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Teaching Innovation Through Location Analytics: Advancing DEI and ESG in Graduate IS Curriculum

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ABSTRACT

This paper presents a teaching innovation that introduces a practical, modular framework integrating Location Analytics (LA) with Diversity, Equity, and Inclusion (DEI) and Environmental, Social, and Governance (ESG) principles in graduate Information Systems (IS) education. Aligned with the Master of Science in Information Systems 2016 Global Competency Model (MSIS 2016 GCM), the framework emphasizes data, technology, business integration, and societal responsibility. It introduces a six-step pedagogical design that covers business understanding, data preparation, spatial analysis, and ethical evaluation, and embeds geospatial thinking and equity-centered reasoning into case-based learning. For IS educators, it offers ready-to-adopt teaching modules, assignments, and case studies that link technical skill development with social impact, aiming to prepare students to use data responsibly and lead with awareness of both business goals and social impact.

Keywords: Location analytics, Diversity, equity, and inclusion (DEI), Environmental, social, and governance (ESG), IS curriculum innovation, Interdisciplinary business education, Bloom's taxonomy, MSIS 2016 Global Competency Model

1. INTRODUCTION

Location analytics ("LA" hereafter) is the process of using geographic and spatial data to gain insights and make informed decisions by analyzing patterns, relationships, and trends within specific locations. It has emerged as a valuable tool for supporting informed decision-making and addressing social and environmental issues across various industries. LA, which utilizes spatial data to reveal geographic, demographic, and socioeconomic patterns, enables students to explore complex problems such as resource allocation, regional disparities, and environmental impact. The growing use of LA in sectors such as retail, logistics, and public services highlights its untapped potential in IS education, where it can bridge knowledge gaps and empower students to address real-world challenges through spatial data analysis (Erskine et al., 2024). Embedding LA in IS curricula helps students link data insights to real-world applications and build the ability to make informed, socially responsible decisions. This integration supports a holistic approach to problem-solving, emphasizing the interconnectedness of data and societal outcomes.

This paper is presented as a contribution to the field of teaching innovation. The contribution is primarily pedagogical and design-oriented, with empirical validation positioned as future work. Our goal is to provide IS educators with a pedagogical framework and classroom-ready resources that illustrate how LA can be meaningfully integrated into graduate curricula to advance DEI (diversity, equity, and inclusion) and ESG (environmental, social, and governance) principles. By embedding geospatial thinking and equity-focused decision-making into case-based instruction, this teaching innovation emphasizes how LA can serve as both a technical and ethical learning tool. It helps students build global awareness, strengthen ethical reasoning, and develop analytical fluency.

The MSIS 2016 GCM for Graduate Degree Programs in IS, developed by the Association of Information Systems (AIS) and the Association of Computing Machinery, provides a guiding framework for IS education, emphasizing technical proficiency, ethical reasoning, and global awareness (Topi et al., 2017). These competencies aim to develop well-rounded IS professionals attuned to their societal responsibilities. Although LA is not explicitly mentioned in the MSIS 2016 GCM framework, its integration with data management, IS strategy, ethics, and IT infrastructure aligns seamlessly with the model's objectives, particularly in supporting ethical decision-making, sustainability, and strategic innovation (Table 1). Incorporating LA into the curriculum extends the GCM's vision by linking technical skills with ethical and socially conscious applications through innovative data analysis and critical thinking skills, which are increasingly relevant in today's interconnected world.

DEI and ESG principles have become fundamental in modern business and education (Oswal et al., 2023; Rivera et al., 2024; Samans & Nelson, 2022). DEI initiatives aim to create inclusive environments that provide equal opportunities for all individuals (Dunn, 2020). ESG focuses on organizations' broader responsibilities, including environmental sustainability, social impact, and governance practices (Armstrong, 2020). DEI and ESG underscore the importance of ethical, socially responsible, and sustainable practices as companies and institutions increasingly recognize their role in addressing societal challenges. In IS education, DEI and ESG principles are commonly covered through discussions on corporate social responsibility and ethical data usage. However, they are frequently treated as separate topics rather than integral parts of analytical methods. Integrating DEI and ESG through LA provides a more practical approach, offering students data-driven strategies to address social issues and grounding these principles in real-world applications.

Recent reviews emphasize that IS curricula must evolve through industry input and experiential learning to remain relevant and demonstrate value to employers (Bohler et al., 2020). This study is motivated by the need to adapt IS programs to meet industry demand for technically skilled and socially

conscious graduates. Our focus on DEI and ESG reflects the growing emphasis on inclusive and sustainability-driven decision-making in business and IS education, reinforced by regulatory shifts, investor expectations, and consumer advocacy.

GCM Competency Area	How LA Contributes	Practical Example
Ethics, Impacts, and Sustainability	Supports ethical decision-making by visualizing inequities and environmental consequences associated with specific geographic regions.	A public health agency maps asthma rates across zip codes and overlays traffic density to advocate for air quality improvements in marginalized neighborhoods.
IS Strategy and Governance	Aligns IT and business strategies by revealing spatial trends in customer behavior, infrastructure risks, or resource availability.	A retail chain uses LA to visualize store-level sales against foot traffic heatmaps, guiding strategic site closures and reallocations.
Innovation, Organizational Change, and Entrepreneurship	Drives innovation by uncovering untapped geographic markets and delivering services tailored to local community needs.	A food delivery startup analyzes underserved urban areas using LA and launches targeted micro-hubs to reduce delivery time.
Data, Information, and Content Management	Enriches traditional datasets by incorporating geocoding, spatial joins, and pattern recognition across locations.	An insurance firm integrates LA to map historical claim data, identifying flood-prone zones and refining premium pricing models accordingly.

Table 1. Practical Examples of How LA Strengthens Key MSIS 2016 GCM Areas

Surveys show that 48% of consumers believe companies should do more to address societal issues, including DEI and human capital management (PwC, 2022). DEI programs also enhance competitiveness, agility, and innovation (Milanesi, 2023), while sustained DEI and ESG initiatives strengthen corporate responsibility and talent attraction (Ajose et al., 2024; Kumaran, 2024). Integrating these priorities into IS education aligns academia with evolving business practices and industry expectations.

As companies increasingly emphasize DEI and ESG, they seek professionals who can combine technical expertise with social awareness (DoGood People, 2025; Sundaram, 2025). Embedding DEI and ESG through LA and IS programs enhances students' employability, encourages creative problem-solving, and prepares them to respond to regulatory and ethical challenges in data-driven environments. This approach also meets students' growing interest in connecting their studies to real societal issues, making IS education more relevant, impactful, and future-ready. Drawing on the authors' experience in designing and delivering such courses at both graduate and undergraduate levels, this paper offers a hands-on, adaptable framework supported by teaching cases, assignments, and learning objectives. These resources help IS instructors integrate DEI and ESG discussions into analytics-focused coursework using LA, thereby preparing students to become ethical, socially aware, and analytically skilled professionals.

This article is organized as follows: We begin with a literature review covering three key areas: (1) the intersection of DEI and ESG principles and business education; (2) current trends in LA education and its implications for IS education; and (3) the role of case study methodology in graduate IS programs. Following this, we discuss course design and integration strategies, focusing on a framework for embedding LA into IS education, pedagogical strategies for teaching LA with an emphasis on DEI and ESG, specific learning objectives for integrating DEI and ESG, and examples of case studies that illustrate practical applications. We conclude by examining the broader impact of LA on DEI and ESG education, its implications for business education programs, and the challenges and opportunities associated with teaching LA within graduate-level IS courses.

2. LITERATURE REVIEW

2.1 The Intersection of DEI, ESG, and Business Education

Integrating LA into business education enables students to interpret geographic and demographic patterns, thereby enhancing their decision-making skills by providing a spatial lens for complex business problems. Geographic Information Systems (GIS), a core technology underpinning LA, help visualize and analyze spatial relationships across business contexts (EsriGIS, 2025; Mennecke, 1997; Pick, 2005). King and Arnette (2011) demonstrate that integrating GIS into business curricula improves students' analytical capabilities in areas such as site selection, market analysis, and resource allocation. These spatial competencies are crucial as institutions strive to integrate DEI and ESG priorities into their teaching and research.

Spatial thinking, the ability to interpret relationships among objects and environments, supports efforts to identify disparities and patterns that are often overlooked in traditional data analysis. While the AACSB (2025, n.d.) calls for diversity to be embedded into accreditation standards, limited case studies currently exist on challenges faced by minority-owned businesses (Adams, 2021; Shinn, 2021). Moreover, even where data analytics is used to explore diversity and equity (Rider & Reagans, 2022), few programs incorporate spatial tools that can illuminate location-based inequities.

Recent work underscores the growing importance of DEI and ESG in business education. DEI initiatives seek to create inclusive environments where diverse perspectives are valued (Riedel et al., 2023), and LA advances these goals by identifying underserved regions and guiding equitable interventions. For instance, Philadelphia used GIS to address food deserts, improving grocery access in low-income areas and aligning with DEI and ESG priorities (Dodge & Nelson, 2023). Likewise, ESG practices are gaining momentum as companies balance profitability with social and environmental stewardship (Ahmad et al., 2024). LA enhances these efforts by revealing spatial patterns in air and water quality, biodiversity, and carbon emissions, helping firms identify pollution hotspots, assess ecological risks, and optimize logistics routes to reduce emissions and support sustainability.

Business schools are under increasing pressure to demonstrate a positive societal impact and integrate complex social and environmental issues into their business strategies (Steidle & Henderson, 2023). There is a growing need to help students understand how societal impact aligns with business objectives to benefit multiple stakeholders (Cadotte & Agrawal, 2022). Sustainability, climate change, health, and social justice have become central themes in forward-thinking business schools (De Novellis, 2022a). Although some institutions are adopting multidisciplinary approaches in teaching and research, geospatial analysis within these initiatives remains limited (De Novellis, 2022b).

This growing expectation has led to increased emphasis on embedding societal impact into curricula, requiring students to evaluate sustainability, health, and equity as integral components of business strategy (Egir, 2024; Miotto et al., 2020; PIR Report, 2023). However, LA remains underutilized despite its proven value across disciplines. De Novellis (2022b) highlights that while multidisciplinary approaches are gaining ground, spatial thinking is still largely absent from business education. GIS, which integrates spatial data with analytical tools, has long proven effective in mapping and addressing real-world challenges (Keenan, 2020). Tools like GIS have been successfully utilized to advance social justice through urban planning and public policy (Narayanan & Manimaran, 2024; Salling et al., 2019;). Steinberg (2021) emphasizes how spatial design and planning methods can enhance student engagement with issues of social impact.

