

VOLUME IV

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# RESEARCH AND TEACHING IN DESIGN AND MUSIC

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INVESTIGAÇÃO E ENSINO  
EM DESIGN E MÚSICA

INVESTIGACIÓN Y ENSEÑO EN  
DISEÑO Y MÚSICA

CHAPTER I  
ARTIGO 5

DOI: 10.53681/2024.103/07

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# SHAPING THE FUTURE THROUGH DESIGN: INTEGRATING SYSTEMSTHINKING IN COMMUNICATION DESIGN EDUCATION

## ABSTRACT

This paper examines the transformative potential of integrating systems thinking in communication design education, highlighting the current shortfall in its application. Using a case report about a course assignment in an undergraduate Graphic Design program in the United States, this paper demonstrates how this approach can foster a deeper understanding of complex, interconnected problems, thereby empowering emerging designers to create more impactful, sustainable solutions with a greater sense of accountability, agency, and empowerment. These projects serve as a testament to the shift from traditional client-driven pedagogical models towards a more inclusive, participatory design process where design deliverables are not predetermined, but rather emerge through the design process itself. The discussion argues that such a pedagogical shift in communication design education is essential in preparing designers to effectively contribute to social and environmental impact projects, in alignment with the Sustainable Development Goals of the UN Agenda 2030 and the New European Bauhaus initiatives.

## KEYWORDS

Communication Design, Systems Thinking, Design for Impact, Design Education, Case Report.

## RESUMO

Este artigo examina o potencial transformador da integração do pensamento sistêmico na educação em design de comunicação, destacando a atual deficiência na sua aplicação. Utilizando um relato de caso sobre um trabalho de curso num programa de licenciatura em Design Gráfico nos Estados Unidos, este artigo demonstra como esta abordagem pode promover uma compreensão mais profunda de problemas complexos e interligados, capacitando assim os designers emergentes para criar soluções mais impactantes e sustentáveis com maior sentido de responsabilidade, agência e empoderamento. Estes projetos servem como testemunho da mudança dos modelos pedagógicos tradicionais orientados para o cliente, para um processo de design mais inclusivo e participativo, onde os resultados do design não são predeterminados, mas emergem através do próprio processo de design. A discussão defende que tal mudança pedagógica na educação em design de comunicação é essencial na preparação dos designers para contribuir eficazmente para projetos de impacto social e ambiental, em alinhamento com os Objetivos de Desenvolvimento Sustentável da Agenda 2030 da ONU e as iniciativas do Novo Bauhaus Europeu.

## PALAVRAS-CHAVE

Design de Comunicação, Pensamento Sistêmico, Design para Impacto, Educação em Design, Relato de Caso.

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## 1. INTRODUCTION

Contemporary and future problems are increasingly complex and interconnected. They are embedded within intricate systems that span various social, cultural, economic, and beyond spheres. For this reason, traditional linear design methodologies are no longer effective when tackling complex design challenges.

The 2030 Sustainable Development Goals (SDG) defined by the United Nations General Assembly and the New European Bauhaus (NEB) initiatives reflect this complex nature of contemporary and future design problems. At the intersection of these two proposals are objectives that address issues such as the climate crisis, poverty, and diversity and inclusion—all of which are wicked problems that necessitate innovative methodologies, and particularly an understanding of systems thinking, to tackle. At the same time, systems thinking is still an emerging area in communication design pedagogy, with many educational programs still focused on traditional design processes and market-driven approaches.

This paper is an exploratory case report that examines the process and outcomes of a sophomore-level, undergraduate communication design assignment that introduces students to systems thinking for the first time. The report discusses the assignment brief and the outcomes from three students, focusing on how the integration of systems thinking helped lead to insights and inform more thoughtful design responses. Each of the student projects reflects a relationship between communication design and education (UN 2030 Goals: 4) with either health and well-being (UN 2030 Goals: 3), inclusivity (UN 2030 Goals: 10/NEB), and sustainability (UN 2030 Goals 6, 7, 11, 12, 13, 14, 15/NEB) being central to the students' concept. Ultimately, the paper reflects on the significance of introducing these methodologies into communication design pedagogy and how this may enhance a designer's sense of agency and impact. With more designers able to navigate wicked problems, more effectively they would be able to help address the complexities embedded within the 2030 Sustainable Development Goals and the New European Bauhaus initiatives.

