Abstracts

In this new section we are presenting the abstracts for each article published in this issue of the journal. The abstracts are arranged in the same order as the full articles. We hope this is seen as a useful addition to the journal and welcome feedback on the approach.

Crafting Humorous Soft Toys: Incorporating Humour to a Holistic Craft Process in Early Years Education

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Abstract

This study explores humour's role in a holistic craft process when 7–8-year-olds design personalised soft toys. Humour enhances learning environments by fostering joy, belonging and a positive atmosphere, acting as a motivational tool in experiential and arts-based learning. The study aims to answer the following questions: (1) What are the humorous characteristics of the soft toys created by the pupils? (2) How does the crafting of humorous soft toys proceed? Employing an educational design research methodology, the project involved 36 first-grade pupils from an urban Finnish school over a 10-day intervention. The study examines how humour, when integrated into a holistic craft process, supports the making and designing of soft toys. In the study, the pupils created humorous soft toys, often anthropomorphised with exaggerated or contradictory traits. Challenges emerged in translating 2D drawings into 3D soft toys, particularly with sewing and fabric painting. Nevertheless, the final products were unique and evoked positive emotions. The findings suggest that incorporating familiar elements, such as humour and soft toys, into the holistic craft process in early years education can enhance motivation and learning outcomes, thus supporting the integration of humour into educational contexts to foster creativity and emotional expression.

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Using performative objects to foster creativity in an education setting to tackle complex challenges

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Abstract

Creativity is often seen as something that occurs primarily during the ideation phase of design processes. However, this article argues that there is significant potential in enhancing creativity in the early stages and that this can contribute to youth learning and tackling complex challenges. Using a Danish educational setting as a starting point, the article illustrates how using performative objects in teaching situations fosters creativity in the early stages of a design process. The article concludes that creativity is not merely an individual skill but a social practice and process, where using performative objects creates a conducive context for creativity.

The teacher's guide's way of communicating with the teacher – within the subject of technology

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Abstract

The materials and artefacts utilized by teachers and students play a crucial role in education. In a subject like technology, where many teachers feel they do not have sufficient competence, curriculum materials such as textbooks and teacher guides provide important support for teachers. Teacher guides, in particular, have the potential to support teachers in different ways. The guidance provided in a teacher's guide can be either directive and talk through the teacher, i.e. telling the teacher what to do, or educative and talk to the teacher, i.e. telling the teacher how to do it and why to do it this way, thereby providing the teacher with knowledge to better understand the teaching of the subject. In this study, we analyze a teacher's guide for grades 7-9 to find out what kind of support it provides the teacher. An adapted framework for the design principles of educative curriculum materials was used. The analysis shows that this particular teacher's guide mostly talks through the teacher, giving the teacher directives on how to teach but without explaining why or suggesting other possible ways. The few educative features found are short and not very detailed. The support an educative teacher's guide could provide would give the teacher agency over their teaching and a better possibility to adapt teaching to situations and students. However, we see little of that kind of guidance in the teacher's guide analyzed in this study and conclude by outlining the possible consequences for technology education.

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Three levels in culturally oriented product design: a participatory approach to cultural inspiration in design education

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Abstract

Culturally oriented product design relies on inspiration from the local cultural heritage in the creation of unique products with specific local features. An authentic experience of cultural design inspiration can facilitate novel design outcomes. However, only a few studies have investigated the acquisition of cultural inspiration from a participatory perspective in the field. To narrow this gap, a design workshop was organized with local government in China. Design students were asked to combine local cultural characteristics in everyday products and to generate new concepts that reflect cultural diversity and support local tourism development. We collected students' visual representations, text notes and recorded verbal explanations of the concepts behind the created product designs. The entire data was analysed following the method of holistic coding to identify the types of cultural inspiration and cultural levels. Data-driven analysis included two rounds of categorising. Using the product metaphorical mapping tool, we specified three cultural levels and the cultural elements related to them. The analytical

method helped reveal students' design intentions in applying both tangible and intangible cultural elements The results demonstrated that design educators can support young designers to apply the participatory approach in bringing ethical cultural transformations regarding visual, behavioural and philosophical design features.