Despite its success in environmental science and public health since the 1990s, the adoption of GIS in business schools remains low. Although early work (Erevelles et al., 1999; Gadish, 2006; McBane, 2003; Miller & Goodchild, 2015; Miller et al., 2007; Miller et al., 2013; Miller et al., 2014; Reames, 2006; Shepherd, 2009) advocated for the integration of GIS, it remains absent from most IS curricula, despite over 80% of firms reporting the use of location analysis in practice (Ramakrishna et al., 2011; Spatial Business Initiative, 2018). Barriers include GIS's steep learning curve and its marginalization as an optional add-on (Bernhäuserová et al., 2022), often detached from core business education and underrepresented in IS departments (Baker et al., 2015; Rivera & Groleau, 2021). This underutilization constrains the ability of business students to explore location-dependent challenges, such as service coverage, customer targeting,

and equitable hiring strategies, among others. Fields such as urban planning and sociology have demonstrated how GIS can address environmental and social issues—applications that business schools have yet to fully adopt (Cappelli et al., 2018; Conner, 2013). Market area modeling (Buckner, 1998), spatial coverage analysis, and community impact assessments (Mitchell, 2020) show how LA can support both commercial and societal decision-making.

Although firms increasingly rely on LA to inform their sustainability strategies, most business school programs have not evolved in parallel. LA's roots in environmental systems make it an ideal framework for analyzing complex interactions across stakeholders, regions, and regulatory contexts. Graduates proficient in LA are better equipped to assess DEI and ESG trade-offs, anticipate spatial risks, and align profitability with social impact.

2.2 Current Trends in LA Education and Implications for IS Education

Despite widespread adoption of location analytics in industry, its integration into Information Systems curricula remains limited and fragmented. LA has become a vital tool across industries, revealing spatial insights that traditional data analysis often overlooks. Despite its transformative potential to improve decision-making, operational efficiency, and strategic planning across sectors such as retail, logistics, and public services, the integration of LA into IS education remains limited, as Erskine et al. (2024) point out. The study underscores LA's potential to enhance IS curricula by equipping students with the critical spatial data analysis skills needed to address complex societal challenges. LA enables the examination of issues such as healthcare accessibility, resource distribution, and environmental justice by revealing spatial disparities that may not be evident in traditional data analysis. By providing insights into these spatial patterns, LA naturally incorporates DEI considerations within the IS curriculum, allowing students to analyze and address inequities across different communities (Nelson et al., 2022).

Additionally, the literature underscores how LA applications in ESG areas further embed social responsibility into IS education. For example, LA can assess environmental impacts, track access to sustainable resources, and analyze carbon footprints, supporting organizational goals that align with ESG principles (Yachai et al., 2021). This integration within IS education fosters socially responsible decision-making by helping students consider the ethical implications of their analyses. Thus, LA in IS programs positions students to gain technical proficiency and develop a heightened awareness of social and environmental issues, aligning with growing calls for DEI and ESG-focused education in the field.

LA aligns closely with the core competencies outlined in the MSIS 2016 GCM, which emphasizes technical proficiency, ethical reasoning, and global awareness. The GCM advocates for IS professionals to possess analytical skills and apply them with a global, ethical perspective. LA supports these goals by encouraging students to consider the social and environmental implications of data-driven decisions.

Moreover, LA can be further contextualized within the United Nations Sustainable Development Goals (UN-SDGs) framework, enhancing its impact beyond traditional IS boundaries (United Nations, 2015). LA provides a data-driven approach to tackling global challenges such as environmental sustainability (McCullough & Murfree, 2022), social equity (Basnett et al., 2019), and sustainable urban development (Kellison, 2022). By integrating spatial analysis and predictive modeling with ethical frameworks, LA prepares students to address global challenges outlined in the UN SDGs. This includes assessing environmental impacts, promoting social equity, and fostering sustainable development through technology.

Through spatial analysis, students gain insights into the impact of decisions across different communities and environments, directly reinforcing the GCM's commitment to ethical, socially conscious decision-making. This synergy between LA and the GCM further highlights LA's role in promoting DEI and ESG within IS programs. By integrating spatial data analysis and predictive modeling with ethical frameworks, LA prepares students to navigate the intersections of technology, social responsibility, and sustainability. This holistic approach equips students to evaluate the impacts of resource allocation, assess environmental effects, and address privacy and equity concerns in location-based services. Implementing LA in IS education ensures that graduates are technically skilled and prepared to make data-informed decisions that prioritize societal impact and foster social equity through technology.

2.3 Case Study Methodology in Graduate IS Programs

Case study methodology is widely recognized for promoting critical thinking, practical application, and ethical decision-making in business education (Yin, 2017). When combined with spatial data, it enables students to engage with real-world scenarios through a multidimensional lens, one that includes geographic context and social implications. This is particularly valuable for integrating DEI and ESG topics, as spatially grounded case studies can reveal patterns of inequality or resource distribution that are otherwise difficult to detect (Narayanan & Manimaran, 2024; Salling et al., 2019).

Students analyzing such cases develop practical solutions by considering how location affects accessibility, inclusion, and environmental outcomes. For example, a GIS-based case on retail site selection may prompt students to examine whether proposed locations disadvantage underserved communities, directly tying business decisions to DEI concerns. Similarly, cases involving climate risk or infrastructure planning allow for ESG assessments, helping students understand the trade-offs between profit, environmental stewardship, and community impact.

However, current case study resources often fall short in incorporating spatial or location-based dimensions and rarely address the lived experiences of minority-owned businesses or ESG-specific challenges (Adams, 2021; Shinn, 2021). This limits the pedagogical effectiveness of DEI and ESG integration in IS programs. To address this, interdisciplinary methods are essential (Warf & Arias, 2009). As Sadler et al. (2019) emphasize, drawing on environmental science, public health, urban planning, and geography can enrich business education with socially responsive tools, such as GIS.

By embedding spatial thinking into case-based learning, IS programs can better align with the MSIS 2016 GCM's emphasis on global awareness, ethical analysis, and real-world application. Students gain both technical proficiency and the ability to assess the broader societal and environmental implications of their decisions, ultimately fostering more inclusive and sustainability-minded business leaders.

3. COURSE DESIGN

3.1 Framework for Integrating LA Into IS Education

Integrating LA into IS education provides essential tools for visualizing and analyzing spatial data, enhancing students' ability to solve complex business problems. Embedding these capabilities within the curriculum equips students with practical skills that are highly sought after in the marketplace. To achieve this, IS programs should identify relevant courses, develop modules blending theory and practical application, and incorporate real-world case studies. Active learning methods, GIS software training, and interdisciplinary collaboration further enrich the curriculum. Practical assignments ensure students are well-prepared to tackle modern business challenges while promoting DEI and ESG principles.

Table 2 presents strategies for incorporating LA into the graduate IS curriculum. These strategies include identifying relevant courses, developing targeted modules, integrating case studies, employing active learning methods, providing GIS software training, encouraging interdisciplinary collaboration, and designing practical assignments that promote learning and retention. Combining theoretical knowledge with hands-on applications encourages collaboration and enhances analytical skills through real-world scenarios. Integrating LA into the curriculum does not have to be an "all or nothing" approach. Faculty can introduce LA in select course portions or gradually expand its integration over multiple semesters, allowing for a flexible and scalable adoption process.

Strategy	Description
Identify Relevant Courses	Pinpoint IS courses where LA can be integrated, ensuring alignment with course objectives.
Develop Specific Modules	Develop modules that integrate theoretical knowledge with practical applications, incorporating GIS fundamentals and spatial data analysis.
Incorporate Case Studies	Use real-world data and case studies to provide hands-on experience, demonstrating the application of LA in solving business challenges.

Active Learning Methods	Engage students through group projects, lab sessions, and fieldwork to promote collaboration and deepen understanding.
GIS Software Training	Through dedicated training sessions, ensure proficiency with the latest GIS software (Esri's ArcGIS or the open-source QGIS, Python & R, etc.) (Erskine et al., 2024).
Interdisciplinary Collaboration	Encourage collaboration with environmental science, urban planning, and public health to enhance analytical skills.
Design Practical Assignments	Create assignments, projects, presentations, and exams that require applying LA to real-world scenarios.

Table 2. Strategies for Integrating LA Into the IS Curriculum

3.2 Pedagogical Strategies for Teaching LA With a Focus on DEI and ESG

In addition to the strategies outlined in Table 2 for embedding LA concepts in various IS courses, a dedicated, standalone graduate IS course on LA could also be offered. This course would focus on multiple aspects of the spatial analysis process, providing an in-depth exploration of the theoretical foundations and practical applications of GIS technology. Students would gain comprehensive knowledge and hands-on experience in spatial data collection, preparation, visualization, and modeling, equipping them with the skills necessary to solve complex spatial problems.

Drawing inspiration from the CRISP-DM (CRoss-Industry Standard Process for Data Mining) framework for data mining (Chapman et al., 2000; Jaggia et al., 2020), we present a pedagogical framework tailored for teaching this course. Our framework consists of six steps, adapted from CRISP-DM to suit the specific scope and objectives of our introductory graduate IS course in LA (Figure 1).

Step 1: Business Understanding. Students engage with diverse business problems, applying spatial thinking and analytical reasoning to achieve distinct learning outcomes. They explore the role of LA in pattern identification, resource optimization, operational efficiency, customer targeting, and decision-making. Through this step, students learn to gather relevant spatial data and develop work plans for practical analysis.

Incorporating DEI and ESG principles in Step 1 involves encouraging students to consider diverse perspectives when defining business problems, ensuring the needs and experiences of underrepresented groups are taken into account, and analyzing case studies that highlight the impact of spatial inequities across different communities to emphasize equitable resource allocation and inclusive decision-making. Additionally, it entails exploring business scenarios focused on sustainability and social responsibility, such as optimizing resource use to minimize environmental impact or targeting services to underserved communities. It also involves discussing LA's role in supporting ESG initiatives, including monitoring environmental changes and assessing the social impact of business operations.

Step 2: Data Understanding. Students learn to analyze spatial data by exploring its characteristics, such as distribution, density, and clustering. They evaluate data sources for reliability and relevance, ensuring the data meets their analysis requirements. Additionally, students understand relevant attributes such as geographic coordinates, temporal information, and thematic variables. This step involves identifying spatial relationships, patterns, and potential preprocessing needs, including data cleaning, transformation, enrichment, and integration with other datasets to prepare for in-depth spatial analysis.

Integrating DEI and ESG principles in Step 2 involves teaching students to evaluate spatial data sources for potential biases and to consider the impact of data collection methods on different communities, while highlighting the importance of data quality and representativeness in accurately reflecting diverse populations and their needs. Additionally, the course emphasizes the use of reliable and ethically sourced spatial data in environmental, social, and governance contexts. It instructs students on identifying and utilizing data for ESG strategies, such as environmental impact assessments and social equity analyses.

