Industry and Academia: Why Practioners and Researchers areDisconnected.

by Gerrit Muller University of South-Eastern Norway-NISE
e-mail: gaudisite@gmail.com
www.gaudisite.nl

Abstract

The industrial world and the academic world have grown far apart. The distance between the worlds primarily originates from different goals and different means of support. This is a problem in the areas of systems engineering and multidisciplinary design. These areas are relatively young, providing lots of opportunity for research. Education in this area is scarce. Publications are tangible examples of the gap between the two worlds.

In this paper we discuss the needs of both communities with respect to publications, education, and research. The mutual understanding of each other’s needs may help to bridge the gap between academics and industry.
Practitioners and Researchers are Disconnected

reflection
evidence
exposure
education
time pressure
pragmatics
cost constraints
products
sales
lots of people
From Mono-Disciplinary to System

multi-objective design methods
multi-objective design methods

performance and resource prediction
single aspect design method

robustness
cost
performance
reliability

system

process organization, people

process issues
multi-disciplinary design
mono-disciplinary design

legend

well defined but soft
rather soft
well defined

Mechanical Engineering
Electrical Engineering
Software Engineering

version: 0.6
June 21, 2020
Gerrit Muller
The Gap-Size is Multiple Orders of Magnitude

Industry and Academia: Why Practitioners and Researchers are Disconnected. version: 0.6
June 21, 2020
Gerrit Muller
Industry and Academia: Why Practitioners and Researchers are Disconnected.

Gerrit Muller

version: 0.6
June 21, 2020

GIA abstraction hierarchy
Industrial Criteria for Articles

- Subject
- Industrial relevance of subject
- Goal, solution oriented
- How to
- Practical
- Other contributors are reviewers
- Single author
- Clear responsibility
- Pointers to related relevant information
- Clear description
- Juicy description
- Understandable
- Lots of signal, very low noise level
- Valuable
- Useful
- More context information
- More detailed information
- Subject
- Alternative
Academic Criteria for Articles

- subject
- scientific relevance of subject
- knowledge oriented
- why, what
- pointers to related scientific work
- clear argumentation
- every statement is supported by reference, verifiable facts
- correct language
- clear positioning, well linked in with existing scientific work
- new original
- deep
- including reviewers
- more context information
- used existing science
- self citations are not-done
- competitors
- blocks broadly interested scientists in development
- strong cultural filter in scientific magazines and conferences
Economic Viewpoint on Publications

Industry:
+ writing and reading publications is a cost
+ publications are useful for PR

 Academics:
+ number of publications and citations determines standing and funding

  tension with Intellectual Property Rights (IPR), confidentiality

  limits change of research area, because you have to rebuild a reputation and to bootstrap background know how
## Comparing the Industrial and Academical Viewpoints

<table>
<thead>
<tr>
<th></th>
<th><em>Industrial</em></th>
<th><em>Academical</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>relevance</strong></td>
<td>useful, valuable</td>
<td>new, original</td>
</tr>
<tr>
<td><strong>orientation</strong></td>
<td>goal, solution</td>
<td>knowledge</td>
</tr>
<tr>
<td><strong>content</strong></td>
<td>practical, how to</td>
<td>theoretical, why, what</td>
</tr>
<tr>
<td><strong>style</strong></td>
<td>clear, understandable, juicy, low noise</td>
<td>clear argumentation,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>no loose statements</td>
</tr>
<tr>
<td><strong>references</strong></td>
<td>service to the reader</td>
<td>positioning in existing science</td>
</tr>
<tr>
<td><strong>author</strong></td>
<td>single author</td>
<td>all contributors as author</td>
</tr>
<tr>
<td><strong>economic driver</strong></td>
<td>writing and reading = cost</td>
<td>funding based on</td>
</tr>
<tr>
<td></td>
<td>public relation vs IPR and confidentiality</td>
<td>number of publications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and citations</td>
</tr>
</tbody>
</table>
Value of publications shared by both worlds

writing facilitates overview and understanding
writing milestones help to focus on results
stops endless wandering
Consequences

Different publications needed for industry and academics

some re-use via copy/paste

But how to share information between the worlds?

And how to cross fertilize, how to get inspiration from the other world?

Industry: how to outsource education to academic community?

Academics: how to enter the unknown area?
The Embedded Systems Institute (ESI) solution:
collaborative research;
seeding for long term (10-15 years) renewed respect