Carlos Aleixo Domingues

iTrans

An Intelligent Transportation Management Platform for Efficient and Equitable Paratransit Services

Periodicojs
EDITORA ACADÊMICA

Carlos Aleixo Domingues

iTrans

An Intelligent Transportation Management Platform for Efficient and Equitable Paratransit Services

Projeto Gráfico, editoração e capa
Editora Acadêmica Periodicojs

Idioma
Português

Dados Internacionais de Catalogação na Publicação (CIP)
(Câmara Brasileira do Livro, SP, Brasil)

Domingues, Carlos Aleixo
iTrans [livro eletrônico] : an intelligent transportation management platform for efficient and equitable paratransit services / Carlos Aleixo Domingues. -- João Pessoa, PB : Periodicojs, 2024.
PDF

Bibliografia.
ISBN 978-65-6010-059-6

1. Mobilidade urbana 2. Tecnologia da informação e comunicação 3. Transporte urbano I. Título.

24-193167 CDD-388.4

Índices para catálogo sistemático:
1. Tecnologia : Transporte : Mobilidade urbana 388.4
Tábata Alves da Silva - Bibliotecária - CRB-8/9253

Obra sem financiamento de órgão público ou privado. Os trabalhos publicados foram submetidos a revisão e avaliação por pares (duplo cego), com respectivas cartas de aceite no sistema da editora.

A obra é fruto de estudos e pesquisas da seção de Teses e Dissertações na America Latina da Coleção de livros Humanas em Perspectiva

Periodicojs
EDITORA ACADÊMICA

Filipe Lins dos Santos
Presidente e Editor Sênior da Periodicojs

CNPJ: 39.865.437/0001-23

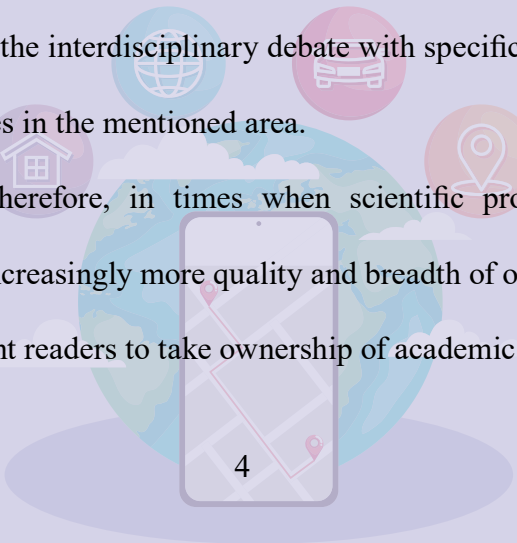
Rua Josias Lopes Braga, n. 437, Bancários, João Pessoa - PB - Brasil
website: www.periodicojs.com.br
instagram: @periodicojs

PREFACE

The collection of ebooks entitled Humanities in Perspective has as its primary purpose the dissemination and publication of quality works in the areas of human sciences that are evaluated in the double blind system.

It was with this in mind that the ebook collection allocated a specific section to emphasize and disseminate the work of teachers, students, researchers and scholars in the areas of human sciences. The objective of this section is to unite the interdisciplinary debate with specific themes and debates in the mentioned area.

Therefore, in times when scientific production requires increasingly more quality and breadth of openness for different readers to take ownership of academic studies,



we created this section with the aim of methodologically democratizing study, research and teaching in the area of human sciences.

This new ebook produced by researcher Carlos Aleixo Domingues demonstrates how technology can improve traffic in cities, and also allow for effective management of public bodies.

Filipe Lins dos Santos

Senior Editor at Academic Publisher Periodicojs

Public transit agencies across the US struggle to meet the constantly increasing demand for paratransit services that connect disabled/aged passengers with their communities. Some paratransit services operate under several restrictions, such as 24-hour booking requirements, limited operating hours, comprehensive pickup time windows, and a lack of real-time communication with the riders, according to the Metrobus platform. While others use intelligent technologies and on-demand services using an innovative application interface but lack accessibility for older people who have difficulties comprehending these technologies. The proposed application will optimize the usage of existing lift-equipped vehicles from several available transportation providers to offer thoughtful, on-demand ride-sharing transportation connectivity for paratransit and traditional passengers. We will conduct our study focusing on the US territory.