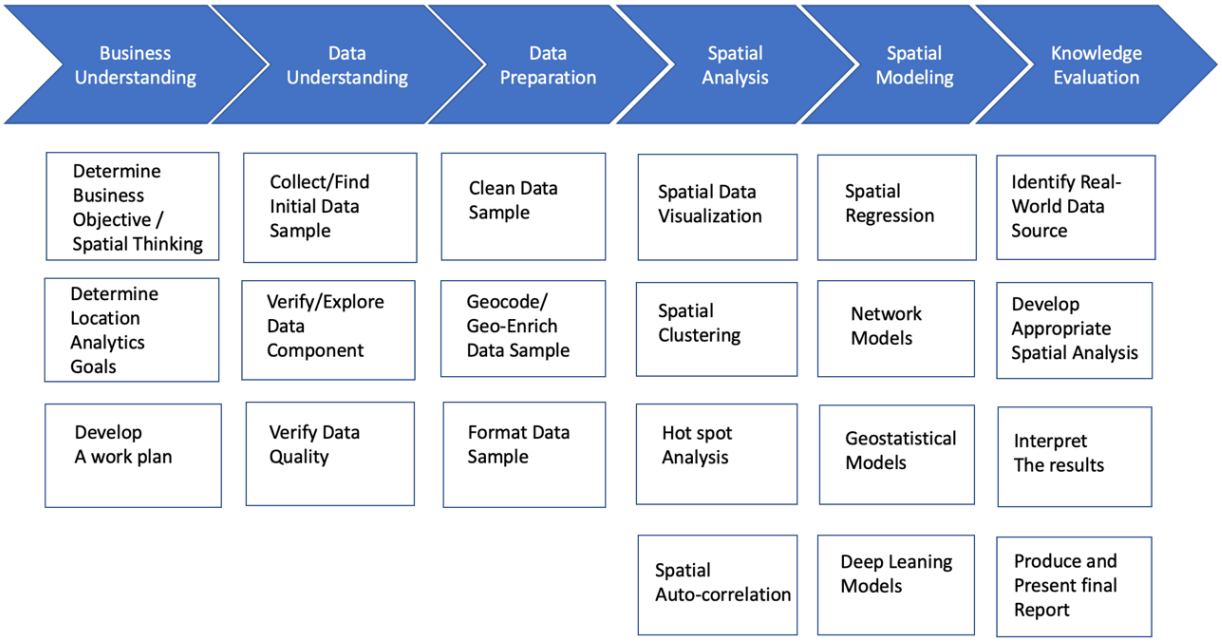

Figure 1. Workflow for Spatial Data Analysis and Knowledge Evaluation

Step 3: Data Preparation. Spatial data from various sources undergoes integration and preparation for analysis, ensuring it is accurate and ready for in-depth examination. This step involves geocoding addresses to convert textual data into mappable points, merging datasets to create a unified view, and incorporating location-specific attributes such as population density, land use, and various demographic and psychographic data. These attributes provide a comprehensive context by adding layers of information related to the population's characteristics and behaviors, enhancing the depth and relevance of the spatial analysis. It also includes data cleaning and transformation to correct inaccuracies, standardize formats, and handle missing values, improving overall data quality. Visualizing the prepared data helps enhance comprehension and ensure compatibility for further spatial analysis. These tasks collectively ensure the data is well-organized, accurate, and enriched, laying a solid foundation for subsequent analysis and modeling.

Incorporating DEI and ESG principles in this step involves guiding students to include demographic and socioeconomic data for comprehensive spatial analysis that reflects community diversity and discussing the ethical implications of data preprocessing, such as geocoding accuracy and potential biases. Additionally, it requires instructing students on integrating environmental and social data with traditional business data for comprehensive ESG analyses. Equally important is teaching data preparation techniques that enhance the reliability of ESG-related spatial analyses by ensuring data compatibility and accuracy.

Step 4: Spatial Data Analysis. Students are introduced to GIS software and various techniques for spatial data analysis, equipping them with the tools to interpret and manipulate spatial information effectively. They learn to use GIS software to create spatial visualizations, which help them understand geographic patterns and relationships through maps and other graphical representations. The course also covers spatial clustering techniques, enabling students to identify and analyze groups of geographically proximate data points that exhibit similar characteristics. Additionally, students explore hotspot analysis, a method used to detect areas with a high concentration of events or features, which is crucial for identifying trends and outliers (Public Health Columbia, 2025). Another critical technique taught is spatial autocorrelation, which measures the degree of similarity between spatial data points based on their location, helping to understand spatial dependencies and patterns (Goodchild, 2013). Through these techniques,

students gain a comprehensive understanding of spatial data analysis, equipping them with the skills to tackle complex spatial problems in various real-world contexts.

Incorporating DEI and ESG principles in this step involves introducing spatial analysis techniques to reveal patterns of inequality and inform strategies to address spatial disparities. This approach encourages the use of GIS software to visualize and analyze data that highlights the experiences and needs of marginalized communities. Additionally, it includes teaching students to perform spatial analyses that support environmental sustainability and social responsibility, such as identifying pollution hotspots or assessing access to green spaces, and discussing how spatial data analysis can inform corporate ESG strategies and reporting.

Step 5: Spatial Data Modeling. Students are introduced to fundamental problem-solving techniques, including the development of statistical or predictive models using spatial data, thereby acquiring essential analytical skills. Common approaches include spatial regression models, which examine the relationships between spatially distributed variables and make predictions based on these relationships. Geostatistical models, such as Geographically Weighted Regression (Brunsdon et al., 1996) and Geographically and Temporally Weighted Regression (Fotheringham et al., 2015), are also covered, focusing on the analysis and prediction of spatially continuous phenomena, including pollution levels and resource distribution. Network models are introduced to analyze and optimize spatial networks, such as transportation or communication networks, highlighting the connections and flow between nodes. Additionally, students learn about machine learning models, such as Random Forests and Convolutional Neural Networks, that are applied to spatial data, enabling the identification of complex patterns and the development of predictive algorithms. These techniques collectively equip students to analyze spatial data comprehensively, make informed decisions, and solve a range of real-world spatial problems.

Integrating DEI and ESG principles in this step involves guiding students in developing models that consider the impacts on diverse communities to ensure equitable and inclusive outcomes. It also consists of introducing methodologies for evaluating the fairness and bias of spatial models, with an emphasis on ethical considerations. Additionally, it includes teaching students to build models that predict environmental and social outcomes to support proactive ESG management, as well as discussing the use of spatial regression, geostatistical models, and machine learning to forecast and mitigate adverse environmental and social impacts.

Step 6: Knowledge Evaluation. Students' knowledge acquisition is systematically assessed by applying various spatial analysis techniques, ensuring they can effectively interpret results and produce comprehensive reports. This process includes evaluating their ability to utilize GIS software, perform spatial visualizations, conduct clustering and hotspot analysis, and apply models such as geospatial regression and geostatistical methods. Additionally, students must demonstrate their understanding by presenting findings in detailed written and visual formats, showcasing their analytical skills and ability to communicate complex spatial data insights. Ethical considerations are also reviewed throughout the course, emphasizing the importance of data integrity, privacy, and responsible usage. By addressing these ethical aspects, students learn to ensure the reliability and usefulness of their analysis, preparing them to handle real-world spatial data with professionalism and ethical awareness. This holistic approach ensures that students master technical skills while also appreciating the broader implications of their work in spatial analysis.

Incorporating DEI and ESG principles in this step involves assessing students' ability to apply spatial analysis techniques with considerations of equity and inclusion, including assignments that require evaluating the ethical implications of their analyses and proposing solutions that promote social justice. Additionally, it involves assessing students' proficiency in applying spatial data to ESG contexts, such as producing reports that consider environmental impact or social equity, and encouraging critical reflection on the role of LA in supporting sustainable and responsible business practices.

3.3 Learning Objectives for DEI and ESG Integration

Incorporating DEI and ESG principles into IS education is essential for developing socially responsible and ethically aware business leaders. Clear learning objectives guide instructional strategies, assessments, and

student learning outcomes, ensuring students theoretically understand DEI and ESG concepts and know how to apply them in real-world business contexts. Table 3 outlines five key strategies, such as developing geospatial modules, incorporating case studies, and designing practical assignments, each paired with classroom examples that the authors have used to illustrate these approaches in their teaching. These strategies guide students from foundational understanding to higher-order thinking, using frameworks like Bloom's Taxonomy to recall, describe, apply, analyze, evaluate, and create solutions that address equity, accountability, and sustainability in IS practices (Armstrong, 2010; Bloom, 1956; Krathwohl, 2002).

Strategy	Description and IS-Focused Implementation Example
Develop Specific Modules	Introduce a module titled "Geospatial Data in Ethical IS Design" within a database or business intelligence course. For example, students utilize Esri's ArcGIS to investigate spatial inequality in broadband access and propose system design enhancements for digital inclusion.
Incorporate Case Studies	Use real-world datasets to build case-based learning on equity and sustainability. As an example, analyze the distribution of electric vehicle charging infrastructure in underserved areas using spatial layers.
Design Practical Assignments	Create projects that apply LA tools to solve DEI/ESG-relevant IS problems. For example, students build a dashboard using Power BI or Tableau with geospatial data layers showing access to telehealth services by zip code, filtered by income or minority populations.
Active Learning Methods	Facilitate lab sessions where students manipulate spatial data tied to DEI/ESG KPIs. For example, in a systems analysis course, students work in teams to redesign a city's 311 public service app to better serve underrepresented neighborhoods, utilizing heatmaps and complaint clusters.
Real-World Impact Assessment	Emphasize stakeholder-aware system development by modeling impact zones. For example, in a capstone IS class, students assess how the rollout of smart sensors for water usage could affect communities differently, visualizing zones of vulnerability and recommending mitigation strategies to address these differences.

Table 3. Strategies for Defining DEI and ESG Learning Objectives in IS Education

3.4 Integrating DEI and ESG Principles Into the LA Curriculum Through Case Studies

Table 4 presents a non-exhaustive list of case studies that highlight the intersection of DEI and ESG concepts with business. These case studies illustrate how spatial data can address complex social and environmental challenges, ensuring that students not only gain technical skills but also develop a comprehensive understanding of the broader impacts of their professional work. Engaging with these real-world scenarios is designed to help students make informed, equitable, and sustainable decisions in their professional careers.

