

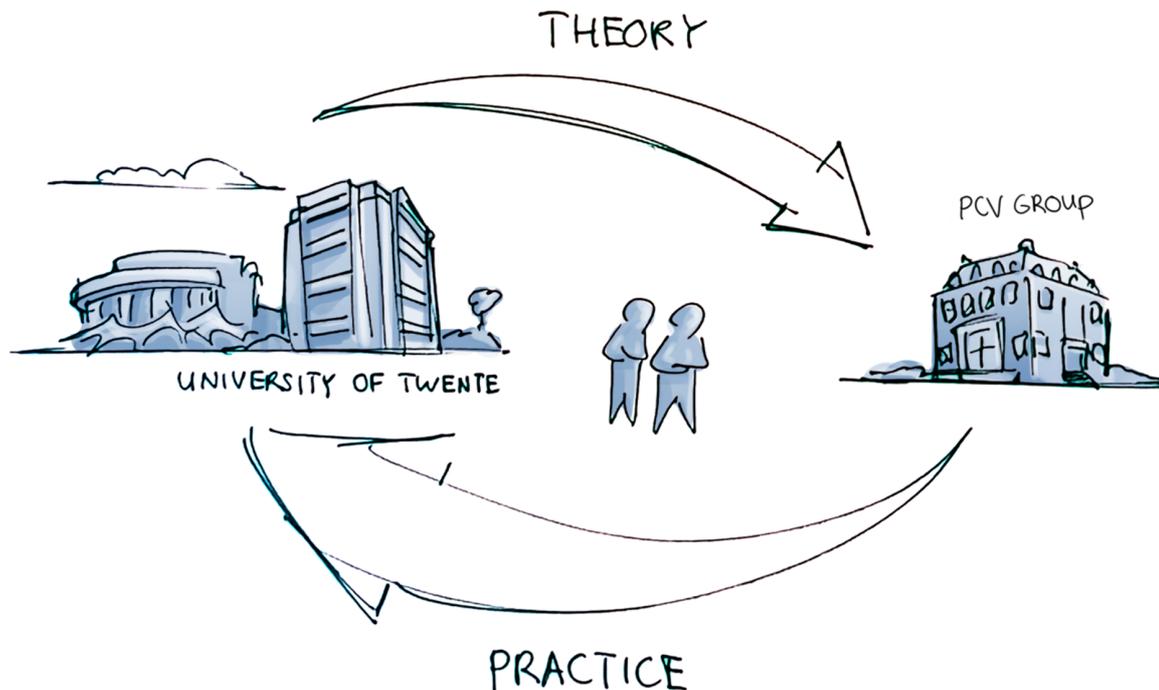
INDUSTRIAL DESIGN SKETCHING IN PRACTICE

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PCV group

ABSTRACT

Students in design education are taught how to sketch and how to apply this skill to generate and communicate ideas. Overall, this skill and its application have a good fit with the design practice, but there are also gaps. This paper identifies some of these gaps by comparing how sketching is taught in Industrial Design Engineering at the University of Twente and how it is applied at PCV Group, a design engineering bureau in Enschede, the Netherlands. By doing so, the authors of this paper aim to provide educators with insight into the way sketching is put into design practice. In turn, they can use these insights to hone and adjust the way sketching is taught to create a better fit between design sketching theory and practice.

