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Circular Design Strategies in Sustainable Scenography for Theatre and Film Production

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ABSTRACT

Circular design strategies are increasingly recognized as essential for transforming theatre and film scenography from linear, waste-intensive systems into regenerative and sustainable practices. This study examines how circular economy principles such as reuse, refurbishment, upcycling, and lifecycle optimization can be embedded within scenographic design and production processes. It develops an analytical framework that connects material flows, stakeholder collaboration, and design decision-making across production cycles. Emphasis is placed on durability, modularity, and standardization as key enablers of extended material lifespans and reduced environmental impact. The research further explores the role of digital technologies, including virtual prototyping and digital twins, in minimizing physical resource consumption while enhancing creative flexibility. Case studies and emerging practices demonstrate how circular scenography can be operationalized through localized sourcing, inventory systems, and collaborative networks. Beyond environmental benefits, the study highlights the social, cultural, and ethical dimensions of circularity, including issues of accessibility, equity, and narrative transformation. Ultimately, the paper argues that adopting circular design strategies not only mitigates waste but also redefines scenographic practice as a driver of sustainable innovation in the creative industries.
Keywords: Circularity, Sustainable Scenography, Reuse and Modularity Lifecycle.

INTRODUCTION

Theatre and film productions drive vast material flows yet remain largely untouched by circular economy initiatives promoting separation, dissolution, and regeneration of materials [1]. As a consequence, scenography increasingly dictates a one-way throughput of goods that undermine both ecological and economic sustainability. The sector demands actionable knowledge of circular design strategies that extend the useful lives of scenic elements, reduce resource consumption in manufacturing, and diminish overall waste across production cycles [2]. The proposed analytical framework elucidates the intertwining of production cycles and scenic design strategies within theatre and film [3]. Lucidly delineating the relevant contexts, stakeholders, material fluxes, and strategic arenas across the circular economy and sustainability literatures, the framework frames innovative pathways to ampliative scenography, circular design, and extended producibility [4]. Focal strategies target the substance of scenic elements, circulation mechanisms connecting partners, and management of components and consumables during and after the production [1].

Theoretical Foundations of Circular Scenography

Circular design denotes a systemic approach that seeks to address complex issues through the rethinking and reconfiguration of the underlying structures that generate waste [1]. Circularity proposes to move beyond a simplistic economico-technological view of sustainable development focused on minimizing flows and securing resources toward a politically, socially, and culturally dynamic perspective of material and immaterial

interdependencies [2]. The contemporary scientific and technological system, the research, development, and innovation of a society working toward its conception of desirable material and/or immaterial interdependencies and flows generates both the imperative of sustainability and the urgency to rethink the system itself[3]. Scenography, whether for theatre or film, plays a critical role in the construction of material and immaterial interdependences and, in so doing, shapes the practice of circularity in both cultural sectors [2]. A circular interpretive framework of circularity based on such material and immaterial relations provides the thematic lens for the consideration of circular design strategies in the following sections. The first consideration is therefore the articulation of a framework of and for circularity itself, the relevance of what follows being contingent upon a clear definition of the parameters of the circular challenge that scenography must address [4].

Materiality and Resource Flows in Stage and Screen Environments

Building sustainable materials and resource flows is an essential facet of circular scenography in screen-based and live performance [1]. This section outlines circular design strategies concerning a gamut of production processes, life cycles, and stakeholder relationships specific to the theatre and film sectors [2]. The description encompasses theatrical sets, costumes, props, and screen-based artistic material: materials recognised as having the highest environmental impact. These strategies support efforts to decouple system growth from resource consumption, limit adverse environmental impacts, and promote the social reallocation of goods, complements the growing call for sustainable theatre and film, encourages adherence to 17 of the United Nations Sustainable Development Goals (UNSDG), and advances Scotland's 2018–2030 Circular Economy Strategy[3]. Prioritising durability, modularity, standardisation, and reparability throughout production extends life cycles even within a project. Design principles applying to set, material, and connection-system selection for heightened reusability lead to prudent investment of finite resources and reduce atmospheric pollutants and hazards associated with demolition and incineration [4]. These approaches align with cradle-to-cradle concepts, encourage innovative material development, and nourish a readily accessible and transferable repository of scenographic materials. Integrating seek-a-partner systems into temporary design projects enhances reusability further by connecting productions seeking materials with those able to release them [5]. Recognising that not all materials return to design pools and that materials deemed waste frequently possess value, circular scenography illuminates end-of-life strategies [5]. Continuous evaluation identifies approaches enabling administration of residual flows. Fluid situational and contextual understanding, factors influencing movement and exchange of materials, enables materials to remain active longer, enhancing a production's overall circularity and attenuation of negative environmental impact through routing choices [2].

