

Publication Models in Computing Research: Is a
Change Needed? Are We Ready for a Change?

**Towards a richer notion of
"publication"**

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Biosketch

- Professor and chair of Software Engineering, DEI—Politecnico di Milano
- EiC ACM TOSEM (2001-2006), current AE of CACM, IEEE TSE, Sci. Comp. Prog., Computing
- PC Chair and GC of several conferences, including ICSE, ESEC/FSE + PC member of many
- Adv. board member of int.l research institutions, member of department evaluation panels in Europe and Japan, panel member of research funding institutions (incl. ERC)
- President of Informatics Europe

My point

- **Publications** and their recognition through *citations* as **proxies** for
 - research product
 - *quality (i.e, impact) of research*
- This model is increasingly challenged and a collective effort is needed to move beyond it
- **We** must develop a richer notion of **research product** and *impact (and how to assess it)*

Research product and impact

- Research products are the enablers of impact
- Impact is a multi-dimensional concept
 - short-term vs long-term
 - internal (to research) vs external (to society)
- My take

**impact = others (researchers, practitioners)
can/do build on it**

What is a research product

- We have been pushing the idea that CS research products are not only journal papers, and we need to continue to do it
- At the same time, we must acknowledge that papers are only proxies for product if research has to have an impact

A richer notion of product

- CLAIM
 - In **many** (most?) areas of CS, papers in isolation are not enough to build on research and make progress
 - product is a constellation of artifacts that include paper
 - software tool
 - prototype
 - model
 - dataset
 - benchmark
 - Review/acceptance/publication should refer to the bundle

Impact

- Citation statistics (which is all you can do for papers) are proxies for quality
 - see excellent report by International Mathematical Union (IMU)—2008
 - or paper "Research Evaluation for Computer Science" CACM April 2009
- they only deal with papers
- and for CS they are even flawed
- For CS we need a richer notion of impact that refers to a richer notion of research product (code downloads, licenses, ...)

Consequences

- Reward authors who care about creating useful artifacts that others can build on
- Foster research leading to results that are reusable and reproducible
- Value also negative results
- Avoid unsupported claims
- Contrast quantity-oriented publication strategies
- *Evaluation effort increases, but number of submissions might decrease*

Possible implementations

- The radical way
 - all papers that include claims on a tool, on data, etc. provide a way to assess them in the review
- The incremental way
 - authors choose
- Papers accepted are in a "gold" category if they pass the entire assessment
- *Variations are also possible and should be evaluated*

A bold new idea?

- No, some communities are moving in this direction
 - Database (repeatability experiment at SIGMOD)
 - Software Engineering (Artifact Evaluation at ESEC/FSE)

Community effort needed

- Consolidate notions of research product and evaluation criteria, create a "culture" (which exists for papers)
- Build sensible quality indicators that go beyond just papers
- Use them consistently for evaluation
- Actively engage with other scientific communities to legitimate this view

The role of Informatics Europe

- Informatics Europe is a younger sister of RA in Europe (created in 2005, \approx 70 depts)
- Initial report on Research Evaluation for Computer Science
 - article in CACM April 2009 by B. Meyer, C. Choppy, J. Staunstrup, and J. van Leeuwen
- We need to go on: from problems to solutions
- And maybe we can express a common view

If we don't do it...

- Others will do it, because there is a need to evaluate productivity and quality of research(ers) and justify societal costs
- Unfortunately, crude, simplistic indicators are often used
- Purely based on paper counts and bibliometric data from commercial companies that capture only part of journal publications