Human Values & SE

30/03/2021
OU/LERO

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Question

How can we study human values in SE?

How can we do so in a way that is:

- scientifically robust,
- applicable to a diversity of domains
- relatable to software practitioners?
- actionable in SE practice?

Takeaways

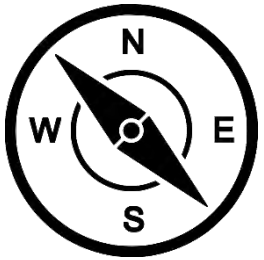
#1 Values ≠ Ethics

- Map ≠ Compass

#2 Research Framework

- beyond taxonomies

Values



Ethics

Roadmap

1 Context

2 Approach

3 Practice

4 Adaptations (AI)

5 Implications for SE practice /Directions

/1 Context

Context - 2011

#patchworks makers lab

Catalyst!

"Citizens transforming society, tools for change"

- 3 year project
- Community groups set the research questions
- 3 x Research Sprints (~9 months each), different domains
- working software and academic publications as outcomes

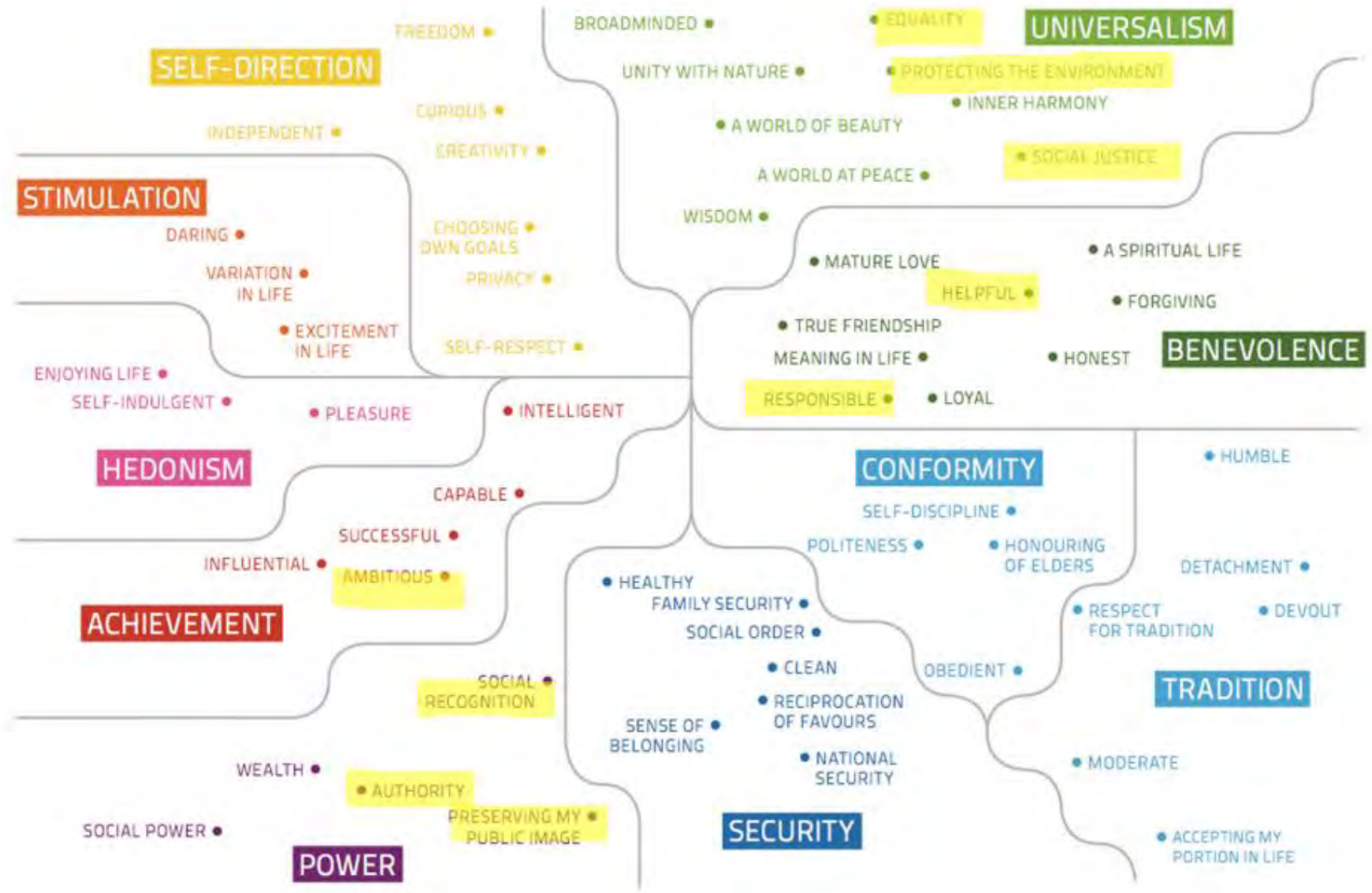
#PATCHWORKS:

Co-design digital technology with homeless groups / charities

https://www.youtube.com/watch?v=ydPcxuixhAw

https://www.lancaster.ac.uk/catalystproject/

How to talk about values within a project?



Simplified version of the Values Model

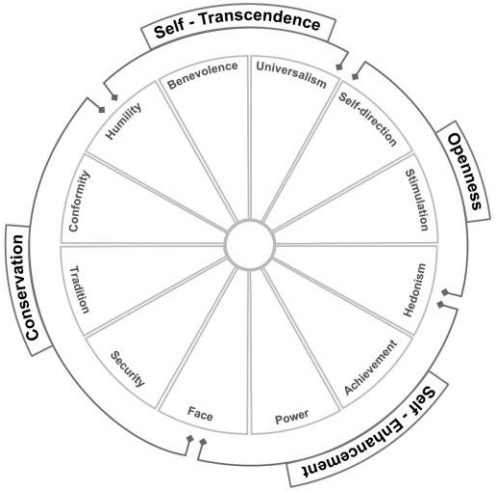


Figure 1: Value structure across 68 countries – Image by Public Interest Research Centre (2011) based on Schwartz, S.H., 1992. Universals in the content and structure

voiceyourview

clasp.

ensemble

Catalyst!

VoiceYour... Real-time Feedback

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Values-First SE: Research Principles in Practice

Will Simm[1], Stephen Forshaw[1][a], ... Smith[1][b], Ian S...ith[3], ...rary Arts[2], ...