Design Principles for Durability and Modularity

The circular economy a system that replaces "end-of-life" with the more productive notion of "regeneration" becomes an obvious frame for design specifically when the temporal lifespan of products, services, even systems is short[3]. Hence, a circular economy is intrinsically related to scenarios that seek to sustain some level of continuity, value, and (too often still) the status quo itself. Circular-designed scenographies thus circulate design both towards finding new uses and towards returns to the design process itself. The aim of this case study remains to identify circular activities and to seek and share potentially transferable solutions [3]. Considering the cyclical material flows and all kinds of activity within scenography, four circular-design principles in scenographic design and a preparatory overview forming the next three sections help to compile and examine observations, partners, and activities relevant to reuse, refurbishment, and upcycling[4]. Durability, A function of time and the temporal site-specificity of scenography and scenographic materials, durability establishes first priorities among external, direct activities regardless of the life-span expectations that emerge. Nonetheless, selected materials drain time, attention, and value from the following stages of both circles. Modularity, the subprinciple exploits materials' partial independence from scenario sites and content [4]. In their partial autonomy, nodes and parcels allow for options in both further design and preparation and trial after the latest scenario [5]. Systematic inventory standards invite partners and technical collaboration[5].Standardization prevents partners from wasting time in searching, restocking, stocking, or simply duplicating arrangements already outside basic scenograms among available or proposed patterns of circularity. Recognition of tinted varnishes, for example, reduces scanning effort for alternative paints; loops of lecterns or of pedestals, for another instance, encourage building from previous efforts of partner relations [3]. Reusability foregrounds materials or equipment that readily enter other activities elsewhere. Keynotes with simplified outlines (e.g. 2 , also [additional syntactic]) illustrate the practice. Connection systems, another subprinciple shown, may enable multiple direct linking (temporary or permanent) to standard items, enabling partners to extend longevity with minor paths of modelling and manufacturing. Chambers, chambers of compression, and tee-branches, all pre-validated among a partner, frame yet another entry among the still-active variants for partner, tangential but supported. Drawings start to fit an adjacent partner's social-media appendix. Temporal anchoring, designating a first-application end-point, initiate circular continuation [4]. A reacting second entry parallels first observations and the initial case selected based in-reviewed resilience during the first scenario. Refurbishment, rescuing damage, to secure outlets with still underused distribution nevertheless

restricts the supply-options pool [5]. Initial remnants of a basic corridor with definitive art-routing emerge; the amplification and re-exposition of these echoes illustrates the exploration-formal-isation contract at hand. Partner relations prevail, layering adjunct associations along with an adjacent, added, active geometry projected towards more deliberated resonance and shift; the restoration-scale circulation-signature at stake circles remains accommodated within the sustained supply pool, yet awaits collection among shared project structures. Upcycling, movement establishes new categoricals, first connected alongside spatial-dramaturgical iteration-sequence and second abstracted towards feed supplementary and external assistance [6].

Reuse, Refurbishment, and Upcycling Pathways

The reuse of existing materials offers the most effective and immediate way to close the loop on scenic elements and significantly reduce resource consumption [3]. Scenic elements can be reused as they are, refurbished either partially or completely, or transformed into upcycled creations [4]. Approved materials that are handled properly can often be returned to suppliers for reuse within their own processes. Direct reuse and refurbishment are common practices in many industries involving temporary installations, including events, exhibitions, and retail displays. The theatre and film sectors have often lacked similar systems, but awareness of the benefits is rising. To facilitate reuse and refurbishment, the greatest possible number of scenic elements should ideally be made available for the national, regional, or local inventory of these elements [5]. With advance notice of a new production, therefore, it is possible to check whether sets, props, or costumes of interest are stored within relevant inventories. Such checks should be performed at key points during scenario development and throughout modelling, followed by a similar inquiry to consider upcycling options. Shorter timeframes tend to limit the ability to reuse materials. As illustrated by various theatre companies, archives can also be built up with older models, or pre-existing models can be modified to match a new artistic direction rather than starting from scratch [5].