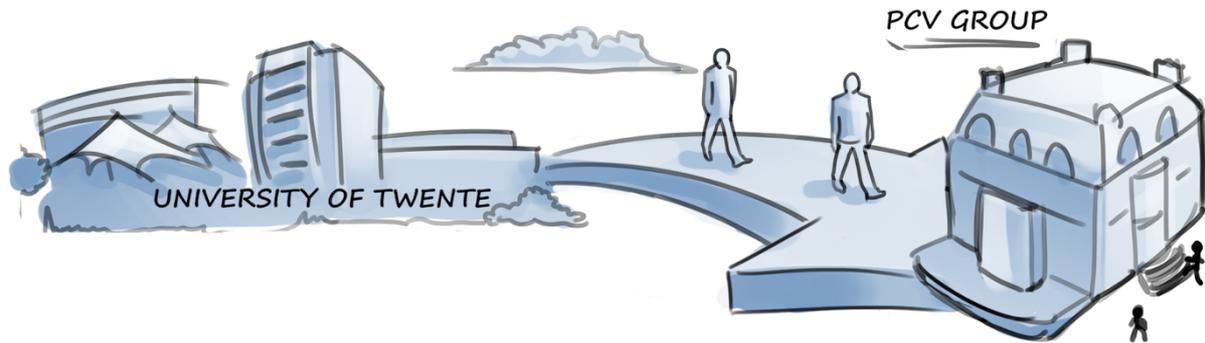


Keywords: Difference theory and practice, design sketching, industrial design

1 INTRODUCTION

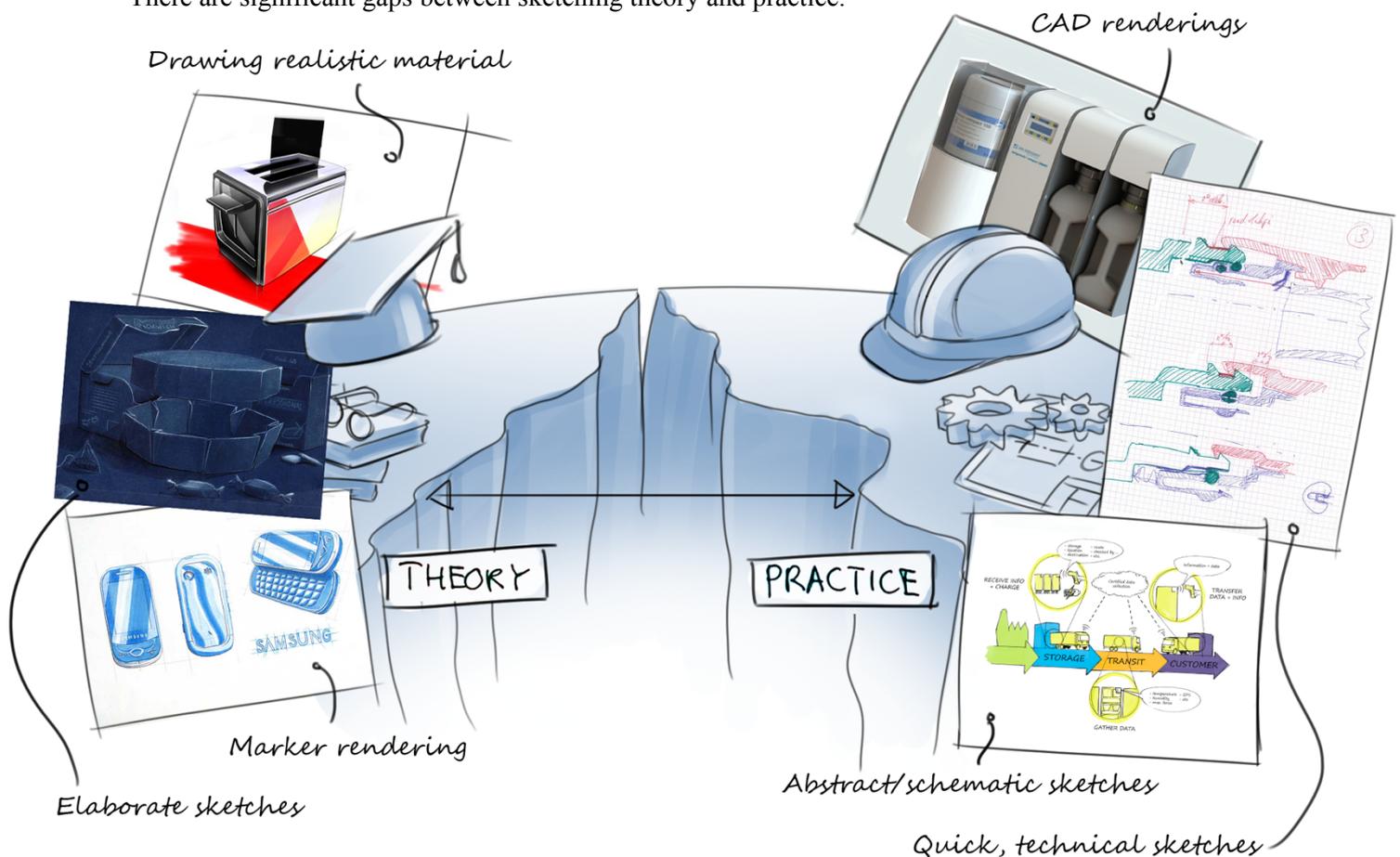
By following the study Industrial Design Engineering, you are preparing yourself to be a product designer. During the sketching lessons we were enthusiastically sketching, marking and busy with chalk to create nice colour gradients. Hours were spent to get the right lines on paper to create the nicest final drawing to hand in. Once working as a product designer, the chalk disappeared deep down in the drawer and it became clear that the practice differs from what has been learned in the classroom.

About the authors: the two authors of this paper both studied Industrial Design Engineering at the University of Twente. During their studies, both also worked as student assistants at various sketching courses for several years. Although they followed the same path, they differ 6 years and thus have not studied nor worked together until they both started working at PCV Group after their studies.



2 HYPOTHESIS

There are significant gaps between sketching theory and practice.



3 RESEARCH QUESTIONS

To test the hypothesis the following research question with its subquestions needs to be answered:

1. What are the gaps between sketching theory and practice?

1.1 How is design sketching taught in product design education?

1.1.1) What kind of design education is referred to?

