Abstracts

In this section we present the abstracts for each article published in this issue of the journal. As previously, the abstracts are arranged in the same order as the full articles. Across these articles valuable insight is presented through quite diverse aspects of design and technology education: from culturally relevant place-based learning with native American middle school students; to nurturing creativity in schools through makerspaces; to approaches that focus on assessable creative outcomes that prioritise design thinking processes; to the complexities and value of collaboration via a cross-cultural, virtual, design studio with a focal point on peer learning. The abstracts provide the 'tasters' for the articles. We hope the provision of the tasters is a useful addition to the journal and welcome feedback on the approach.

Designing Futures: Place-Based STEM Learning through Cultural and Spatial Innovation

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Abstract

This study examines how culturally grounded and immersive design pedagogies can enhance STEM engagement for Native American middle school students, integrating Place-Based Education (PBE), Culturally Relevant Teaching (CRT), and Problem-Based Learning (PBL). Utilizing Virtual and Augmented Reality (VR and AR) and 3D printing, the project aimed to boost student interest and engagement in STEM through culturally responsive, problem-solving modules. A Design-Based Research (DBR) methodology facilitated a co-design process with educators, community members, and students from three Oklahoma tribes (Citizen Potawatomie Nation, The Otoe-Missouria Tribe, and United Keetoowah Band of Cherokee Indians) to develop a curriculum incorporating local cultural narratives and environmental contexts. Findings show that place-based and culturally relevant pedagogies significantly enhance STEM education in tribal communities. Native educators effectively adapted the curriculum, integrating tribal origin stories and cultural practices into activities like architectural visualization and design thinking. Despite challenges such as irregular attendance and COVID-19 disruptions, the program successfully increased student engagement and motivation, particularly through hands-on hackathons. This research underscores the transformative potential of combining PBE, CRT, and PBL with advanced technologies to deepen students' connections to their heritage, enhance learning experiences, and strengthen STEM identities. Future plans include expanding professional development for educators and incorporating career narratives from Native American STEM professionals to further inspire students. Discussing these topics through the tangible contexts of architecture and interior design makes abstract ideas more engaging and accessible for students. As researchers committed to inclusive and community-centered educational design, our engagement with the three partner Tribal Nations stems from a longstanding collaborative relationship grounded in mutual respect. This partnership is guided by reciprocal learning, with communities benefiting through

access to emerging technologies, tailored curriculum, and STEM enrichment for their youth. This study highlights the importance of culturally responsive, place-based STEM education in preparing Native American students for future STEM careers.

Reclaiming Relevance: Positioning Design and Technology at the Heart of a Whole-School Creativity Framework

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Abstract

Design and Technology (D&T) in the UK is approaching a crisis point, with declining enrolment, staffing shortages and increasing marginalisation in the curriculum. However, this paper argues that D&T is not a problem to be solved. Rather, it is a solution to be scaled. Positioned at the intersection of material practice, iteration and design thinking, D&T is uniquely placed to lead a whole-school strategy for embedding creativity as a set of teachable, observable competencies, not as an abstract ideal. This paper introduces a structured Creative Competency Framework, drawing on cognitive science, classroom research and cross-curricular theory. It outlines 15 core and meta-competencies, from divergent thinking and sequencing to translational and meta-cognitive awareness. Moreover, the paper demonstrates how creative competencies can be mapped onto existing D&T projects to reveal and develop their creative potential. Using a bespoke AI-powered tool, the paper presents trial analyses of two contrasting projects to show how creative depth can be made visible, measurable and actionable. Ultimately, the paper proposes a new standard for assessing creativity that is not merely based on outcomes, but is rooted in the thinking processes embedded in a task. Finally, the paper issues a call to practitioners to contribute to the refinement of this tool, with the aim of developing a bank of high-performing, creativity-rich D&T projects for shared use. The result is both a defence and a reinvention of the subject, repositioning D&T as foundational to a future-facing, creative curriculum.

Fostering Creativity in School Makerspaces: Principles and a Framework for Assessing Creativity-Supportive Design

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Abstract

School-based makerspaces are increasingly recognized as powerful contexts for fostering creativity, collaboration, and problem-solving. However, educational research on creativity has often prioritized individual traits or final products, underemphasizing the environmental conditions - physical, social, emotional, and cognitive - that shape creative engagement. This paper argues for re-centering Press, the environmental dimension of Rhodes' Four Ps model, as a central driver of creativity in educational makerspaces. Drawing on interdisciplinary literature from creativity studies, learning sciences, and educational psychology, the paper identifies six interrelated principles that characterize creativity-supportive learning environments: a supportive socio-emotional atmosphere, learner autonomy, inspirational stimuli, collaborative culture, teacher support and guidance, and equitable access to technology and resources. These principles are synthesized into the Creative Educational Environment Assessment Model, a prospective conceptual framework designed to evaluate and enhance makerspaces in ways that are context-responsive, equitable, and pedagogically robust. The model emphasizes process as well as product, incorporates intellectual resources as a dimension of creative support, and situates teacher capacity as a systemic driver. Intended as both a theoretical scaffold and a practical tool, the framework offers researchers, educators, and policymakers actionable guidance for transforming makerspaces into environments where creativity is structurally supported and democratically accessible.

Outputs of a Cross-Cultural Virtual Design Studio: EINSTUDIO – A Design Journey Across Countries

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Abstract

Following the COVID-19 pandemic, research on Virtual Design Studios (VDS) increased significantly, revealing mixed opinions about their limitations. This paper aims to present these contrasting views on VDS education, with a particular focus on peer-learning. While many studies argue that peer-learning diminishes significantly, or even disappears in VDS, others claim the opposite. The conceptual framework of this study explores the possible limitations of peer-learning in VDS and critically highlights how COVID-19-related anxiety may have influenced many of these opinions. The empirical study discussed in this paper is based on an Erasmus+ project titled *European Strategic Partnership Project: European Interactive Industrial Design Studio (EINSTUDIO*). Students and instructors from three different countries participated in EINSTUDIO. The project aimed to leverage recent developments in online and web-based communication to address the challenges of teamwork in cross-national teams. Accordingly, this paper investigates whether current virtual technologies support the implementation of cross-national design studios. Variables such as motivation, collaboration, cultural diversity, and the contribution of the e-learning infrastructure are examined through participants' self-evaluations. The findings indicate that although virtual peer-learning presents certain

limitations and cross-national collaboration poses even greater challenges, a more structured methodology, syllabus and close supervision, such as EINSTUDIO's semi-hybrid studio model, syllabus, and platform can help mitigate issues related to peer-to-peer communication and collaboration issues.