Tiree Energy Pulse: Exploring Renewable Energy Foreca... on the Edge of the Grid

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[1]School of Computing and Communications, [2]Management School, [3]LICA, Lancaster Univer...
[4]Tiree Tech Wave, Tiree, UK and University of Birmingham, UK
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ABSTRACT
In many parts of the world, the electricity supply industry makes the task of dealing with unpredictable spikes and dips in production and demand invisible to consumers, maintaining a seemingly unlimited supply. A future increase in reliance on time-variable renewable sources of electricity may lead to greater fluctuations in supply. We engaged remote islanders as equal partners in a research project that investigated through technology-mediated enquiry the topic of synchronising energy consumption with supply, and together built a prototype renewable energy forecast display. A number of participants described a change in their practices, saving high energy tasks for times when local renewable energy was expected to be available, despite having no financial incentive to do so. The main contributions of this paper are in: 1) the results of co-development sessions exploring systems supporting synchronising consumption with supply and 2) the findings arising from the deployment of the prototype.

Figure 1. Tiree Energy Pulse located device.

Software Engineering for 'Social Good': Integrating Action Research, Participatory Design, and Agile Development

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ABSTRACT
Software engineering for 'social good' is an area receiving growing interest in recent years. Software is increasingly seen as a way to promote positive social change: this includes initiatives such as Code for America and events such as hackathons, which strive to build innovative software solutions with a social conscience. From a software engineering perspective, existing software processes do not always match the needs of these social software projects, which are primarily aimed at social change and often involve vulnerable communities. In this paper, we argue for new software processes that combine elements of agile, iterative development with principles drawn from action research and participatory design. The former allow social software projects to be built quickly with limited resources; the latter allow for a proper understanding of the social context and vulnerable user groups. The paper describes Speedplay, a software development management framework integrating these approaches, and illustrates its use in a real social innovation case study.

SE) to be the development, maintenance and sustainability of software aiming to promote social change. Our focus is on small-scale software that is developed for specific community needs where communities and software engineers work together.

Social SE's primary motivation is social transformation. Here, software and digital artifacts are viewed as vehicles for social change, rather than end products or solutions to problems as in traditional commercial and non-commercial SE (e.g. Open Source Software). To this end, design and development decisions must be taken jointly with a diverse set of stakeholders including public service providers (local authorities, etc.), communities, charities and 'hard to reach' groups. Research [7] shows that this context requires the integration of SE methodologies, such as agile and iterative development (A-ID) [17], with user-focused and participatory approaches [8, 15, 21]. Crucially, such integration *"must exist within a cohesive project management framework that facilitates without being overly bureaucratic or prescriptive"* [7].

Why society needs a more scientific understanding of human values

January 10, 2018 8.25am EST

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LinkedIn
Print

When we talk about "human values" we tend to mean important abstract ideals. Things like freedom, equality, security, tradition and peace.

Politicians mention values all the time, while all kinds of organisations claim to put "key values" at the heart of whatever business they are in. This makes perfect sense, as values *are* relevant to everything we do. They help us to choose careers, romantic partners, homes, consumer products and the broader ideologies by which we live.

But public debate often focuses on perceived threats to different values – while rarely recognising the problem of really understanding the values themselves.

Context- 2018

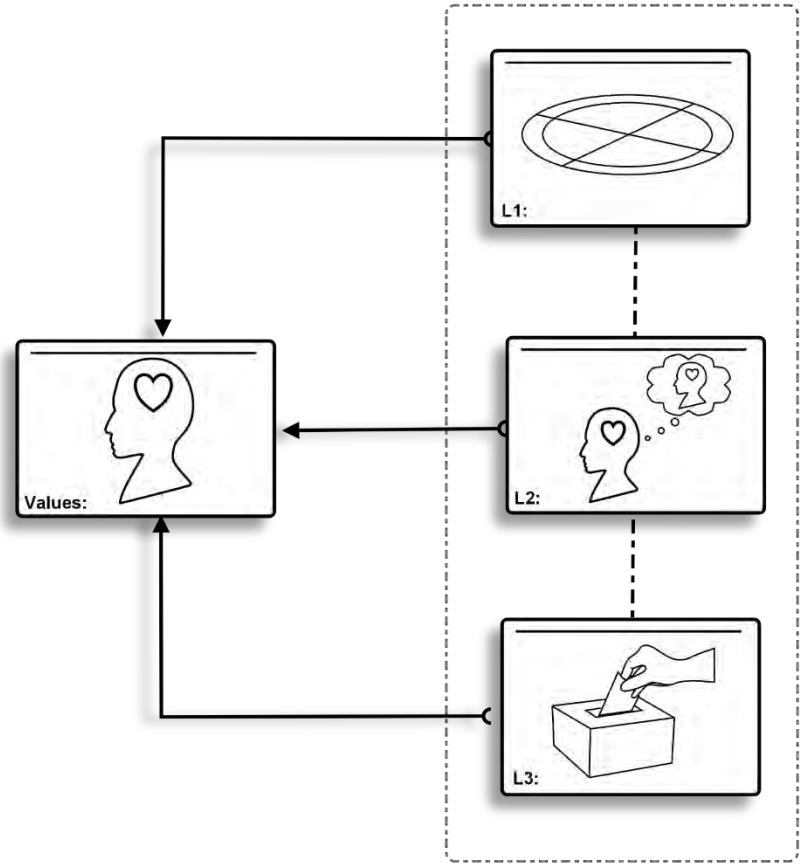
Author

Gregory Maio
Professor of Psychology,
University of Bath

*"What does it mean for terrorism to threaten the value of **"freedom"**, but for national defence to promote the value of "**security**"? What does it mean for war to threaten **"peace"**, but promote "**democracy**"? What does it mean for Arctic oil exploration to threaten the **"environment"**, but promote **"wealth"**.?*

University of Bath provides funding as a

https://theconversation.com/why-society-needs-a-more-scientific-understanding-of-human-values-82537



