in providing education based on the needs of managers and employees	I8, I2, I19, I1
			Focusing on the performance of employees and managers in delivering related educational programs	I2, I3, I9
		Individual Factors	Individuals' enthusiasm for learning	I8, I7, I11, I18
			Trainers' enthusiasm for providing structured civic education	I7, I3, I9, I3, I17
			Individuals' attention to their educational needs	I1, I9, I1
			Employees stating their educational needs	I6, I7, I5, I1
			Creating motivation towards education	I8, I7, I11, I18
			Efforts to implement effective education	I7, I3, I9, I17
			Strengthening the learning culture in the municipal community	I6, I7, I5, I7
		Educational Factors	Trainers' familiarity with work environments and the necessity of civic education programs in municipalities	I10, I3, I18, I2
			Enhancing the skills of trainers responsible for civic education	I7, I5, I1, I7
			Skill in delivering the desired content	I11, I3, I2, I9
			Knowledge of educational aids	I7, I5, I1, I7
			Providing technological infrastructure for delivering quality educational programs	I6, I8, I10, I17, I4
			Attention to the type of educational design by educational managers	I10, I8, I1, I3, I4
			Awareness of the educational environment and its adaptation to the social and job environment of individuals	I3, I1, I5, I2, I16
			Attention to the practicality of civic education	I2, I6, I10, I2
			Focus on motivational components in delivering curriculum-related education	I6, I9, I3, I5
			Attention to educational interaction	I2, I1, I10, I7
Obstacles	-	Educational Obstacles	Lack of professional trainers for civic education	I6, I19, I3, I5
			Lack of creativity in delivering civic education	I2, I1, I10, I7
			Ignoring individual needs	I4, I2, I8, I15, I9
			Education not being job-oriented	I8, I2, I19, I1
			Lack of attention to a curriculum based on knowledge creation	I10, I2, I3, I9
		Managerial Obstacles	Lack of sufficient attention and support from municipal managers for designing a new curriculum	I8, I7, I11, I18
			Insufficient budget allocation for civic education	I7, I9, I3, I17
			Lack of attention to technological educational tools	I1, I9, I1
			Ignoring social and economic development in designing civic education	I6, I7, I5, I7
			Lack of attention to social progress and growth	I8, I7, I11
		Individual Obstacles	Lack of individuals' attention to the value-orientation of civic education	I7, I3, I9, I3, I17
			Insensitivity to the quality of civic education	I6, I5, I7
			Lack of critical examination of the dimensions and values of civic education	I10, I2, I18, I2

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The results showed that the strategies for civic education in smart cities include managerial, organizational, individual, and educational strategies. Additionally, the existing obstacles include educational, managerial, and individual barriers.

Table 2

Identified components after using literature, background, and existing theories

Construct	Component
Strategies	Managerial Strategy
	Organizational
	Individual
	Educational
Obstacles	Educational
	Managerial
	Individual

4 Discussion and Conclusion

A smart city is a sustainable and efficient city with a high quality of life, aiming to address urban challenges (improving mobility, optimizing resource use, enhancing health and safety, improving social development, supporting economic growth, and participatory governance) using information and communication technologies (ICT) in services and infrastructure, collaboration among stakeholders and key shareholders (citizens, universities, government, and industry), and investment in social capital. ICT is a key feature of a smart city, but this does not mean neglecting social issues; technology does not automatically result in smartness, and people play a crucial role in this. A review of various definitions shows that the meaning of a smart city is multifaceted. Each author emphasizes different aspects of a city, making the measurement of a smart city complex. Since each city has its unique administrative, economic, and social status and geographical context, along with different priorities, defining a fixed global system considering the diverse characteristics of cities worldwide may be challenging. This highlights the importance of smart cities. The present study proposed that one aspect of a smart city is the presence of education tailored to creating a smart city. One such education is civic education, which refers to education that leads to the development and nurturing of civic skills, capabilities, and competencies. Such training is necessarily understood in connection with the expectations of specific communities and nations because, in each society, knowledge, attitudes, values, insights, and skills, along with participation patterns and methods in collective or civic life, are uniquely transferred. The philosophy of establishing educational systems is to nurture such citizens. Civic education refers to those educational activities that prepare and socialize individuals of a society for membership in the political community in both formal and informal forms. Civic training is pursued in both formal and informal ways, and its educational content can be found at both the national and local levels.

The results presented in this study identify the strategies for civic education in smart cities, including managerial strategies (support from managers for implementing civic education in municipalities, allocating necessary budget for the implementation of civic education programs in municipalities, provision of educational facilities by municipal managers, reaching a consensus among managers and key individuals for implementing educational programs, managers' determination towards providing civic education), organizational strategies (focusing on decentralization in decision-making for implementing civic education, reducing formality in the municipality, reducing job complexity in providing education based on the needs of managers and employees, focusing on the performance of employees and managers in delivering related educational programs), individual strategies (individuals' enthusiasm for learning, trainers' enthusiasm for providing structured civic education, individuals' attention to their educational needs, employees stating their educational needs, creating motivation towards education, efforts to implement effective education, strengthening the learning culture in the municipal community) and educational strategies (trainers' familiarity with work environments and the necessity of civic education programs in municipalities, enhancing the skills of trainers responsible for civic education, skill in delivering the desired content, knowledge of educational aids, providing technological infrastructure for delivering quality educational programs, attention to the type of educational

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design by educational managers, awareness of the educational environment and its adaptation to the social and job environment of individuals, attention to the practicality of civic education, focus on motivational components in delivering curriculum-related education, attention to educational interaction). Additionally, the existing obstacles include educational obstacles (lack of professional trainers for civic education, lack of creativity in delivering civic education, ignoring individual needs, education not being job-oriented, lack of attention to a curriculum based on knowledge creation), managerial obstacles (lack of sufficient attention and support from municipal managers for designing a new curriculum, insufficient budget allocation for civic education, lack of attention to technological educational tools, ignoring social and economic development in designing civic education, lack of attention to social progress and growth) and individual obstacles (lack of individuals' attention to the value-orientation of civic education, insensitivity to the quality of civic education, lack of critical examination of the dimensions and values of civic education).

Based on the study's findings, the following suggestions can be made:

Conduct a survey regarding the implementation of civic education in municipalities to gather opinions from managers and employees about the education methods.

Monitor the educational needs of municipal managers and employees by the educational managers of Tehran municipality.

Develop formal and informal educational programs, utilizing social media capacity to provide the necessary informal content.

Assess the municipality's facilities for implementing civic education, creating a task force to evaluate these facilities in Tehran municipality.

Organize the educational content provided based on the municipality's needs.

Enhance the attractiveness of educational content with the help of municipal employees and managers and the use of social media.

Encourage managers and employees to participate in educational programs by appreciating the participants or providing them with incentives.

Authors' Contributions

All authors have contributed significantly to the research process and the development of the manuscript.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

In this research, ethical standards including obtaining informed consent, ensuring privacy and confidentiality were observed.

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