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Study on the Interactive Design of Public Guidance Systems Based on the Design Thinking Behavior Model

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Abstract

This study explores the interactive design of public guidance systems based on the Design Thinking Behavior Model (DTBM). By analyzing user behaviors and thought processes, the research aims to optimize the design of public guidance systems to enhance user experience and system efficiency. Using Changsha Subway in China as a case study, the study identifies existing problems in the guidance system and proposes optimization strategies. The findings indicate that the DTBM can effectively improve the functionality and usability of public guidance systems, providing theoretical support and practical references for the development of smart cities.

Keywords

Design Thinking Behavior Model, Public Guidance Systems,Interactive Design.

1. Introduction

With the rapid advancement of urbanization, subways have become a vital component of urban public transportation. The design of subway guidance systems directly impacts passengers' travel experiences and the overall image of the city. In the context of growing urban populations and increasing reliance on public transportation, the efficiency and user-friendliness of subway systems are more important than ever. A well-designed guidance system not only helps passengers navigate the complex network of subway lines but also enhances their overall travel experience. In recent years, the Design Thinking Behavior Model (DTBM) has emerged as a significant theoretical framework in the design field, emphasizing the importance of user behaviors and thought processes in creating innovative and user-centered design solutions. This model provides a systematic approach to understanding user needs and behaviors, which is crucial for designing effective guidance systems. By focusing on the cognitive and behavioral aspects of users, the DTBM enables designers to develop more intuitive and efficient guidance systems that cater to the diverse needs of passengers. This study aims to apply the DTBM to the interactive design of subway guidance systems, using Changsha Subway in China as a case study. By analyzing the existing problems in the guidance system and proposing optimization strategies, this research seeks to enhance the user experience and system efficiency of subway guidance systems. The study also aims to provide theoretical support and practical references for the construction of smart cities. Through the application of the DTBM, this research explores how to create more user-friendly and efficient guidance systems that can adapt to the dynamic needs of modern urban environments. The findings of this study are expected to contribute to the development of more sustainable and user-centered urban transportation systems, ultimately improving the quality of life for city dwellers..

2. Organization of the Text

2.1. Research Background and Objectives

This section provides an overview of the development of subway guidance systems and highlights the existing issues in their interactive design. The study introduces the Design

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Thinking Behavior Model (DTBM) as a theoretical framework and discusses its application value in guidance system design. The primary objective of this research is to optimize the interactive design of subway guidance systems using the DTBM, thereby improving passengers' travel experiences. The study also aims to identify the key factors that influence the effectiveness of guidance systems and propose strategies to enhance their functionality and usability. By focusing on user behaviors and thought processes, the research seeks to develop a more intuitive and efficient guidance system that can better meet the needs of diverse user groups. Additionally, the study explores the potential of integrating emerging technologies, such as artificial intelligence and big data, to further enhance the interactive design of subway guidance systems.

2.2. Methodology and Case Study

The research employs a combination of literature review, field investigation, and case analysis. The literature review section outlines the theoretical foundation of the DTBM and its potential applications in guidance system design. The case study focuses on Changsha Subway in China, where field investigations are conducted to identify the shortcomings of the existing guidance system. Based on these findings, optimization strategies are proposed. The study concludes with a summary of the research findings and future directions for subway guidance system design. The methodology also includes user surveys and interviews to gather feedback on the current guidance system and identify areas for improvement. By combining quantitative and qualitative research methods, the study aims to provide a comprehensive analysis of the existing problems and propose practical solutions. The case study of Changsha Subway serves as a practical example to demonstrate the application of the DTBM in real-world scenarios, providing valuable insights for other urban rail transit systems.

Table 1: Overview of Changsha Subway Guidance System

Dimension	Current Status	Identified Issues	Optimization Strategies
Visual Design	Uses a combination of static signs and dynamic displays	Map layout is unclear, and standardization is low	Improve map design and standardization, enhance color contrast and font size
Cultural Integration	Some stations have cultural themes	Lack of cultural elements in guidance system	Incorporate local cultural symbols and historical references into guidance design
Interactivity	Basic interactive features such as touchscreens and voice prompts	Limited interactive functions and user-friendly design	Enhance interactive features, simplify operation processes, and improve user interface design
Accessibility	Provides basic accessibility features such as Braille and audio prompts	Insufficient accessibility considerations for special needs	Optimize accessibility design, improve signage for visually impaired, and enhance accessibility facilities

2.3. Methodology and Case Study

The implementation of the Design Thinking Behavior Model (DTBM) in guidance system design involves a series of structured steps that ensure the final product is both innovative and user-friendly. The process begins with a thorough analysis of user behaviors and needs, which forms the basis for the design strategy. This initial phase involves conducting extensive user research,

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including surveys, interviews, and observational studies, to gather data on user preferences, behaviors, and pain points. By understanding how users interact with the current guidance system, designers can identify areas for improvement and develop a design strategy that addresses these issues.