Area of Study	Topics	Learning Outcomes	Classroom Activities
(1) Community Impact	Spatial Inequality	Discern patterns of spatial inequality and explore how LA can address environmental disparities while practicing DEI in the classroom.	Create a map visualizing spatial inequalities and DEI, analyze an environmental disparity using LA, and provide recommendations based on the findings.
	Environmental Justice	Analyze how LA can address environmental disparities.	Identify an environmental disparity, discuss the implications of using LA to analyze it, create a spatial visualization, and provide recommendations based on the analysis.
	Urban Planning	Examine how LA can inform equitable urban planning.	Explain equitable urban planning, elaborate on implications, design a spatial visualization, and provide analysis and recommendations using LA.
(2) Cultural Sensitivity	Demographic Analysis	Interpret and analyze demographic data with sensitivity to cultural diversity and differences.	Explain demographic data, develop an LA procedure for analyzing demographic data, apply it to a specific problem, and discuss the implications of this analysis.
	Language Diversity	Explore language diversity in spatial datasets and its implications.	Define language diversity, explore it through spatial thinking, assess its implications on tabular datasets, and create a map that highlights the geographic significance of language diversity.
	Cultural Heritage Mapping	Use LA to preserve and honor cultural heritage.	Describe cultural heritage examples, elaborate on preservation efforts, explore the use of spatial data in supporting cultural heritage, and depict heritage preservation through mapping.
(3) Accessibility	Transportation Equity	Assess transportation accessibility for marginalized communities.	Recognize a marginalized community using demographic data, research transportation modalities, develop transportation maps, and recommend steps to enhance accessibility based on a gap analysis.
	Disability Access	Analyze spatial data to improve accessibility for people with disabilities.	Review accessibility and disability concerns, clarify spatial data for analysis, create maps analyzing accessibility, and specify implications for improving accessibility.
	Healthcare Accessibility	Evaluate healthcare access disparities.	Pinpoint healthcare disparities, decide on data for evaluation, investigate and map healthcare

			disparities, and communicate geospatial issues in healthcare access using the developed maps.
(4) Social Justice	Crime Mapping	Examine the relationship between crime patterns and social inequities.	Characterize social inequities spatially, explain historical crime patterns, correlate crime and social inequity patterns, and generate recommendations for targeting crime based on analysis.
	Food Deserts	Utilize LA to identify and address food deserts.	Clarify the concept of food deserts, select spatial data for analysis, map food deserts, and investigate the patterns that emerge from the mapping.
	Educational Equity	Investigate spatial disparities in educational resources and outcomes.	Identify spatial data on educational resources and outcomes, map and compare them to find disparities, and report on patterns and their implications.
	Demographic Analysis	Consider demographic factors such as race, ethnicity, socioeconomic status, and gender in data analysis.	Utilize interdisciplinary perspectives to enhance understanding of social dynamics, collaborate across fields, and develop innovative approaches to social challenges using LA.

Table 4. DEI/ESG Integration in LA Curriculum – Sample Activities and Outcomes

3.5 Examples of Case Studies and Practical Applications

This section presents two complementary case studies illustrating how DEI and ESG principles can be integrated into LA pedagogy. The first, *GreenTech's Facility Expansion*, is a conceptual example that demonstrates how LA can guide ethical business decisions related to site selection. Its goal is to showcase the pedagogical potential of LA in advancing social responsibility rather than to serve as a fully developed classroom module. To complement this, a second case study, *Mapping Food Deserts in Memphis*, is included in the appendices as a classroom-ready resource featuring datasets, structured tasks, and instructional guidance for direct adoption. Together, these cases illustrate both the conceptual framework and practical application of embedding DEI and ESG considerations into graduate IS curricula.

3.5.1 Teaching Case-1: Equitable and Sustainable Facility Expansion of GreenTech

Background

GreenTech, a leader in renewable energy technologies, is preparing to expand its operations by opening a new U.S.-based manufacturing facility. This expansion, driven by increasing global demand for clean energy and the need to diversify its supply chain, poses a critical strategic question: *Where should GreenTech locate its next facility to maximize efficiency while advancing its commitments to DEI and sustainability?*

To answer this, GreenTech has identified four candidate regions for consideration: Detroit, Michigan; Phoenix, Arizona; Houston, Texas; and Charleston, South Carolina. Each area offers clear advantages but also significant trade-offs. Detroit offers opportunities for community revitalization in a distressed economic zone, supported by an experienced labor pool from the automotive sector. Phoenix provides abundant solar potential and a growing, diverse workforce, but faces extreme heat and water scarcity. Houston offers strong port access and a skilled energy workforce, yet it is vulnerable to high-risk hurricanes.

Charleston provides cost advantages and strategic proximity to renewable supply chains, but its hurricane vulnerability and lower DEI indicators pose concerns.

Using LA, GreenTech must weigh these competing factors:

- Workforce availability and diversity (skilled labor, racial/ethnic diversity, income levels)
- Energy costs and renewable energy potential
- Climate and environmental risks, including hurricanes, flooding, and extreme heat
- Economic uplift potential in distressed or underserved regions

Students are tasked with evaluating these real-world trade-offs to determine the optimal location. The decision must strike a balance between business imperatives (cost, efficiency, and resilience) and broader responsibilities (equity, community benefit, and climate adaptation), demonstrating how businesses can strategically integrate ESG and DEI principles into their expansion planning. The case highlights the intersection of data-driven decision-making and ethical responsibility, challenging students to navigate real-world trade-offs where the "best" site may depend on whether the priority is cost savings, risk reduction, or social impact.

Publicly Available Data: Students will work with the following publicly available datasets.

- Demographic data (working-age population, income, racial diversity) [https://data.census.gov]
- National Storm Events Database [https://www.ncei.noaa.gov/stormevents]
- U.S. Energy Information Portal [https://www.eia.gov]
- Economically Distressed Area Indicators [https://www.statsamerica.org/distress]

Student Learning Objectives: Students completing this case will be able to:

- Use LA to identify ideal facility locations based on workforce availability, energy economics, and environmental risk.
- Evaluate how site selection can promote equity and economic development in distressed areas.
- Forecast future disruptions and resilience factors using storm and climate risk data.
- Propose location-based strategies that integrate ESG and DEI principles into business expansion.

3.5.1.1 Teaching Suggestions. This case is ideal for graduate courses in Business Analytics, IS Strategy, and Operations Management.

Pre-Class Prep: Assign readings on ethical site selection and watch a short video on energy justice and equitable development zones (EnergyJustice, 2025; Siteselection, 2025).

3.5.1.2 In-Class Activities. Some of the in-class activities include the following:

- *Map Analysis:* Compare candidate sites by layering workforce data, risk zones, and energy costs to inform decision-making.
- *Breakout Discussion:* Explore the trade-offs between minimizing costs and maximizing community benefits.
- *Scenario Simulation:* Evaluate how each site performs under simulated climate events or labor shortages.
- *Debrief:* Highlight the intersection of analytics, equity, and corporate responsibility in real-world decisions.

3.5.1.3 Discussion Questions. Here are some discussion questions to consider:

- Which factors should be prioritized when selecting a new site: cost, labor availability, climate risk, or DEI outcomes?
- How can spatial data reveal hidden inequalities or risks that would otherwise be overlooked?
- What are the potential reputational and community impacts of GreenTech choosing a non-diverse or high-risk location?

- How can GreenTech ensure its expansion strategy contributes to economic uplift in underserved regions?
- Should government incentives play a role in guiding equitable and sustainable private sector expansion?

3.5.1.4 Suggested Assignments. Here are some suggested assignments:

- *Assignment A: Data-Driven Location Pitch.* Students create a 3-slide pitch to GreenTech's executive team recommending one of four sites, supported by spatial analysis, demographic trends, and risk evaluation.
- *Assignment B: DEI-Forward Site Simulation.* Using provided datasets, teams simulate how each location performs under a DEI lens (e.g., income diversity, minority workforce availability, accessibility).
- *Assignment C: Ethics & ESG Roundtable.* Students role-play as operations leaders, community advocates, and board members, debating: "Should GreenTech prioritize equity and sustainability even if the most efficient site scores lower on those metrics?"

3.5.2 Teaching Case-2: Mapping Food Deserts in Memphis

This case study demonstrates how LA can be applied to a real-world problem at the intersection of equity, public health, and urban infrastructure. The case focuses on food access disparities in Memphis, Tennessee, where income inequality, limited transportation, and demographic vulnerability intersect to create persistent food deserts. Students assume the role of consultants advising the City of Memphis and are tasked with using GIS tools to identify high-need areas, analyze contributing factors, and propose data-driven, equity-focused interventions.

Unlike the GreenTech case, which illustrates conceptual decision-making, the Memphis case is designed as a hands-on, classroom-ready module. It requires students to integrate spatial analysis, demographic profiling, and system design into a coherent decision-support approach.

3.5.2.1 Learning Objectives. Students completing this case are expected to:

- Identify spatial patterns of inequality in food access using geospatial data,
- Apply GIS tools to analyze relationships among demographic, health, and infrastructure variables, and
- Design a decision-support dashboard that communicates equity-focused insights to stakeholders.

3.5.2.2 Student Tasks. The case is structured around a sequence of applied tasks. Students first identify high-need zones by overlaying spatial layers such as grocery store access, transit coverage, income levels, and health indicators. They then conduct a deeper analysis of selected zones, examining demographic and socioeconomic characteristics to understand community-level constraints. Building on this analysis, students develop a prototype dashboard that visualizes disparities and supports decision-making. Finally, they propose targeted interventions, such as improving transit access, incentivizing grocery store placement, or designing community-based solutions.

3.5.2.3 Assessment Approach. Student performance is evaluated across three dimensions. First, technical competency is assessed through map-based analysis and the correct use of GIS tools to identify and justify high-need areas. Second, students are evaluated on their ability to design a clear and effective dashboard that communicates spatial insights to non-technical stakeholders. Third, reflective assessment focuses on how well students incorporate DEI and ESG considerations into their recommendations, including their ability to recognize trade-offs, address equity concerns, and propose socially responsible solutions.

The full instructional version of this case, including datasets, step-by-step exercises, and teaching notes, is provided in Appendix A and Appendix B

4. DISCUSSION AND IMPLICATIONS

4.1 Impact of LA on DEI and ESG Education

Using LA in DEI and ESG education can help students better understand social and environmental issues by visualizing them in a spatial context. It enables them to examine how challenges such as unequal access to resources, pollution, or demographic disparities vary across different locations. LA can reveal patterns often hidden in traditional analyses, thereby enhancing students' understanding of systemic inequities. Through spatial mapping, students can identify underserved communities and service gaps, supporting fair and inclusive decision-making. This hands-on approach promotes critical thinking and problem-solving skills, allowing students to analyze data from multiple perspectives and propose solutions that integrate social, environmental, and economic considerations.

Beyond technical learning, integrating LA promotes experiential and interdisciplinary learning by connecting data-driven insights to real-world policy and business contexts. Students gain opportunities to collaborate across disciplines such as business, geography, and social sciences, enhancing their ability to apply analytics to diverse social challenges. This approach also develops ethical data literacy, as learners must consider the implications of data accuracy, representativeness, and potential bias in spatial datasets.

At the institutional level, LA can support curricular goals aligned with AACSB and MSIS 2016 GCM standards, reinforcing competencies in data, technology, and societal responsibility. Embedding LA into DEI and ESG education is intended to equip future business professionals with both analytical fluency and moral awareness, skills essential for responsible leadership in a data-driven, globally connected world.

4.2 Broader Implications for Business Education Programs

Integrating LA into business education advances interdisciplinary learning by connecting business with geography, environmental science, and the social sciences. This integration encourages students to approach business challenges holistically, drawing from multiple domains to understand the spatial dimensions of economic and social systems.

