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[Faculty of Science
Information and Computing Sciences]

Ethics in Research and Experimentation

Master of Business Informatics – Advanced
Research Methods

Wohlin et al., Ch 2.11:
Ethics in Experimentation

Sjaak Brinkkemper

Outline

- Ethics
- Four principles in Software Experimentation
 1. Scientific Value
 2. Beneficence
 3. Informed Consent
 4. Confidentiality
- Research Code of Conduct
- Conclusions
- Reading



Efficiency of Clinical Decision Support Systems Improves with Experience

Michiel C. Meulendijk  , Marco R. Spruit, Floor Willeboordse, Mattijs E. Numans, Sjaak Brinkkemper, Wilma Knol, Paul A. F. Jansen, Marjan Askari

10.1007/s10916-015-0423-z

[Copyright information](#)

Abstract

Efficiency, or the resources spent while determining the usability of a system, is a determinant of usability. In this study, the efficiency of a similar task over a prolonged period of time was performed in the domain of decision support systems in a randomized controlled trial. Three experienced pharmacists conducted 150 computerized medication reviews in Amsterdam, the Netherlands. Results were analyzed using a linear mixed model showed a significant decrease in time; $F(31.145) = 14.043$, $p < .001$. The time to the first quartile was $M = 20.42$ ($SD = 6.13$). This leads the authors to conclude that efficiency decreased significantly as they gained experience.

Keywords

Clinical decision support – Medication review – Efficiency – Usability

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (Medical Ethics Committee of the VU University Medical Centre Amsterdam, reference 2011/408) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed consent

Informed consent was obtained from all individual participants included in the study.

Ethics in Research

Ethics: systematizing, defending and recommending concepts of right and wrong conduct

- addressing disputes of moral diversity
- a branch of philosophy
- subjective, time-bound, domain specific, cultural

Ethics are expressed in **principles**:

- Kind of norm or rule
- Kind of best practice

- Ethics in research
- Ethics in experimentation
- Ethics in University-Industry collaboration



Ethical Issues

- Research has been performed for centuries
- **Ethical issues** have been popping up
- **Rules and procedures** for human subjects in the domains of medicine, biology, humanities, social sciences, etc.
- How about **ICT research**?

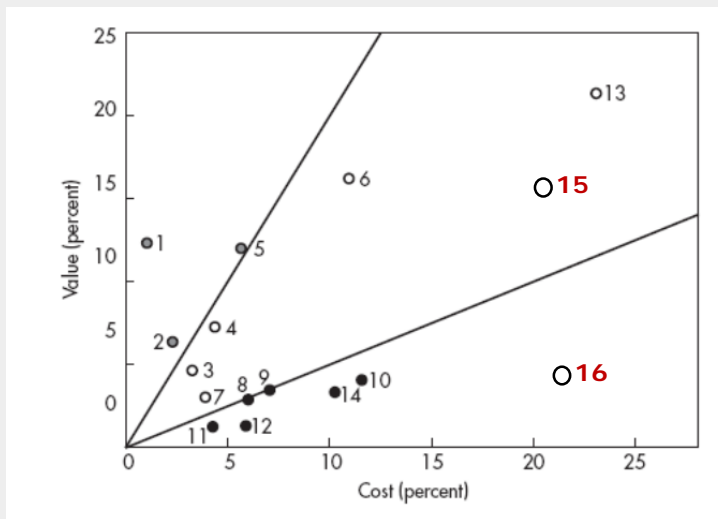
Many issues in research

- Fabrication of data (social psychology, antropology)
- Plagiarism (data mining, computer vision, circuit design)
- Ghost-writing
- Papers with misconduct get retracted.
 - See stories on RetractionWatch.com

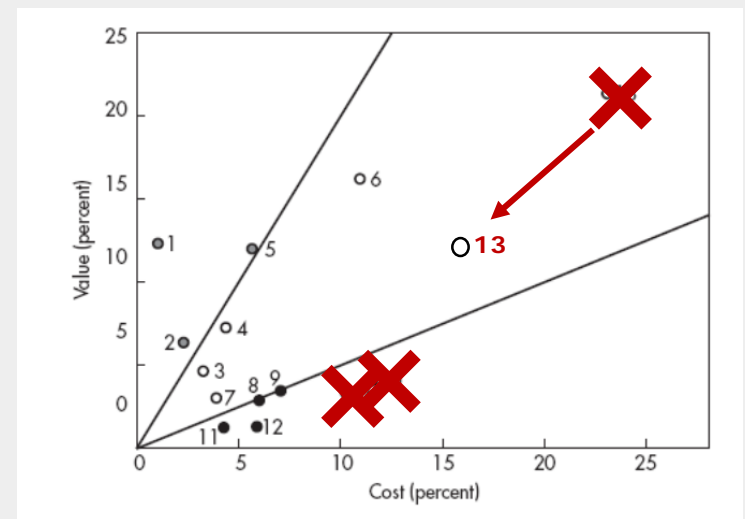


Types of misconduct

- **Fabrication** is making up results and recording or reporting them.
- **Falsification** is manipulating research processes or changing or omitting data.