Following the analysis phase, designers create prototypes of the guidance system. These prototypes are then tested with users to gather feedback on their functionality, usability, and overall user experience. The iterative nature of the DTBM allows for continuous refinement based on user feedback. This process involves making adjustments to the design based on the insights gained from user testing, and then retesting the updated prototypes to ensure that the changes have the desired effect. This cycle of testing and refinement continues until the design meets the needs of the users and stakeholders.

In the context of subway guidance systems, this approach can lead to the development of more intuitive and efficient designs that enhance the overall user experience. For example, by analyzing user behaviors, designers may discover that passengers often struggle to find the correct exit or platform due to unclear signage. Based on this insight, designers can create new signage designs that are more visually clear and easy to understand. These designs can then be prototyped and tested with users to ensure that they effectively address the identified issue.

The implementation of the DTBM also emphasizes the importance of collaboration between designers, users, and stakeholders. This collaborative approach ensures that the guidance system meets the needs of all parties involved. For instance, designers may work with subway operators to understand the operational requirements of the system, while also engaging with users to gather feedback on the usability and effectiveness of the guidance system. By involving all stakeholders in the design process, the final product is more likely to be successful and well-received.

Furthermore, the DTBM encourages the use of innovative design techniques and technologies to enhance the guidance system. This may include the integration of digital technologies, such as interactive kiosks and mobile applications, to provide users with real-time information and personalized guidance. By leveraging these technologies, the guidance system can become more interactive and user-friendly, ultimately improving the user experience and contributing to the development of more sustainable and user-centered urban transportation systems.

In summary, the implementation of the DTBM in guidance system design is a comprehensive and iterative process that involves user research, prototyping, testing, and refinement. By focusing on user behaviors and needs, and fostering collaboration between designers, users, and stakeholders, the DTBM ensures that the final guidance system is both innovative and practical, ultimately enhancing the user experience and contributing to the development of more sustainable and user-centered urban transportation systems.

2.4. Importance of User Feedback in DTBM

User feedback plays a crucial role in the Design Thinking Behavior Model (DTBM), as it provides valuable insights into the effectiveness and usability of the guidance system. In the context of public guidance systems, user feedback is essential for identifying the strengths and weaknesses of the current design. By gathering feedback through various methods such as surveys, interviews, and user testing, designers can gain a deeper understanding of user behaviors and preferences. This information is vital for making informed decisions about design improvements.

In the case of subway guidance systems, user feedback can reveal issues that may not be apparent through observational methods alone. For example, users may report confusion regarding the layout of the maps, the clarity of the signage, or the functionality of interactive elements. These insights can help designers pinpoint specific areas for improvement, such as

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enhancing the color contrast of the signage for better visibility or simplifying the interface of interactive kiosks for easier navigation.

Moreover, user feedback is essential for ensuring that the guidance system meets the diverse needs of its user base. Different user groups, such as the elderly, visually impaired individuals, and non-native speakers, may have unique requirements and challenges when using the system. By actively seeking feedback from these groups, designers can develop more inclusive and accessible designs that cater to a wider range of users.

The iterative nature of the DTBM allows for continuous refinement based on user feedback. This process ensures that the final design is not only innovative but also practical and user-friendly. For instance, if users report difficulties in using the touchscreens at subway stations, designers can experiment with different interface designs and conduct further user testing to identify the most effective solution. This iterative process of gathering feedback, making adjustments, and retesting is fundamental to the DTBM and ensures that the guidance system evolves to meet the changing needs of its users.

In addition to improving the functionality of the guidance system, user feedback also plays a significant role in enhancing user satisfaction and overall experience. When users feel that their input is valued and incorporated into the design process, they are more likely to have a positive perception of the system. This positive experience can lead to increased usage of the subway system and a greater sense of community engagement.

Furthermore, user feedback can provide valuable insights for the integration of emerging technologies into the guidance system. As technology advances, new tools and features, such as augmented reality (AR) and artificial intelligence (AI), can be incorporated to enhance the interactive design of the system. User feedback can help designers understand how these technologies can be effectively integrated to improve the user experience without causing confusion or frustration.

In summary, user feedback is an indispensable component of the DTBM, providing critical insights that drive the optimization and innovation of public guidance systems. By actively engaging users in the design process and incorporating their feedback, designers can create guidance systems that are more intuitive, efficient, and user-friendly, ultimately contributing to the development of more sustainable and user-centered urban transportation systems.