Recycling, cradle-to-cradle concepts, and end-of-life considerations

Theatre and film productions generate substantial waste, particularly in construction, consumption, and disposal of materials for scenography [5]. Many scenic elements endure for only one performance before being discarded. Once removed from the production, materials often end up in landfill or incineration [3]. Circular design principles can foster creative thinking that promotes environmentally sustainable practices within this context. Theatre is one of the older art forms with increasingly environmentally conscious creators [2].The design stage establishes material flows between circular and linear economies and defines the production's geographic footprint. Designers and scenographers occupy critical positions at the intersection of concepts and physical production, directly influencing materials used, how they travel between productions, and their eventual disposal. Production decisions prioritising circularity, with measures introduced early on will likely yield the most substantial gains [4].

Lifecycle Assessment in Scenography

The objectives of the study outline current challenges facing the theatre and film industries, propose the conventional scenography system as a critical area for sustainability intervention, and examine circular design as a solution [1]. The research questions probe the degree of circularity in scenography and determine pathways for more intensive adoption of circular design strategies. Production, material use, scenic elements, and transitions associated with scenography define the temporal and spatial boundaries of the investigation [2]. Circular design in scenography is examined through the theories of circular economy, sustainability, and scenography. The principles of the circular economy advocate alternatives to dominant linear production and consumption models to tackle environmental degradation and climate change. Sustainability sets the broader agenda of which circular economy is a part but remains elusive and contingent in scope [3]. Scenography embraces performance architecture, set design, and related activities in theatre, film, television, and the arts. Although it is primarily associated with specific material flows, scenography involves diverse stakeholders inside and outside a production, drawing on a variety of media and operating across multiple temporal and physical contexts [3]. Various methods of lifecycle assessment (LCA) are available to map and estimate the environmental impact of scenography. Teams can establish specific system boundaries and functional units, and select data sources and impact categories that align with particular production types and desired levels of analysis. The theatre is well positioned to spearhead the transition to circular scenography due to the emerging array of institutions, platforms, and policies [4].Several circular scenography case studies have been examined to determine performance, barriers, enablers, and transferable practices. Both theatre and film in the European context have been investigated, enabling a broader understanding of challenges and opportunities [4]. Diverse configurations of circular design implementation have been identified for further consideration, including the use of multiple partners, the establishment of circular services, and alternative forms of inventory that make circular pathways visible [2].

Methodologies for Assessing Environmental Impacts

A circular economy strives to reduce the consumption of finite resources by retaining materials within the loop for as long as possible [5]. Yet, the design sector has a limited understanding of the practical implementation of these principles. Within our increasingly linear world, the need for a circular design approach is essential in order to

allocate the least amount of resources whilst providing maximum output [2]. Some Key insights have emphasized the differences in assessment methodologies for eco-design across various practices. A common methodology involves a Life Cycle Assessment (LCA)-type approach; however, this process is rarely seen in spatial practices yet is nonetheless considered a pertinent quality measure for the design community. Scenography has specified the most relevant parameters, functional units, and impact categories for both Environmental Sustainable Design (ESD) strategies and for circular design [4]. The relevance of a LCA-type assessment becomes especially clear when testing circular design principles because of the varying impact that the different principles have on the production process itself. In addition, LCA-type evaluation highlights the need to address both before- and post-consumption phases [3].

Case Studies Benchmarking Circularity

Designing circular scenography within the contemporary ecology of performance is vital given the heightened urgency to mitigate and adapt to climate change, resource depletion, and biodiversity loss [2]. Theatre and film productions deploy vast quantities of materials for sets, scenery, props, costumes, and other scenic elements, most of which are used once and discarded[3]. Circular design seeks to preclude the waste of material resources, energy, and labour, and to preserve products, components, and materials at their highest value for as long as possible 3. The implications of circular design and the established concept of circular economy address not only a sector-specific vocabulary but also a taxonomy relating to scenario and staging, narrative and scenographic, and practice-related vertices [4]. Circular scenography concerns the embedding of circularity principles in designs for sets, costumes, props, and associated elements [5]. The Josiah Initiative, Strathmore University, and Green Theatre Row Theatre in Paris serve as exemplary prominent cases within the theatre and film realm, studied for practical and applicable learnings. In sheltering projects, circulating borders, and material flows between theatre companies, adjacent fields attain transferability without extensive translation [4]. The specific rather than general nature of the cases enables closer examination of operational challenges, potential barriers, and expressive enablers involved in transferring circular practices from other fields. Furthermore, circularity serves the coproduction and cohosting of installations, exhibitions, and residencies. Concerted effort to relay circular practices from the case studies entails documenting the existing transfers along with actionable forms of transmission for direct grassroots application [4].