Fabrication



Falsification



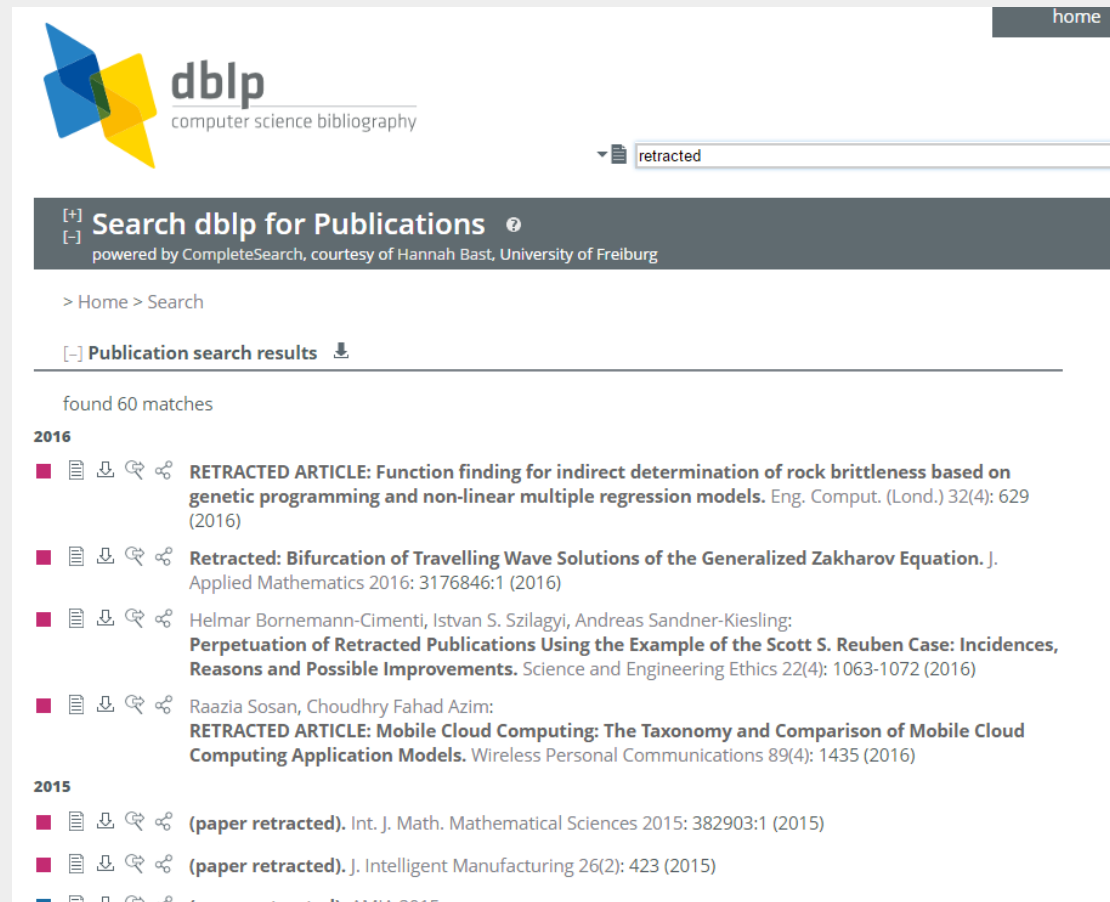
Types of misconduct

- **Plagiarism** is the appropriation of another person's ideas, research results or words without giving appropriate credit.
 - Text, original figures, photographs, tables
 - Violation of copyright laws
- **Improper dealing with infringement** of integrity
 - attempts to cover up
 - reprisals to whistle-blowers
 - violations of due process
- Research institutes have the **duty to promote** good research management
 - research integrity is instilled into the culture.
- Infringement has severe consequences on education and career



Retracted papers in Information and Computing Sciences

<http://dblp1.uni-trier.de/search/pubs?q=retracted>



The screenshot shows the dblp (computer science bibliography) search results for the query 'retracted'. The page header includes the dblp logo and a search bar with the query 'retracted'. Below the header, there is a section titled 'Search dblp for Publications' powered by CompleteSearch. The search results are displayed as a list of publications, with the first four results from 2016 and the first two from 2015. Each result is preceded by a red square icon and a list of icons (document, download, share, etc.). The results are as follows:

- 2016**
 - RETRACTED ARTICLE: Function finding for indirect determination of rock brittleness based on genetic programming and non-linear multiple regression models. Eng. Comput. (Lond.) 32(4): 629 (2016)
 - Retracted: Bifurcation of Travelling Wave Solutions of the Generalized Zakharov Equation. J. Applied Mathematics 2016: 3176846:1 (2016)
 - Helmar Bornemann-Cimenti, Istvan S. Szilagyi, Andreas Sandner-Kiesling: Perpetuation of Retracted Publications Using the Example of the Scott S. Reuben Case: Incidences, Reasons and Possible Improvements. Science and Engineering Ethics 22(4): 1063-1072 (2016)
 - Raazia Sosan, Choudhry Fahad Azim: RETRACTED ARTICLE: Mobile Cloud Computing: The Taxonomy and Comparison of Mobile Cloud Computing Application Models. Wireless Personal Communications 89(4): 1435 (2016)
- 2015**
 - (paper retracted). Int. J. Math. Mathematical Sciences 2015: 382903:1 (2015)
 - (paper retracted). J. Intelligent Manufacturing 26(2): 423 (2015)