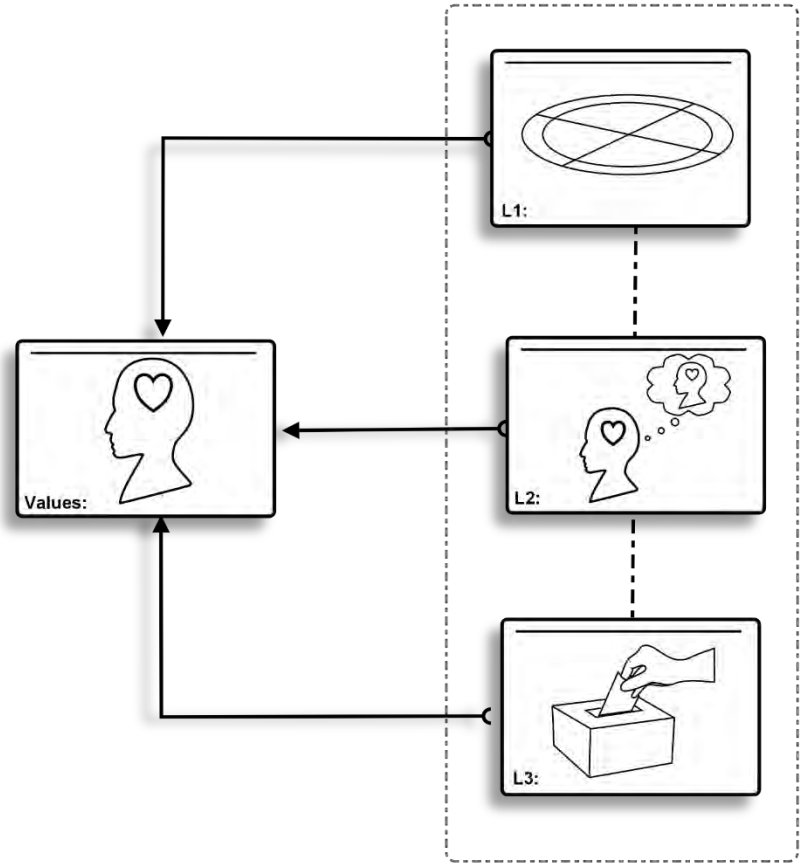
/2 Approach

What are human values?

Values are guiding principles & beliefs that we hold as important and that we use to guide our actions [Schwartz 2012].

Some values have a clear ethical import (e.g. ‘equality’) **some don’t** (e.g. ‘prestige’).

How can we study human values in SE?



We consider values as mental constructs that can be studied at three levels:

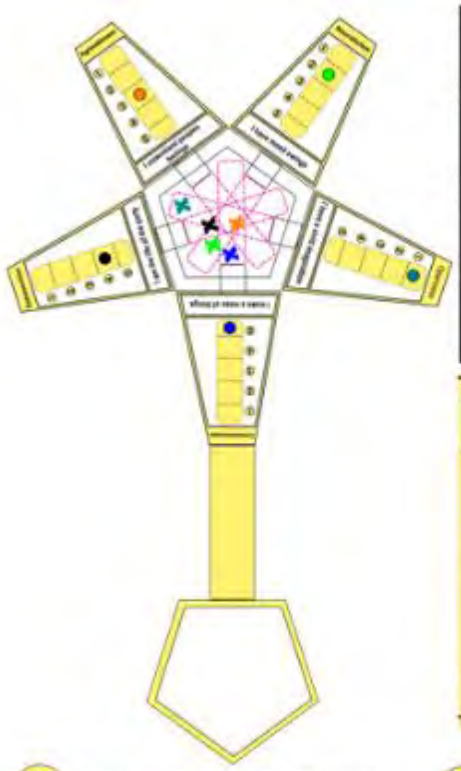
1) System (Universal) **(L1)**
2) Abstract (Interpretation) **(L2)**
3) Concrete (Instantiation) **(L3)**

Research Framework: Social Psychology

S. Schwartz's Universal Values Model (1992, 2012) & **G. Maio's** (2010) work

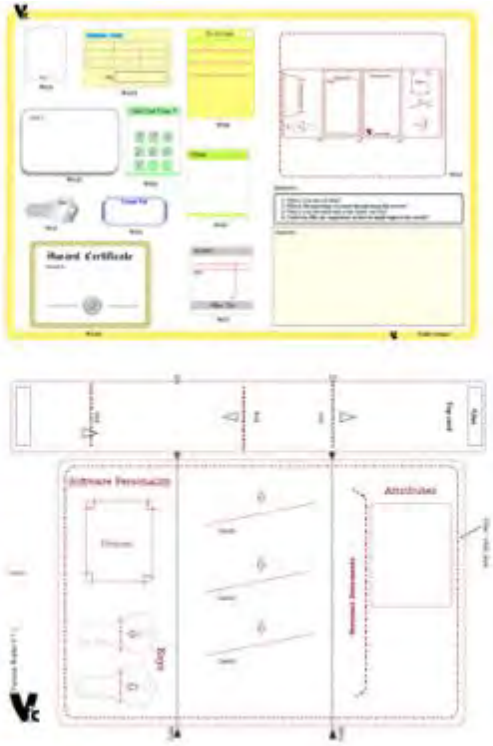
Maio, G.R., 2010. Mental representations of social values. In *Advances in experimental social psychology* (Vol. 42, pp. 1-43). Academic Press.

What tools?



