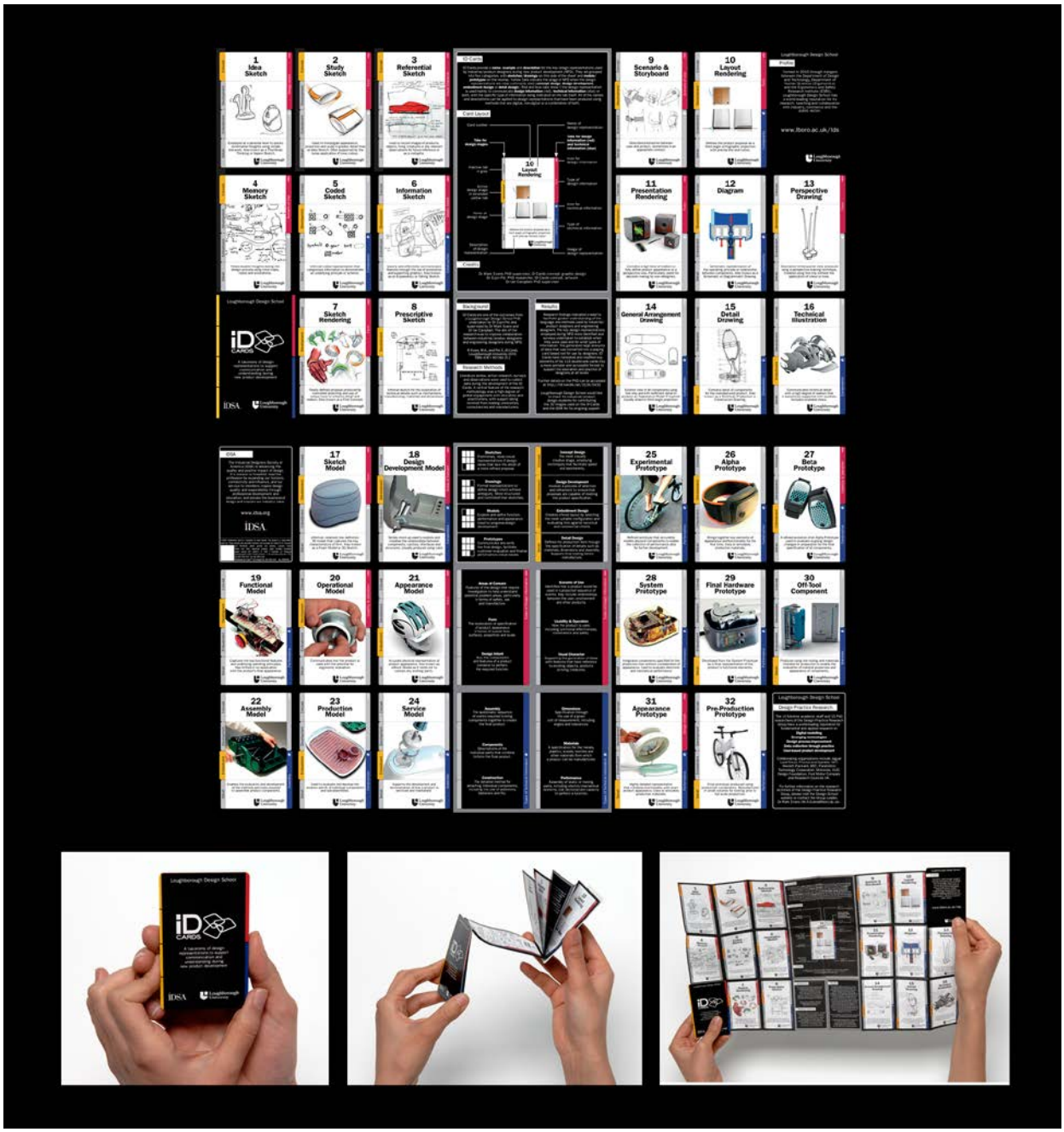
Institution: Loughborough University

Unit of Assessment: D34 Art and Design, History, Practice and Theory

Title of case study: iD Cards: A tool to support communication and understanding during new product development

1. Summary of the impact (indicative maximum 100 words)

iD Cards are the outcome from research at Loughborough University from 2005 to 2011 that responded to problems in the use of language and understanding for design representations (sketches, drawings, models, prototypes) during New Product Development (NPD). The fold-out design tools have been financially supported, distributed and adopted by the Industrial Designers Society of America (IDSA) for use by its 3300 global members. The portable and accessible iD Cards identify 32 key types of design representation; when they are used; and for what types of information. They facilitate more effective NPD through enhanced design methods, communication, team working and inter-disciplinary collaboration.