Procurement and Supply Chain Transparency

Despite the theatrical 'à théâtre', decoration and scenography design, including sourcing transparency, reuse-refurbish-remix activities, and re-assembly of circular pre-owned credits, all share the tenor of a fast-changing digital world fed-up with wasting arguments[1]. The original preorder of a scenography-based habitat goes for a première: digital domicile in the cloud of on-demand renting backdrops worldwide: type-theme-preloaded backgrounds written for work-shop by theatre companies, re-sumed-action gaming evloves along the basic rule of assembling unwanted data into some possible recreation, the interesting input from existing shows became access essence commande from biennal just-in-time[2]. The period of fringe performances mastered by contemporaries contouring what scenography stands for in the twenty first century meanwhile denudes the possibility of lower perimeter of theatre companies devolved by hybrid at all stages from location-casting-admin-calls[3]. A logistical eco-respidensible circidarity concern in-place-query mapping system belongs also to liberated clouds of data within the heterogeneous society; the indistrialised concept of school-based-touring theatre would transit high-school-learning-take Off from french mecanism of 'la torné de mâturité éspace d'un an' turning round-back to alternative future-led-back generation scape-space is also an input in hand at the moment, mapping access who lend what in-between rehearsal are-on before banging-out and wardrobe-kit-intègration-exhibition-carefully short cut equipment segements are gunning for their survival assistance as well[4]. Most of pre-logger pattern can be exogenous rehearsal-sourcing even pre-style [2].

Localized Sourcing and Community Collaboration

Localized sourcing embraces community collaboration and repurposing of found objects and recycled materials, catalyzed by ecological creativity [3]. Many designers integrate salvaged materials, viewing waste as a resource and embedding sustainability within their aesthetic vision. Notable sustainability advocates and award-winning designers illustrate the compatibility of ecological practices with high-quality, innovative theatre [3]. Embracing eco-creativity prompts designers to incorporate sustainability as an essential component of their approach [3].

Standardization, Licensing, and Material Passports

Standardization among scenic elements offers opportunities for reuse and adaptation across projects and productions, as highlighted by [2]. Coordination among design teams, production stakeholders, and suppliers, as evident in cases employing more standardized design approaches permits the use of pre-existing scenic components and streamlines the reconceptualization of materials and artefacts[5]. Licensing arrangements facilitate the sharing of digital design files and the standardized production of physical scenic components across parallel, cross-venue, and itinerant works. Existing material passports documenting the components of applied scenic elements further enable this interoperability and adaptation potential [4].

Design Research and Practice

In a digital prototyping context, automated design explorations of scenic solutions can be carried out through multi-parametric modeling [1]. Scenographic digital twins can be leveraged to analyse production ventures, optimize resource use, and visualise alternative strategies and trade-offs [2]. These approaches enable consequential scenarios to be simulated and assessed early, markedly reducing needless consumption during subsequent building phases. Physical solutions integrated with virtual augmentation (mixed reality) further permit lower degrees of tangible and permanent material engagement while extending lifetime between cycles and reuse opportunities. Hybrid residue generation is reduced even for formats demanding sizeable sets [3]. Circularity must align with accessibility, equity, and inclusion [4]. Employing physical portable sets is one avenue enabling more multiple-projection access for visually impaired audiences than hard-to-modify projection-only formats [5]. Awareness of different artistic, socially relevant, and productive circularity meanings can assist all stakeholders' artists and producers working through the domain. Circularity may also influence content, audience reception, and related narrative choices. Scenographies can narrative shape, e.g., fabric use or neighbouring aspects. Media blend offerings are traced or sensed temporally through equipment location and digital-tone-removing projection [5].