## 2. A NEW ERA OF COMPLEXITY

In a 2017 digital publication by AIGA (The Professional Association for Design), Meredith Davis, a professor of Graphic Design and Director of Graduate Programs in Graphic Design at North Carolina State University, highlighted seven trends forecasted to influence the future of communication design. These trends have been detailed in AIGA's digital publication, *Design Futures Research*. Among these, the trend "Complex Problems" stands out for its relevance to the objectives of the 2030 Sustainable Development Goals and the New European Bauhaus initiatives.

The "Design Futures Trend: Complexity" section of *Design Futures Research* outlines how design practice has evolved from simple, form-driven goals to addressing today's complex, systems-level challenges. Davis explains that the root of contemporary design practices can be traced back to the craft guilds of Europe in the 12th century, where apprentices learned to design and create relatively simple items through direct, hands-on

experience under the mentorship of skilled masters. The Industrial Revolution led to significant changes by decoupling the design process from manufacturing. Despite this separation, the emphasis on aesthetics and usability remained a crucial objective of manufactured products (Davis, 2018). In the late 1800s, Modernist architect Louis Sullivan introduced the mantra "form follows function," a principle that asserts that a building or object's intended use or purpose should dictate its visual characteristics. This concept became a cornerstone of what constitutes effective design, which continued to emphasize craftsmanship, functionality, and aesthetics.

Today's world faces "wicked problems"—complex and ambiguous issues that defy traditional, linear design solutions. These problems present systemic challenges, characterized by intricate forces and interrelationships that influence the components of a system. Conventional approaches to design are inadequate when tackling the systemic challenges presented by these problems.

Even so, contemporary design problems are often addressed in isolation and with solutions largely determined by client demands and the prevailing capitalist economic system. However, the dynamics of a market-driven approach that typically informs design outcomes prove to be ineffective in addressing the complexities of the SDG and NEB initiatives. Addressing these challenges requires a fundamental change in approach: designers need to be viewed as catalysts for change, focusing on a thorough systemic analysis of problems before developing solutions or deliverables.

Because of this trajectory, *Design Futures Research* serves as a resource for design educators to help implement this pedagogical shift. Davis urges design educators to recognize the importance of systems-level work and to adopt research, interdisciplinary collaboration, and participatory methods (Davis, 2018). Davis outlines several pedagogical competencies for each of the seven trends as resources for educators. Among the competencies that respond to the trend of Complex Problems are:

- "Students should frame design problems at various scales, nested at the level of components, products, systems, and communities (Davis, 2018)."
- "Students should identify and visually map the interdependent relationships among people, places, things, and activities in a complex system (Davis, 2018)."
- "Students should evaluate design solutions for their short- and long-term physical, social, cultural, technological, and economic effects (Davis, 2018)."

In the past decade, the importance of systems thinking in design has increasingly been recognized, yet there is still a noticeable lack of its application within communication design pedagogy. The ability of communication designers to evolve their design process to grasp complex interrelationships and foresee both the direct and indirect effects of their creations is increasingly necessary. Introducing this change in communication design education is crucial to prepare designers with the skills needed for making significant contributions to societal and environmental well-being, aligning with the SDG and NEB initiatives. These initiatives demand a systems thinking perspective to fully comprehend and address the complexity of interconnected issues. Design education, therefore, must prioritize systems thinking from the onset of a designer's training, ensuring they are well-equipped to tackle these challenges effectively.

### 3. SYSTEMS: A HOLISTIC APPROACH

The notion of “Systems Thinking” was conceived in 1956 by MIT Professor Emeritus Jay W. Forrester when he created the Systems Dynamic Group, which focuses on understanding, designing, and managing change through system dynamics. Donella Meadows, Forrester’s student, further developed the field with her 1972 book, *Limits to Growth*. Utilizing dynamic systems modeling, she examined how human actions impact the environment. During a period of economic turmoil and transition in the 1970s, her book prompted discussions on the consequences of rapid economic and population growth on natural resources, thereby contributing significantly to the discourse on sustainable development.