2. Underpinning research (indicative maximum 500 words)

The research responded to a need to enhance communication and understanding between industrial designers and other professions during NPD. The research commenced in 2005 and was undertaken by Dr Eujin Pei (PhD researcher, Loughborough University 2005 – 2009), Dr Mark Evans (Reader, Loughborough University 1991 – present) and Dr Ian Campbell (Reader, Loughborough University 2001 – present). Evans and Campbell had practitioner backgrounds in industrial design and engineering design respectively and, having identified communication problems between designers and engineers during their pre-academic careers, sought to resolve these through academic research with the support of Pei.

Following a literature review and interviews with 31 industrial designers and engineering designers in the UK and Singapore, differences in the language used for design representations and a general lack of understanding of how they were used were identified as key barriers to communication **[3.1]**. This resulted in an original taxonomy of design representations comprising 37 types of sketch, drawing, model and prototype **[3.2]**. The accuracy and relevance of the taxonomy was confirmed via interviews with 27 industrial designers and engineering designers from 17 companies. The interviewees were also asked when the design representations were used and for what types of information. The outcomes from the interviews provided rich data that had the potential to standardise language and increase understanding in the role and contribution of design representations. After investigating ways in which this information might be presented, the need for immediacy and portability resulted in a physical card-based format being selected and developed. Prototype cards were designed by the researchers and refined following interviews with industrial designers, engineering designers and academics (total 10). Validation of the final version involved interviews with 61 stakeholders. A two week case study in which the mocked-up 114 double-sided full colour playing card-size cards were employed during NPD was also undertaken **[3.3]**. The overwhelmingly positive response to the cards during all stages of the final validation indicated that they had the potential to enhance understanding and collaboration during NPD during design education and professional practice.

Having validated the contribution of the knowledge framework **[3.3]**, post-doctoral research and development was undertaken to make the tool available to practitioners. This resulted in a completely revised graphic design solution and use of a two-sided, 8 x 3 panel A3 paper Z Card format **[3.4]** that was launched by the Industrial Designers Society of America in 2011 **[3.5]**. In response to demand, a modified pdf download of the iD Cards was made available via IDSA web site **[3.6]**.

3. References to the research (indicative maximum of six references)

3.1. **Pei, E., Campbell, R.I., and Evans, M.A.** (2010) *Development of a tool for building shared representations among industrial designers and engineering designers*, *CoDesign Journal*, Volume 6 Issue 3, p139-166. ISSN 1571-0882, DOI: 10.1080/15710882.2010.510197

Academic journal with 267 article views from Taylor & Francis Online

3.2. **Pei, E., Campbell, R.I., and Evans, M.A.** (2011) *A taxonomic classification of visual design representations used by industrial designers and engineering designers*. *The Design Journal*, Volume 14 Issue 1, 2011 pp64-91 DOI: 10.2752/175630610X12877385838803

Academic journal published by Berg rated INT1 in the European Reference Index for the Humanities (ERIH)

3.3. **Pei, I.** (2009) *Building a common language of design representations for industrial designers and engineering designers.* PhD Thesis, Loughborough University

PhD thesis on which the underlying structure of the iD Cards are based available from http://hdl.handle.net/2134/5432

3.4. iD Cards (2011)

Print run of 26000 globally published by the IDSA and Loughborough Design School (ISBN: 978 1 907382 352)

3.5. **Evans, M.A.** (2011), *From PhD to IDSA: Case Studies in the Evaluation of Design Tools*. In *2011* International Conference of the Industrial Designers Society of America, New Orleans USA, pp.1-10 available at http://www.idsa.org/category/reserved-tags/dr-mark-evans

Conference paper supported by presentation to students, educators and practitioners for launch of the iD Cards to the IDSA at their annual International Conference

3.6. iD Cards PDF download

Open access download available via the Industrial Designers Society of America web site at http://idsa.org/id-cards-now-available-free-pdf-download

