

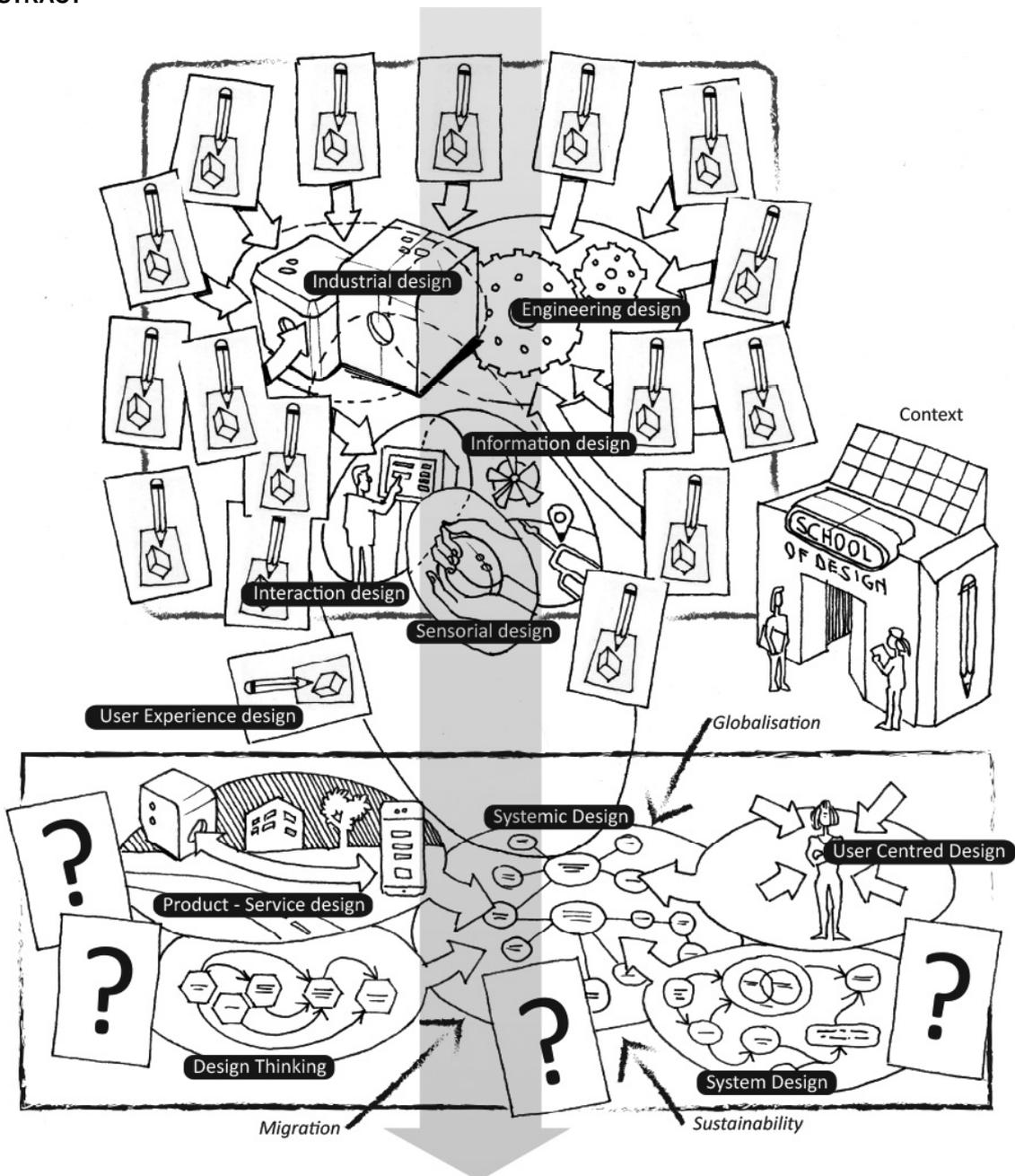
TOWARDS AN EXTENDED DESIGN SKETCH & VISUALISATION TAXONOMY IN INDUSTRIAL DESIGN EDUCATION

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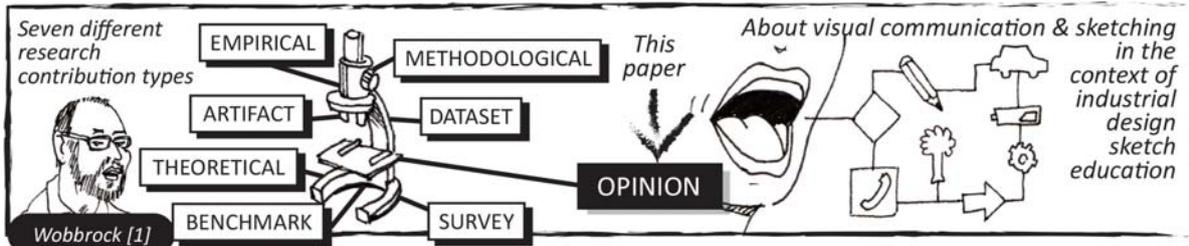
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ABSTRACT