RETRACTED ARTICLE: A distance vector similarity metric for complex networks

Natarajan Meghanathan¹

Received: 28 January 2017 / Accepted: 26 June 2017 / Published online: 4 July 2017
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The editor-in-chief and publisher have retracted this article in agreement with the author. The article was simultaneously submitted to and published online in *Computing* [DOI [10.1007/s00607-017-0565-6](https://doi.org/10.1007/s00607-017-0565-6), Natarajan Meghanathan, A distance vector similarity metric for complex networks] and *Journal of King Saud University – Computer and Information Sciences* [DOI [10.1016/j.jksuci.2017.06.007](https://doi.org/10.1016/j.jksuci.2017.06.007), Natarajan Meghanathan, Decay centrality-based distance vector similarity (DIVES) metric for complex networks]. The online version of this article contains the full text of the retracted article as electronic supplementary material.



RETRACTED: Sentiment Analysis in Decision Sciences Research: An Illustration to IT Governance

Qing Cao , Mark A. Thompson  , Yang Yu 

 [Show more](#)

<http://dx.doi.org/10.1016/j.dss.2012.10.026>

[Get rights and content](#)

Referred to by Qing Cao, Mark A. Thompson, Yang Yu
Retraction notice to “Sentiment Analysis in Decision Sciences Research: An Illustration to IT Governance” [Decision Support Systems (2013) 1010–1015]
Decision Support Systems, Volume 54, Issue 2, January 2013, Page R1
 PDF (89 K)

This article has been retracted: please see Elsevier Policy on Article Withdrawal (<http://www.elsevier.com/locate/withdrawalpolicy>).

This article has been retracted at the request of the Authors.

This article contains significant overlap with a paper submitted two months prior to this submission. (The aforementioned paper is still in pre-acceptance stage, so does not yet have citation details or DOI.)

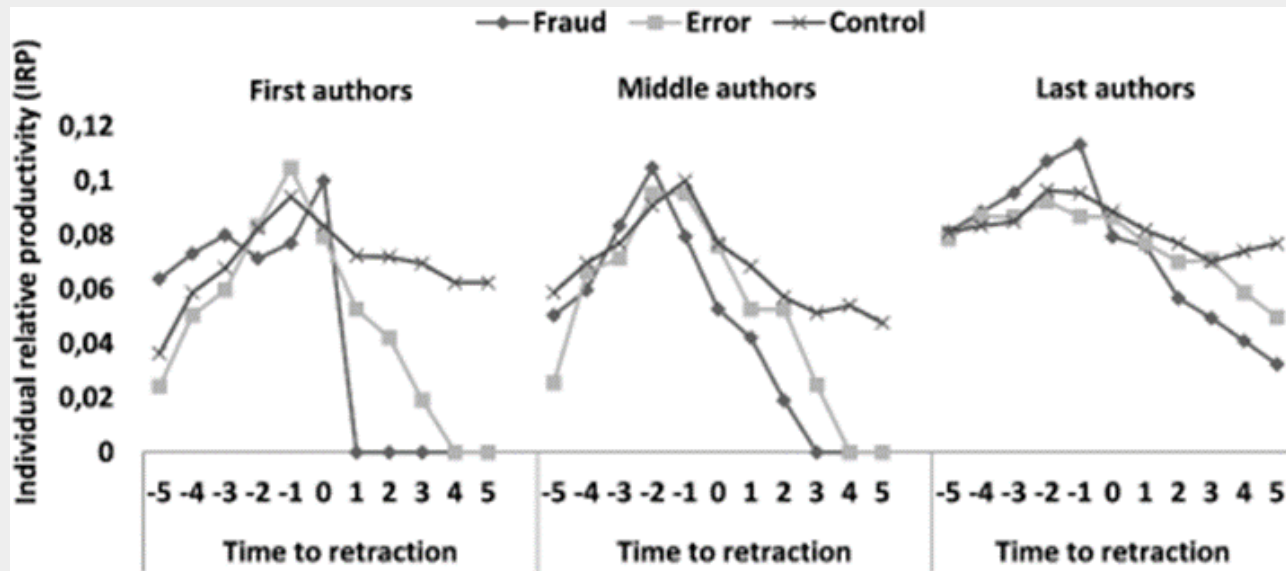
Furthermore, this article contains empirical errors.

The authors would like to apologize to the readers of the journal for the inconvenience.