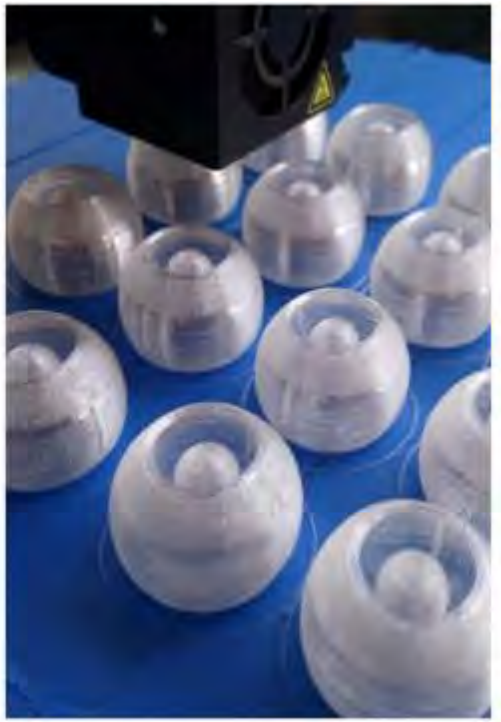
1 Software Personality Starmap

2 Values- Q-Sort, cards and grid.



3a Values Wallet Design

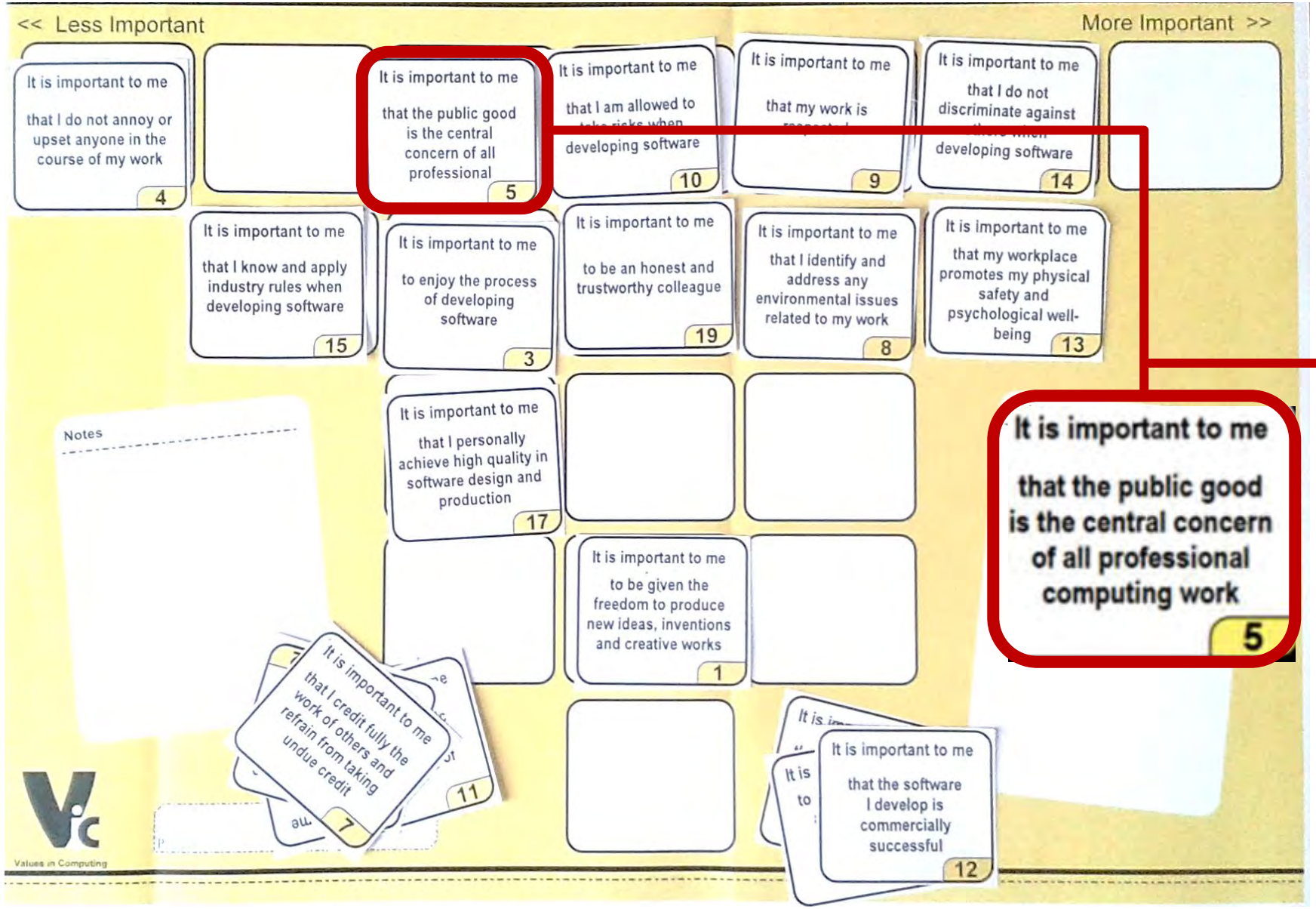
3b Values Wallet Analysis Grid

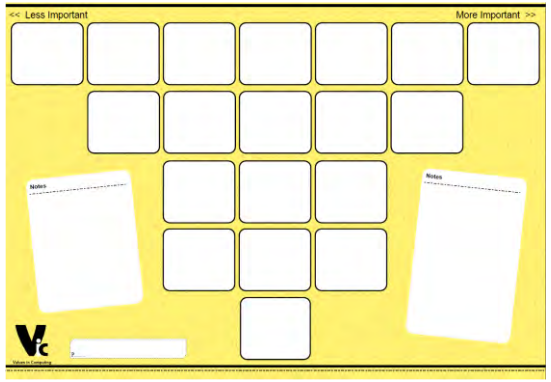


4 3DP AI Values probes

http://www.valuesincomputing.org/tools/

The Values Q-Sort (V-QS)





Q-GRID

Q-SET

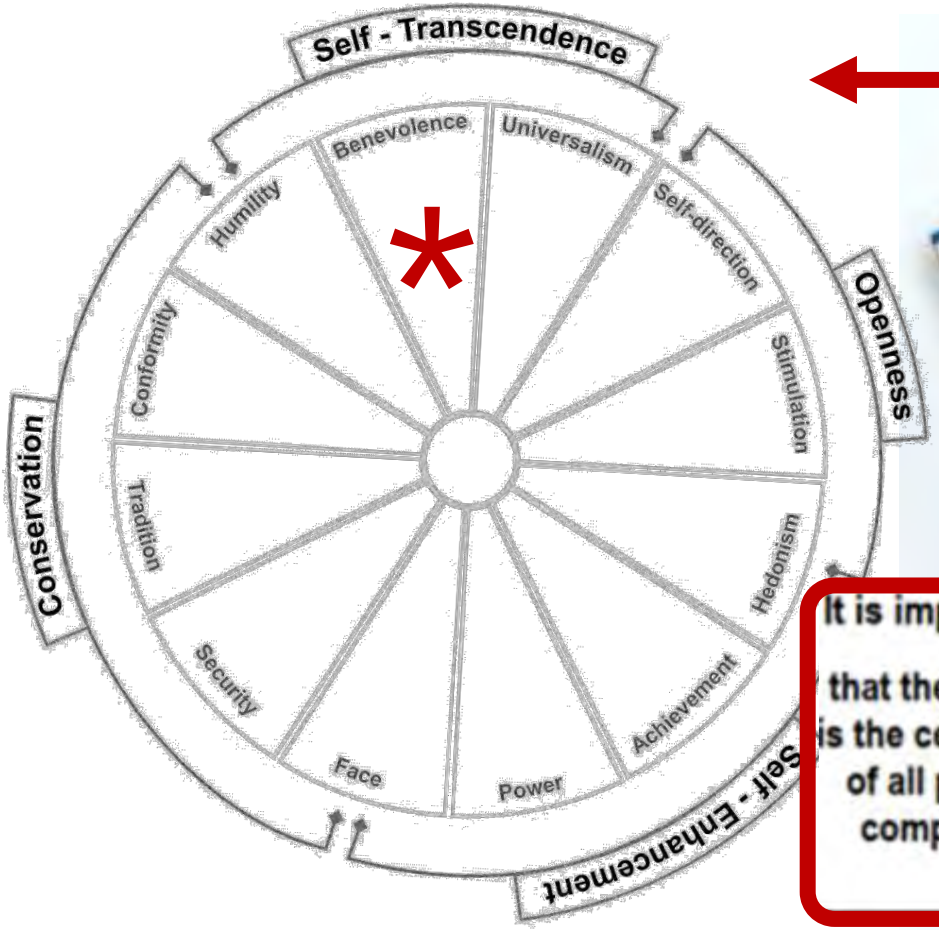
Mixed method
Around since the ‘30s A robust tool for studying subjectivity