Since then, systems thinking has evolved and been integrated into various fields, including design, where it is highly regarded for its ability to help understand how design can address complex issues. In her book *Designing in Systems* (2008), Meadows defines systems thinking as: “an interconnected set of elements that is coherently organized in a way that achieves something (function or purpose)”. She divides systems into three parts: the elements, the connections between those elements, and the overall purpose of a system. Meadows also highlights that systems may be part of larger systems, and systems themselves may be interconnected. Meadows stresses that, although we cannot completely control or predict the outcomes within systems, by understanding their behavior and patterns, we can interact with them more effectively and influence them toward desired outcomes (Meadows, 2008).

As Wolfgang Jonas emphasizes in his work on systemic design, the goal of design should be to solve problems and create desirable futures through systemic interventions. Designing using a systems framework differs markedly from traditional design thinking; it emphasizes creative strategies aimed at shaping future behavior and outcomes by making systemic adjustments, rather than addressing isolated problems (Jonas, 2001). Peter Senge’s *The Fifth Discipline* further enriches this perspective by introducing the idea of “mental models,” which are deeply ingrained assumptions or generalizations that influence how we understand the world and take action. In the context of design education, encouraging students to become aware of and challenge their mental models is crucial for fostering innovative and holistic solutions. Senge’s advocacy for shared vision and team learning also aligns with collaborative aspects of systems thinking, promoting a collective approach to understanding and solving design problems (Senge, 2006).

Utilizing systems thinking within the design process prioritizes the anticipation and shaping of future possibilities through a process of repeated redesign and problem analysis. This method emphasizes understanding the behaviors and patterns within systems to enhance their functionality and identify when interventions are needed. Although it is accepted that we cannot fully control or predict every aspect of systems, this approach enhances a designer’s ability to interact with them more effectively. Systems thinking also focuses on co-creating the future with stakeholders, moving beyond mere problem-solving to proactively design systems that accommodate evolving needs and avoid potential unintended consequences to design decisions. In essence, systems thinking merges design thinking principles with a broader, systemic view, aiming to navigate and shape complex futures.

## 4. CASE REPORTS: EARLY INTEGRATION OF SYSTEMS THINKING IN COMMUNICATION DESIGN PEDAGOGY

The following case report explores the transformative potential of integrating systems thinking within early communication design pedagogy. It considers how this approach can foster a deeper understanding of complex, interconnected problems in undergraduate design education, thereby empowering emerging designers to create more impactful, sustainable responses and become involved in projects that have social and environmental impact, such as the initiatives defined by the SDG and NEB.

These projects serve as a testament to the shift away from traditional client-driven models and towards a more inclusive, participatory design process where deliverables are not predetermined, but rather emerge through insights made during the systems-focused design process itself. Central to this discussion is the concept of “buy-in” from communication design students, which is achieved by allowing their values and interests to help shape their projects, thus promoting responsibility, empowerment, and a sense of agency. This approach challenges the more prevalent market-driven communication design model that is influenced by capitalist dynamics, advocating instead for a method where designers are considered agents of change.

Although the significance of integrating systems thinking into design education is becoming more widely acknowledged, there is a significant shortfall in incorporating these crucial skills in early communication design education. To address this, a specific assignment was recently introduced in a sophomore-level course within the Graphic Design program at Lawrence Technological University, Southfield, MI, USA.

The project was partially informed by the systems thinking process defined by Eric Benson and Yvette Perullo—both communication design educators—from their book, *Design to Renourish: Sustainable Graphic Design in Practice* (2017). The book outlines four interrelated steps in a systems thinking process: 1) determine project goals, 2) map out the design problem, 3) brainstorm design outcomes, and 4) evaluate each possible design outcome (Benson & Perullo, 2017). Instead of focusing solely on what Benson and Perullo call the traditional, linear design method of researching, ideating, refining, and delivering, this systems-focused process integrates these steps into a nonlinear, woven process that asks designers to move both forward and backward, continuously assessing the forces of the systems at play (Benson & Perullo, 2017).