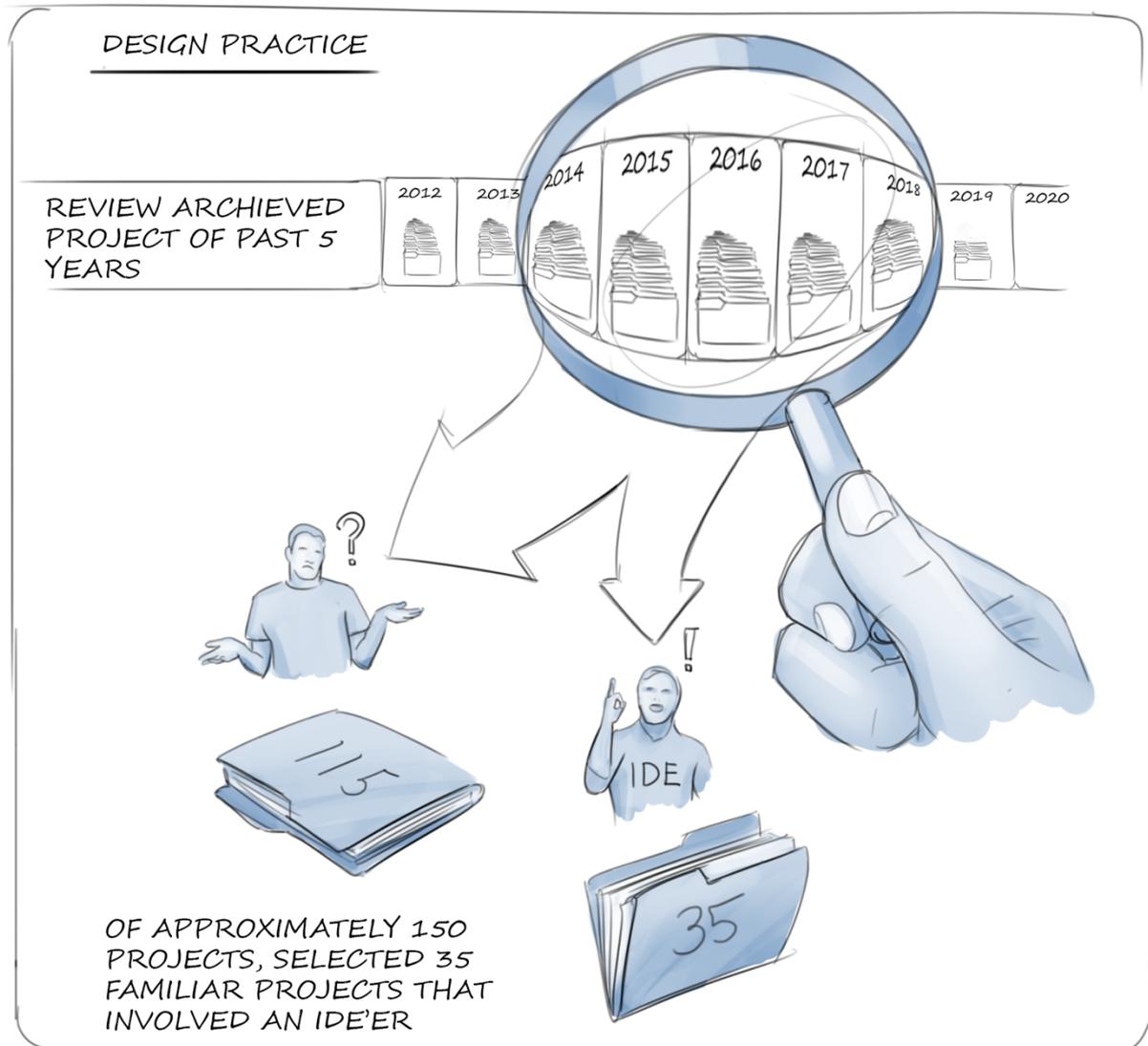
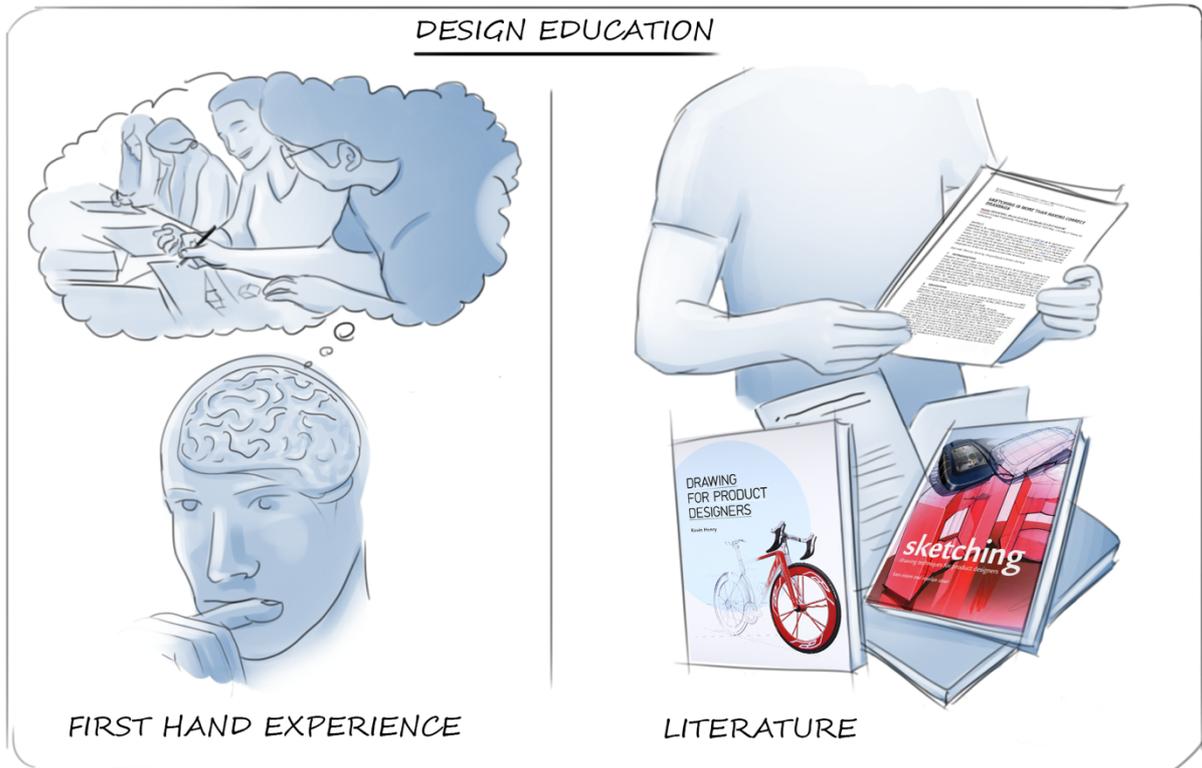
1.1.2) How is this design sketching taught?

1.2 How is design sketching practiced in professional product design engineering?

1.2.1) What kind of design practice is referred to?

1.2.2) How is design sketching practiced in this company?

4 METHODOLOGY

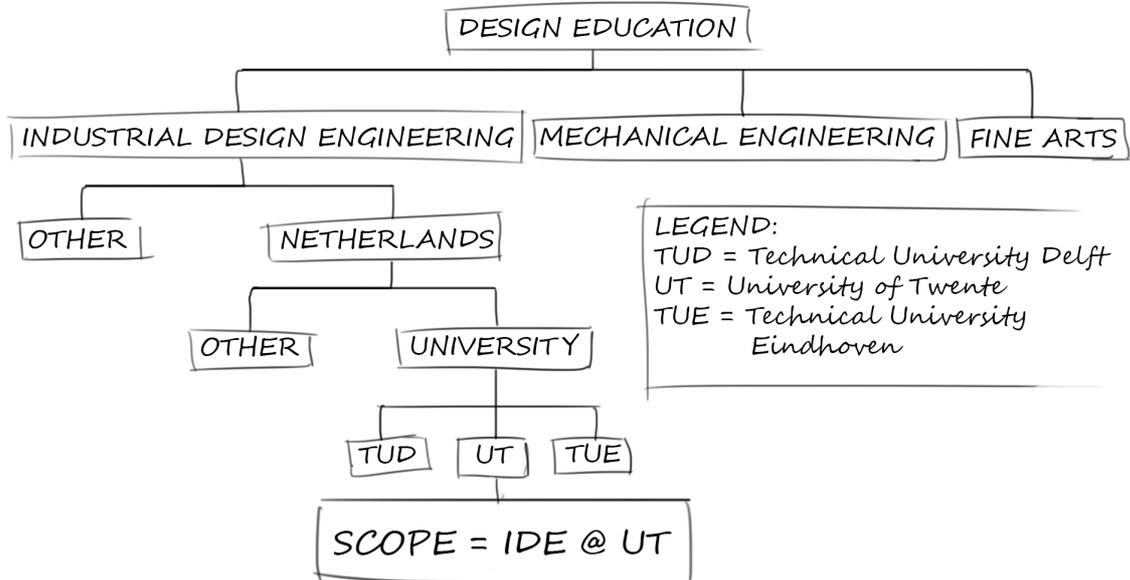


5 RESULTS

The results are formulated as answers on the research question starting with the subquestions