Adopting LA also drives curricular innovation, prompting institutions to design new courses, incorporate spatial modules into existing programs, and invest in appropriate software and faculty training. These efforts build capacity for data-driven, socially responsible decision-making across business disciplines.

Furthermore, embedding LA enhances the strategic value of business schools by differentiating their programs through experiential and analytics-rich learning opportunities. It encourages collaboration between academia and industry, supporting internships, research partnerships, and applied projects that address DEI and ESG priorities. Ultimately, the inclusion of LA equips graduates with spatial reasoning and ethical data literacy, competencies increasingly essential for sustainable leadership in a globally connected economy.

5. CHALLENGES AND OPPORTUNITIES

Bringing LA into graduate business programs can be a challenging task. Many students and faculty members still view it as a complex subject or as a tool intended only for specialized fields. However, web-based GIS platforms, open data sources, and hands-on case studies have made it easier for both instructors and students to use. These tools are often simpler than traditional software, such as spreadsheets or statistical packages, and come with strong online support, thereby reducing faculty workload.

Another challenge is the misconception that GIS is limited to specific disciplines, which hinders collaboration. LA, like statistics, applies across various business areas, including supply chain, marketing, site selection, and human resources. Business schools should use this opportunity to promote interdisciplinary projects and partnerships that solve spatially based business problems.

Generative AI (GenAI) adds a powerful new dimension to this learning environment. It can automate map creation, summarize spatial trends, and assist students in writing analyses or generating scenario-based

insights from location data. For instructors, GenAI can help design assignments, explain complex spatial models in plain language, and provide real-time feedback on student work. When used responsibly, GenAI makes LA more interactive, creative, and accessible to learners from diverse backgrounds.

Emerging technologies also bring new research opportunities. Machine learning and deep learning methods can help solve complex spatial problems, while real-time data from sensors and social media enhance analysis in fields such as logistics, emergency response, and retail. Visualization tools, such as virtual reality and augmented reality (VR/AR), can further enhance the communication of results to business and community stakeholders (Khanal et al., 2022).

At the same time, ethical and privacy concerns remain critical. Best practices must ensure the responsible handling of sensitive location data, protecting transparency and fairness. Educators should also guide students to consider how language and artificial intelligence solutions impact equity, sustainability, and community well-being. Collaboration with industry partners through projects and case studies provides valuable practical experience. Interdisciplinary work across public health, urban planning, and environmental studies helps students tackle real-world challenges. Finally, continuous educator training through workshops and conferences is essential to keep pace with advances in both LA and GenAI, ensuring that business education remains relevant and forward-looking.

6. SUSTAINABLE AND SCALABLE FRAMEWORK

The proposed framework for embedding LA into IS education is designed to be adaptable across diverse academic institutions and business curricula. This study is designed to support pedagogical soundness and practical applicability by aligning with established methodologies, such as the MSIS 2016 Global Competency Model, and with best practices in DEI and ESG education.

Sustainability is reinforced through interdisciplinary collaborations, scalable teaching strategies, and real-world applications that enable long-term adoption. The framework's replicability is supported by clear implementation guidelines, open-access geospatial data and tools, and case studies that can be tailored to various educational contexts. Future research can expand on this work by incorporating longitudinal assessments, comparative studies across institutions, and industry-driven feedback to further validate and refine the integration of LA into IS education.

This research contributes to the evolving discourse on ethical and socially responsible decision-making by proposing an approach to equip students with critical analytical skills that extend beyond the classroom into business practice and policymaking. By bridging technical proficiency with social impact, this study underscores LA's role in shaping an inclusive, data-driven, and sustainability-conscious workforce.

7. CONCLUSION AND OUTLOOK

Integrating LA into graduate IS curricula provides a concrete, implementable pathway to advance DEI and ESG education. This teaching innovation framework enhances both geospatial and analytical fluency, while also cultivating a systems-level understanding of equity and sustainability. By engaging students in real-world spatial problems and ethical reasoning, the framework reinforces key dimensions of the MSIS 2016 Global Competency Model, particularly in areas of data analysis, ethical leadership, and global awareness.

7.1 Contribution to Knowledge and Significance

This study contributes to IS education as a pedagogical innovation by presenting a practical, easily adoptable framework that integrates LA with DEI and ESG learning goals. While prior literature has emphasized spatial data literacy and analytics, the role of spatial thinking in promoting ethical and sustainable outcomes remains underexplored. This work fills that gap by providing case-based resources and learning modules aligned with the MSIS 2016 Global Competency Model, supporting technical proficiency, ethical reasoning, and a global, sustainability-focused mindset. Institutions can adapt this framework to enrich interdisciplinary curricula and enhance student readiness for modern business demands.

7.2 Future Direction and Empirical Validation

While this paper primarily focuses on pedagogical design and teaching innovation, our current evidence of the framework's success is mainly anecdotal, drawn from classroom experiences rather than formal empirical studies. Future research will address this limitation by systematically evaluating the framework's impact through student surveys, pre- and post-assessments of learning outcomes, and comparative analyses across course sections. These efforts aim to validate how LA enhances students' spatial reasoning, ethical awareness, and understanding of DEI/ESG in IS education. By documenting implementation across various institutions and contexts, we aim to make a significant contribution to evidence-based curriculum innovation.

Looking ahead, evolving GIS technologies and growing ESG imperatives will continue shaping IS education. Sustained faculty development and cross-sector partnerships will be essential to scale impact, support innovation, and ensure graduates are equipped to lead equitable, data-driven decision-making in an increasingly spatially aware business environment.

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APPENDICES

Appendix A: Mapping Food Deserts in Memphis

A.1 Introduction

This instructional case explores how location analytics (LA) can inform data-driven strategies to address food access disparities in Memphis, Tennessee. It emphasizes how IS tools, such as GIS mapping, data dashboards, and stakeholder modeling, can be applied to socially responsible business practices aligned with DEI (diversity, equity, and inclusion) and ESG (environmental, social, and governance) goals. The case challenges students to analyze layered spatial datasets, engage in ethical decision-making, and simulate collaborative planning to identify sustainable, community-informed interventions. Designed for graduate-level IS courses, it promotes interdisciplinary skill-building across data analysis, stakeholder engagement, and policy awareness.

A.2 Background

As the morning sun rose over Memphis, Tennessee, a city long defined by its rich musical heritage and civil rights legacy, planners in the Urban Planning Division gathered around a series of thematic maps. For weeks, growing concerns about food insecurity had dominated internal reports. National data confirmed what residents had long known - Memphis was among the most food-insecure metro areas in the country.

But this wasn't just about hunger. In Memphis, issues of food access are interwoven with income inequality, limited public transportation, health disparities, and racial segregation. Neighborhoods such as Klondike-Smokey City, South City, and Orange Mound exhibited consistent overlap in poor transit access, high obesity rates, and a lack of full-service grocery stores. These trends were especially troubling for children, elderly residents, and low-income families.

The city had just received a grant to develop a community-informed food equity plan. In response, a cross-functional working group was formed, comprising representatives from the Mid-South Food Bank, the Shelby County Health Department, local grocery retailers, and nonprofit organizations. They turned to advanced mapping and LA tools to identify gaps, prioritize interventions, and present an equity-informed dashboard to the city council.

You are a newly hired GIS consultant supporting this initiative. Your task is to analyze food access challenges using geospatial and demographic data, simulate decision-making with multiple stakeholders, and design a transparent, community-facing dashboard that helps drive DEI/ESG-aligned outcomes.

A.3 Tools and Resources for Completing the Case

To complete the spatial analysis, demographic profiling, and dashboard design components of this case, students will need access to Esri's ArcGIS Online platform (ArcGIS Online, 2025). ArcGIS Online allows users to view, analyze, and overlay spatial data in an interactive map environment. As part of the free three-week trial license, students will also have access to ArcGIS Business Analyst Web (ArcGIS Business Analyst Web, 2025) for retrieving and analyzing demographic data, and ArcGIS Insights (ArcGIS Insights, 2025) for creating interactive, data-driven dashboards. Students who do not already have an institutional account can sign up for the free trial account by visiting the Online Trial site (ArcGIS Trial, 2025). After creating an account, students should log in and explore how to add data layers, adjust symbology, make buffers, access demographic datasets via Esri's Business Analyst Web, and develop dashboard components in Esri's ArcGIS Insights. These tools will be essential for examining the provided Memphis map layers, identifying high-need zones, and building the Equity Dashboard in later tasks.

This case unfolds in five stages as follow.

A.3.1 Task 1: Analyzing the Need: Layering Spatial Insights. As part of your analysis for the City of Memphis, you begin by reviewing three map layers prepared by the city's GIS team. These visualizations are designed to help identify areas with critical gaps in food access, particularly where equity and vulnerability intersect.

- *Map 1: Transit Access & Equity* shows the coverage of public transportation across grocery store neighborhoods, highlighting areas with limited or no access to reliable transit.
- *Map 2: Obesity Rates + Access Buffers* visualizes public health data along with a 0.5-mile radius around full-service grocery stores.
- *Map 3: Grocery Stores + Age-Sensitive Populations* overlays the locations of food retail with concentrations of residents under 18 and over 65, who often face mobility or affordability challenges.

As you examine the maps, your task is to identify where these indicators overlap. You are looking for areas that simultaneously show:

- No nearby grocery store access within walking distance,
- High obesity rates and low-income populations, and
- A significant presence of youth or older adults.

These overlapping conditions help identify zones where interventions can most effectively advance equity, support underserved communities, and promote sustainable development.

A.3.1.1 Deliverable. On the provided City's GIS map (Case 2 Map, 2025), identify at least two zones you consider to be high-need areas. Use critical thinking to support your choices: explain your selections with reference to at least three indicators shown on the maps. An example of such a map for Task 1 is shown in Figure A-1.

A.3.1.2 Suggested Steps

- Identify neighborhoods with no grocery stores within a 0.5-mile radius and low walkability.
- Check for census tracts that have both high obesity rates and low-income levels.
- Use the transit map to evaluate the accessibility of grocery options for individuals without access to a car.

