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
• 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, ≈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