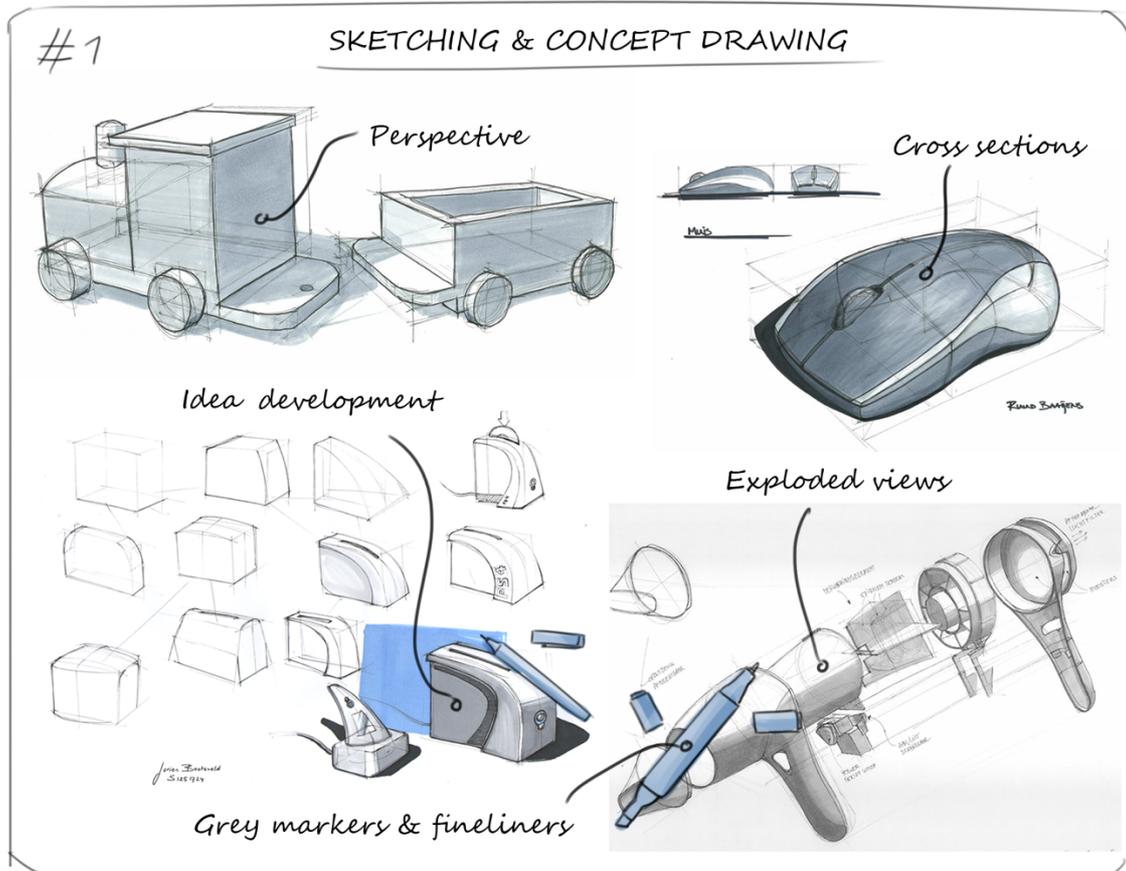
1.1 How is design sketching taught in product design education?

1.1.1) What kind of design education is referred to?



1.1.2) How is this design sketching taught?¹

Three courses are offered during the Bachelor:

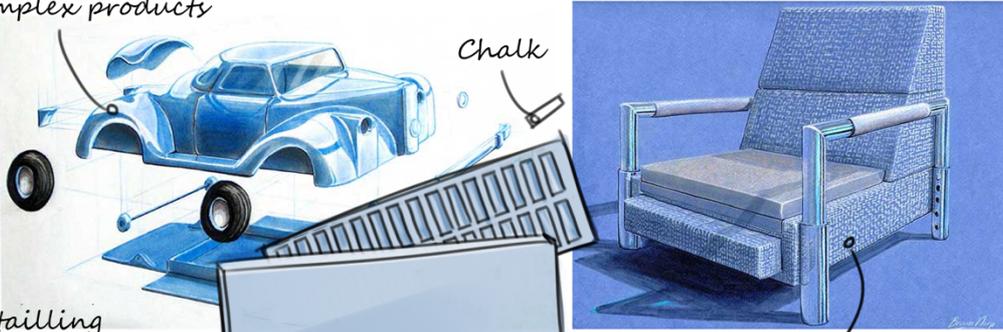


¹ On the 6th of march 2019 Pepijn van Passel verified that the contemporary design sketching education content has remained the same to a large extent with respect to the content at the time the authors of this paper received their education.

