

# *Shape language: How people describe shapes and shape operations*

*Tjamme Wiegiers, Lau Langeveld and Joris Vergeest, Faculty of Industrial Design Engineering, Delft University of Technology, Landbergstraat 15, 2628 CE Delft, The Netherlands*

*This research investigates which terms designers use to exteriorise and communicate shape. An experiment was devised for two test subjects, who both receive a picture of a shape. Subject A receives, in addition, a picture that is said to be a modified version of the initial one. Subject A is asked to explain the modified shape to B, who sketches it. The shape terms used are registered and categorised. The research method is described in detail and the observed terms are presented. The most frequently used categories of terms were Locations, Courses, Shape\_characteristics, Values and Shape\_instantiations. We observed differences in the use of shape terms between subjects with distinct educations. We discuss implications of the results for design support systems. © 2011 Elsevier Ltd. All rights reserved.*

*Keywords: case study, prototypes, creative design, conceptual design, design techniques*

We investigated the terms people use to express shapes. Our goal is to get an insight in the way people naturally exteriorise and communicate shape and shape modifications. This insight might help to improve interaction methods for shape design software. If a designer uses a computer tool for shape design, he communicates with the computer tool, to carry over his shape ideas in a way the system can interpret. This requires a certain cognitive effort. This effort can be reduced by adapting the interaction in such a way that it better reflects the way the designer would naturally express his ideas. A designer may, for example, think of pinching a part of an object, instead of editing a large set of control points. More intuitive interaction is in particular desirable during ideation, when the designer's creativity should not be restrained by interaction problems.

Brain studies can reveal the parts of brain which are active (Murray, Kersten, Olshausen, Schrater, & Woods, 2002), however, they don't tell which shape ideas a designer has in mind. We can only observe a designer's shape ideas once they are exteriorised. A design can be made without tools, fully by imagination (Athavankar, 1997; Bilda, Gero, & Purcell, 2006). However, in general, designers use means to exteriorise ideas and reflect on them. The

**Corresponding author:**  
Tjamme Wiegiers  
t.wiegiers@tudelft.nl



[www.elsevier.com/locate/destud](http://www.elsevier.com/locate/destud)  
0142-694X \$ - see front matter *Design Studies* 32 (2011) 333–347  
doi:10.1016/j.destud.2011.03.002  
© 2011 Elsevier Ltd. All rights reserved.

externalisation of ideas and the perception of the externalisations can help to explore new possibilities (Menezes & Lawson, 2006; Straight, 1976). They support the reflection in action, which Schön (1992) describes as essential for the design process (Valkenburg, 2000). Shape exteriorisation can be done by sketching (Bilda & Demirkan, 2003; Goldschmidt, 2003, 1995; Schutze, Sachse, & Romer, 2003), gesturing (Athavankar, 1999), the use of models (Evans, Cheshire, & Dean, 2000), prototypes (Brereton & McGarry, 2000; Horton & Radcliffe, 1995), and digital support systems (Sapir, Goldschmidt, & Yezioro, 2007), but also by verbalisation (Dong, 2007; Jonson, 2005; Ulusoy, 1999). Lenau and Boelskifte (2005) has shown that verbal expressions are able to communicate the essence of a product's semantic content. Podehl (2002) collected terms that are used for styling and shows that a few terms are sufficient to communicate changes to a model. These terms can be used as a common language. We want to know in more detail how an ideating designer thinks about shape and modification of shape. Because much research is done on sketching and not much on the verbal expression of shape, our research will focus on designers' verbal utterances. It can be expected that the way people exteriorise shape depends on their education. Therefore, we used subjects from two different schools.

In the following section, we describe the method of the research, including the role of bias and feedback, and the set up of the experiment. Some parts of the method are described in detail in the following sections: the transcription and coding procedure in section 2, and the categorisation of shape terms in Section 3. Section 4 shows the results of the experiment. Their implications are discussed in Section 5. Finally, Section 6 contains conclusions.

## *1 Method*

### *1.1 Bias and feedback*

Since exteriorisation is a process that can be influenced in many ways, we should be aware of all kinds of possible errors and bias. If somebody tells another person which shape he has in mind, the following errors can occur:

- The speaker's image of the shape is not clear, or inconsistent, or it changes.
- The speaker's exteriorised image deviates from his mental image (e.g. when the speaker is distracted by the environment or by parallel thoughts.)
- The speaker uses wrong words or grammar to articulate the shape.
- The speaker's utterances are incomplete or ambiguous and are misinterpreted.
- Inconsistencies in the speaker's description (e.g. the round edge of the triangle).
- Over specification, e.g. if the speaker releases a constraint, but does not communicate that. If the listener understands a constraint is dropped, he may choose the wrong one.

Download English Version:

<https://daneshyari.com/en/article/261700>

Download Persian Version:

<https://daneshyari.com/article/261700>

[Daneshyari.com](https://daneshyari.com)