[Faculty of Science
computing Sciences]



Impact of fraud on co-authors' careers



From: Mongeon, P. and Larivière, V. (2016), Costly collaborations: The impact of scientific fraud on co-authors' careers. *J Assn Inf Sci Tec*, 67: 535–542. doi: 10.1002/asi.23421



Research Code of Conduct

- How to behave as researcher
 - Formulated principles
 - Misconduct: when and how to handle
 - Guidelines for good practice
-
- **European Science Foundation**: European Code of Conduct for Research Integrity, March 2011
 - **Vereniging van Samenwerkende Nederlandse Universiteiten (VSNU)**: Nederlandse Gedragscode Wetenschapsbeoefening, revised, 2012.



Pledge of scientific integrity

At the end of the doctorate defense a pledge of scientific integrity has to be promised by the candidate before the Dr degree is conferred. This is performed by the following text.

Supervisor:

By virtue of the authority conferred on us by law and according to the decision of the Doctoral Examination Committee present at this session, I hereby confer upon you ... (doctoral candidate's first and surname) the doctoral degree to which are attached all rights and obligations towards science and society as laid down by law and custom.

*Do you promise always to **perform your duties according to the principles of academic integrity**: honestly and scrupulously, critically and transparently, independently and impartially?*

Doctoral candidate:

I promise.

Supervisor:

Then I present you with the diploma, signed by the rector, [and] supervisor(s) [and cosupervisor(s)] and bearing the great seal of Utrecht University



Discussion on ethics cases

Discussion with class

- What are the options?
- Good, better, best, bad, worse, worst
- Where is the border between ethical and unethical behaviour?
- Using Kahoot survey tool on smartphone
- We expect everybody participates
- Please sign on to Kahoot at: www.kahoot.it
- Enter game pin and give yourself a name
- Note: this is not a test; you will not be graded



Discussion: How to conduct well?

Case A:

Dr. Abramson is a professor at a well-known university in the software engineering program. He recently conducted on a research project to determine how collaboration styles influence software quality. His hypothesis is that *software engineers who work well together produce better software*.

Dr. Abramson collects data by observing SE teams at local companies. He then categorizes the teams according to their success at collaboration. He also collects metrics for software components previously developed by the same teams. Dr. Abramson plans to correlate the collaboration quality measures with the metrics to determine whether teams that collaborate better produce higher quality code.

A few weeks into the research program, a *manager asks to see Dr. Abramson's field notes and wishes to know how his company compares to the other companies* regarding the metrics assessment.

Discussion questions:

1. Should Dr. Abramson disclose details of research data with the manager of the software team?
2. Should Dr Abramson treat all teams the same or include the company as an independent parameter?



Kahoot 1: Should Dr. Abramson disclose details of research data with the manager of the software team?

Dr. Abramson is a professor at a well-known university in the software engineering program. He recently conducted on a research project to determine how collaboration styles influence software quality. His hypothesis is that *software engineers who work well together produce better software*.

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Yes, because it is the data of the company.



Yes, because this validates the research approach.



No, as the engineers were not informed upfront.



No, because the researcher acts independent from the company



Kahoot 2: Should Dr Abramson treat all teams the same or include the company as an independent parameter?

Dr. Abramson is a professor at a well-known university in the software engineering program. He recently conducted on a research project to determine how collaboration styles influence software quality. His hypothesis is that *software engineers who work well together produce better software*.

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A few weeks into the research program, a manager asks to see Dr. Abramson's field notes and wishes to know how his company compares to the other companies regarding the metrics assessment.