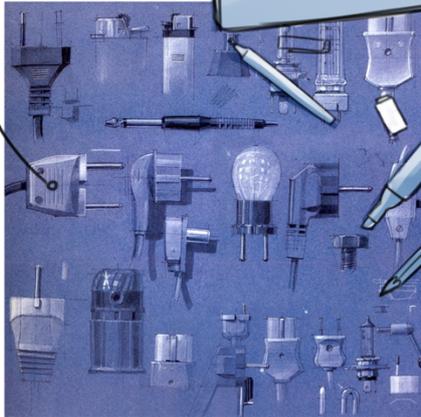
#2

PRODUCT PRESENTATION DRAWING

Complex products



Detailing



Presentation drawing



Material expression

Grey & coloured markers, pencils

#3

APPLIED DIGITAL SKETCHING

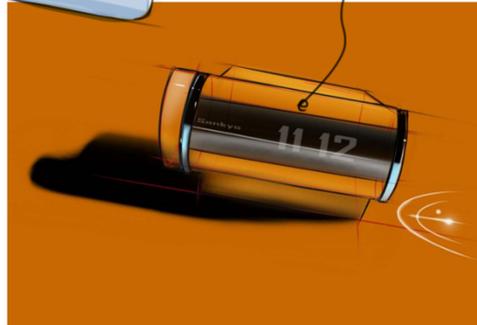
Digital sketching

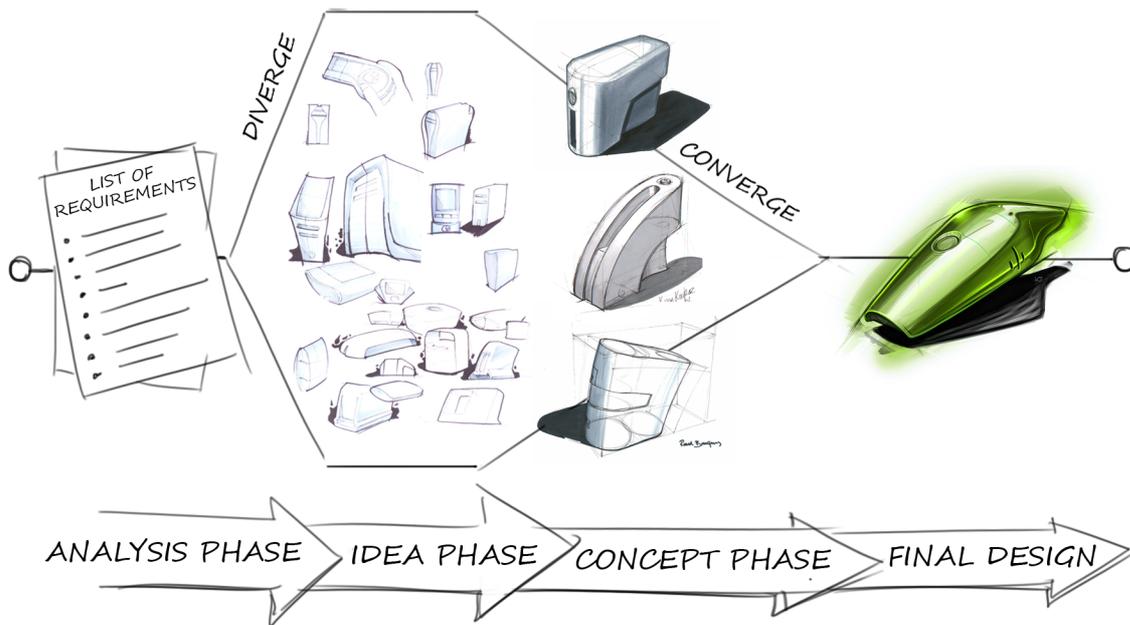


Foam



Rendering

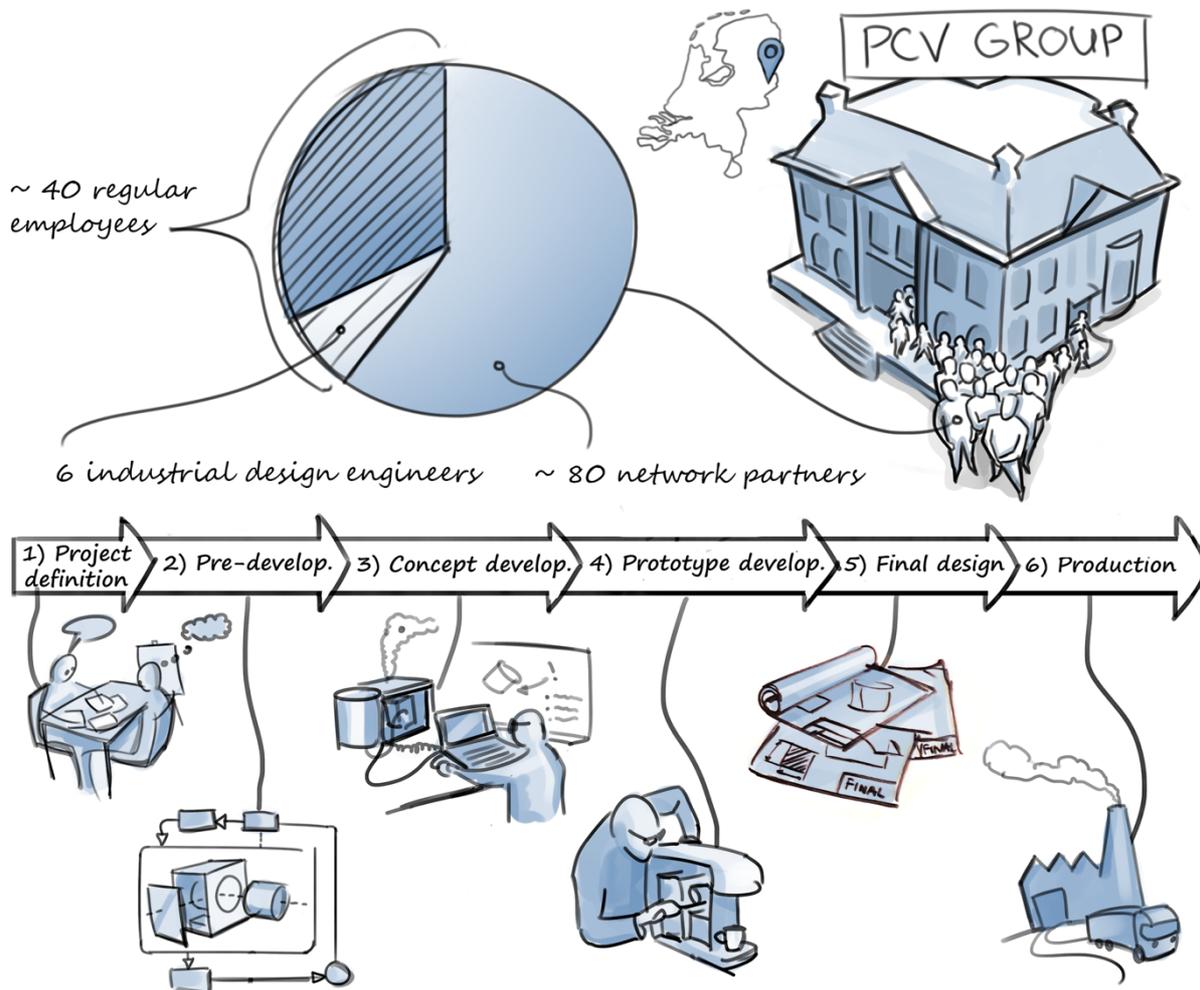