Where do the V-QS statements come from?

Q-Set: map The Code onto the Values Model

Schwartz PV-19
(Refined) Values Model
(Schwartz et al. 2012)

ACM Code of Ethics
(2018) https://www.acm.org/code-of-ethics



Q-Sort Statements: Values Model & ACM Code of Ethics

S#	Values Q-Sort statement (it is important to me…)	Schwartz value definition in terms of motivational goal	Schwartz value	ACM Code Statement
1	to be given the freedom to produce new ideas, inventions and creative works	Freedom to cultivate one's own ideas and abilities	SELF-DIRECTION Thought	1.5
2	the software I develop is robustly and usably secure	Safety and stability in the wider society	SECURITY Societal	2.9
3	to enjoy the process of developing software	Pleasure and sense of gratification	HEDONISM	N/A
4	that I do not annoy or upset anyone in the course of my work	Avoidance of upsetting or harming other people	CONFORMITY Interpersonal	N/A
5	that the public good is the central concern of all professional computing work	Commitment to equality, justice, and protection of all people	UNIVERSALISM Concern	3.1
6	that the software I develop influences the end user	Power through control of people	POWER Over People	N/A
7	that I credit fully the work of others and refrain from taking undue credit	Recognizing one's insignificance in the larger scheme of things	HUMILITY	ACM1999 7.03
8	that I identify and address any environmental issues in my work	Preservation of the natural environment	UNIVERSALISM Nature	ACM1999 3.03
9	that my work is respected	Maintaining public image and avoiding humiliation	FACE Public Image	N/A
10	that I am allowed to take risks when developing software	Excitement, novelty, and change	STIMULATION	N/A
11	to improve public awareness and understanding of software	Devotion to welfare of in-group members	BENEVOLENCE Care	2.7
12	that the software I develop is commercially successful	Power through control of material and social resources	POWER Resources	N/A
13	that my workplace promotes my physical safety & psychological well-being	Safety in one's immediate environment	SECURITY Personal	3.3
14	that I do not discriminate against others when developing software	Acceptance and understanding of those who are different	UNIVERSALISM Tolerance	1.4
15	that I know and apply industry rules when developing software	Compliance with rules, laws and formal obligations	CONFORMITY Rules	2.3
16	that I make own decisions when developing software	Freedom to determine one's own action	SELF-DIRECTION Action	N/A
17	that I personally achieve high quality in software design and production	Success according to social standards	ACHIEVEMENT	2.1
18	to uphold, promote and respect the principles of my industry	Maintaining & preserving cultural, family, or religious traditions	TRADITION	4.1
19	to be an honest and trustworthy colleague	Being a reliable and trustworthy member of the in-group	BENEVOLENCE Dependability	1.3

Winter, E., Forshaw, S., Hunt, L. and Ferrario, M.A., 2019. Advancing the study of human values in software engineering. In *Proceedings of the 12th International Workshop on Cooperative and Human Aspects of Software Engineering* (pp. 19-26). IEEE Press.

3 Practice

VQ-Sort Use (N participants=200++)

RESEARCH/INDUSTRY

2018/2019

- N = 1+ **5** prototype stage
- N = **12 Pilot Case Study** (Opportunistic Sample from different organisations)
- N = **24 Industry Case Study** – the digital arm of a large membership-based (4.5M) organisati
  - 5- week research sprint;
  - 2 x development teams (com, net);
  - 24 individual q-sorts
  - 2 x Values-retrospectives

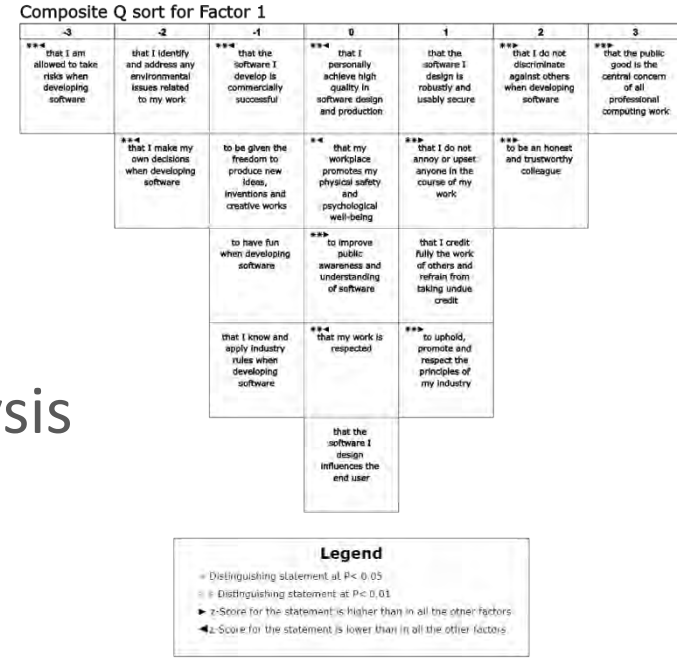
  Ultimate Goal: to explore ways to support a values-informed decision making process

UG TEACHING/EDUCATION, started with..:

- N = **19 Software Studio Context** (2UG, teams)
- N = **25** RE Class (1UG, teams)
- N = **15** Law & Computing Class (3UG, teams)

Identifying Patterns (L1)

(**Industry case study** N=24)



Values orientations 'types' emerging from the VQ-Sort stat analysis

TEAM Com (N=9)

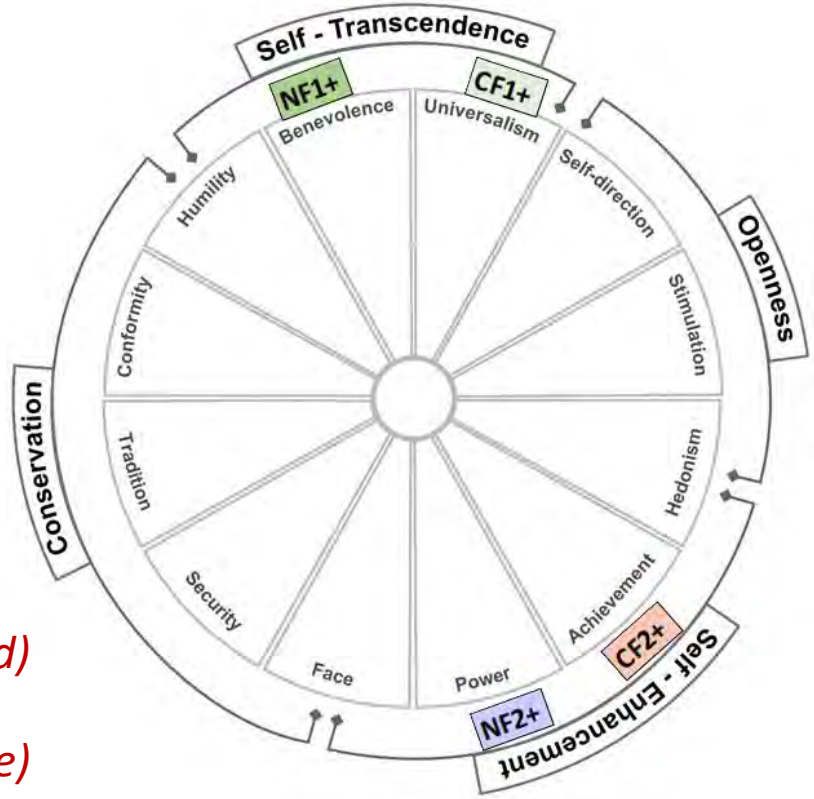
- **Com1:** Socially-Concerned and Considerate *(S5*– Public Good)*
- **Com2:** Ambitious and non-Conformist *(S17*– High Quality Code)*

TEAM Net (N=12)

- **Net1:** Dependable and Considerate *(S19*– Trustworthy Colleague)*
- **Net2**: Market Conscious and Autonomous *(S12*- $ Commercial success)*

Identifying Patterns (L1)

(**Industry case study** N=24)



Values orientations 'types' :

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TEAM Net (N=12)

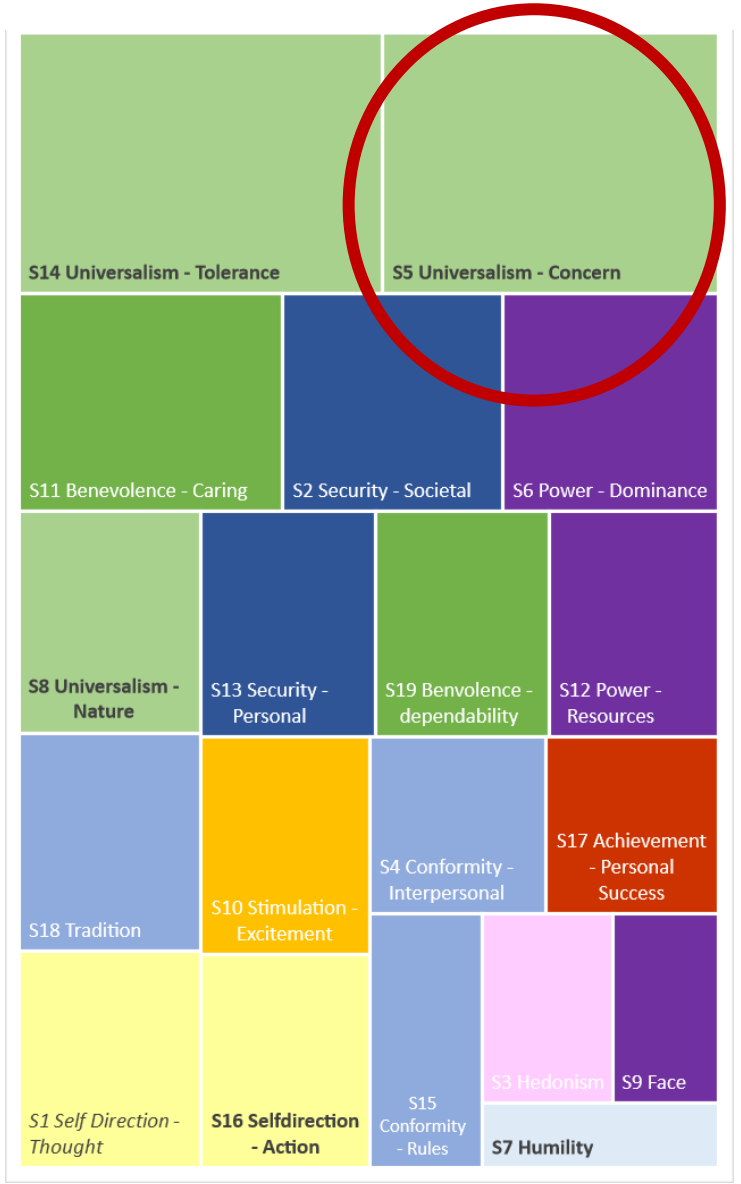
- **Net1:** Dependable and Considerate *(S19* -Trustworthy coll.)*
- **Net2**: Market Conscious and Autonomous *(S12* -$uccess)*

Many meanings of values at (L2) e.g. **“Public Good”**

Level 2-

Several and Different interpretations of “public good”

Is it **“minimizing harm”?** having a **“positive impact on people”? Both? Neither?**



Different actions (L3): “Public Good”

Level 3- Different ways in which the ‘Right Thing For the User’ could be actioned – {Same Team}