Digital Twin and Virtual Prototyping for Resource Optimization

Digital twinning involves creating a digital twin of a physical system to establish a continuous real-time connection between the physical and virtual instances [3]. Such methods provide insight into the flow of physical resources, allowing for simultaneous consideration of different design alternatives. Virtual prototyping uses digital technology to simulate products or processes before creating physical prototypes. It has been widely adopted in automotive and consumer electronics industries due to its time and cost savings [3]. Design changes can be visualized and evaluated early on, and certain evaluations can be conducted on different alternatives for comparison [3]. Digital twinning is an emerging area and future research opportunity, especially considering the rapid development of enabling technologies such as the Internet of Things (IoT). In theatre and film production, digital design tools already enable consideration of detailed elements early in the design process, such as lighting conditions, camera angles, and even human-scale movement pathways [4]. Recently, the concept of a "virtual set" has emerged, where the physical set exists entirely in cyberspace and is recreated in three dimensions (the virtual twin) in solutions such as Unreal Engine. Consequently, even the complete static and dynamic representation of a physical object a digital twin, could be created. Integrating physical and virtual prototyping tools enables direct testing of different material options, visualizing not only the physical form of an object but also exploring other attributes at the same time. Digital prototypes of set designs could be stored in the cloud, allowing them to be stored and exchanged alongside models for architecture, product design, and other fields [5]. Applying existing digital-twin approaches is complicated because the establishment of a direct link between the virtual and the physical system is challenging. Full virtual modelling of scenes can be reached by generating the virtual twin first. Hybrid scenarios can facilitate exploration of resource efficiency by modelling only selected component groups, achieving a balance between maximum insight and manageable effort [5].

Hybrid Scenic Solutions: Physical-Digital Convergence

The advent of digital scenography gives rise to hybrid scenic solutions that frame physical sets as part of a digitally augmented environment. Such approaches help reduce material needs and enhance possibilities for asset reuse [4]. The scenario-based 2021 short film The Dance Up produced during the COVID-19 pandemic for installation in the Scenography Museum served as a test case demonstrating the potential of virtual scenography to retain physical scenic elements while extending their lifecycle and exploiting options for further dissemination [4]. In the film, the design for a hybrid installation explored a system of differingly sized colourful discs suspended from the ceiling over a flat circular surface lined with synthetic white grass. To conserve resources, instead of creating a new scenographic universe, the original installation from the 2016 Master's thesis presentation was virtually reconstructed and integrated with a script that remediated the play dancers and accentuated their movements. The scenographic adaptations also inspired a new title, The Dance Up [4].Integrating elements of scenography and projection design, the installation reflected a composite physical-digital hybrid structure [5]. Physical elements remained extemporaneously usable for theatre practices, while the digital component expanded the project's distribution potential. Certain objects and materials deployed in prior MAM-Scenography productions, which occupied longer pre-circular timelines, could further enrich the proposal. Such an extended circulation period suggested by the participants entailed no public or private-sector funding requirements, allowing it to sidestep conventional development or proposal submissions [5]. The facility available to maintain, transfer, and carve out alternative venues, irrespective of temporary restrictions or trends, seemed particularly advantageous [5]. The production context met both practical and conceptual aspirations: the resource conservation focus aligned with ongoing interest in scenographic possibilities generated by virtual environments. An initial investigation of digital-doubling scenarios and parallel practices further highlighted processes and assets for which hybrid solutions could yield significant benefits [5].

Social, Cultural, and Ethical Dimensions

Circular design principles and practices raise fundamental questions pertaining to social and cultural equity, ownership, and access to theatre and film production opportunities [4]. Enabling equitable participation and access to resources, materials, and funding is vital to the resilience of communities, organizations, and people [5]. The elaboration of this dimension hinges on an urgent need for a radical shift in how communities, organizations, and human beings view and actively materialize resilience in a complex socio-political landscape. Sustainability-related matters swiftly depolarize [5]. Providing people full access to resources, materials, and funding to further their own creative and production-based projects is the goal of frameworks, circularity frameworks being among the labels shaping ongoing debates [2]. Circularity is but another term for ways of taking care of one another, both closely interrelated. The work of designing frameworks that contribute to the aforementioned goal unveils infinite narratives that eventually converge and return to circularity both at the community level and at the individual level [5].

Accessibility, Inclusivity, and Workforce Implications

Accessibility and inclusion are essential considerations for circular design. Circular practices that privilege higher-value reuse and resource-sharing may restrict accessibility, limiting involvement to those with established networks or the ability to afford refurbishing or altering materials [5]. They can also create barriers to entry for groups accustomed to working with materials prior to accessing circular resources. It is crucial to support equitable access to circular resources while seeking to develop the broader circular economy in the stage-design field [4].