1.2 How is design sketching practiced in professional product design engineering?

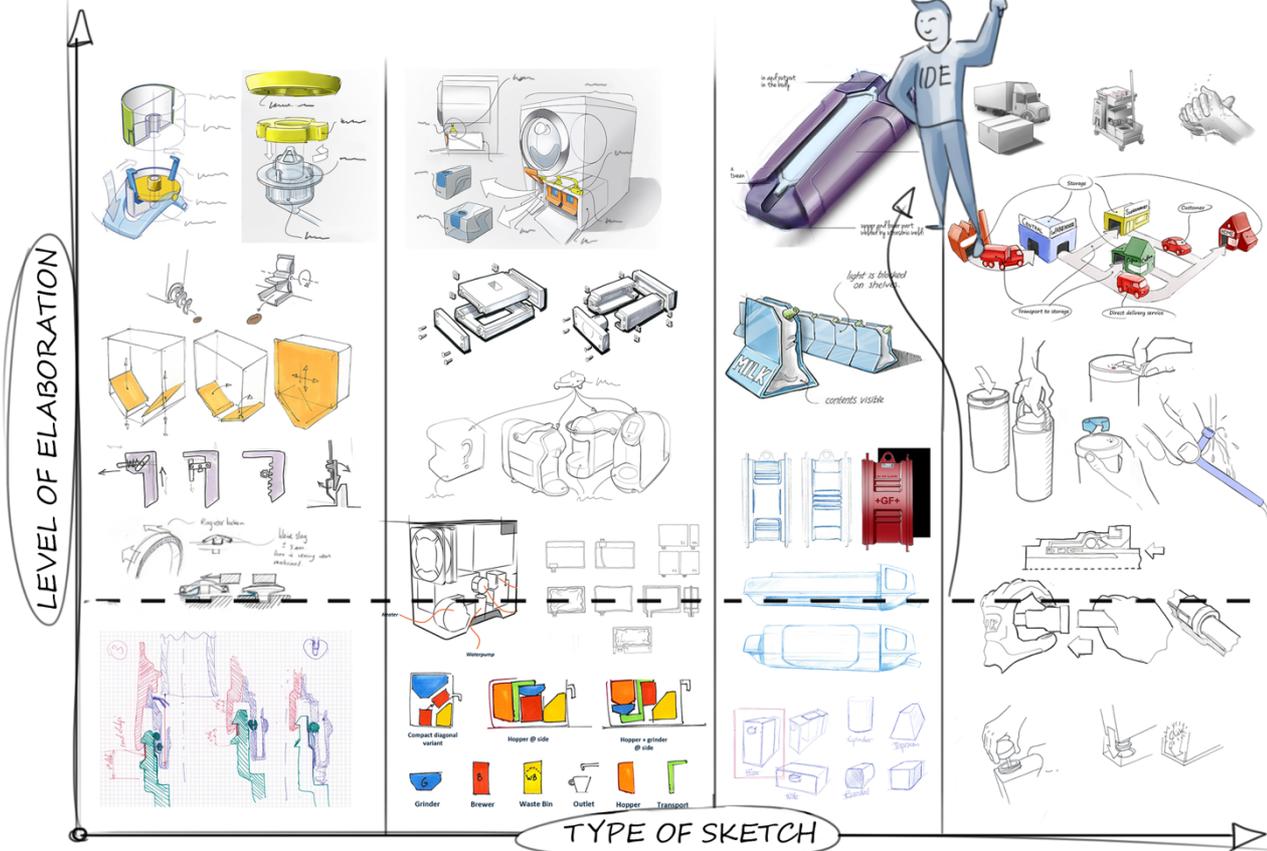
1.2.1) What kind of design practice is referred to?

PCV Group is specialized in the design and development of high-tech, low cost products and key components in professional, consumer and medical products.

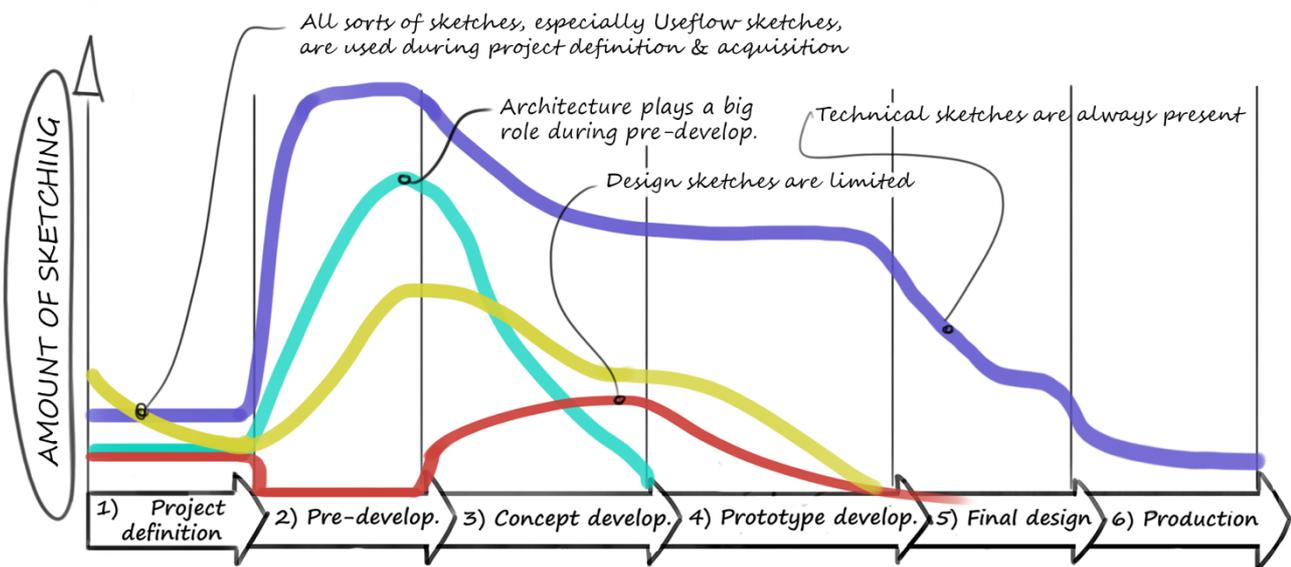


1.2.2) How is design sketching practiced in this company?