In this particular assignment in the Graphic Design program at Lawrence Technological University, students collaborated as a full group in steps 1 to 2 before working independently in steps 3 to 4. To begin the projects, they were asked to engage in a collaborative exercise to identify issues that they were passionate about and to subsequently develop the various systems that affect them through a visual map. Using the digital collaborative tool, Mural, the group of students began by ideating a myriad of concerns that they were passionate about, such as food insecurity, reparations, LGBTQ+ rights, abortion access, and the housing crisis in the United States. From there, they identified two of these issues to build out at a comprehensive systems level: body positivity and the lack of mental health access in the United States. For each issue, the students collectively explored interrelated forces within the system, as well as the various societal groups that are affected.

Using the digital sticky notes and connection lines, they collectively developed the elements, relationships between those elements, and purposes of the systems and subsystems to gain a deeper understanding of the complexities of the issues.

When exploring the issue of body positivity, the students examined various social groups who are affected like preteens going through puberty, children with dietary restrictions or challenges, and the trans community who experience puberty before hormone replacement therapy. They also analyzed the forces influencing these issues, including the impact of social media and peer groups at school on this age group.

When addressing the need for better mental health access, the students identified specific challenges faced by single parents, new parents, low-income communities, people struggling with substance abuse, workers who are impacted by layoffs, and people who are employed but have poor medical health insurance coverage, among many other factors. They integrated other forces within these systems, such as the perception that therapy is taboo for some generations and communities, the difficulties men can face when expressing their feelings, and the lifestyles of societal groups with significant barriers to accessing mental health support.

The collaborative exercise marked a significant aspect of the design process. It served as a form of collective brainstorming, bringing together diverse perspectives, experiences, and insights to shape the systems' elements and relationships. This approach mirrored aspects of participatory design by allowing students to contribute insights that were formed by their unique perspectives, experiences, and identities. Participatory design plays a crucial role in systems thinking processes by ensuring that the design process is developed through the active involvement of various stakeholders. This approach integrates the knowledge, experiences, and needs of those who will be affected by the system, leading to more holistic, sustainable, and effective outcomes.

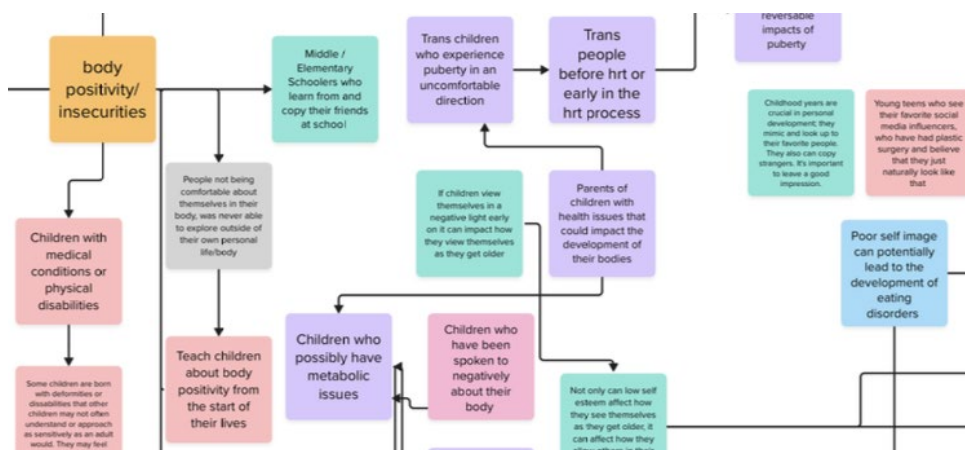


Fig. 1. Excerpt from collaborative systems thinking exercise.

This project was the first time that these students engaged in a systems thinking methodology. It deliberately excluded external stakeholders, prioritizing the need for students to grasp the fundamentals of the process. Despite this, the group's collaboration integrated the participatory element and demonstrated significant foundational value that could be deepened through real stakeholder participation in the future.

In step 3, each student then chose one of the two issues that were developed at the systems level to explore further and to respond to through design deliverables that they defined themselves. During this phase, each student was responsible for deepening their research using additional methodologies and tactics, such as interviews, surveys, and literature reviews. In step 4, students were required to define potential design deliverables and evaluate their feasibility and viability. This assessment was then incorporated into their systems map, allowing for the continued addition of new insights and explorations in a nonlinear approach.