3. Literature References

3.1. Theoretical Framework of Design Thinking Behavior Model

The Design Thinking Behavior Model (DTBM), proposed by Siran and Anwar (2020), provides a systematic approach to optimizing the design process through behavioral analysis and user-centered thinking. The model emphasizes starting from user needs and integrating behavioral science with design theory to explore innovative solutions. By understanding users' behavioral patterns and thought processes, the DTBM enables the creation of products and services that better meet user requirements. This theoretical framework serves as the foundation for the current study, guiding the re-examination of subway guidance system design from the perspective of user behaviors and thought processes. The DTBM also emphasizes the importance of iterative design and prototyping, allowing designers to refine their ideas based on user feedback and testing. This approach ensures that the final design is not only innovative but also practical and user-friendly. The model's focus on user-centered design is particularly relevant in the context of subway guidance systems, where the needs of diverse user groups must be considered to ensure effective navigation and a positive travel experience. By applying the DTBM, designers can develop guidance systems that are more intuitive, efficient, and responsive to the needs of passengers, ultimately contributing to the overall functionality and user satisfaction of the subway system.

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3.2. Influence of Reference Materials on Design Strategiese

Further research by Siran, Abidin, and Anwar (2020) investigated the impact of reference materials on design strategies and form establishment. The study found that the selection and use of reference materials significantly influence design outcomes. Reference materials not only inspire design ideas but also affect the implementation process of the design. By optimizing the selection and use of reference materials, design strategies can be improved, leading to higher quality design results. This research supports the methodological approach of the current study, aiding in understanding how to enhance the interactivity and user experience of subway guidance systems through optimized reference materials and design strategies. The study also highlights the importance of cultural and contextual factors in the selection of reference materials, ensuring that the design is relevant and appropriate for the target user group. In the context of subway guidance systems, the use of culturally relevant reference materials can enhance the system's usability and appeal to local users, while also providing valuable information and guidance to visitors. By carefully selecting reference materials that align with the cultural and functional requirements of the subway system, designers can create guidance systems that are both effective and aesthetically pleasing, contributing to a more positive and efficient travel experience for all passengers.

3.3. Application of DTBM in Guidance System Design

The application of the Design Thinking Behavior Model (DTBM) in guidance system design represents a significant advancement in the field of design. By focusing on user behaviors and thought processes, the DTBM offers a structured approach to creating guidance systems that are not only functional but also user-friendly and innovative. In the context of subway guidance systems, the DTBM can be applied to various aspects, such as visual design, cultural integration, interactivity, and accessibility. For instance, by analyzing user behaviors and preferences, designers can develop more intuitive and efficient visual designs that enhance the overall user experience. Additionally, the DTBM can guide the integration of cultural elements into guidance systems, making them more relevant and appealing to local users while also providing valuable information and guidance to visitors. The model's emphasis on iterative design and prototyping ensures that the guidance system is continuously refined based on user feedback and testing, leading to a final design that meets the needs of diverse user groups. Overall, the application of the DTBM in guidance system design can significantly improve the functionality, usability, and user satisfaction of subway guidance systems, contributing to the development of more sustainable and user-centered urban transportation systems.

4. Conclusion

This study explores the application of the Design Thinking Behavior Model (DTBM) in the interactive design of subway guidance systems. Using Changsha Subway in China as a case study, the research identifies existing problems in the guidance system and proposes targeted optimization strategies. The findings indicate that the DTBM can effectively enhance the user experience and system efficiency of subway guidance systems. By focusing on user behaviors and thought processes, the DTBM enables the development of more intuitive and efficient guidance systems that better meet the needs of diverse user groups. The study also highlights the importance of iterative design and prototyping, allowing designers to refine their ideas based on user feedback and testing. This approach ensures that the final design is not only innovative but also practical and user-friendly.

Future research can further explore the application of the DTBM in other urban rail transit systems and integrate emerging technologies, such as artificial intelligence and big data, to further optimize guidance system design. The study suggests that continuous user feedback

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and testing are essential for ensuring the ongoing improvement and relevance of guidance systems in dynamic urban environments. Additionally, the research emphasizes the potential of incorporating cultural and contextual factors into the design process, ensuring that guidance systems are not only functional but also culturally relevant and aesthetically pleasing. By addressing the identified issues and implementing the proposed optimization strategies, the study aims to contribute to the development of more sustainable and user-centered urban transportation systems, ultimately improving the quality of life for city dwellers. The findings of this study provide valuable insights for designers and policymakers seeking to enhance the effectiveness and user experience of public guidance systems in urban environments.

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