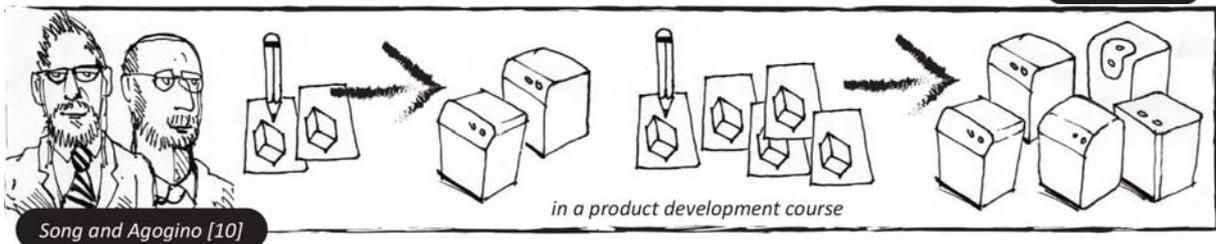
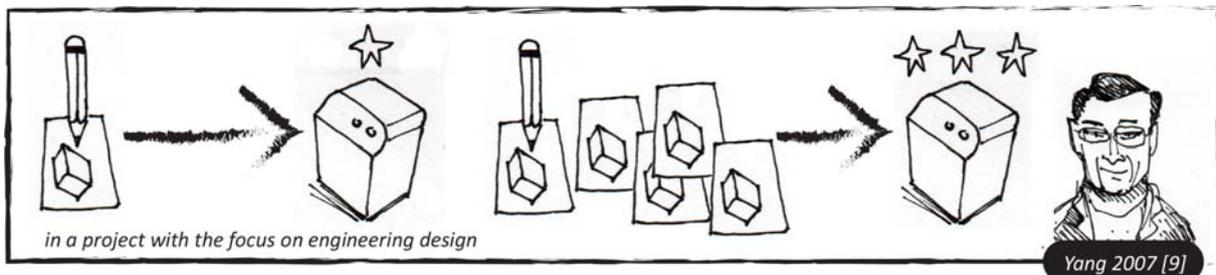
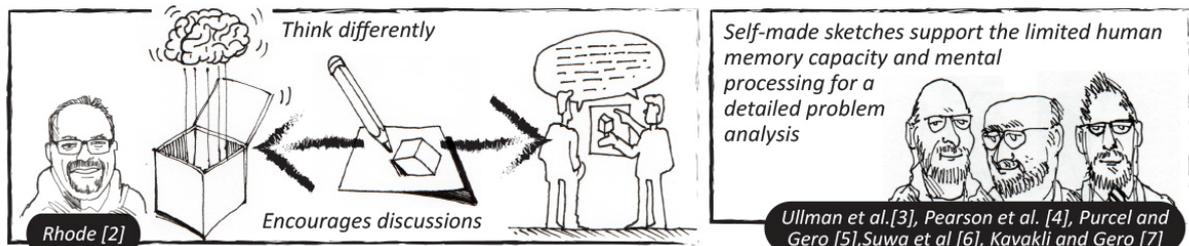
Keywords: Design sketching, design education, design visualisation

1 INTRODUCTION

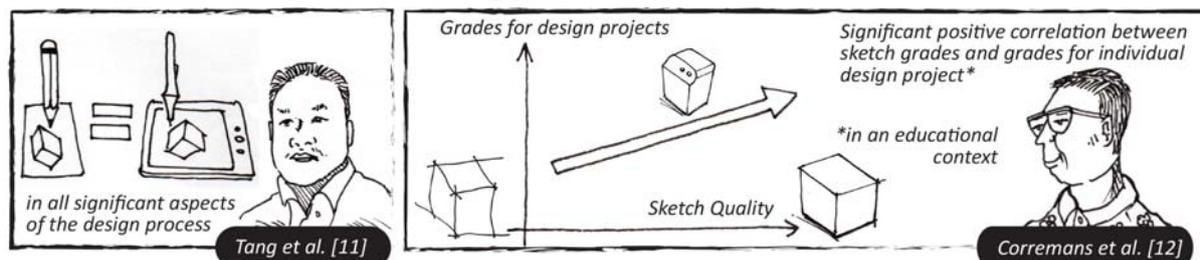


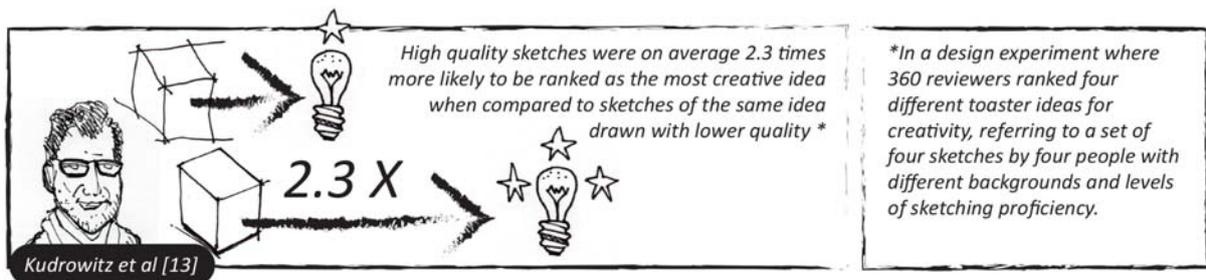
The visualisation and communication of problems and possible solutions are extremely important in the context of engineering and industrial design. The objective of this paper is to ask the question if industrial design and engineering educational curricula should extend their design sketch and visualisation taxonomy, based on emerging evolutions in the field of design.