In this research, we aimed to: (i) identify and define specific challenges related to paratransit operations by interviewing transportation service providers and city

planners, (ii) understand the paratransit customers' needs through surveying disabled and elderly passengers as well as from existing data sources, (iii) gather the data required for developing the software application based on the inputs received in the previous steps, (iv) preprocess data and conduct preliminary analyses, and (v) assess the potential untapped demand for this service, considering several parameters, such as attitude towards using a ride-sharing service and travel duration.

The Saint Louis Metro Website provides an essential transportation service for residents and visitors of St. Louis, Missouri. The website offers information about the MetroLink train service and the MetroBus system, including routes, schedules, and fares. As part of my study on paratransit transportation services, I analyzed the St. Louis Metro Website to understand how the buses work and the hours of operation. Through my analysis and further research on the internet, we concluded that a demand-responsive van service that transports both paratransit and non-paratransit passengers based on an app would be the

best solution for paratransit passengers.

The St. Louis Metro Website indicates that the MetroBus system operates seven days a week and provides over 70 routes throughout the city and surrounding areas. The hours of operation vary depending on the route and day of the week, with some routes starting as early as 4:00 AM and others ending as late as 12:30 AM. Additionally, the website indicates that the MetroBus system has several accessibility features, such as wheelchair lifts and low floors, to accommodate passengers with disabilities, according to the information provided on their web page[1] ("Metrobus Schedule.", 19 Oct. 2022)

Despite the accessibility features of the MetroBus system, paratransit passengers may still face challenges using the service. For example, the buses may not run at convenient times or may not stop close enough to a passenger's destination. Furthermore, paratransit passengers may have to share the bus with other passengers, resulting in delays and inconvenience. According to the information

1 Available at <https://www.metrostlouis.org/metro-bus-schedule/.> Access: May 15th, 2023.

provided on their platform Metrobus, many improvements still need to be made.

To address these challenges, we conducted further research on the internet to identify alternative solutions for paratransit passengers, finding out that demand-responsive van services, which transport passengers based on an app or online platform, have become increasingly popular in recent years. These services allow passengers to book rides on-demand, and the van picks up and drops off passengers at their desired locations. Additionally, some demand-responsive van services offer accessible vehicles and specialized services for passengers with disabilities. The platforms for the various transportation systems of other states are present under “Other States Platform” on the reference page.

Furthermore, demand-responsive van services have several advantages over traditional fixed-route bus services. For example, they offer more flexible scheduling options, and passengers do not have to wait at bus stops for extended periods. Additionally, passengers can travel

directly to their destination without scheduling the van via phone, as it similarly happens in other states such as Florida or Alabama. That information can be found under “Other States Platforms.”

Moreover, demand-responsive van services would benefit non-paratransit passengers by providing a more flexible and convenient mode of transportation for people with no transportation challenges. To maintain a high supply of vans, integrating all kinds of passengers into a hybrid system that transports paratransit and non-paratransit passengers would be a good idea. In that way, we are not only providing everyone an extra option for demand-responsive transportation. We are also decreasing polluting gas emissions, making transportation more democratic and inclusive, and boosting the economy with many workers who now move to their workplaces.

In conclusion, my study of the St. Louis Metro Website and research on the internet led me to conclude that a demand-responsive van service would be the best solution for paratransit passengers. Such a service would provide

a more flexible and convenient mode of transportation for both paratransit and non-patransit passengers and could offer specialized services for passengers with disabilities. As technology continues to evolve, it is essential that we continue to explore innovative solutions to provide accessible and inclusive transportation services for all.

In the weeks of research, we reinforced the research theme. We considered other opportunities, such as optimizing manufacturing production. Still, my boss from my job thought it was too unrelated, and we also decided it was more fruitful to continue to research, starting from where we left off last semester.

Furthermore, we decided to expand the research instead of only covering the Saint Louis area. We would cover the entire country. I was responsible for extensive research to find each state's most popular paratransit services. After gathering all the data, we concluded that states with a more significant rural portion use more government vehicles for transportation that often rely on outdated scheduling systems. On the other hand, more

urban states such as California and New York have private on-demand transportation services that use more modern tools such as apps and a hybrid system that paratransit and non-paratransit passengers can use. Information about that can be checked under “Other States Platforms” on the citation with the respective name of the city.