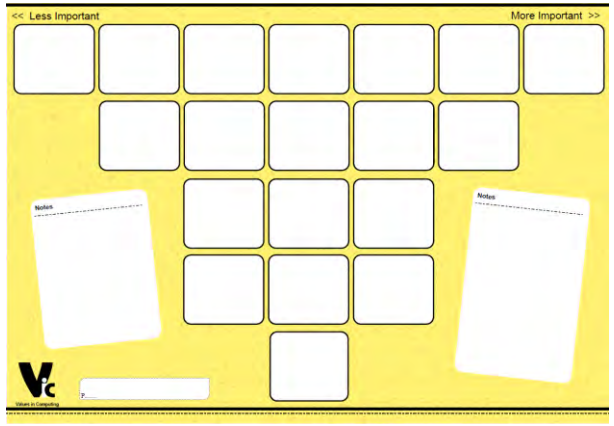
- **Quick and easy user experience?** *“getting them to find what they want quickly and easily”*
- **Optimized user experience?** *“we then analyse that data once the user hits our website, we would then optimize off that behavior”*
- **Free form user experience?** *It’s […] letting them choose to not give us any of that kind of information.”*

Do the ‘Right’ Thing for the end-user

4 Adaptations

Image from:
https://futureoflife.org/ai-principles/

The AI V-QS

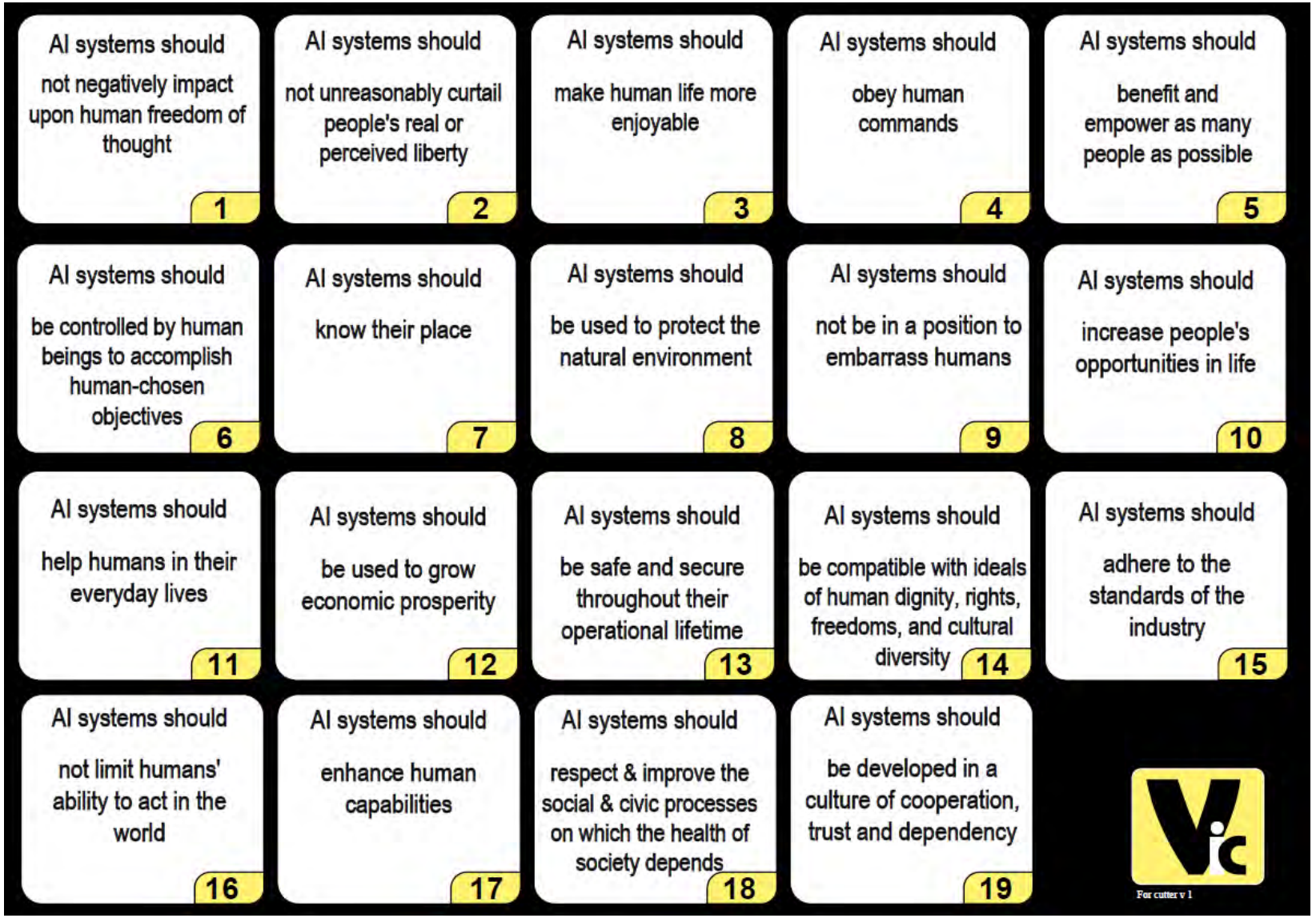


ASILOMAR PRINCIPLES 2017

These principles were developed in conjunction with the 2017 Asilomar conference (videos here), through the process described here.

EFA2018 team settings N=~80
Academic Staff: N=25

(more info on this)



5 Implications / Directions

Lessons Learned

- Avoid using values models as a mere taxonomy
- Remember they can be studied at different level (we started with three)
- Best not to try to second-guess values from their ‘representations’ or ‘instantiation’ without sufficient context / reliable ground truth
- Check the state of the art / discuss with experts,, e.g. re: choosing the value wheel – specialists have done the ground work comparing them e.g. [Hanel et al. 2018]

Hanel, P.H., Litzellachner, L.F. and Maio, G.R., 2018. An empirical comparison of human value models. Frontiers in Psychology, 9, p.1643.