2 THE IMPORTANCE OF SKETCHING



3 THE IMPACT OF SKETCH QUALITY





4 SKETCH TAXONOMY

It is not only the act of sketching or the quality of the sketches that has the impact, but also what the designer sketches is important. Hoftijzer et al [14] researched the communication factors of sketches and provided implementation guidelines for specific types of sketches. Lengler and Eppler [15] composed a Periodic Table of Visualization Methods for Management compiling 100 existing visualization methods with a proposition on how to use them. A 'Taxonomy on Drawing for Design' was proposed by Schenk [16], and similar to Schenk, Pei et al [17] compiled and categorised a

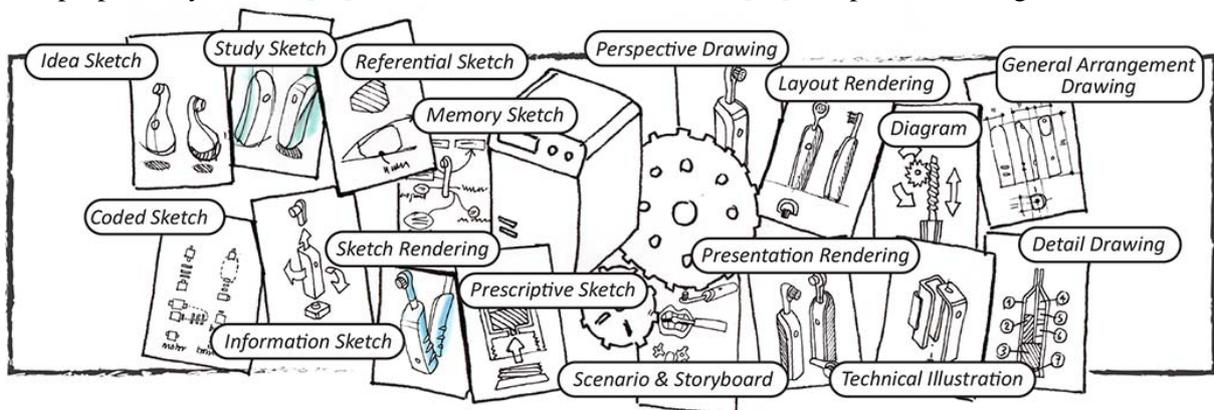


Figure 1. Illustration of the 16 ID-cards of the sketches and drawing categories

taxonomy of all Visual Design Representations employed by industrial designers and engineering designers during a New Product Development design process. Based on this study, Evans, Pei and Campbell [18], in collaboration with the University of Loughborough, produced the ID-cards; a clear and visual synopsis of the compiled taxonomy where they distinguish four categories: sketches, drawings, models and prototypes. Figure 1 illustrates the different sketching and drawing types of ID-cards categories sketches and drawings, Figure 2 shows a few of the original ID-cards.