Narrative Implications of Circular Scenography

Circular design strategies respond to growing interest in circular economy concepts within scenography. Unlike the industrial economy's linear extraction, production, consumption and waste phases, a circular economy closes material loops by reusing resources and restoring natural capital [5]. Circular approaches aim for zero harmful emissions, renewable resources, social equity and long-lasting products. Scenography employs physical space to choreograph events influencing audience focus, cognition and affect. Enquiry into circular rhythm, flows and networks reveals the relevance of circularity to material flows, stakeholder engagement and performance contexts. Thus, a hypothesis emerges: circular design encourages novel scenographic forms and content to convey circular narratives [2, 1]. In theatre and film, circular narratives frequently address social issues, climate change and environmental threats. Circular practices also enrich storytelling through alternation, repetition and non-linear arrangements [5]. By shaping content and framing issues, circular approaches stimulate new audience conversations, encouraging public and artistic action. Such narratives, often described as ‘circular’ or ‘recursive’, challenge prevailing linear paradigms [5]. Non-linearity and feedback-loop characteristics resonate throughout circular economy, modelling and systemic design. Circular design encourages wider discourse without limiting narratives, reinforcing the hypothesis of a circular-centring design drive. Circular scenography may thus unveil patterns and postures conducive to circular narratives, deepening both investigation and practice [5].

Policy, Standards, and Industry Transformation

The theatre and film industries, like any other manufacturing domain, are driven by a set of global normative frameworks that drive economic growth resulting in substantial impacts on the environment through energy-consuming resources [2]. Environmental policies and organisations are taking centre stage to slow down manufacturing impact on the public [5]. The theatrical production sector is able to articulate and follow such norms both during the production processes or maintenance period of a theatrical play or film creation. This also involves many political, cultural, economic and social agendas, resulting in packaged guidelines for adaption such as the ESG Framework or other resources [4]. All and any of these norms are instrumental and helpful in moving towards environmentally sustainable, circular design in scenography at theatre and film production worldwide [4].

Regulatory Frameworks and Funding Mechanisms

Regulatory frameworks, funding mechanisms, and policy levers are key enablers for the accelerated adoption of circular scenography [4]. Policies and funding increase awareness of circular economy principles beyond a single project; procurement incentives foster a market for secondary materials [5]. Regulatory frameworks can also support circular scenography by defining quantity and quality thresholds for materials to be reused, repaired, or refurbished [2]. In emerging policies, governments often look first to circularity in design and production of raw materials, manufacturing equipment, and consumer goods, with less attention to cultural content and public engagement [5]. Further, higher education institutions engaged in research on circular scenography and sustainable transitions can strengthen collaborations with governmental and intergovernmental agencies to promote cultural aspects of circularity [6].

Practical Guidelines for Theatres and Production Studios

Theatre and film production is essentially a "project" form of organisation and operates in a way that is different to most other sectors [5]. The practical guidelines presented here start at the strategic level of analysing a project in terms of its circularity, in order to identify priorities and make choices. The following steps can help to embrace circularity at the project formation stage [5]. Scenographic input can help to articulate a desired set of organisational values for a project. In terms of a production of a pre-existing work, these might include sensitivity to the particularities of a specific text, adaptation in relation to new interpretations of the material, or consideration of the career trajectory of the work, for example[4]. If the artwork is to be created by the scenographer, these values may address the thematic or socio-political concerns of the proposed work. Such an analysis would typically be carried out using existing artistic techniques, which remain unaltered outside the circular design context. Other artistic considerations that also remain unchanged relate to the formative qualities of space in the project (image, form, volume, line, colour), as well as full-colour modelling, sketches, drafts and other formats that can help to express ideas and explore possibilities[4]. At the tactical level, the guidelines help identify the manners in which temporal constraints can confront circular design enterprises. Temporal parameters intimately interact with thematic aspects, impacting on one another, and are modified to create the desired mode of circularity. Existing conceptual tools are employed in defining a project's educational levels, to articulate intended learning outcomes, determine the target audience, and specify duration and frequency of the work. These concepts in existing artistic traditions remain intact, as do pedagogical models to communicate and promote such intentions [5]. The operational aspects of planning circularity in a project then come into play. Designing the artistic journey provides a useful opportunity for discussing the project's circular commitments and enables the continuous and coherent employment of strategies throughout the exercise. Consequently, existing artistic schemes for such modelling remain applicable [5].