Different, as the company culture influences team collaboration



Same, as software engineering is similar everywhere



Different, as collaboration depends on programming language



Same, as the teams are from the same region



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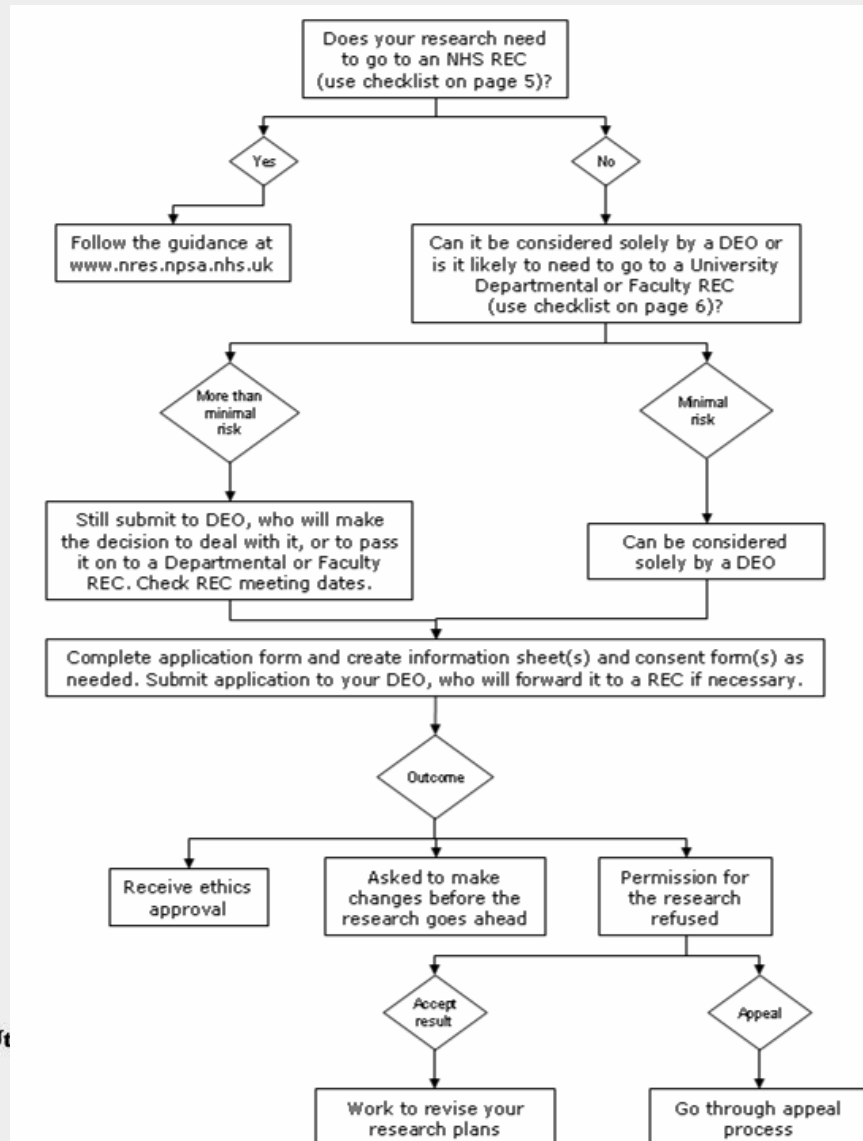
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Ethical Review

- Some countries **legally** require an **ethical review** for studies involving **human subjects**.
 - Canada, Australia, USA, NL
 - Biomedical research
 - Sociology, Psychology
- The documentation needed in the review typically includes a description of the project, comprising details on subjects and treatments, documentation of how informed consent is obtained, and a review of ethical aspects of the project.



Ethical Review procedures



From: ERB, Univ Leicester, UK



Invitation example with ethical approval

A Survey on Standards for AnyTopic Research in the IS Discipline
Invitation and Information Sheet

You are invited to participate in this survey because you either (1) serve in an editorial role in a top journal that might publish Anytopic Research, (2) have served on the program committee of an Anytopic conference, and/or (3) have authored or co-authored a paper published at a Anytopic conference.

The purpose of this survey is to develop an understanding of the current diversity and coherence of the IS field's members' perceptions of what they consider to be acceptable and desirable practice in the conduct of Design Science Research and what has changed in five years since a prior survey (AuthorName, 2010).

Allowing us to receive and understand your views is important to developing a clear and accurate understanding of the state of the field as a whole. Developing this broad understanding will allow the field to better engage in debate and to move toward a clear and agreed set of standards and expectations.

Should you choose to participate, your individual answers will be kept confidential. Should it become desirable to publish individual opinions or even those of a particular journal, permission will be sought beforehand and required for publication of anything other than aggregate results.

The survey should take less than 20 minutes to complete. Participation is completely optional. If you do not wish to participate, either simply do not complete the survey or, alternatively, email me (AuthorName) at AuthorName@anytown.edu to advise me that you do not wish to participate, so that you do not receive a follow-up request. If you have any questions, please email me.

This survey has received ethical approval from Anytown University Human Research Ethics Committee, approval number AU12345. Should you wish to make a complaint on ethical grounds, please contact the anytown University Human Research Ethics Committee (Secretary) by phone at +99 9999 9999 or email at hrec@anytown.edu or in writing C/- Office of Research and Development, Anytown University, GPO Box U9999, Anytown, Somecountry.

Thank you very much for your time and thoughtful consideration. I look forward to receiving your views.

Dr. AuthorName

Outline

- Ethics
- Four principles in Software Experimentation
 - Scientific Value
 - Beneficence
 - Informed Consent
 - Confidentiality
- Research Code of Conduct
- Conclusions
- Reading



Ethics in Software Experimentation

- Any **empirical research** activity involving **human subjects** must take **ethical aspects** into consideration.
- Singer and Vinson (2001) provided practical **guidelines** for the conduct of empirical studies.
- They identified **four key principles**:
 1. Scientific Value
 2. Beneficence
 3. Informed Consent
 4. Confidentiality



Four Ethical Principles

1. Scientific Value (*your win*)

The study should have *scientific value* in order to motivate subjects to expose themselves to the risks of the empirical study.

2. Beneficence (*their win*)

Weighing risks, harms and benefits, the *beneficence* must outweigh, not only for the individual subjects, but also for groups of subjects and organizations.



Four Ethical Principles (2)

3. Informed Consent

Subjects must give *informed consent* to their participation, implying that they should have access to all relevant information about the study, before making their decision to participate or not.

4. Confidentiality

Researchers must take all possible measures to maintain *confidentiality* of data and sensitive information, even when this is in conflict with the publication interests.