Indeed, in today's world, technology has revolutionized how we live, work, and travel. Paratransit transportation services apps are prime examples of integrating technology into transportation services, providing a convenient and efficient way to travel. However, older adults may find it challenging to use these apps due to the complexity of the user interface, according to a study posted at the National Library of Medicine. Therefore, it is essential to study how to make these apps more accessible to this demographic. In this essay, I will discuss how I studied using articles on the internet on how to make modern paratransit transportation services apps more accessible to older people.

To begin with, I conducted an extensive search

on the internet for articles and research studies related to the accessibility of modern transportation service apps for older adults, available under “Other States Platform.” Through my research, I identified several key issues that older adults face when using these apps, including difficulty navigating the app, reading the text, and understanding the interface. Additionally, I found that many older adults may not be familiar with the latest technology and may require more extensive user guides and tutorials, as the “Older Adults Perception of Technology”[2] study says.

Next, I analyzed the solutions proposed in the articles to make these apps more accessible to older adults proposed in that study. I found that simplifying the interface, using larger text, and providing step-by-step tutorials were among the most effective solutions. Moreover, incorporating accessibility features such as text-to-speech, voice commands, and adjustable font size was also suggested.

Additionally, I studied the importance of user

2 Available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5649151/> Access: May 15th, 2023

feedback and user-centered design. I learned that involving older adults in the development process and conducting user testing can provide valuable insights to make the app more accessible to this demographic.

Finally, I synthesized the information from my research to propose practical solutions for making modern paratransit transportation services apps more accessible to older adults. I suggested designing a simplified interface with larger text, incorporating step-by-step tutorials and user guides, and leveraging the accessibility features of modern smartphones.

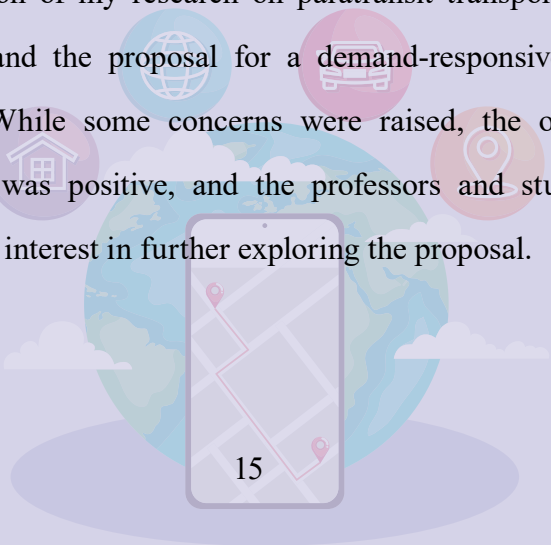
After extensively researching paratransit transportation services and analyzing the Saint Louis Metro Website, I presented my findings on the Undergraduate Research and Creative Achievements Forum. During the presentation, I highlighted the challenges that paratransit passengers face with traditional fixed-route bus services and proposed a demand-responsive van service as a potential solution.

I provided examples of successful demand-

responsive van services from other cities and discussed how such a service could benefit both paratransit and non-paratransit passengers. I also addressed concerns about the feasibility and cost of implementing such a service and provided potential solutions to address these concerns.

The presentation went well, and the people were receptive to my proposal. They appreciated the thoroughness of my research and the potential benefits of a demand-responsive van service. However, some professors raised concerns about the potential impact on existing transportation services and the need for further feasibility studies.

In conclusion, the people well-received the presentation of my research on paratransit transportation services and the proposal for a demand-responsive van service. While some concerns were raised, the overall feedback was positive, and the professors and students expressed interest in further exploring the proposal.



BIBLIOGRAPHIC REFERENCES

Ihnen, Alex. “Understanding Population Change and Density in St. Louis (UIC & NextSTL @ PXSTL).” NextSTL, 24 Feb. 2016, https://nextstl.com/2014/09/pxstl/.

Imgur. “Metro Reimagined: High Frequency Bus Routes in St. Louis.” Imgur, https://imgur.com/a/KaVK940.

Louis, Think Health St. “2022 Demographics.” Think Health St. Louis :: Demographics :: County :: St. Louis, https://www.thinkhealthstl.org/demographicdata.

“Metrobus Schedule.” Metrostlouis.org, 19 Oct. 2022, https://www.metrostlouis.org/metrobus-schedule/.

