Design and Technology Education: An International Journal

24.1

Editorial: Design processes at the heart of the matter

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Welcome to the first issue for 2019 of Design and Technology Education: An International Journal (now routinely referred to as the DATE Journal). As with previous issues, we have a good collection of research articles, drawn from both school and higher education. Across these articles the contexts are very different, with authors from Finland, Netherlands, Turkey, United Kingdom and United States of America and articles spread across a range of design disciplines. What all have in common is a consistent focus on the importance of placing design processes at the core of learning and making these explicit though student project work.

But first, with this issue, we also have some changes to report. The first of these is an Editorial change. For the last four years, the Journal has been jointly edited by Kay Stables and Erik Bohemia. Unfortunately, pressure from other aspects of Erik's academic life have created the need for him to step down from this role. Over the last four years Erik has made a valuable contribution, not least in promoting the journal to a wider audience and instigating the Guest Edited sections, the first of which was included in Issue 23.2, with a set of articles developed from selected papers for the 2017 Engineering and Product Design Education (EPDE) conference. Fortunately, Erik is not leaving the Editorial Board and so will still play a part in the development of the Journal.

The decision to create a joint editorship was made as a way to address the growing breadth of articles received by the Journal, including those coming from design in higher education. Kay's experience is predominantly in schools' education and Erik's in higher education. To continue with this approach, we are delighted to announce that Eur Ing Dr Lyndon Buck from Buckinghamshire New University has agreed to accept the role of co-editor of the Journal. Lyndon will be known to the higher education design community and also to readers of this journal in his role of Guest Editor for the special section of articles from the EPDE conference published in issue 23.2.

A second change has been caused by Richard Kimbell's decision to 'hang up his *reflections* hat' after twenty years of writing a reflection for every issue of the journal. Richard's reflection pieces, thought provoking, amusing and serious at the same time and based on his nearly 50 years teaching and researching design and technology education, have been enjoyed by many readers. The first ten years were collected together in a single book and plans are now afoot to create a second edition of following ten years. Richard's contribution goes way beyond the reflections. He also was Editor of the Journal for ten

years (1995-2004) and has also contributed articles from his own research. We owe him a deal of thanks for his role in the success of the journal. We also look forward to future contributions of research articles (watch this space).

Richard stepping down has left us pondering what to do with the 'reflections' section. While we work on this we will be inviting guest reflections, the first of which is in this issue and is by Tony Ryan. Tony is just over one year into his role as CEO of The Design and Technology Association – the Professional Association for UK Design and Technology Educators and the sponsor of the DATE Journal – it seems a fitting opportunity to hear what is on his mind!

A final change that was instigated last year was, in addition to the Editorial Board, to introduce a panel of reviewers. This has allowed us to broaden the review expertise for the Journal and also to spread the workload as the Journal attracts increasing numbers of submissions. While the panel has done both of these things, there are still areas where additional reviewers would be helpful and we would welcome expressions of interest, particularly from researchers with experience in primary education and higher education.

Reflection

The first 'reflection' article of 2019 has been provided by Tony Ryan. Tony's background is as both a Design and Technology teacher and as Headteacher of two large urban secondary schools for 11-18 year olds. He reflects on a set of current issues in the English school system as he considers whether the current system is fit for purpose. While his reflections relate specifically to England, it would be interesting to consider if his reflections have resonance with education systems elsewhere in the world, or whether they are unique to England. What are the priorities at the core of national education systems? And do they match up with those things valued by learners and their parents? Please let us know if you have comments to contribute.

Articles

The first article in this issue is a systematic literature review that is prompted by a need for teachers in basic education (school education from age 7 to age 16) to understand how technology and computational thinking can be introduced into active learning in craft education. In *Beyond Programming and Crafts: Towards Computational Thinking in Basic Education*, Sinikka Pöllänen (University of Eastern Finland) and Kari Pöllänen (Cloudia Ltd, Finland) analyse literature to address two research questions: how programming is described through craft science-based concepts of craft labour; and examples that exist to teach programming in crafts education. In contextualising craft education in Finland, they point to their national curriculum that sees craft as multi-material with design-based holistic craft processes. Through a systematic, far-reaching and representative review they identified 10 texts that informed on the first research question and 68 on the second,

allowing them to distinguish literature that provided insight into both programming as a craft and computational thinking in crafts. This allowed them to see convincing parallels between programming and crafting and to provide a wealth of perspectives on the potential for computational thinking and programming to be taught through craft. While situated within the Finnish curriculum, this article has much to offer to school and tertiary design and technology educators, showing how computational thinking, seen broadly, can enrich learning and teaching activities.

The next two articles both focus on developing students' ability to focus more on the end users of their designing.