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Artificial Intelligence as a Tool for Individual and Collaborative Creativity in Design Education

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Abstract

Integration of Artificial Intelligence (AI) in the design process is a growing area of research interest. Three years after its public launch in 2022, AI has already established itself as the most disruptive tool revolutionizing how designers conceptualize, iterate and innovate. As AI technologies continue to evolve, it is pertinent that design students are acquainted with the potential of the technology and how it can be integrated in their professional practice. The objective of this paper is to explore the role of AI as a conceptualization and research tool in interior design. We aim to examine its effectiveness in enhancing the ideation process and facilitating collaboration and knowledge sharing in intercultural design teams. The case study presented is a collaborative online international learning project (COIL) with the participation of interior design students from the University of Monterrey (Mexico) and Wayne State University (USA). Students were involved in experimentation with various AI tools and platforms in the early stage of designing children's spaces in commercial interiors. Through meticulous documentation and evaluation of all design variations generated were gained valuable insights on the impact of AI on the evolution of the ideas. To collect research data on how students' creativity, idea exchange and decision-making were affected, surveys and reflection writings were distributed. The findings confirmed that students developed a greater understanding of AI as an essential tool in the design process. They acquired skills in utilizing it to aid the decision-making during the conceptualization phase. Furthermore, AI fostered their self-confidence in communicating within culturally diverse teams. The conclusion discusses the challenges encountered and lessons learned from the integration of AI technologies into the learning process.

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Looking, Experimenting, Creating, Telling – Testing a Pedagogical Model for Design Learning

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Abstract

This article shares the outcomes of international workshops focused on traditional costume construction and surface embellishment techniques and designs. These workshops were inspired by the findings of the Creative Europe TRACtion (Traditional Costume Innovation) project. The latter motivated students and adult learners in the Republic of Ireland, Finland, and Malta to develop creative, sustainable, and innovative responses to traditional textile artefacts. The Finnish Association of Design Learning (SuoMu) Design Learning Model was applied to support the development of creative thinking in the workshops. Additionally, teaching strategies developed by textile educators and craftspeople in each context complemented the SuoMu Design Learning Model, facilitating interactions between workshop ideas, materials and participants. The workshops aimed to foster design, creative thinking, sustainability, innovation, and a deeper appreciation of textile heritage. Participant feedback was analysed through thematic data analysis, and the visual outcomes were examined for indicators of creative thinking, such as fluidity, flexibility, elaboration, and uniqueness. The SuoMu model played a key role in guiding the design process and developing creative thinking skills. Sketching and brainstorming techniques sparked a wealth of ideas, while group activities and practical and experiential learning supported the ideation process. The workshops led to numerous fluent and flexible responses and ideas, many of which evolved into unique and innovative designs. Participants developed visual literacy skills and textile cultural empathy while achieving sustainability in material usage.

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Design students' views on future work at the stage of Industry 5.0 and Society 5.0: Dimensions and levels of resilience

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Abstract

This study investigates design students' perspectives on future work environments shaped by the evolving paradigms of Industry 5.0 and Society 5.0, with a focus on their views of work communities, technological advancements and systemic problem-solving. The concept of resilience is used as an analytical lens. The study explores the relevance of Industry 5.0 and Society 5.0 frameworks in the context of the design profession and examines how design students anticipate and interpret future changes in their professional landscape. The study addresses the following research question: What are the dimensions and levels of resilience according to design students' views of future work? Data were collected in 2023 from 92 design students at various stages of their studies. Using principal component analysis, three dimensions of resilience were identified: resilience in work community, in technological development and in systemic problem solving. The findings suggest that students are aware of major shifts in their field and express varying degrees of readiness and adaptability across the identified dimensions. These results offer insights into how design education might better support students in navigating the uncertainties of future work.

Roadmap to Early-Stage Medical Device Design through Experiential Learning and Role-Play

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Abstract

Purpose: Biomedical engineers that have the ability and skill sets to comprehend and retain basic anatomy and physiology (A&P) knowledge, apply fundamental engineering principles, use critical thinking, and communicate effectively across multiple disciplines to facilitate successful development and clinical translation of medical devices. The authors created an undergraduate medical device design course that follows a roadmap for developing novel devices and/or innovative technology from concept to clinical product with the course focusing on the early-stage of the development process.

Methods: A holistic approach is taught from the unique perspective of inventors, investors, and surgeons (IIS) by integrating interactive presentations, guest lectures, labs, field trips, and role-playing activities into a 15-week curriculum and meets ABET student learning objectives. Individual assignments require oral presentations and written reports that mimic project leaders on design teams, and group assignments are completed through IIS role-playing. These activities culminate with individual student design projects that help build self-confidence in their ability to successfully jump into and navigate the medical device development process. This is accomplished by identifying a clinical need, formulating an innovative concept, defining design criteria, fabricating a prototype to demonstrate proof-of-concept, bench testing to demonstrate feasibility, completing an invention disclosure, making an elevator pitch with constructive classroom critique, and writing an executive summary and detailed report emulating a NIH SBIR Phase I grant.

Results: Course effectiveness was demonstrated by: (1) 204% improvement in A&P knowledge, (2) positive role-playing evaluations (98.7% of students reporting that it was a useful educational experience, written feedback), and (3) favorable course evaluations.

Conclusions: A roadmap for early-stage development of medical devices using a holistic, experiential learning approach is presented to prepare undergraduate bioengineering students for future healthcare careers as engineers, scientists, clinicians, and/or entrepreneurs.