The following discussion describes three of the students' final solutions that were informed by this process.

## 4.1. METHODOLOGY

This study focuses on a key research question that integrates three sub-questions:

1. What is the transformative potential of integrating systems thinking into communication design education?
  1. How does system thinking contribute to fostering a deeper understanding of complex, interconnected problems?
  2. What are the key differences in outcomes and approaches between a systems-driven approach that informs outcomes and a traditional client-driven project model?
  3. In what ways does system thinking empower emerging designers to create more impactful responses?

The results of these questions are qualitatively assessed through an analysis of each student's process work, which includes a comprehensive systems map. The relationship between the students' process work and their final project deliverables is used to assess the influence of systems thinking.

### Project 1

Student 1 focused on developing a strong sense of body positivity for preteens by designing a fictional, empowering food brand called "Radiant Bites". This brand champions the enjoyment of tasty and healthy eating, aiming to cultivate a positive physical and psychological relationship with food. Radiant Bites leverages upbeat and inspiring messaging alongside vibrant and joyful colors. Positive affirmations like "Your body is your ally—nourish it with love." and "Your body is beautiful and radiant." are central to the brand voice, promoting self-love with every bite.

Student 1's system mapping process incorporated areas of exploration like dieting cultures, media targeting pre-teens, and an assessment of the impact of different design deliverables. To better understand these areas, the student developed a survey and conducted a market analysis of other brands that aspire to communicate body positivity to their target audience.

Integrating systems thinking into the project led to a deeper understanding of complex, interconnected problems by linking brand messaging systems and the psychological influences of healthy food. One sub-system within

the systems map highlighted the potentially harmful effects of keywords like "dieting" and other messages that focus on physical appearance. This demonstrates a comprehensive approach that integrates multiple influences to enhance the understanding of the topic.

The systems map also addressed several communication design-related choices, such as how the overall graphic style would resonate with the target audience, including typographic choices and color palettes. While analyzing these elements is standard in any client-driven project, the student assessed the potential impact of various design artifacts with deeper engagement. This led to a more nuanced understanding of the various forces at play, extending beyond a traditional approach that often pre-determines design deliverables, resulting in more thoughtful decisions motivated by goodwill rather than purely financial incentives.

Furthermore, the systems mapping process guided the student to an area of personal interest, allowing them to take ownership of the project concept. Initially focused on body positivity in a general sense, the student's analysis shifted the focus to a more meaningful target audience: young teens, who can significantly benefit from these positive messages.

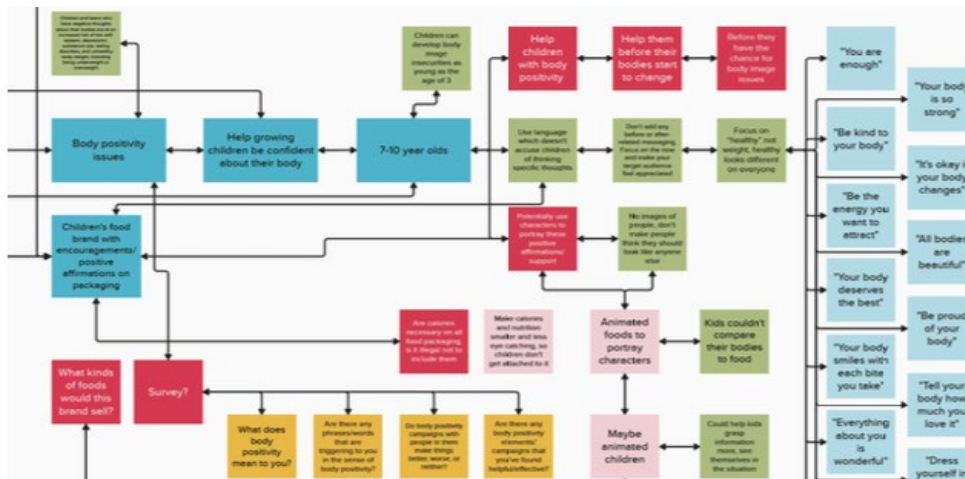


Fig. 2. Excerpt from systems thinking exercise.



Fig. 3. Radiant bites package design mockup.