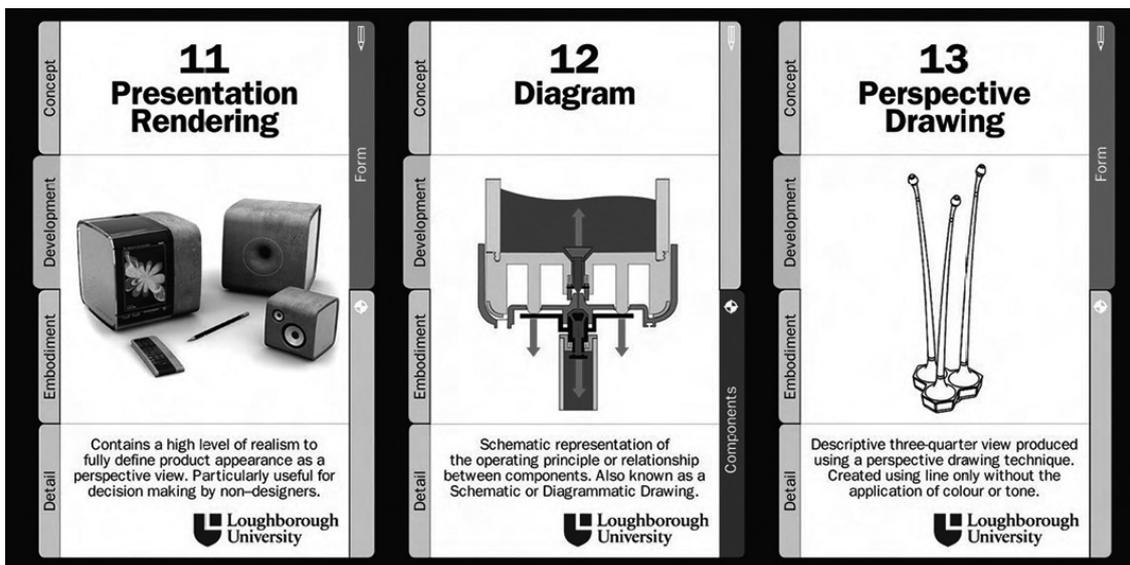
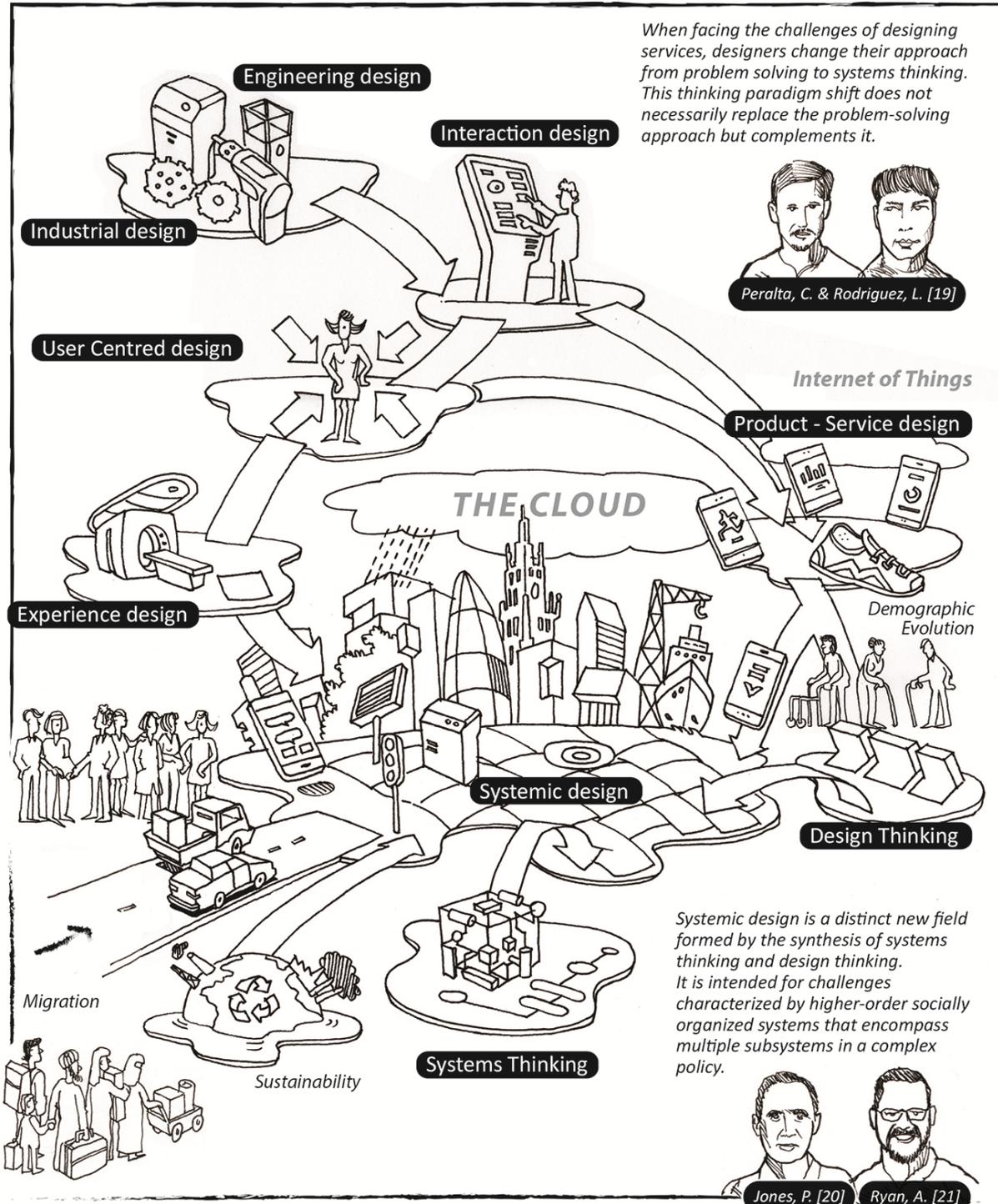


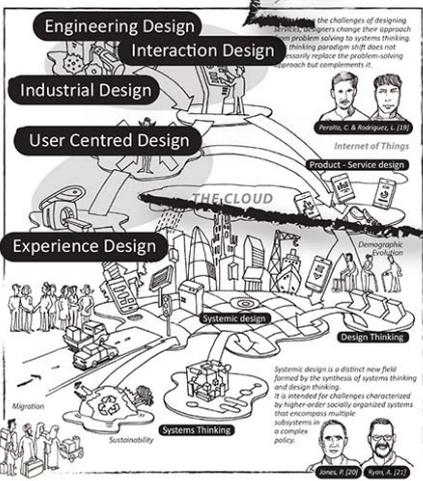
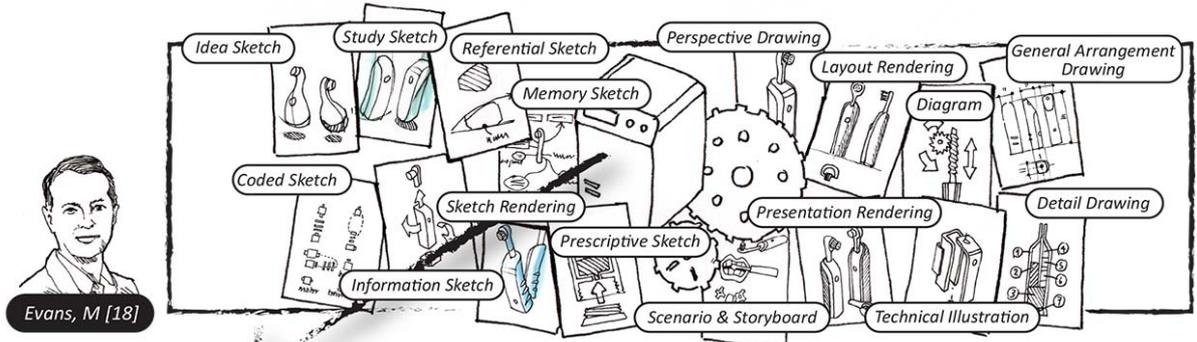
Figure 2. Three original ID-cards of the sketches and drawing categories by Evans, Pei and Campbell