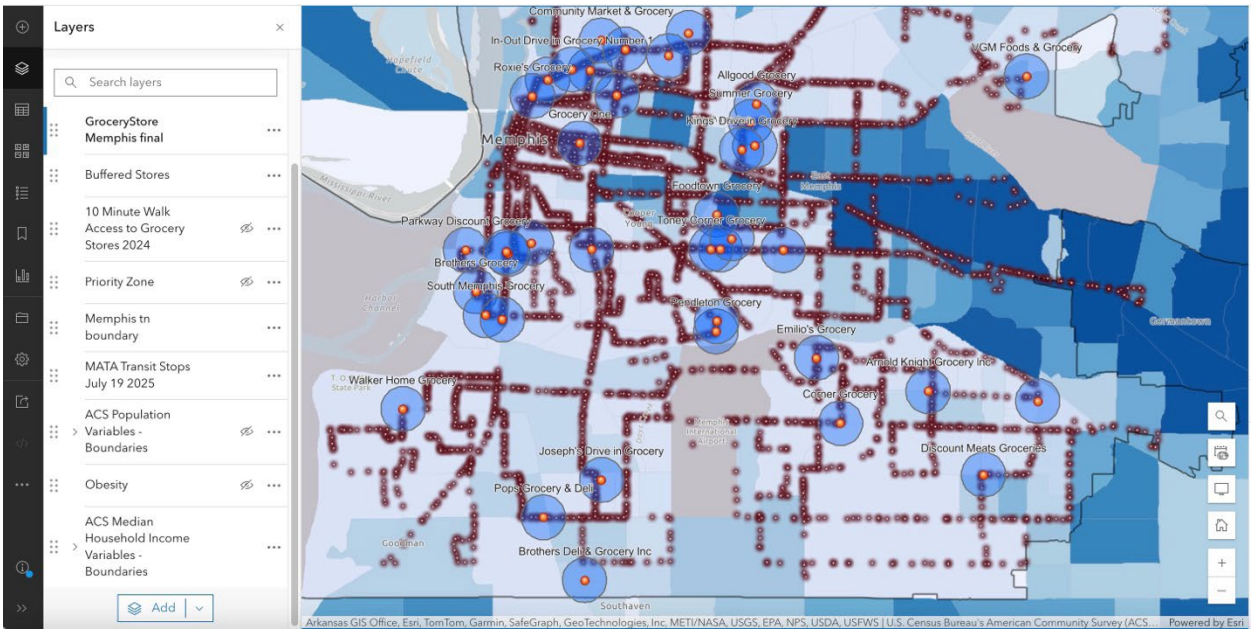

Figure A-1. Overlay of Transit Routes, Grocery Stores, and Household Income Variables in Memphis

A.3.2 Task 2: Understanding Community Realities: Deep Dive into Priority Zones. After identifying areas of need using the city's GIS maps, your team is now assigned to focus on one of the four designated Priority Zones, which are neighborhoods that exhibit overlapping challenges related to food access, transit, and vulnerable populations.

Your assigned area, for example, might be Zone 1 (Figure A-2, red polygon in north Memphis), Klondike–Smokey City, a historically underserved neighborhood in North Memphis. Using the demographic and socio-economic data overlays, you begin to build a picture of who lives here and what daily life might look like. Note: Import the web map into ArcGIS Business Analyst to create four distinct zones and analyze various socio-economic data to compare these zones.

To better understand these challenges from a human-centered perspective, you have been asked to develop a fictional persona who lives in your zone. This helps frame the real-world impact of limited access to healthy food and mobility options.

You will need to consider:

- Income levels, drawn from census data.
- Age ranges and family status
- Transit access and proximity to grocery stores
- Health-related vulnerabilities, such as obesity or diabetes prevalence
- Time constraints due to employment or caregiving roles

This exercise brings the data to life by putting you in the shoes of someone affected by food inequity.

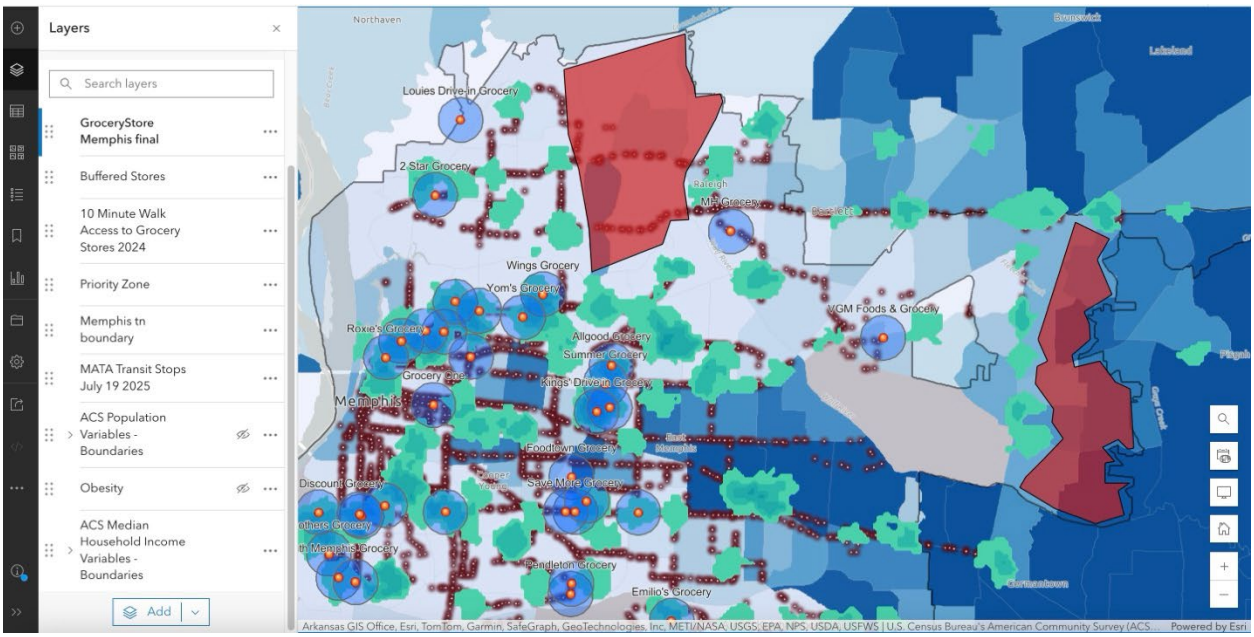

Figure A-2. Mapping Grocery Store Accessibility and Priority Zones in Memphis

A.3.2.1 Deliverable

- Write a short paragraph describing your fictional resident, including their age, income, household situation, and lifestyle.
- List three food access challenges they face, each tied to a different factor—transportation, time, and health.

A.3.2.2 Suggested Steps

- Use Esri's Tapestry data to create a realistic and data-driven persona.
- Connect identified barriers, such as the absence of nearby bus stops or the lack of full-service grocery stores within walking distance, to the mapped layers.
- Consider how health conditions or mobility limitations may exacerbate these challenges.

Figures A-3 & A-4 illustrate how to identify the four zones by visually analyzing different layers of information on the Web map. The detailed layer information was imported from the Business Analyst Web map. The priority zones are named as "1" (north), "2" (east), "3" (south-east), and "4" (south-west) as shown in the map below.

A.3.3 Task 3: Collaborative Decision-Making – The Stakeholder Roundtable. With map-based insights in hand and Priority Zones identified, your working group now shifts into a simulation exercise, a roundtable planning session designed to model real-world decision-making.

You and your team will assume the roles of key stakeholders responsible for shaping Memphis's community food ecosystem. Each role brings a unique perspective, priority, and set of constraints:

- An Urban Planning Official who must weigh zoning, infrastructure, and long-term city development goals.
- A representative from the Mid-South Food Bank, who is focused on emergency hunger relief and distribution logistics.
- A Community Organizer from Orange Mound, advocating for residents' voices and cultural considerations.
- A Grocery Chain Executive, concerned about financial sustainability and supply chains.
- A Public Health Analyst from Shelby County, focused on health disparities, obesity trends, and access to nutritious food.

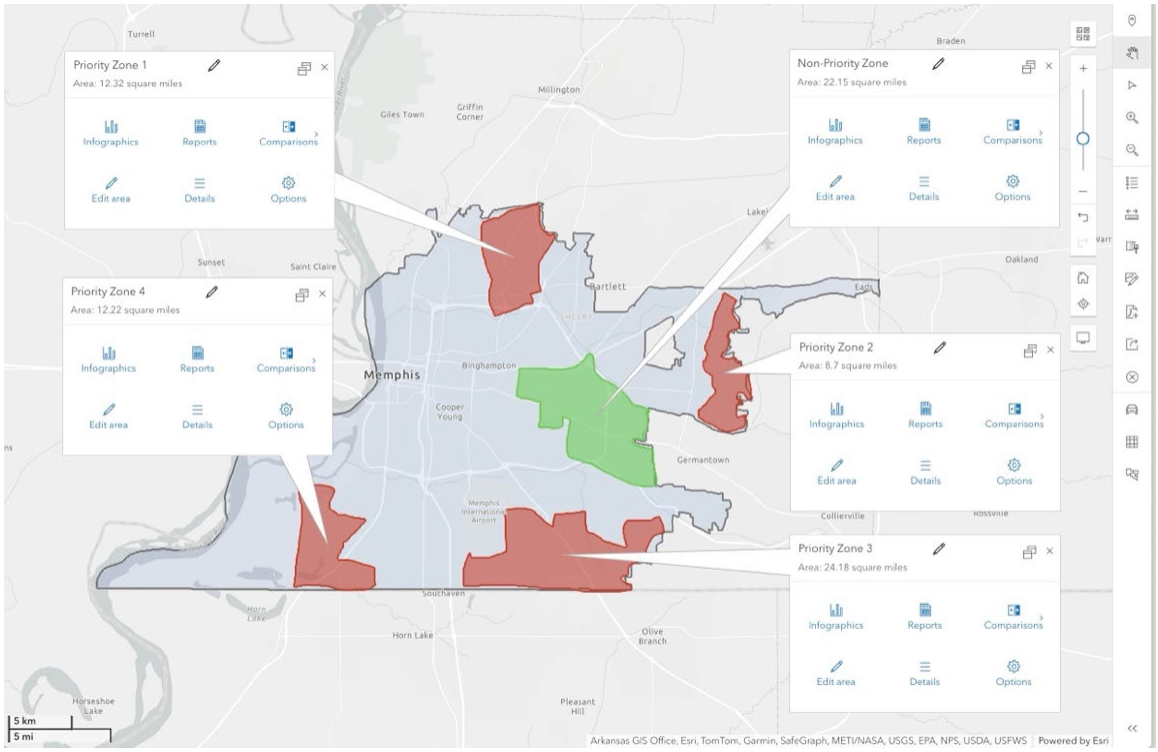

Figure A-3. Economic Priority Zones (Hand-Drawn Polygons on the Map) to Compare a Non-Priority Zone (Green), Where Food Access Is Not an Issue at All