## Project 2

Student 2's project, "Positive Pals," aims to teach young children about body positivity and diversity by highlighting rare physical disabilities. "Positive Pals" features engaging stories disseminated through a YouTube channel and a book series, celebrating extraordinary animal characters that each represent a different human disability, to increase representation and challenge stereotypes. A key story in the series focuses on Oliver Owl, a character with one eye, representing Anophthalmia, a condition that can occur during pregnancy, leading to blindness or severely limited vision in infants.



### Project 3

Student 3 concentrated on addressing mental health concerns within the bisexual Millennial and Generation Z communities through a guerrilla marketing tactic titled "Bi All Means." The campaign aims to increase awareness about bisexuality and challenge prevailing stereotypes through a social media campaign and by employing sticker bombing—placing numerous stickers on commonly ignored or gritty urban surfaces such as street signs, lamp posts, and walls. Additionally, "Bi All Means" extends its reach with other visual materials intended for public spaces, including posters applied to walls with wheat paste, to further convey its message and engage the community.

Student 3's system mapping exercise initially focused on mental health support before finding a focus on the bisexual segment of the LGBTQ+ community. Their research found that this particular group has markedly high stigmatization and discrimination, and has a higher probability of depression and suicide compared to some of the other LGBTQ+ sub-communities, like gays and lesbians.

Student 3's systems mapping process, though less extensive than that of Student 1 and Student 2, effectively guided the student from an initial exploration of the need for stronger mental health support to an understanding of the relationship between mental health and the need for more resources, issues of stigmatization, and treatment gaps in the United States healthcare system. Through research embedded in the systems mapping process, Student 3 learned that bisexual individuals report higher rates of depression and suicide compared to heterosexual, gay, or lesbian individuals. This insight was crucial in shaping the project's focus to address a significant and specific need within the community.

The student explored various options when determining the most effective formats to deliver the project's core message. These included creating validating messages on everyday products, producing zines focused on mental health, and designing public art to communicate staggering statistics. This analysis embedded in the systems thinking exercise ultimately led the student to design deliverables that deviated from a traditional client-driven market approach. Instead, the student created design artifacts that were more grassroots and socially conscious, without a monetary incentive for producing the work.

This distinction is significant, as it highlights the transformative potential of systems thinking in fostering a deeper commitment to social impact and ethical considerations in design. By prioritizing meaningful and socially relevant outcomes over commercial interests, the student was empowered to create work that addressed the target audience's immediate needs and contributed to broader societal change. This approach encourages designers to think critically about their work's implications and strive for innovative and beneficial solutions for the community. Through systems thinking, the student was able to develop a project that was not only visually compelling but also deeply impactful, demonstrating the power of design to drive positive social change.



Fig. 6. Excerpt from systems thinking exercise.



Fig. 7. Bi All Means poster design mockups.

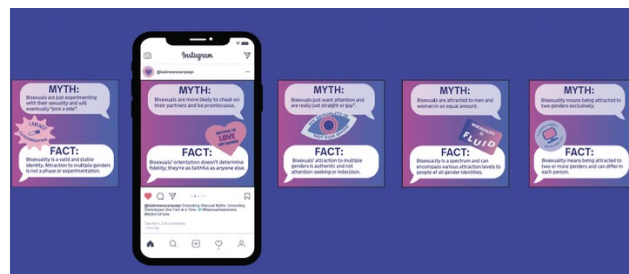


Fig. 8. Bi All Means social media campaign.



Fig. 9. Bi All Means sticker bombing mockup.

## 5. CONCLUSION

This study examined the transformative potential of integrating systems thinking in communication design education through case reports from a sophomore-level undergraduate course. The key findings demonstrate that systems thinking enables students to develop a deeper understanding of complex, interconnected problems, leading to more socially conscious and impactful design solutions. By focusing on mental health support,

body positivity, and inclusivity within the LGBTQ+ community, students created projects that addressed significant community needs. This approach shifted the design process from a traditional client-driven model to one that emphasizes social impact and ethical considerations.

### 5.1. TRANSFORMATIVE POTENTIAL

Integrating systems thinking into communication design education enabled students to create more meaningful and impactful design solutions. The projects demonstrated how systems thinking enhances a designer's ability to understand and address complex issues. This approach led to a deeper comprehension of interconnected problems, allowing students to make informed decisions based on a thorough analysis of these issues.

