



Figure 1 “Make Good – Between Bloor and Shaw” by ViC team

“How can we support the next generation of computing professionals with the deliberative, technical, and critical skills necessary to tell the difference between what is ‘worth’ from what is potentially harmful to self and society?”

Values in Computing

As we watch digital technologies shaping personal, social and organisational aspects of human life, we also witness their deployment for questionable practices aimed at tapping into people’s deep-seated values at an unprecedented scale. Much computing research focuses on understanding and developing digital technologies that can change people’s lives. Instead, Values in Computing (ViC) aims to understand and systematically capture **how digital technologies come to life**. In doing so, we argue that a more scientific understanding of values is needed, especially when it comes to computing technologies.

Goal

Ultimately, our goal is to support the next generation of computing professionals with the **deliberative, technical, and critical skills** necessary to tell the difference between what is worth pursuing – in research, education, government, and industry – from what is potentially harmful to self and society. How can we create and support **organizations** where this is encouraged?

Activities

This commitment has been translated into teaching and research activities, including the Values-First Software Engineering (SE) project, which investigates values in software production and started in March 2018. The project is young, the problems are old, yet their nature have been **transformed by scale**. Below some of the challenges that we are trying to address.

Research Questions

Our key research question is **how can values be systematically studied in software production/SE?**

- What existing values-mapping methods can be used/adapted to SE?
- How does investigating values in SE differ from other fields?
- What values are specific to SE/ software industry?
- What approaches (i.e. computationally intensive, qualitative, quantitative, etc.) can be used to capture and talk about values?
- What do these systematic approaches capture? What do they leave behind? How can we tell?

Tools

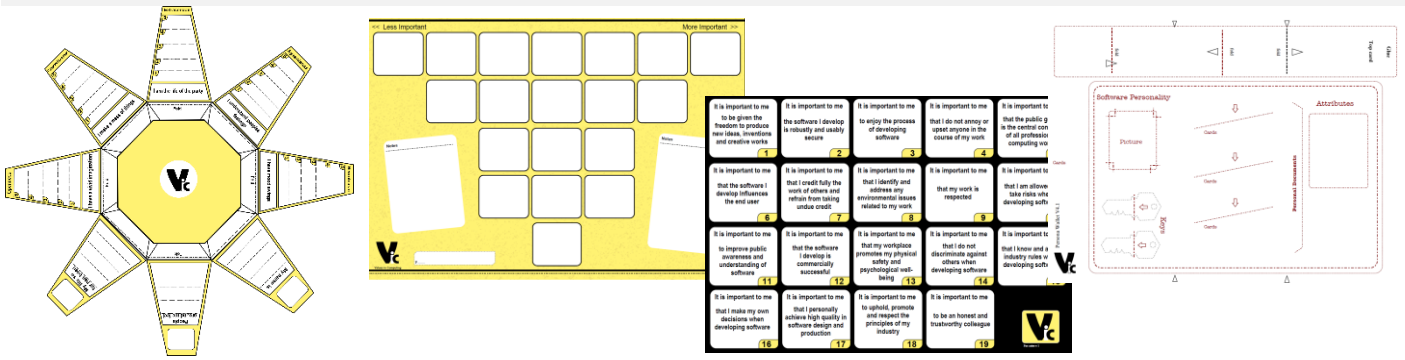


Fig 2 A selection of ViC tools, from left to right: software star map; ViC Q-sort, grid and cards; software personality wallet

ViC is developing a selection of tools to investigate values in software production. There are **three tools** currently being piloted (see Fig 2 above). As we aim for a more scientific understanding of values (e.g. at a system, abstract and instantiation level), we need tools fit for the task; we argue that such tools should have the following characteristics:

1. **Replicability** – can be used by many and capture comparable data
2. **Diversity** – supports the collection and analysis of different kinds of data, i.e. numbers and narratives
3. **Accessibility** – ready to use with minimal training and costs
4. **Transparency** – the design process must be clear, motivated and described.

Background & Research Directions

Our starting point is that *values become facts* (Feenberg 2010), and that it is possible to take a systematic approach to their study and representation in software production. A turning point for ViC was The Denver Manifesto, which drafted some key guidelines for a shift in the way responsibilities in computing-related disciplines are taught, learned, deliberated and practiced in both industry and academia.

Some may be skeptical of manifestos. Still, the effort that went into agreeing upon every word of the document is a testament of how difficult and important is to be sharing common reference points in this highly **subjective field of understanding**. The manifesto came out of a CHI2017 workshop and has since acted as a touchstone for the Values-First SE project at Lancaster University. Below, the specific questions that are currently guiding our research.

Broader Challenges

- As reckless user profiling activities show, computational techniques are widely used to effectively, or at least 'believably', tap into (quantify, label) human deepest held values. Instead of people's, we are currently looking into how **'software personas'** can be identified, articulated and investigated.
- In particular, we argue that automated techniques could be used to extract and study **'values at scale'**. Our research is exploring how values profiling can shift from the individuals to institutions and corporations.
- Key questions remain on how computing researchers, developers, educators, organizations and the general public can sharpen the **'critical, technical, and deliberative skills'** necessary to better understand our relationships with technology.

Further Reading

- [1] Ferrario, M.A., Simm, W., Forshaw, S., Gradinar, A., Smith, M.T. and Smith, I., 2016, May. Values-first SE: research principles in practice. In Proceedings of the 38th International Conference on Software Engineering Companion (pp. 553-562). ACM. [\[authors' copy\]](#)
- [2] Maio, G.R., 2010. Mental representations of social values. In Advances in experimental social psychology (Vol. 42, pp. 1-43). Academic Press. [\[author's copy\]](#)
- [3] <http://www.valuesincomputing.org/reading-room/>

About: ViC is an Engineering and Physics Research Council (EPSRC) funded project which investigates values in software production (2018-19). ViC team is based at the School of Computing and Communications, Lancaster University, UK. For more information visit www.valuesincomputing.org or contact ViC principal investigator m.ferrario@lancaster.ac.uk