5 EVOLUTIONS IN INDUSTRIAL DESIGN



New levels of complexity and abstraction in the field of industrial design require new powerful visualizations to analyse, discover, express and depict progressions, emotions, experiences, stories, scenarios and other intangible aspects involved in the system. A new vocabulary of sketching and visualisations should facilitate mutual communication between designers, engineers, users, specialists and all other stakeholders during this design processes. The taxonomy of Evans et al. thoroughly covers all sketches and drawings applied in object oriented industrial design projects, but the scope of industrial design constantly broadens, so the designer needs to extend his/hers sketch vocabulary with sketch types adopted from related fields.

6 NEW POWERFUL VISUALIZATIONS



Interaction or experience designers should be able to image and depict a person's behavior as they interact with a system over time. Storyboard and animation sketches involve the 'end user' as an actor in the visual narrative, and illustrate not only the context of an interaction sequence, but can also express the experiences the user goes through while 'using' the product or service.

3.2 Gebruikscenario's
Op de volgende bladzijden worden de belangrijkste gebruikscenario's uitgetekend voor het Blagrit systeem. Via deze weg proberen we de eerder besproken functies en concepten tastbaarder en begrijpbaar te maken. Dit doen we aan de hand van een aantal specifieke situaties die getrapteerd kunnen worden over het gehele concept.

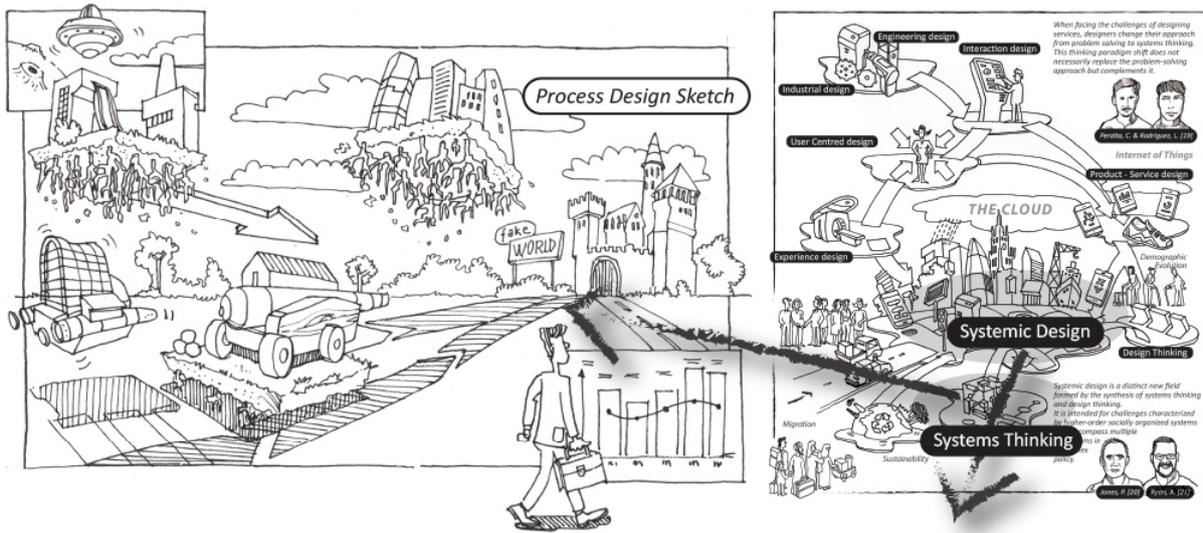
1. De renner activeert de intercom door één van de knoppen op de tassen van de remmen in te drukken, en begint te spreken.