“Shrinking City, Flourishing Region: St. Louis Region.” Shrinking City, Flourishing Region: St. Louis Region | Newgeography.com, https://www.newgeography.com/content/002013-shrinking-city-flourishing-region-st-louis-re gion.

“System Maps.” Metrostlouis.org, 14 July 2022, https://www.metrostlouis.org/system-maps/.

Vaportzis, E., Clausen, M. G., & Gow, A. J. (2017, October

4). Older adults perceptions of technology and barriers to interacting with tablet computers: A FOCUS Group Study. Frontiers in psychology. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5649151/

Alaska - AnchorRIDES Paratransit Transportation. (n.d.). https://nrd.gov/resource/detail/12740109/AnchorRIDES+Paratransit+Transportation+-+Alaska

Access services applying for access - accessla.org. (n.d.-a). https://accessla.org/uploads/files/TransitEvalAppEng.pdf
Ada Paratransit Services. CT.gov. (n.d.).

https://portal.ct.gov/DOT/Publictrans/Bureau-of-Public-Transportation/Paratransit-serv ice

Home. Mountain Transit. (2023, June 1). https://www.mountaintransit.org/

Network of Care. (n.d.). https://larimer.co.networkofcare.org/aging/services/edit-agency.aspx?pid=ViaMobilityServices_1189_1_0

On Kakoʻo Paratransit Services: Hawaii County, HI mass transit agency. Hele. (n.d.). https://www.heleonbus.hawaiicounty.gov/programs/hele-on-kako-o-paratransit-services

Razorback transit - transit and parking | University of Arkansas. (n.d.-b). https://parking.uark.edu/_resources/documents/ParatransitPaxPolicies-Procedures14.pdf

The State of Delaware - Dart First State. (n.d.). Paratransit information. Dart First State. https://dartfirststate.com/RiderInfo/Paratransit/

Transportation disadvantaged. MetroPlan Orlando. (2022, July 7). https://metroplanorlando.org/programs-resources/transportation-disadvantaged/

Transportation Services. Alabama Medicaid. (n.d.). https://medicaid.alabama.gov/content/4.0_programs/4.5_transportation.aspx

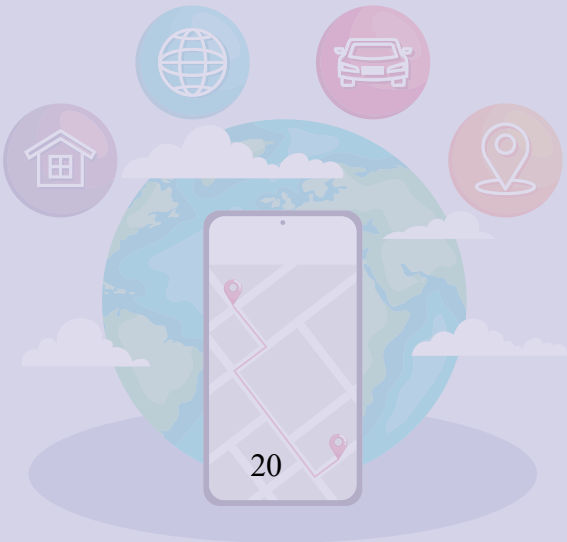
Valleymetro.org. (n.d.). https://www.valleymetro.org/accessibility/ada-paratransit

Do autor

Carlos Aleixo Domingues

I went to the United States in 2021 where I studied at the University of Missouri as an Honors Student. I first found research opportunities through the S.T.A.R. program. (Student Training for Advancing Research). After completing

the certification, I got a meeting with the project director, who connected me with Dr Suchi Rajendran. She trusted that I would do a good job and invited me to participate in her project studying how to optimize the location of the fire station in the city of St. Luis. After working on this project for a few months, I proposed starting this iTrans research project and she agreed to be my mentor.