4. Details of the impact (indicative maximum 750 words)

In 2009, the potential to work with the IDSA to disseminate the research findings was discussed with the experienced industrial designer and Executive Director of the Industrial Designers Society of America (IDSA), Frank Tyneski. The capacity of the research findings to resolve issues of communication and understanding during NPD was acknowledged and a desire to make an affordable product available to IDSA members expressed. Following post-doctoral development, in 2011 mock-ups of the iD Cards were presented to the Executive Board of the IDSA (comprising elected senior practitioners and academics) by the new Executive Director [text removed for publication]. The Executive Board acknowledged the need and contribution to NPD from the information embodied in the iD Cards and, though a process of peer review, approved an order for 5000 and distribution to members **[5.1, 5.2]**. The dissemination route for the iD Cards exploited a high engagement of student, educator and practitioner members of the IDSA through its 5 annual District Conferences in April 2011 and annual International Conferences in September 2011 and August 2013:

- Mideast District Conference, Cincinnati 8 - 10 April 2011
- Northeast District Conference, Providence 8 - 9 April 2011
- Western District Conference, San Jose, 6 - 7 April 2011
- Southern District Conference, Austin 15 - 17 April 2011
- Midwest District Conference, St Louis 1 3 April 2011
- International Conference, New Orleans 14 - 17 September 2011
- International Conference, Chicago 21 - 24 August 2013

Dr Evans was invited to support the launch of the iD Cards through presentations at the Northeastern District Conference (2011), International Conference (2011) and Southern District Conference (2013). In parallel with the launch of the iD Cards at the District Conferences, they were exposed to further peer review when the jury of the International Design Excellence Awards made the iD Cards a Finalist in the 2011 competition **[5.3].**

In addition to the dissemination at conferences, iD Cards were sent to the IDSA's 61 university chapters (59 in the USA, 2 in Canada) by post **[5.2]**. In response to demand from members, the information embodied in the iD Cards was made available through a modified pdf download on the IDSA website.

Having disseminated the iD Cards to members of the IDSA, unsolicited emails started to be received by Dr Evans about their impact on design education and NPD. This was further reinforced with anecdotal comments when Dr Evans was invited to give guest lectures at 5 Design Schools in the USA in 2012 and 2013 (Illinois Institute of Technology, Northwestern University, Carnegie Mellon University, University of Cincinnati, Ohio State University). Impact in the USA has been corroborated by the Vice President for Education for the IDSA where the iD Cards have made a significant contribution to more effective NPD through the teaching and learning of design communication ("Your contribution towards the understanding of appropriate level [sic] of sketching

and visual communication has had a positive impact on our society"**[5.2]**); and ("the value of summarizing [sic] communication between industrial designers and other product development professionals)"**[5.2]**. In addition to supporting mainstream NPD such as that undertaken by [text removed for publication] ("We are also trying to improve/expand the way that our folks view prototypes and that's where you really excelled" **[5.4]**), the iD Cards have started to have an impact on **inter-disciplinary collaboration** between professions that are typically outside of mainstream NPD ("Often trying to explain what Industrial Design is to none designers and none product people can be very challenging, if not impossible. These cards not only have made it easy to explain what ID is, but also shows how design works through a project, and the steps that are needed to develop a world class product" **[5.5]**; "Colleagues from Engineering, Quality, Marketing and Finance were enabled to understand the different stages of the new product development cycle and speak in a common language **[5.6]**). Beyond typical NPD, the iD Cards have impacted in areas such as medical device design by enabling clinical staff to understand the nature of NPD (".....most clinical staff has [sic] little experience in regards to product development process. We routinely use the iD Cards as a visual explanation of the process" **[5.2]**).

5. Sources to corroborate the impact (indicative maximum of 10 references)

The following sources of corroboration can be made available at request.

5.1. Email from Industrial Designers Society of America Executive Director 2009 – 2012. www.idsa.org

5.2. Letter from member of IDSA Executive Board [text removed for publication]

5.3. Finalist award certificate for 2011 International Design Excellence Awards (IDEA): http://www.idsa.org/id-cards-facilitaing-collaboration-and-understanding-during-new-product-development

5.4. Email from Senior Director, [text removed for publication] (manufacturer of household products)

5.5. Email from Senior Industrial Designer, [text removed for publication] (manufacturer of consumer and commercial products)

5.6. Email from Industrial Design Director, [text removed for publication] (manufacturer of consumer products)