Elaborate sketches are made by IDE'ers

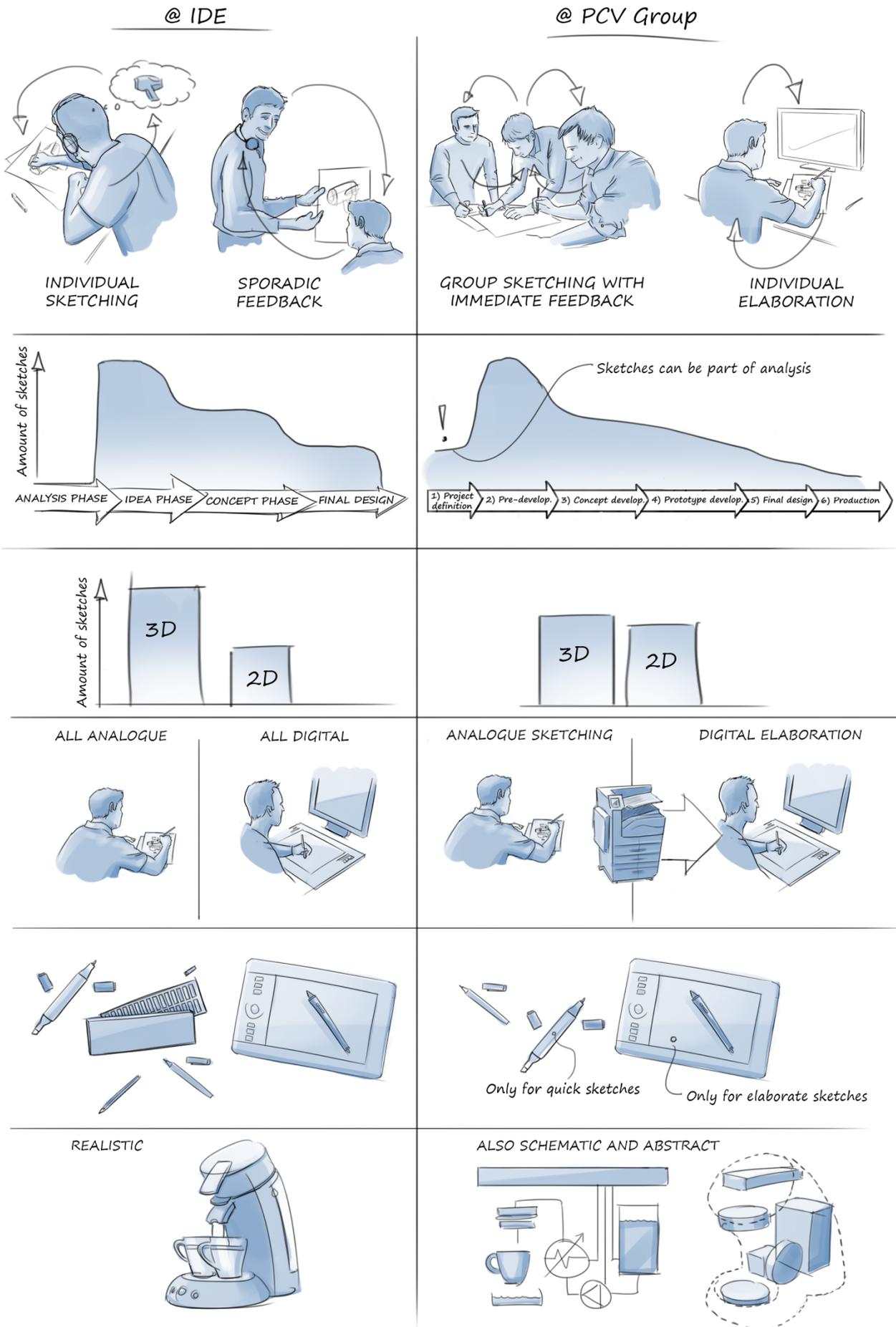


TECHNICAL SKETCH	ARCHITECTURE SKETCH	DESIGN SKETCH	USEFLOW SKETCH
Principles How it works Section view Morphological	Configurations Exploded views Interaction of components Space budget	Shape Detailing Colour Look & feel	User interaction Steps during life cycle Use issues & opportunities Intended ideal use



If and when these 4 types of sketches play a role in the design process strongly varies from project to project. Firstly, because the nature of the projects differs. Secondly, because projects have varying start and end points, e.g. start at concept development and stop at final design. The graph illustrates our experiences regarding the amount of sketching at PCV Group.

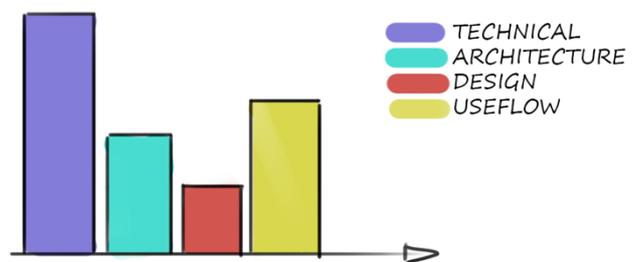
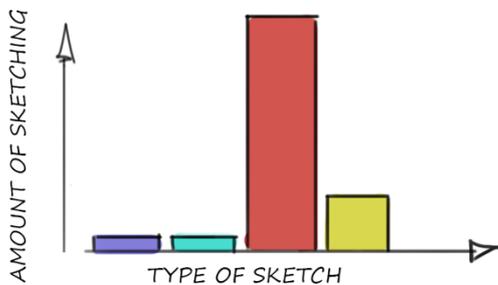
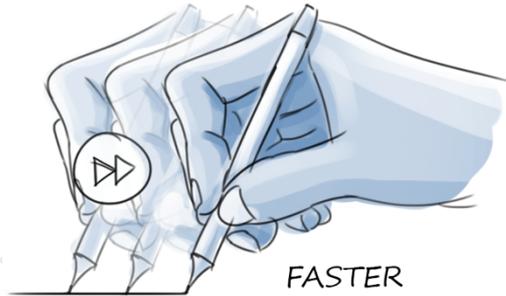
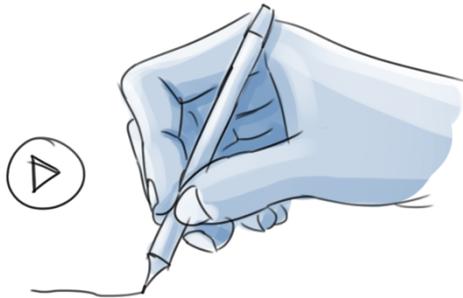
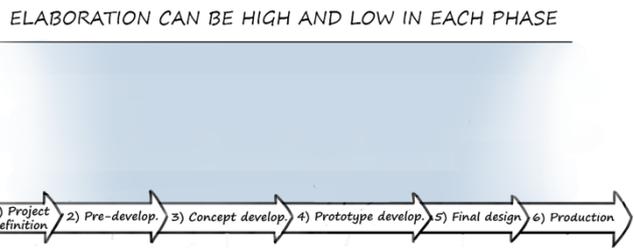
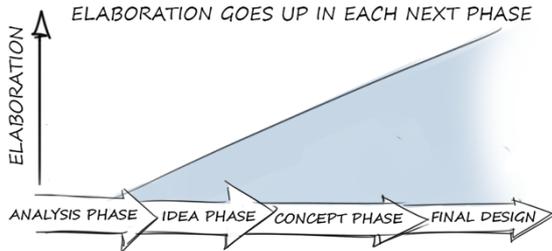
1. What are the gaps between sketching theory and practice?