2. De ploegleiding hoort de renner praten in de volgwagen. Het is nu de foto van de spreekende.

4. Een aantal andere renners activeert de intercom via de knopjes in de remmen en pikken in op het gesprek.

5. Ook hun bestellingen en data worden weergegeet op het scherm zodat de ploegleiding kan zien wie er spreekt.

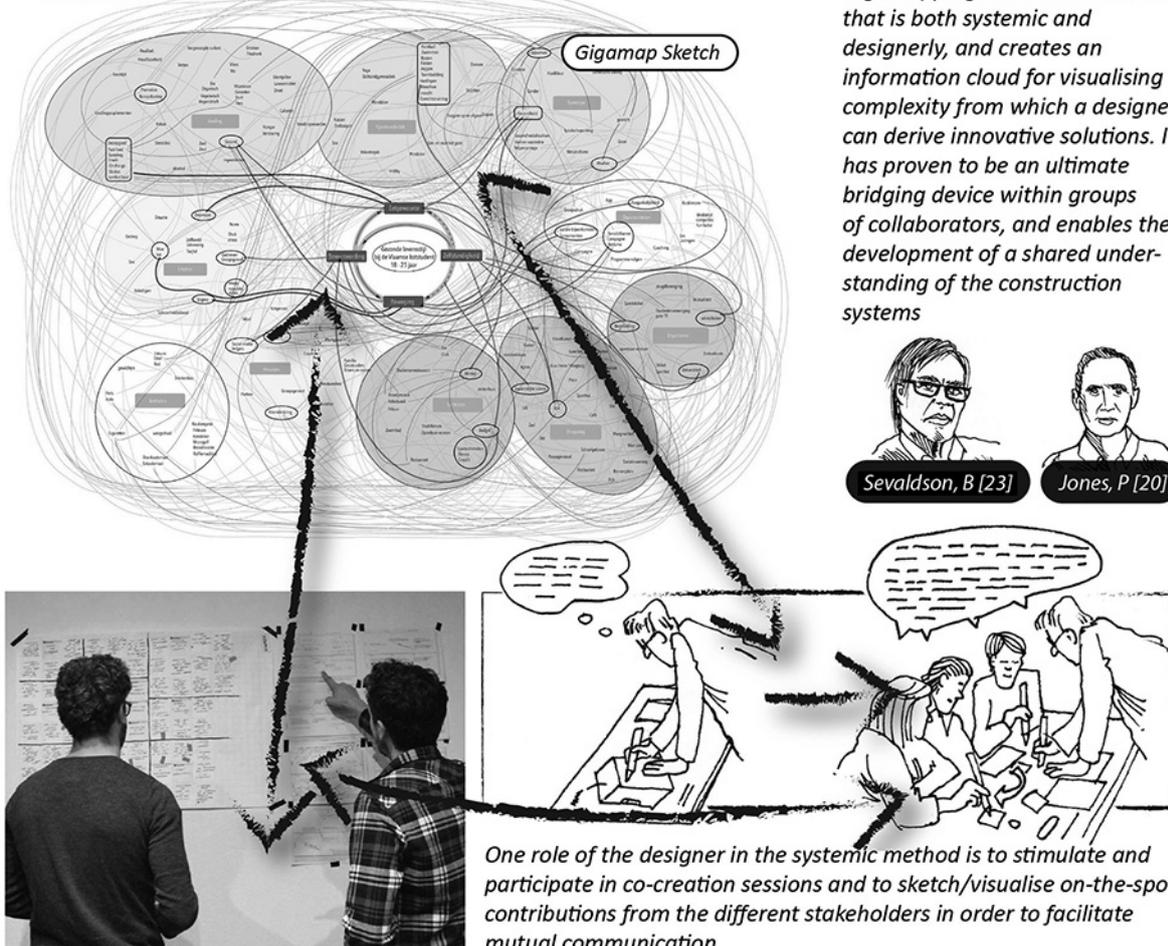
Illustration: Fé Van Dam



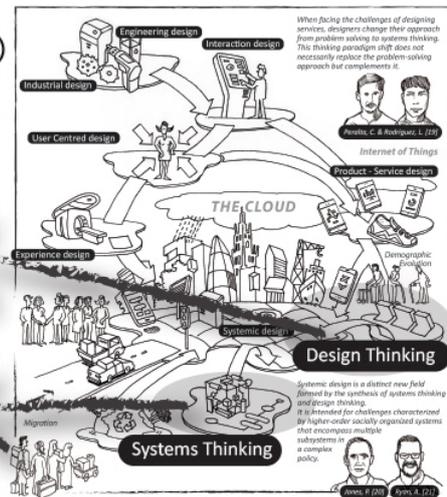
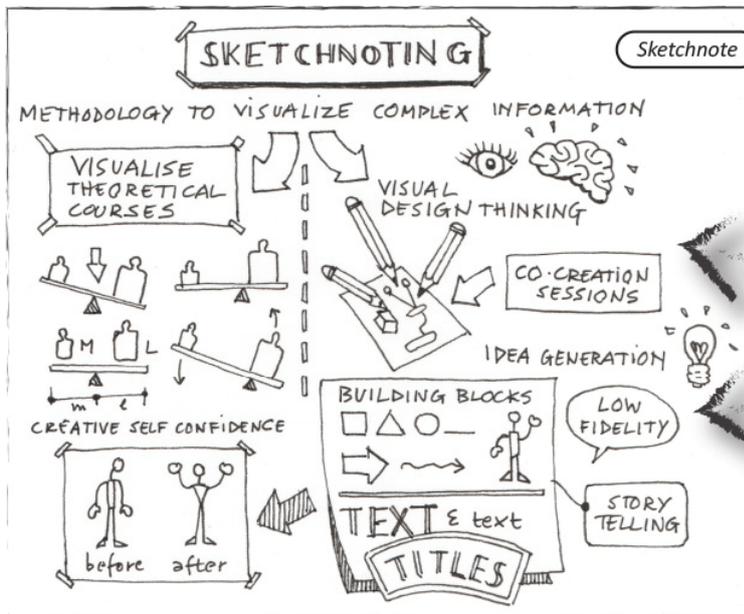
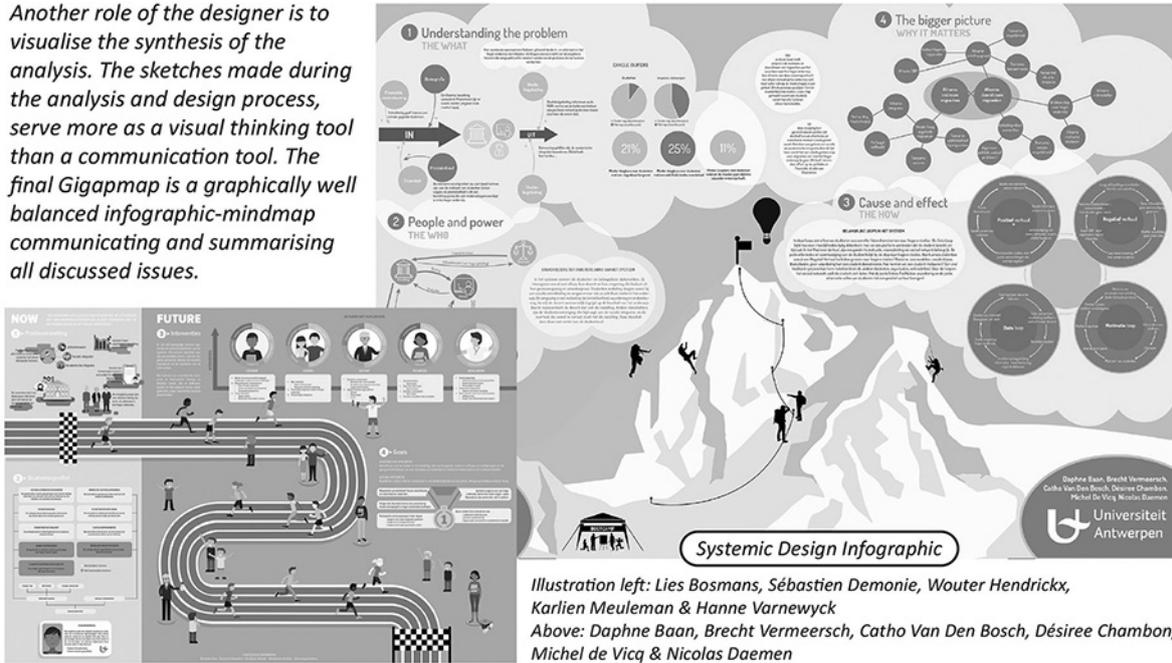
Systemic Design