In *An Instructional Model for Social Design Education: A Design Project for Stray Animals Including Production-Based Learning Approach*, Güçlü Yavuzcan and Damla Şahin (Gazi University, Turkey), Barış Gür (Venn Design Ltd, Turkey) and Özden Sevgül and Cemil Yavuz (Gazi University, Turkey) report on research that involved developing new methodologies to integrate social design into industrial design education. The article presents a social design toolkit and reports on a project where it was employed in which students worked in groups, designing in the context of animal welfare. This topic was chosen as one where there is limited evidence of projects in this context and also it allowed students to work directly with immediate issues of stray dogs on the university campus. The research took a design thinking and production based learning model where students were designing, prototyping and building full size, fully functioning, stray animal shelters. They worked in teams and consulted with stakeholders. Based on observation of projects, interviews with instructors, post-project questionnaires with the students and instructor assessments the research concluded that the model had improved learning outcomes. The article is particularly valuable for the detailed account of the toolkit and of the projects undertaken, which highlight the value of a real-world (as opposed to hypothetical) project and the impact of collaborating with stakeholders.

In *Empathy Thresholds in Transport Design Students*, Andree Woodcock, Jane Osmond, Michael Tovey (Coventry University, UK) & Deana McDonagh (University of Illinois, USA), highlight the importance of student designers developing empathy with the users of their designs. Threy explore the possibility that empathy could be considered as a threshold concept and capability that student designers need to achieve. Providing insight from previous research into the nature of a threshold concept as being transformational, irreversible, integrative and troublesome, the article makes a clear case for the value of identifying threshold concepts for designing and also the challenges for students in progressing to and through them. The authors report on the use of Discrete Learning Interventions (DLIs) that were used across different cohorts aimed at teaching empathy and that were designed to take students through four stages: discovery, immersion, connection and detachment. The aim of the interventions was increase participants' empathy towards older transport users. Results showed the difficulty students found putting themselves in the space of users who were radically different to themselves and also the challenge this presents to design educators. What is clear from the research is the

importance of seeing empathy as a threshold concept and the importance of developing pedagogic approaches to enabling students to pass through this threshold.

The final three articles each provide insight into different aspects of processes of design.

The first of these article focuses on a question of whether and how design educators articulate designerly actions and skills. In *The tacit design process in architectural design education* Elise van Dooren, Machiel van Dorst, and Thijs Asselbergs, (TU Delft, Netherlands) and Jeroen van Merrienboer (Maastricht University, Netherlands) and Els Boshuizen, (Open University, The Netherlands & University of Turku, Finland) explore this question in the context of architecture education through a case study approach, analysing videos of tutorial sessions with first year architecture students. The analysis uses a framework developed and used in previous research with practicing designers that identified five generic elements of design processes: experimenting; a guiding theme; particular domains (architecture examples including form and space, physical context/site, socio-cultural/economic/historic/philosophical); frame of reference; physical language (or laboratory) of experimenting (their example, sketching and modelling). Tutorials were analysed with regard to different actions and skills of design processes and the extent to which the teachers were implicit or explicit about processes. This analysis then linked to the five generic elements. The insights provide a rich level of detail about the ways in which the tutorials were conducted, with an overarching conclusion that teachers largely do not articulate the "how and why of the design process in general", much being implicit, despite research evidence from elsewhere that making design processes explicit can speed up student learning processes.

The next article that has a design process dimension focuses on supporting students' creativity. In *Evaluation of strategies of creativity development used in store design projects based on student projects*, Seval Özgel Felek (Ordu University, Turkey) and Özge Gül (Dogus University, Turkey) report on research undertaken in a second level interior architecture studio project. Through a broad ranging literature review, the authors make a valuable case for a need to develop students' strategies for creativity, particularly as a means to support innovation. They highlight a large number of potential strategies, and then report on the specific use of two strategies, chosen to meet perceived needs of the students in question and of their project that was a design challenge of producing alternative layouts for a retail store design. The two strategies, "Dead Head Deadline" and "Merged Ideas in a Box and Circle of Opportunity", are described, along with their use in the students' projects. Data was drawn from an analysis of the students' work and questionnaire feedback from the students about the use of the strategies. Although a small-scale research project, both sources gave clear indications of the impact of introducing the strategies, both within the project in question and potential future use identified by the students.

The final research article providing insight into design processes turns attention to students' attitudes towards the use of software applications. In *Evaluation of the Relationship between the Use of Multi-Software and the Students' Attitude towards*

Computers and Technology in Undergraduate Architectural Design Studio Education, Asli Agirbas (Fatih Sultan Mehmet Vakif University, Istanbul, Turkey) raises the issue of the increasing number of architecture related computer programs becoming available and in his research explores the relationship between the use of multi software and students' attitudes towards computers and technology. Drawing on Kolb's model of experiential learning, the research focuses on second year architecture students and the range of different software programs used within a site-specific architecture design project that included a range of research and analysis requirements placing demands on students that could be helped by use of different programs. The article presents questionnaire data collected from the students on their use of computer programs and three high scoring projects that were evaluated in detail. The questionnaire data indicated a strong link between those students who have an interest in computers and a willingness to overcome challenges of using different software packages. The detailed project analysis showed that the high scoring students had used a wide range of software and that their choice of software linked closely to different phases of their projects' development: site analyses; early design sketches; modelling plans etc; and presenting their projects. As with the previous article, the research reported here is from a small-scale project. But it none-the-less highlights the importance of students linking the design purpose they have at any given stage on their process, with the tools that can directly assist with that purpose.

Finally, this issue has a review of *Drawing for Science, Invention and Discovery: even if you can't draw* by Paul Carney, published by Loughborough Design Press and reviewed by Alison Hardy of Nottingham Trent University, UK