PHOTOREALISTIC RENDERING



ONLY PHOTOREALISTIC CAD RENDERS

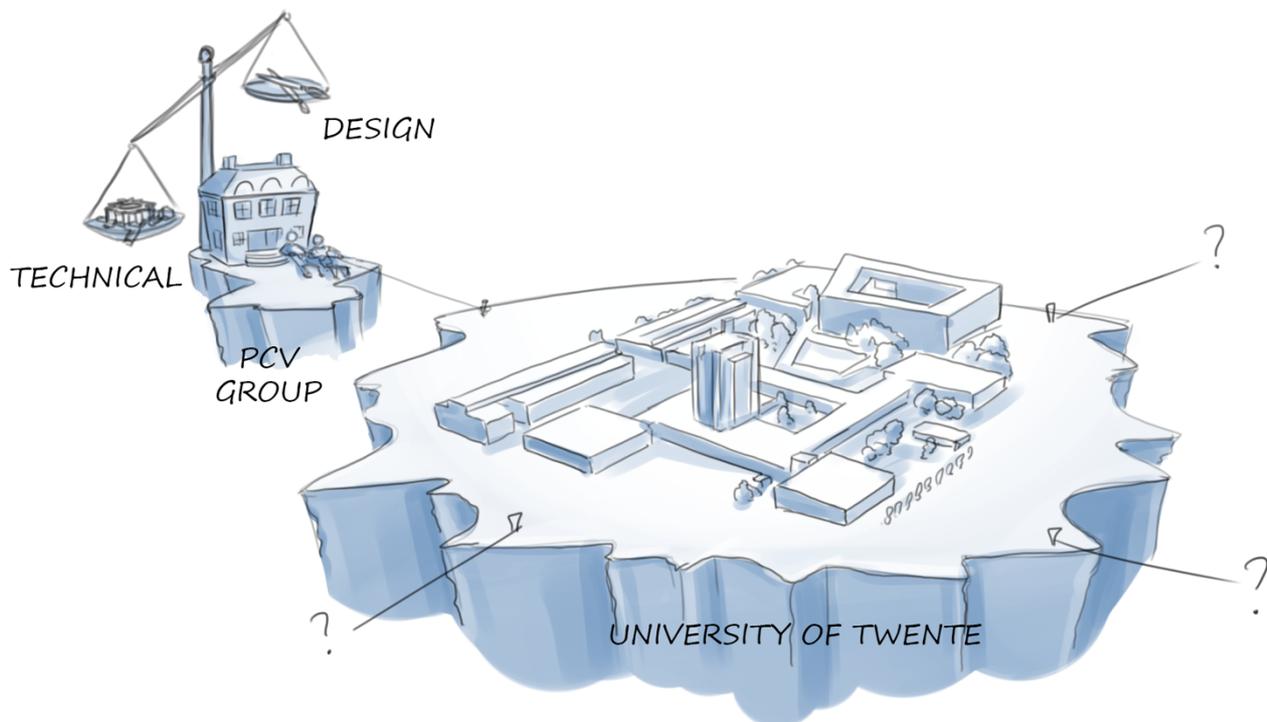


6 CONCLUSION

The hypothesis is that there are significant gaps between theory and practice. Numerous gaps have been identified when comparing the way sketching is thought with the way it is applied in design practice. Some gaps are in line with what one might expect such as the substitution of photorealistic sketching for CAD renders and the stronger focus on speed in design practice. There are also gaps that are less obvious. First, sketches in practice are also used during the analysis phase. This helps in creating mutual understanding and managing expectations between team members and between the team and the customer. Secondly, sketching in a group is something that is very common in practice, but which is not practiced during education. It is a very different dynamic that is generally very efficient. Thirdly, the focus during education lies virtually exclusively on realistic sketching, whilst abstract and schematic sketching plays a very big role in practice. Knowing how to make these types of sketches efficiently and clearly is a valuable skill. Fourthly, the level of elaboration can be low and high for each phase and type of sketch in design practice. The level of elaboration is dictated by whether the sketch is used internally or externally. Lastly, of the four types of sketches identified, design sketches are the least common at PCV Group whilst these receive the most attention during IDE as taught at the University of Twente.

6 DISCUSSION & RECOMMENDATIONS

- Is it necessary to close the identified gaps? Some gaps might just be necessary differences.
- Furthermore, PCV Group is one of many companies and these gaps might not exist elsewhere.
- Recommendations:
 - Expand this research by involving more companies and other institutions that have a different technology/design balance (see illustration).
 - Broader use of sketching (analysis phase, more abstract/ schematic/ figurative/ technical use of sketches).
 - Sketching education should include group sketching with immediate feedback instead of periodical feedback on finished sketches with group members or the client only.
 - The fruitful crossover between analogue sketching and digital elaboration should be emphasized more.



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