1. Scientific value

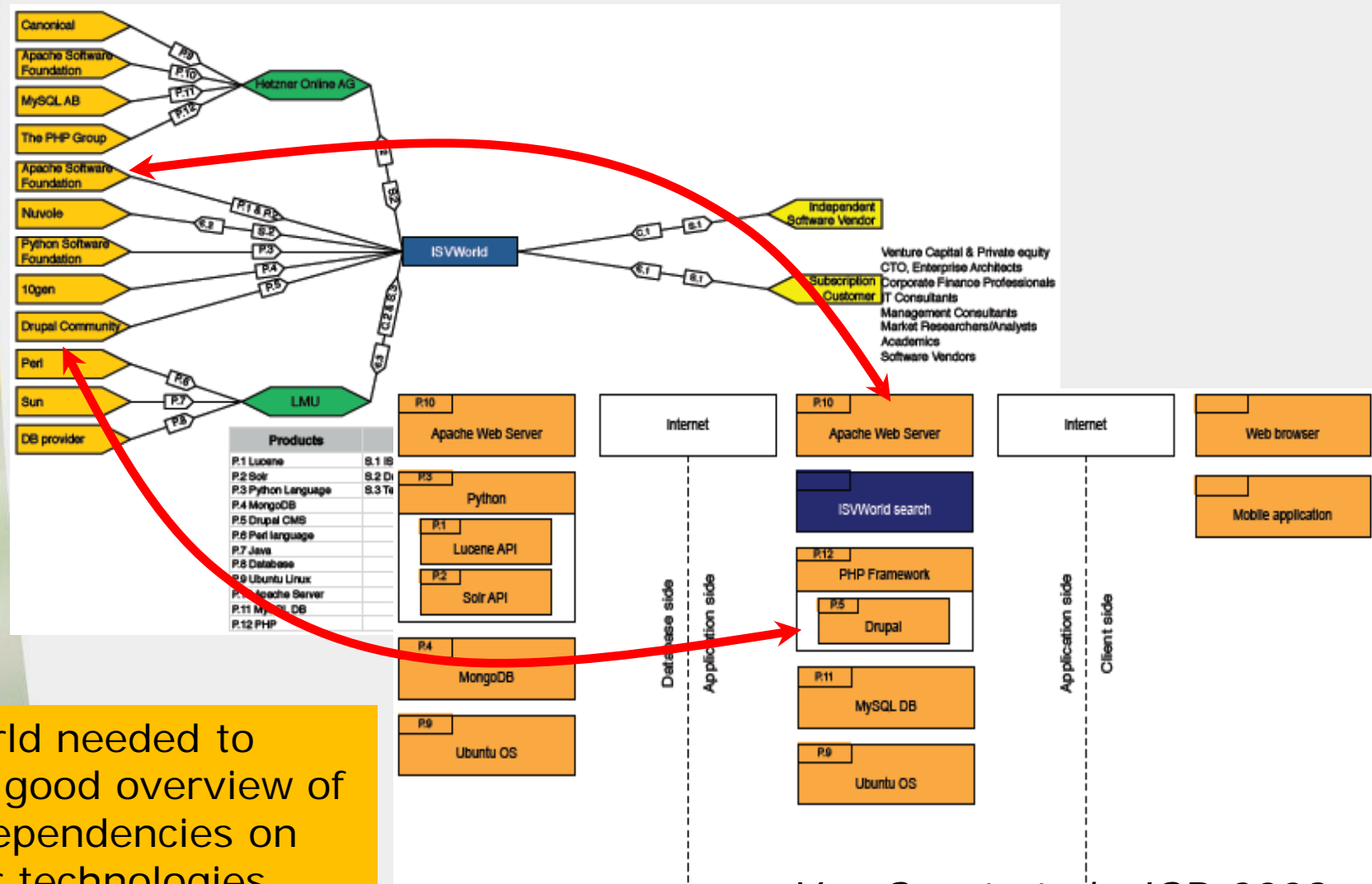
- The **WIN**-win situation
- Advancement of knowledge
- Expectation of interesting and significant contribution
- Craft and experience of the researcher
- Goal is paper published in high ranked conference or journal



Planon case: Scrum extension for SPM Agile Requirements Refinery



Management of dependencies in software ecosystems @startup



ISVWorld needed to have a good overview of their dependencies on partner technologies.

Case C: Code transformation

Dr. Cornell conducts research on source code reengineering and automated translation from **one programming language to another**. To carry out his work, he needs access to programs with several million lines of source code. He obtains access from his industrial partners. Upper management has always been happy to have its source code updated by Dr. Cornell, but the software engineers who maintain the source code have **not been so appreciative**.

Consequently, Dr. Cornell has implemented procedures to minimize the impact of the source changes on the software engineers. First, he **involves the software engineers** in all of the issues surrounding the project's schedule and the new source code's integration into the existing system. He also arranges for the software engineers to **receive training** in the new source code's language.