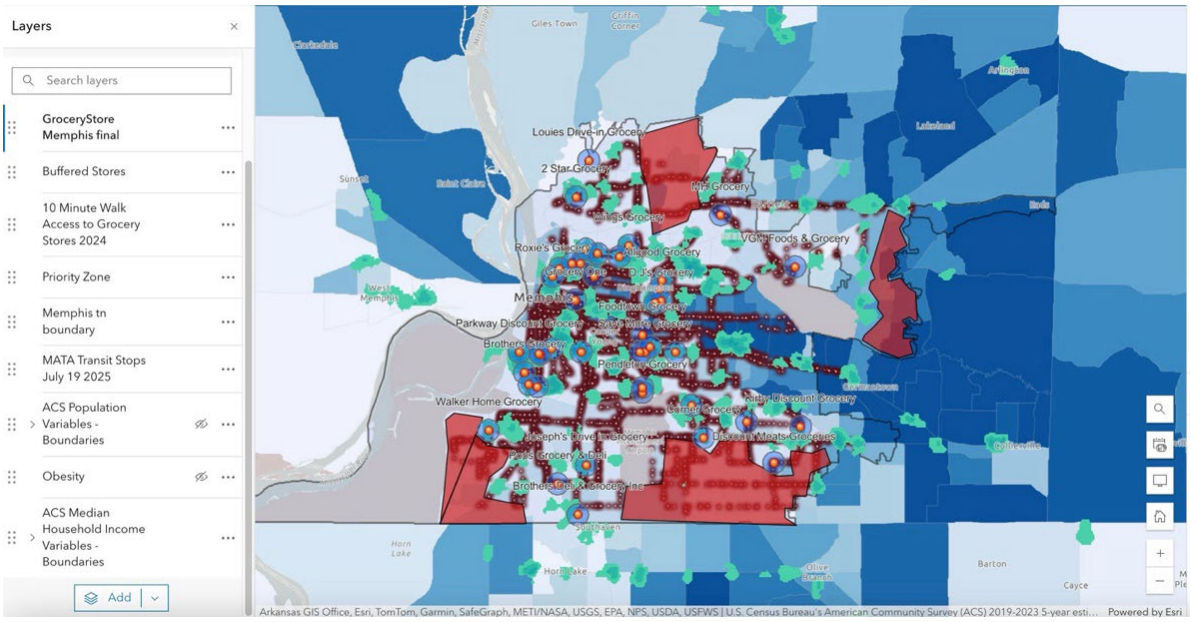

Figure A-4. Identifying High-Need Food Access Areas in Memphis

As a group, your task is to determine *where* and *how* to pilot a new food retail intervention, such as a cooperative grocery, mobile market, or an ESG-certified store, drawing on the insights you have gathered.

Consider the unique trade-offs in each potential zone:

- *Zone 1*: High public health needs due to obesity rates, but transit access is limited. How might you address transportation challenges while ensuring access?
- *Zone 2*: Aging residents and no existing retail space. Could partnerships or adaptive reuse of buildings be part of the solution?
- *Zone 3*: Some infrastructure exists, but the community's need is lower. How could you justify investment here, and who might benefit?
- *Zone 4*: Prior community projects have built momentum, but data is incomplete. How would you bridge the information gaps before committing resources?

A.3.3.1 Deliverable. Draft a one-page group statement summarizing your team's recommendation (or disagreement), clearly citing map evidence and stakeholder priorities.

A.3.3.2 Suggested Steps

- Use a quick scorecard to rank each zone based on need, feasibility, and alignment with ESG principles.
- Capture each stakeholder's viewpoint and note tensions or alignments across roles.
- Document whether you reached consensus or where disagreements persisted, and why.

Note: Create a table with zones in rows and criteria such as Need**,** Feasibility**,** ESG Alignment, in columns. Use a simple scale (e.g., 1-5) for each criterion, with 5 being the highest priority or most.

Substantial alignment. Sum the scores to get a quick comparison, but also note any "deal-breakers" that a score alone might not capture. Here is an example (Table A-1) where Zones 1 & 4 are the winners.

A.3.4 Task 4: Visualizing Impact: The Equity Dashboard Prototype. Having completed your spatial analysis and participated in a stakeholder roundtable, your team is now tasked with translating insights into impact. The Memphis City Council seeks a dashboard that presents complex data in a format accessible to both policymakers and the public.

This is not just about charts. It is about transparency, equity, and accountability. You have been tasked with prototyping a community-facing *Equity Dashboard* to visualize food access disparities across the city, with a focus on the four Priority Zones. The goal is to help residents, decision-makers, and advocates understand where interventions are needed most and how they align with DEI and ESG values.

Your prototype should include:

- A Grocery Access Map showing 0.5-mile buffers and underserved areas.
- Identify the Zone(s) where the obesity rate is more than 50% and how would that affect your decision on intervention strategy?
- A bar chart comparing the average household income and poverty index in priority and non-priority zones (Figure A-5).
- Research Community Tapestry Data (Tapestry segmentation profile in Business analyst web) for each zone and prioritize the zone that will need the most help.

Zone	Need (1-5)	Feasibility (1-5)	ESG Alignment (1-5)	Total Score
Zone 1	5	3	5	13
Zone 2	2	4	4	10
Zone 3	4	3	4	11
Zone 4	4	4	5	13

Table A-1. Comparison and Selection of Preferred Zone(s) for Intervention

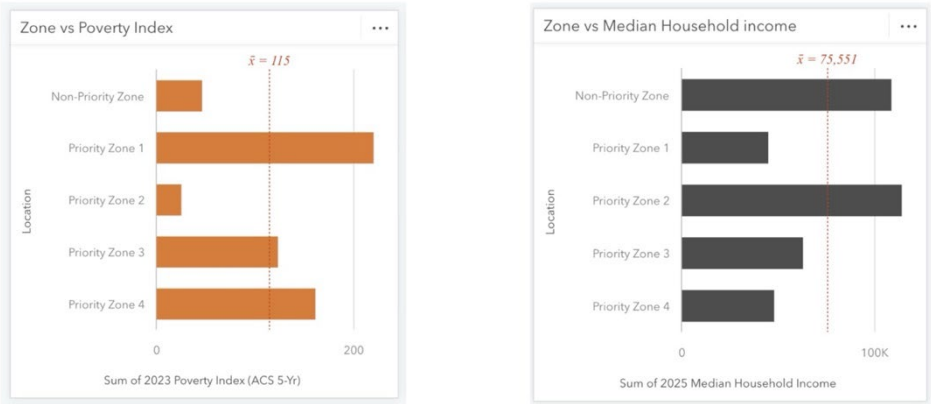

Figure A-5. Socioeconomic Disparities Across Priority and Non-Priority Zones

A.3.4.1 Deliverable. Prepare a dashboard using ArcGIS Insights. Include at least three widgets tied to specific Priority Zones and write a brief (2-3 sentences) summary of how residents or city staff could use it to track progress or advocate for change.

A.3.4.2 Suggested Steps

- Use data from your previous tasks (mapping, personas, roundtable) to inform each visual.
- Write a short explanation highlighting the intended users and how this tool supports inclusive and data-informed planning.

A.3.5 Task 5: Beyond the Data - Ethical Reflection. As your team wraps up its planning work, the focus shifts from what can be done to what might happen next. A city council member closes the session with a pause-worthy reminder: "Good data doesn't always mean good outcomes."

It is a moment to step back and shift the conversation. Beyond feasibility or design choices, consider the ripple effects of your plan. A food retail initiative may reshape long-standing community businesses, alter the character of a neighborhood, or disrupt the cultural patterns of grocery shopping that have been passed down for generations. These are not side notes; they are central to responsible decision-making. Your task is to identify these potential consequences and incorporate them into the discussion, so that the plan reflects not just efficiency, but also equity and respect for community life.

You are asked to take a step back and think critically. What are the unintended side effects of your intervention? And more importantly, what can be done to prevent them?

A.3.5.1 Deliverable. Write a 150-200-word personal reflection discussing at least two potential risks and one safeguard strategy. Your ideas should consider both Memphis-specific examples and broader patterns from other cities.

A.3.5.2 Suggested Steps

- Use case examples to ground your concerns.
- Reflect on the importance of community voice. Could participatory design or hiring from within the neighborhood be effective solutions?
- Consider how digital tools (such as apps, dashboards, and surveys) can invite feedback and ensure inclusivity as plans move forward.

This final step is your opportunity to explore how location intelligence and IS must be used responsibly, with equity as the foundation for sustainable solutions.

A.4 Conclusion: Designing With Purpose

This case has taken you through a realistic decision-making journey, one grounded in data but shaped by people. You have analyzed maps, modeled dashboards, created fictional personas, and debated policy trade-offs. But beneath all those tasks lies a deeper challenge: how to align business innovation with equity-centered thinking.

Too often, DEI and ESG principles are treated as external reporting frameworks or compliance checklists. They serve as strategic lenses that can uncover blind spots, encourage innovation, and establish long-term trust. In this Memphis-based food access project, you have seen how LA and IS can serve as tools for inclusion—or exclusion—depending on how they are applied.

Appendix B. Teaching Notes for Instructors

B.1 Case Synopsis

This teaching case introduces graduate students to the application of LA in advancing DEI and ESG principles within business and IS education.

Set in Memphis, TN, one of the most food-insecure metropolitan areas in the U.S., the case challenges students to utilize Esri's ArcGIS Online, Business Analyst, and Insights to investigate disparities in food access across neighborhoods. Students analyze spatial data layers (e.g., transit, grocery store buffers, obesity prevalence, demographics), identify priority zones, and build personas that reflect community realities.

Through a stakeholder roundtable simulation, students explore the trade-offs that different actors (city officials, food banks, community organizers, retailers, and public health agencies) bring to decision-making. They then design a prototype *Equity Dashboard* to visualize disparities and reflect critically on the ethical risks of interventions.

The case is designed to cultivate data-driven, socially responsible decision-making skills by combining geospatial analysis with DEI/ESG frameworks. It equips students with practical tools and ethical awareness needed for modern IS practice.

B.2 Learning Objectives

After completing this case, students will be able to:

- Apply Location Analytics tools (ArcGIS Online, Business Analyst, Insights) to integrate spatial and demographic datasets for analyzing urban equity challenges.
- Identify and evaluate high-need areas by interpreting overlapping indicators such as food access, health disparities, transit access, and vulnerable populations.
- Develop data-driven community personas that translate quantitative data into lived realities, highlighting how inequities affect specific populations.
- Simulate stakeholder decision-making by role-playing multiple perspectives and negotiating trade-offs across equity, feasibility, and sustainability dimensions.
- Design a prototype *Equity Dashboard* that communicates disparities and potential interventions in an actionable way for policymakers and communities.
- Critically reflect on the ethical implications of interventions, including unintended consequences, and propose safeguards that align with DEI/ESG principles.
- Articulate the pedagogical value of LA in IS education, demonstrating.

B.3 Target Audience

- Graduate-level students in:
  - Information Systems & Marketing
  - Business Analytics / Data Science
  - Public Policy & Urban Planning (interdisciplinary electives)
- Advanced undergraduates in IS or Business Analytics (senior capstone or elective)

B.4 Positioning in Curriculum

- Fits within courses/modules on:
  - Business Analytics & Data Visualization
  - IS Strategy & Ethics
  - Location Analytics / Geographic Information Systems
  - Corporate Social Responsibility / ESG in Business
- Can be used as:
  - A standalone 1–2-week module
  - A capstone group project with multiple deliverables

- A lab activity for hands-on learning in ArcGIS Online/Business Analyst/Insights

B.5 Prerequisites

- Basic data literacy (reading charts, interpreting indicators).
- Familiarity with Excel is helpful but not required.
- No prior GIS experience is required: the case provides step-by-step instructions, datasets, and a teaching note to make it accessible to both instructors and students.