Systemic Design, a recent discipline in the field of design, is located as a human-centred systems-oriented design practice with a strong inter- and trans-disciplinary approach [23]. It integrates systems thinking and human-centred design with the intention of helping designers cope with complex design projects. The recent challenges to design coming from the increased complexity caused by globalisation, migration, sustainability render traditional design methods insufficient. According to Pauli [24] future progress should embed respect for the environment and natural techniques that will allow production processes to be part of the ecosystem.

Illustration: Bram Cobben, Ben Goovaerts & Cédric Van Steenkiste



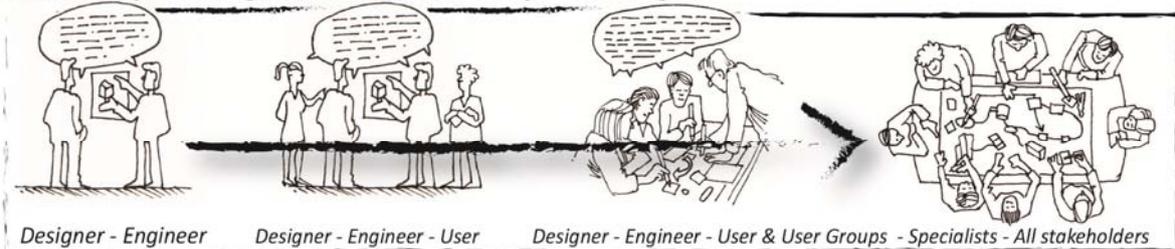
Another role of the designer is to visualise the synthesis of the analysis. The sketches made during the analysis and design process, serve more as a visual thinking tool than a communication tool. The final Gigapmap is a graphically well balanced infographic-mindmap communicating and summarising all discussed issues.



Sketchnoting seems to lower the inhibition threshold of putting pen on paper. In a multidisciplinary design team, the low fidelity visualisation technique allows designers with little sketch self-confidence to quickly synthesize what was heard and seen, making connections and discovering patterns and sharing information with others visually.