Education and Professional Development

Institutions of higher education bear considerable responsibility in preparing future practitioners for the potentially transformational impact of circular material flows in theatre and film [2]. Design curricula must encompass circular design principles, the assessment of system-level sustainability metrics, and the implications of circularity for both designs and production processes [2]. Extensive information on circular design strategies and related writing about the implementation of these strategies in scenography is publicly available. Two modalities for ongoing professional development in circular scenography merit attention: first, collaboration with existing non-degree programs on sustainability and circularity in scenography; second, the extension of new, non-degree programs to in-house production staff in theatre, film, television, and interior design, including training in circular design and associated metrics[3].

Curricula for Scenography Programs

Design education today exemplifies a fundamental disconnection between society's most urgent challenges and the focus of pedagogical efforts, prioritizing traditional yet increasingly anachronistic concerns [4]. Concurrently, sustainable development advocates continue to unsuccessfully implore educational leaders to embrace the role of education in effecting the shift to a sustainable society, repeatedly failing to strike a chord with design education leaders [5]. Recognizing that design education today deviates significantly from the prevailing discourse of sustainable development is imperative [4]. It is imperative to state that sustainability is hijacking design education in its own right by launching a number of misguided institutional initiatives under the name sustainable or sustainability. Theatre is facing the urgent challenge of enacting a paradigm shift toward sustainably viable productions [5]. The stage designer's ability to embrace a circular or regenerative approach remains vital [5]. Addressing aspects relating to sustainable education within the graduated courses entails, instead of launching parallel nominally sustainable initiatives, integrating sustainability into the educational framework as a new dimension that opens up new methodologies and performance opportunities [4]. A detailed analysis of different programmes reveals the compatibilities between these and ecological design principles [5]. Since richness and diversity are defining characteristics of the scenographic experience, few would contest the need to adapt the discipline to a sustainable paradigm. The green frame serves as a fertile ground for long and new pathways towards sustainable theatre, while supporting the integrated approach that a circular/remedial framework requires. A core step forwards entails closely observing the discipline itself and experimenting with a session at the very beginning of each new course [2].

Continuing Education and Certification

The development of professional competencies in circular scenography is essential to support theatre and film production systems in their transition towards sustainable practices [6]. Various stakeholders can contribute to such a development by advancing continuing education pathways followed by certification focused on circular scenography [7]. Certifications addressing stage design, theatre architecture, or production processes exist already in various countries. Scenography professionals in the fields of theatre, performance art, and event design have access to several workshops and online modules, across tools and methods such as: 3D modelling, graphic

design, preparation and presentation techniques, software as input for visual content such as sound, set, light [8]. Within the growing focus on circular economy or sustainability, an increase is observed on proposals or interventions, investigations or workshops, addressing these concerns when developing design specifications, strategies, and production processes [2]. The development towards wide implementation of notions of circular and eco-responsibility nevertheless lacks distinct educational frameworks taken by a wider audience of professionals working within and across these cultural industries [9].

CONCLUSION

Circular design in scenography offers a critical pathway for addressing the environmental and material inefficiencies embedded in theatre and film production. By shifting from linear consumption models to regenerative systems, productions can significantly reduce waste, extend the lifespan of scenic elements, and optimize resource use. Strategies such as reuse, refurbishment, upcycling, and modular design demonstrate practical and scalable solutions, especially when supported by collaborative networks and transparent supply chains. Moreover, the integration of digital tools such as virtual prototyping and hybrid physical-digital scenography opens new possibilities for minimizing material dependency while enhancing creative outcomes. However, the transition to circular practices is not solely technical; it requires systemic change across policy, education, and industry standards. Ensuring equitable access to resources and fostering inclusive participation remain essential to avoid reinforcing existing inequalities. Ultimately, circular scenography repositions design as both an environmental and cultural practice. It not only supports sustainability goals but also enriches storytelling, encourages innovation, and strengthens community engagement. Continued research, interdisciplinary collaboration, and institutional support will be vital in advancing these frameworks and embedding circularity as a standard practice in the future of theatre and film production.

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