B.6 Value Proposition for Instructors

- Provides ready-to-use teaching materials: maps, data sources, task prompts, and discussion guides.
- Engages students in real-world, socially relevant problems while building technical and ethical reasoning skills.
- Positions Information Systems as not just a technical field but as a driver of equitable and sustainable decision-making.

B.7 Assignment / Discussion Questions

As summarized in Table B-1, the 180-minute session is structured into six progressive activities, each designed to integrate DEI/ESG principles with spatial analysis and experiential learning.

B.7.1 Task 1 – Analyzing the Need (Maps 1–3)

- Which neighborhoods emerge as high-need food access zones?
- What three indicators (e.g., grocery buffers, obesity rates, transit access, income) support your selection?
- How would you explain your zone selections to a city council audience unfamiliar with GIS?

B.7.2 Task 2 – Understanding Community Realities (Personas)

- Create a brief persona profile of a resident in your zone, including their age, household situation, income, and any mobility challenges they may face.
- What are three food access challenges this persona faces (transportation, time, health)?
- How does persona-building add value beyond raw data?

B.7.3. Task 3 – Stakeholder Roundtable

- From your stakeholder role, what is your primary priority (equity, feasibility, financial sustainability, health)?
- Which zone(s) would you advocate for intervention, and why?
- How did stakeholder perspectives align or conflict during your roundtable?
- If consensus was not reached, what process could help bridge disagreements?

B.7.4 Task 4 – Ethical Reflection

- What are two unintended consequences that could result from your intervention?
- Propose at least one safeguard strategy to ensure equity and sustainability.
- How does this reflection illustrate the intersection of data, ethics, and community trust?

B.7.5 Integrative / Wrap-Up Questions

- How does Location Analytics advance DEI and ESG in this case?
- What MSIS Global Competency areas does this case strengthen?
- How might this framework be adapted for a different social equity issue (e.g., healthcare access, climate vulnerability)?
- What did you personally learn about the role of IS in promoting socially responsible decision-making?

Time	Activity	Purpose
0–15 min	Case introduction & framing The instructor sets the context, covering food insecurity in Memphis, DEI/ESG frameworks, and an overview of ArcGIS tools.	Ground students in a real-world context and goals.
15–45 min	Task 1 – Analyzing the Need (Maps 1–3) Students work in teams to identify high-need zones using transit, obesity, and demographic data. Deliverable: Select two zones and justify with relevant indicators.	Develops skills in layering/reading spatial data; practice evidence-based reasoning.
45–70 min	Task 2 – Community Realities Teams select one priority zone and create a persona (a fictional resident) using demographic/health data.	Connects quantitative data to human impact; builds empathy and DEI awareness.
70–100 min	Task 3 – Stakeholder Roundtable Simulation Teams assume roles (urban planner, food bank, retailer, community organizer, public health analyst). Debate trade-offs, complete scorecard, and recommend a zone.	Encourages systems thinking, negotiation, and ESG trade-offs.
100–130 min	Task 4 – Dashboard Prototype Using ArcGIS Insights, build 2–3 widgets (map, bar chart, KPI). Summarize how the dashboard supports decision-making.	Builds technical & communication skills.
130–150 min	Task 5 – Ethical Reflection Each student writes a short (150–200 words) reflection on risks & safeguards.	Reinforces ethical reasoning and critical thinking.
150–180 min	Debrief & Wrap-up Teams share dashboards and reflections. Instructor ties back to DEI/ESG frameworks and MSIS competencies.	Synthesis and closure of teaching objectives.

Table B-1. Suggested Teaching Plan: 150-180 Minutes

B.8 Instructor Guidance

For more detailed guidance and steps, please review the attached PowerPoint File.

- Set up: Provide students with the case handout (Appendix A) and access to ArcGIS Online trial links. Encourage students to work in teams of 3-4 for collaboration.
- Framing: Remind students that the case is not only technical but also about decision-making trade-offs and equity implications.
- Assessment: Deliverables can be graded lightly (based on completion and quality of reasoning) or as part of a project report.

Task 1: Analyzing the Need (Spatial Layers)

- Instructor setup: Demonstrate adding one or two layers in ArcGIS Online (e.g., grocery stores + obesity rates).
- Student activity: Teams layer data, identify overlapping problem zones.
- Discussion tip: Ask: *"Which areas consistently appear across multiple indicators?"*
- Common pitfalls: Students may treat layers separately rather than overlaying them. Encourage them to look for intersections of indicators.

Task 2: Community Personas

- Instructor setup: Demonstrate how to retrieve demographics from the Business Analyst (including income, age, and education).
- Student activity: Create a fictional resident profile tied to the data.
- Discussion tip: Ask: *"How does putting a face to the data change the conversation about equity?"*
- Common pitfalls: Personas can become stereotypes. Stress the importance of grounding personas in real demographic data + empathy.

Task 3: Stakeholder Roundtable

- Instructor setup: Assign or allow teams to choose stakeholder roles (e.g., city planner, food bank, retailer, organizer, health official). Provide a scorecard template (including Need, Feasibility, and ESG alignment).
- Student activity: Teams debate which zone(s) to prioritize. Each role advocates based on their perspective.
- Discussion tip: Debrief by asking: *"Which zones scored highest, and why? What tensions emerged between roles?"*
- Common pitfalls: Students may rush to a consensus. Encourage surfacing disagreements, that is where learning happens.

Task 4: Dashboard Prototype

- Instructor setup: Demonstrate ArcGIS Insights basics (map card + one chart card). Keep it simple.
- Student activity: Teams create at least three visuals (e.g., poverty vs. income bar chart, obesity hotspots, buffer map).
- Discussion tip: Ask: *"How would this dashboard look different if your audience were community members vs. city council vs. retailers?"*
- Common pitfalls: Students over-design or get stuck in the tech. Remind them that the goal is communicative clarity, not a polished product.

Task 5: Ethical Reflection

- Instructor setup: Frame the "good data ≠ good outcomes" reminder.
- Student activity: Write short reflections on risks and safeguards.
- Discussion tip: Ask: *"What unintended consequences could undermine an equity-focused intervention?"*
- Common pitfalls: Students may generalize ("gentrification might happen"). Push them to tie risks to the Memphis context or similar real cases.

Closing Debrief

- Tie back to IS competencies (data, ethics, global awareness).
- Emphasize that this is a teaching innovation, demonstrating how IS can integrate analytics with DEI/ESG frameworks.
- Optionally, ask students how they would adapt this case to another domain (healthcare deserts, climate vulnerability, education access).

B.9 Suggested Answers / Key Insights

Task 1: Analyzing the Need (Spatial Layers)

- Likely high-need zones:
  - Klondike–Smokey City (North Memphis) → high obesity rates, low income, poor transit coverage, and few grocery stores.
  - South City (South Memphis) → low walkability, historically underserved, high poverty.

  - Orange Mound (East-Central Memphis) → aging population, high child poverty, limited full-service grocery access.
- Key insight: Food deserts in Memphis are not isolated; they correlate with systemic inequities (race, income, mobility).

Task 2: Community Personas

- Example Persona: *Angela, 68, a retired grandmother with a fixed annual income of $21,000, caring for two grandchildren. She lives in Klondike–Smokey City, doesn't own a car, and the nearest grocery is 2 miles away with no reliable transit. She shops at corner stores with limited fresh produce. She struggles with diabetes, worsened by limited healthy food options.*
- Key insight: Personas help students connect quantitative indicators to lived realities, grounding equity analysis in human stories.

Task 3: Stakeholder Roundtable

- Sample priorities:
  - Urban planner: Infrastructure + long-term city development.
  - Food bank: Immediate hunger relief.
  - Retail executive: ROI and customer base.
  - Community organizer: Cultural voice, resident trust.
  - Health analyst: Reducing obesity and chronic illness.
- Sample scorecard (Need / Feasibility / ESG Alignment):
  - Zone 1 (Klondike–Smokey City): High / Medium / High → Strong candidate.
  - Zone 2 (South City): High / Low / Medium → Requires more investment.
  - Zone 3: Medium / Medium / Low → Less urgent.
  - Zone 4: Medium / High / Medium → Feasible but less impactful.
- Key insight: Tensions often emerge between equity-driven vs. profit-driven actors. Negotiation reflects real-world complexity.

Task 4: Equity Dashboard Prototype

- Example visuals:
  - Map: Grocery buffers + obesity rates.
  - Bar chart: Median household income comparison (priority vs. non-priority zones).
  - Tapestry segmentation: Lifestyle clusters showing vulnerable households.
- Key takeaway: Dashboards democratize insights — policymakers and residents can see inequities spatially and numerically, supporting transparent decision-making.

Task 5: Ethical Reflection

- Common unintended consequences:
  - New grocery development often leads to gentrification, resulting in higher rents.
  - Mobile markets → risk of undermining small corner stores.
  - Community dashboards → risk of stigmatizing neighborhoods.
- Safeguard strategies:
  - Participatory planning (include residents in decisions).
  - Hiring from within neighborhoods to staff initiatives.
  - Adaptive governance (ongoing monitoring via dashboards, community feedback loops).
- Key insight: Students should recognize that well-intentioned data projects can inadvertently reinforce inequities unless they are coupled with robust ethical safeguards.

Wrap-Up Key Insight

- Location Analytics can bridge technical skills with ethical/social responsibility, directly aligning with MSIS competencies.

- This case demonstrates that IS education is not just about "tools," but about shaping responsible, equity-aware decision-makers.

B.10 References & Resources

B.10.1 Core Tools Used in the Case

- ArcGIS Online (Esri) – cloud-based mapping platform for layering and visualizing spatial data. Trial access: https://www.esri.com/en-us/arcgis/products/arcgis-online/trial
- ArcGIS Business Analyst Web (Esri) – a demographic and market profiling tool that supports socio-economic comparisons across zones.
- ArcGIS Insights (Esri) – a visual analytics and dashboarding tool for building interactive, equity-focused dashboards.

B.10.2 Data Sources (used in the Memphis case)

- CDC PLACES Project – obesity and chronic health indicators at the census tract level.
- US Census / ACS (American Community Survey) – income, age, household composition.
- Esri Living Atlas – transit, walkability, and retail location layers.
- Esri Tapestry Segmentation Data – community lifestyle and market profiles.
- Local Memphis sources – grocery locations, Shelby County planning data (referenced in case materials).
- Student's Map (https://asu.maps.arcgis.com/apps/mapviewer/index.html?webmap=a21aa21518984ccc916a094450572aca) and Completed Map (https://asu.maps.arcgis.com/apps/mapviewer/index.html?webmap=aa583199709d415786c72029d73a4252)

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