### 5.2. INFLUENCE ON DESIGN APPROACH

The systems thinking approach led to more thoughtful and critical design solutions that were not only visually compelling but also addressed underlying social issues. While not wholly disassociated from the market economy, this approach still encouraged students to prioritize social impact over commercial interests.

### 5.3 EMPOWERMENT OF EMERGING DESIGNERS

Systems thinking empowered students to take ownership of their projects, fostering a sense of responsibility and enabling them to create sustainable and meaningful design responses. The students' work reflected a commitment to ethical design and social change.

### 5.4. INTEGRATING SYSTEMS THINKING IN DESIGN EDUCATION

The student projects showcased thoughtful, insightful, and well-researched solutions, exhibiting the development of foundational systems thinking processes as outlined by Senge. These processes, such as mental models and shared vision, were evident in the students' ability to brainstorm design deliverables and evaluate them within a holistic context (Senge, 2006). This may be due to the emphasis within their design education, which has traditionally been client-driven and deliverable-focused, neglecting the importance of understanding the larger systemic web of influences.

Despite this, the assignment's introductory nature productively laid the groundwork for a method of thinking that promises greater understanding and integration in their future studies. This aligns with Senge's concept of learning organizations, where continuous improvement is fostered (Senge, 2006).

One of the more noteworthy achievements of this assignment was the considerable buy-in from the students, effectively allowing them to author and develop their projects within the structured steps of the assignment. This approach not only introduced students to the basics of systems thinking but also cultivated a strong sense of agency and accountability.

## 5.5. LIMITATIONS AND FUTURE DIRECTIONS

This study has several limitations that highlight potential areas for future direction. First, the scope and sample size were limited, as the research was based on case reports from a single sophomore-level undergraduate course with a small number of students. The next steps of this study should include multiple courses and institutions that provide a more comprehensive understanding of the results.

The study's short duration, focusing on a single assignment within one semester, also posed a limitation. Systems thinking benefits from long-term application and iterative processes, and extending the study period would better capture its sustained impact on students' design approaches and outcomes.

Additionally, this was the students' first exposure to systems thinking methodologies. Their understanding and application of these concepts were still developing. Future studies should examine the impact on students who have had multiple exposures to these methodologies throughout their education to gain a deeper insight into their learning curve and retention.

Another limitation was the absence of external stakeholders. The project deliberately excluded real-world stakeholders to allow students to grasp the systems thinking fundamentals. Including external stakeholders in future assignments could provide a more realistic and comprehensive experience, highlighting the collaborative and participatory aspects of systems thinking.

Moreover, a significant portion of the students' systems-mapping process emphasized communication design elements more than the underlying systems influencing the issues. This might be due to their existing design education, which has been largely client-driven and deliverable-focused. Future assignments could place greater emphasis on understanding and integrating underlying systems to balance these aspects.

## 5.6. CONCLUDING THOUGHTS

The integration of systems thinking into communication design education has significant transformative potential. Jonas highlights the importance of designers as active participants in creating systemic change, rather than just passive problem solvers (Jonas, 2001). Educators can foster a deeper commitment to social impact and ethical design by equipping students with tools to analyze and understand complex systems. This approach encourages students to think critically about the implications of their work and strive for solutions that benefit the community, aligning with Jonas's view of design as a transformative practice. Systems thinking not only enhances the quality and impact of design solutions but also empowers emerging designers to drive positive social change. Even while introductory, the projects analyzed in this study demonstrate how systems thinking can lead to more thoughtful, responsible, and impactful design practices, ultimately contributing to a more socially conscious and sustainable future in the field of communication design.

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**HOW TO REFERENCE THIS ARTICLE**

**Crum, L. (2024). Shaping the Future Through Design: Integrating Systems Thinking in Communication Design Education.**  
*In* Raposo D., Neves J., Silva R., Castilho, L.C. & Dias R..  
Research and Teaching in Design and Music Vol. IV (51–66).  
Convergências Research Books Collection.  
Editions IPCB. pp. <https://doi.org/10.53681/2024.103/07>

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