Moreover, he insists that management allot the software engineers time to simply explore the new source code. These procedures give the software engineers control over the whole translation process, thus reducing their stress. They also allow the software engineers to more easily transfer at least some of their expertise (e.g., knowledge of source code/domain relationships) to the new source code.



Kahoot 3: Is it wise to have such a strict instructions on training?

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Yes, as this assures uniformity in the research project



No, because the individual software engineers have different working styles and attitudes



Yes, because the management requires the software code transformation



No, because it depends on the two programming languages



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Kahoot 4: What could be altered to improve the research project or outcome?

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Perform the research per company specific



Perform the research with voluntary subjects in a research institute



Have a specific training for each company



Perform the research with student subjects in a software transformation course



2. Beneficence

- The win-**WIN** situation
- In recruiting subjects for an experiment, there must be **inducements** to **motivate** their **participation**. The experience and knowledge gained by applying a new method may be inducement enough.
- The **inducement** must be **balanced** to ensure that the consent to participate really is **voluntary**, and not forced by too large economic or other inducements.

Typical incentives

- Scientific reflection
- Recognition as a technology leader
- Benchmarking



Customer Involvement in Requirements Management: Lessons from Mass Market Software Development

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Practice

Integrated development and maintenance for the release, delivery, deployment, and customisation of product software: A case study in mass market ERP software

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Information and Software Techn

journal homepage: www.elsevier.com/locate/infsof

The agile requirements refinery: Applying SCRUM principles to software product management

Kevin Vlaanderen^{a,*}, Slinger Jansen^a, Sjaak Brinkkemper^a, Erik Jaspers^b

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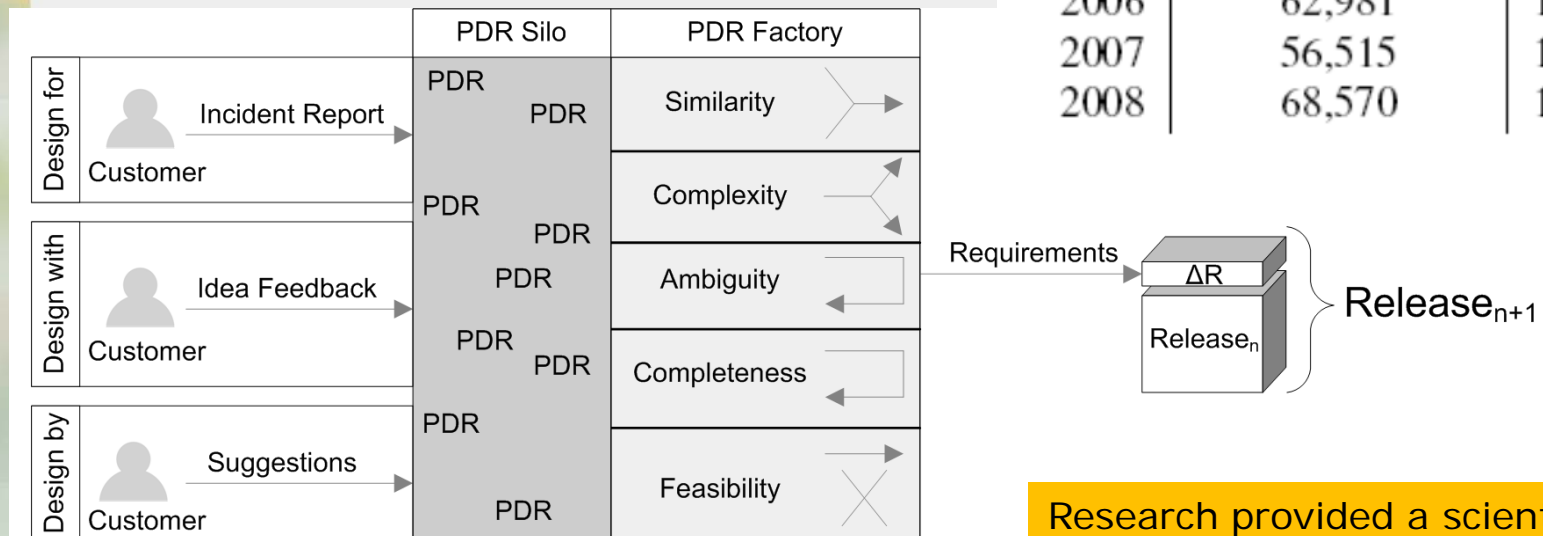
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Top-ranked papers with empirical studies in software industry.

Study in Customer Involvement @large software company in NL

- What is happening with all customer questions, complaints or bugs?
- Approximately 60.000 reports of customer interaction per year handled by helpdesk and consultancy
- 85% can be solved by referring to the manual
- 15% is a bug or shortcoming

	Incident Reports	PDRs
2005	64,541	15,411
2006	62,981	12,913
2007	56,515	15,346
2008	68,570	17,904



Research provided a scientific foundation for customer involvement AFAS CEO designed.