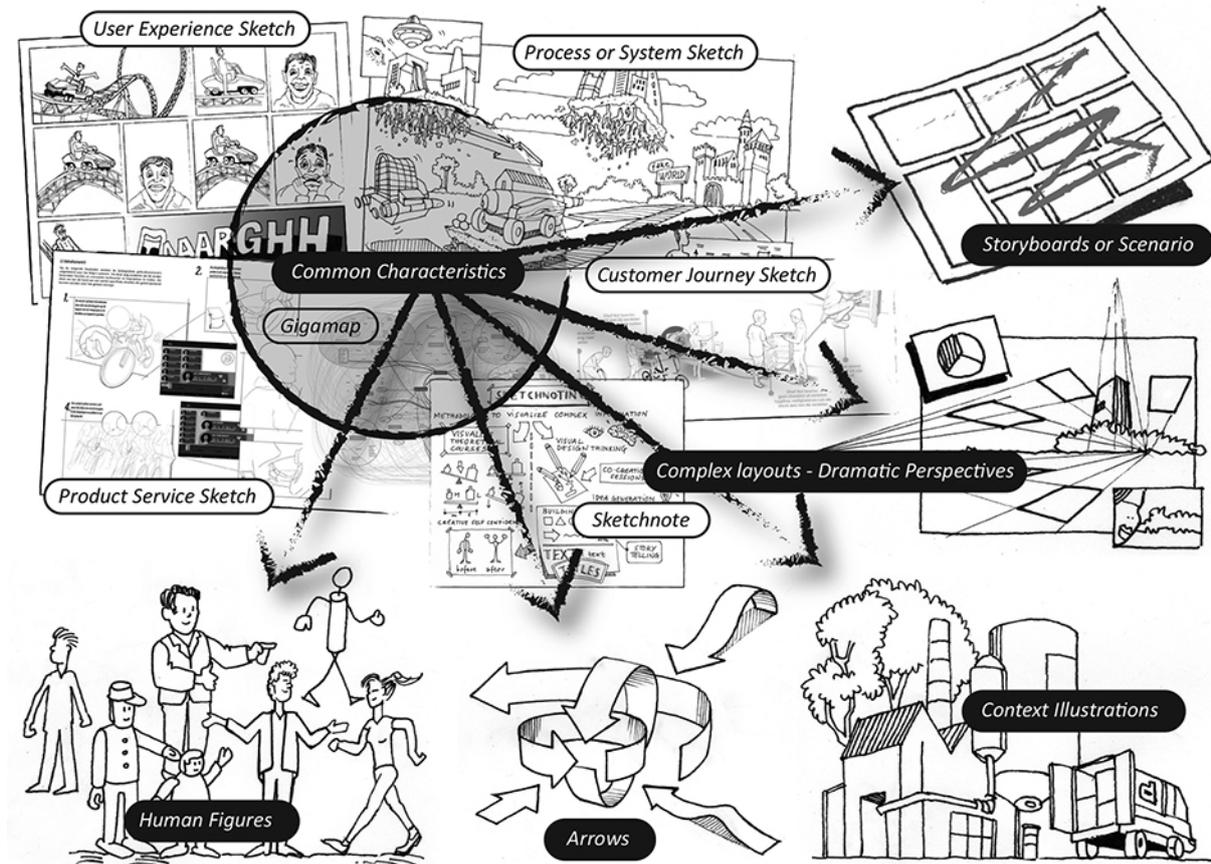
Evolution of the Design Team and a new role for the designer



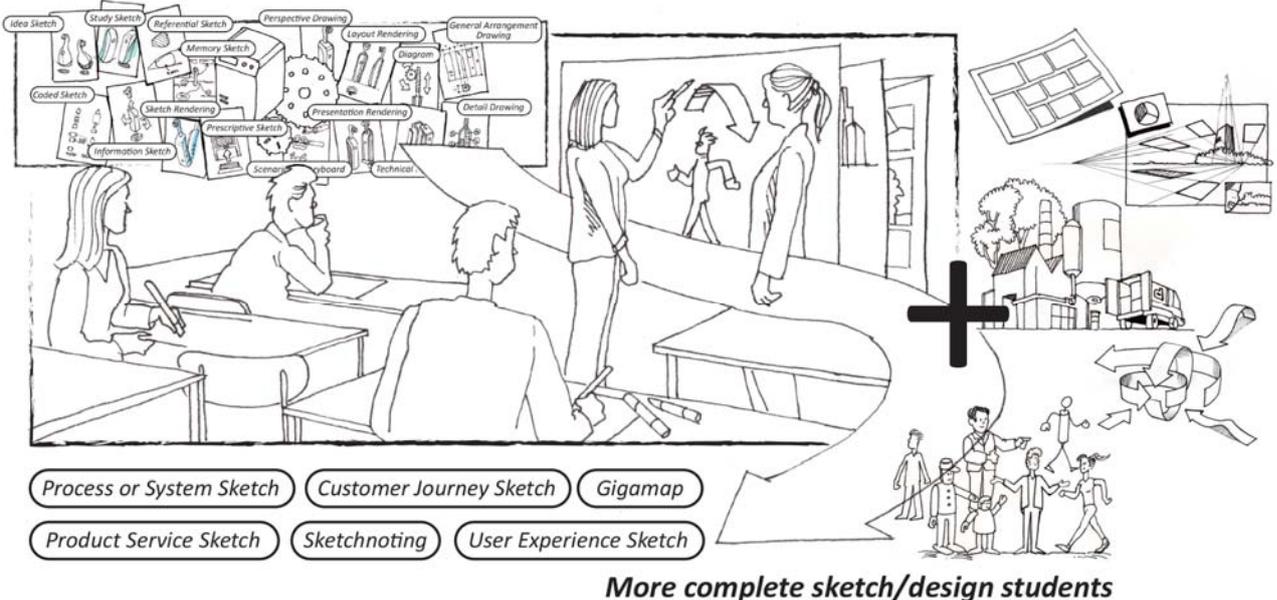
One of the roles of the designer in these multi-disciplinary teams is to facilitate co-creation, stimulate mutual communication between the different members of the stakeholderteams and to visualise preliminary results and outcomes.

7 TOWARDS AN EXTENDED SKETCH AND DRAWING TAXONOMY

User experience sketches, process sketches, product service design sketches, customer journey illustrations are recently added to the spectrum of the designers' sketch vocabulary. What these new sketches and visualisations have in common is the fact that they are mostly non-object related. Sketches made in the early stages of a New Product Development phase of complex systems designs depict more the mutual relations between the different stakeholders, the evolution of the project in time, the context of the problem, the different system design possibilities, than any possible hardware components involved.



8 CONCLUSION



More complete sketch/design students

If the goal of design educational programmes is to prepare students to become skilled creative people in a fast evolving industrial design and engineering landscape, students' sketch competences should extend beyond merely object related sketches and drawings. For design schools this insight could mean a major revision of the sketch and drawing courses.

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