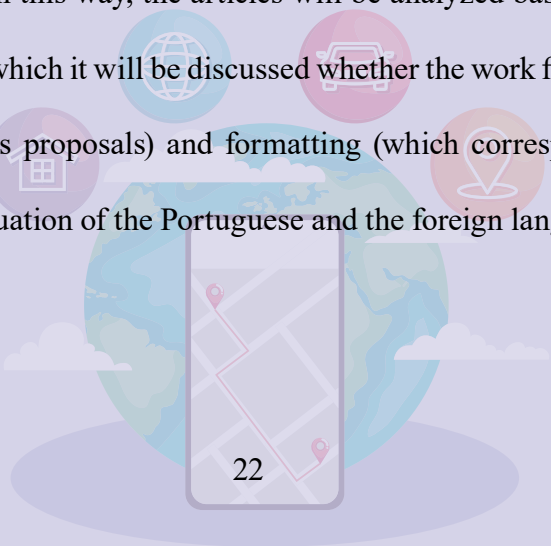
Política e Escopo da Coleção de livros Humanas em Perspectiva

Humanas in Perspective (HP) is a collection of books published annually for researchers in the areas of human sciences. Our objective is to serve as a space for the dissemination of thematic academic production on these areas, allowing free access and dissemination of the authors' writings. Our target audience for receiving productions are postdocs, doctors, masters and postgraduate students. Therefore, authors must have some of the aforementioned degrees or be taking a postgraduate course. Furthermore, the Collection will accept participation in co-authorship. Our submission policy will receive scientific articles with a minimum of 5,000 and a maximum of 8,000 words and critical reviews with a minimum of 5 and a maximum of 8

pages. HP will also receive expanded summaries between 2,500 and 3,000 characters, accompanied by a title in English, abstract and keywords.

The works will be received in a continuous flow, with 10 volumes of this collection being published per year. Works can be written in Portuguese, English or Spanish. Our evaluation policy is intended to follow the criteria of novelty, well-founded discussion and coated with relevant theoretical and practical value, always giving preference to receiving articles with empirical research, without rejecting other methodological approaches.

In this way, the articles will be analyzed based on merit (in which it will be discussed whether the work fits the collection's proposals) and formatting (which corresponds to an evaluation of the Portuguese and the foreign language used).



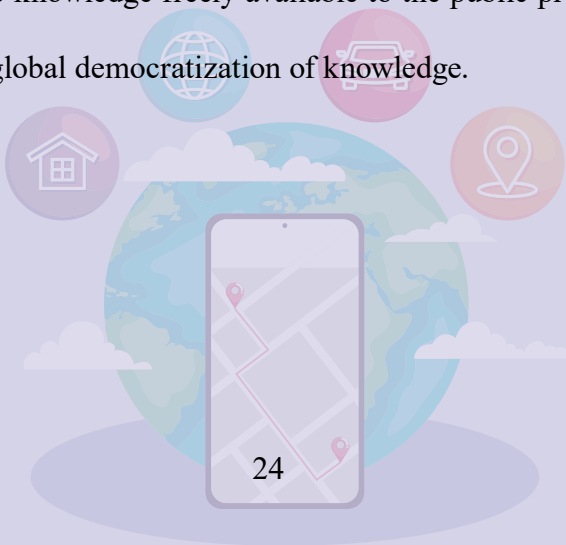
The analysis time for each work will be around two months after deposit on our website. The article evaluation process initially takes place when submitting articles without mentioning the author(s) and/or co-author(s) at any time during the electronic submission phase. The data is only mentioned in the system, which leaves the name(s) of the author(s) or co-author(s) hidden from the evaluators, with the aim of ensuring the impartiality of the evaluation. The choice of the evaluator is made by the editor according to the area of undergraduate and postgraduate training of the evaluating professor with the theme to be addressed by the author(s) and/or co-author(s) of the evaluated article.

Once the evaluation is completed without mentioning the name(s) of the author(s) and/or co-author(s), a letter of acceptance, acceptance with amendment or rejection of the article is sent by the evaluator sent depending on the opinion of the evaluator. The subsequent

stage is the preparation of the letter by the editor with the respective opinion from the evaluator to the author(s) and/or co-author(s). Finally, if the work is accepted or accepted with suggestions for modifications, the author(s) and/or co-author(s) are notified of the respective deadlines and the addition of their data(s) as well as academic qualifications.

Our book collection is also dedicated to publishing a complete work relating to monographs, dissertations or doctoral theses.

The public will have immediate free access to the content of the works, following the principle that making scientific knowledge freely available to the public provides greater global democratization of knowledge.



This new ebook produced by researcher Carlos Aleixo Domingues demonstrates how technology can improve traffic in cities, and also allow for effective management of public bodies.