Incorporate Values in Current SE Practice

- Carry out Values Base-Lines, e.g.
  a) Use V Q-S in a team setting at the start of a project, on-boarding new members
  b) Use outcome from (a) to extract a values mission statement, incorporate in the design doc – L1
  c) Use (b) as reference when….
     - interpreting/representing values (e.g. as NFR/FR)- L2
     - and instantiating/implementing them it (choice of frameworks, data models)-L3
- Adapt User Stories to include the 'why' of the 'because'
- Adapt Personas, e.g. identify their values 'types'
- Adapt GSM to evaluate & measure a range of values (beyond productivity*)
- Carry out Values Reviews as you would Code Reviews.
- Values 'Evil Twins' are also fun workshops to run…

Winters, T., Manshreck, T. and Wright, H., 2020. *Software Engineering at Google: Lessons Learned from Programming Over Time*. O'Reilly Media.

Mystery Quote (With Clue + Answer)

"Too many neither felt responsible for the system nor recognised the full impact of their actions

"*We need to promote the values of responsibility, solidarity, integrity and prudence as best we can, through pay, through codes and regulations, while recognising that these can only be fully lived through culture and practice.*

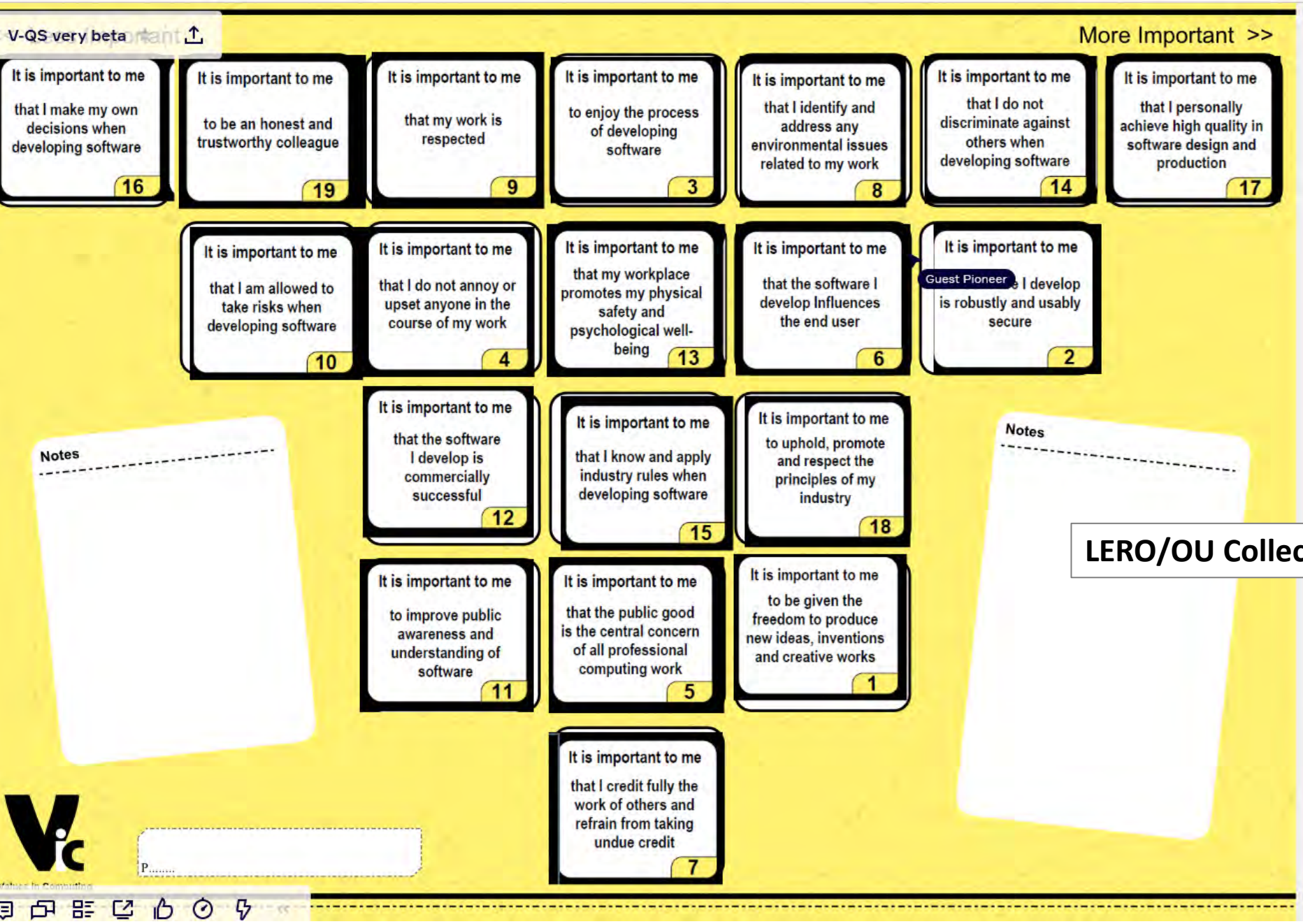
THE REITH LECTURES 2020: HOW WE GET WHAT WE VALUE

Reith Lecturer: Dr. Mark Carney, former Governor of the Bank of England

More info and publications

- Winter, E.R., Forshaw, S.W., Hunt, L. and Ferrario, M.A., 2019. **Towards a Systematic Study of Values in SE: Tools for Industry and Education.** In *Proceedings of the 41st ACM/IEEE International Conference on Software Engineering* (ICSE-NIER2019 track) DOI: https://doi.org/10.1109/ICSE-NIER.2019.00024
- Winter, E.R., Forshaw, S.W., Hunt, L. and Ferrario, M.A., 2019. **Advancing the Study of Human Values in Software Engineering.** In *Proceedings of IEEE/ACM 12th International Workshop on Cooperative and Human Aspects of Software Engineering (CHASE)* hosted at ICSE2019, 27 May 2019, Montreal, Canada https://doi.org/10.1109/CHASE.2019.00012
- Winter, E.R., Forshaw, and Ferrario, M.A. 2018. **Measuring human values in software engineering.** In *Proceedings of the 12th ACM/IEEE International Symposium on Empirical Software Engineering and Measurement* (ESEM '18). ACM, New York, NY, USA, Article 48, 4 pages. DOI: https://doi.org/10.1145/3239235.3267427
- Ferrario M.A., Simm W., Forshaw S., Gradinar A., Smith M.T., and Smith, I. 2016. **Values-first SE: research principles in practice**. In *Companion Proceedings of the 38th International Conference on Software Engineering* (ICSE 2016). ACM, New York, NY, USA, 553-562. DOI: https://doi.org/10.1145/2889160.2889219

www.valuesincomputing.org/publications



LERO/OU Collective Values Q-sort!!!