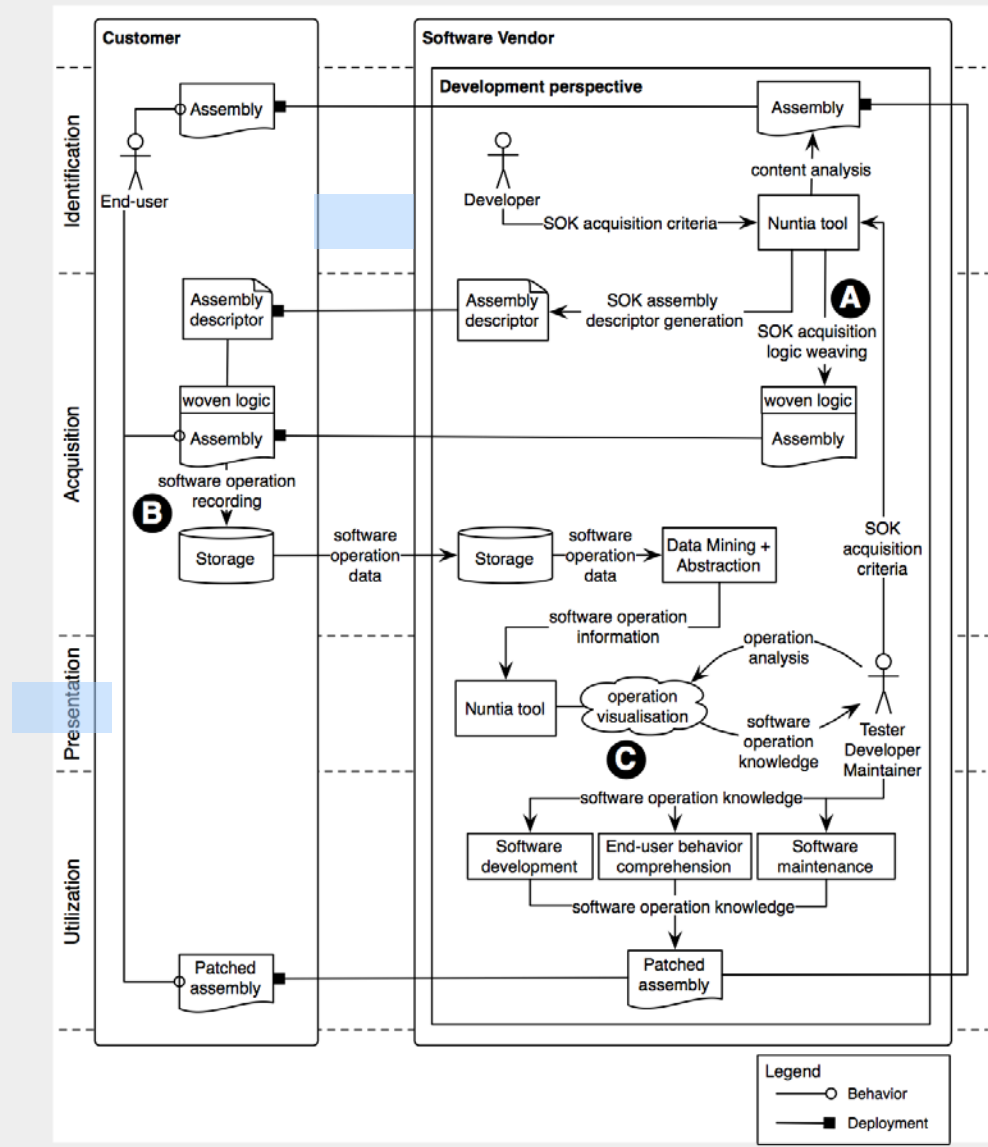
Stabiplan case: Software Operation Knowledge

Definition:

Software Operation Knowledge is knowledge of in-the-field performance, quality and usage of software, and knowledge of in-the-field end-user software experience feedback

Vd Schuur et al., CSMR 2011

Stabiplan provided a complete development infrastructure for studying software operation data.



Discussion: Inducement

Case D:

Dr. Davids works in a software engineering research center. Her research deals with **process improvement**. Dr. Davids is quite excited by a newly published process model. Consequently, she collects process data from a software development team working for a large government contractor.

Using the model to analyze her data, Dr. Davids finds **five major flaws** in the contractor's software process, including the contractor's over-reliance on one team leader. Dr. Davids is very impressed with the new model's usefulness **and publishes her results** in a publicly available conference proceedings.

Discussion:

If the company finds out about the paper it is more likely that ...



Feedback

- To maintain long term relationships and trust with the subjects of a study, **feedback** of results and analysis are important.
- Subjects must not agree on the analysis, but should be given the **opportunity** to get information about the study and its results.
- Experience shows that the software industry greatly appreciates feedback on their participation and input.
C.f. SPM maturity assessments in SPM course



Feedback: Studies on Maturity in SPM

Focus Area	None	A	B	C	D	E	
<i>Portfolio management</i>							
Market analysis	30.2	32.6	16.3	4.7	7.0	9.3	
Partnering & contracting	16.3	23.3	37.2	2.3	11.6	9.3	
Product lifecycle mgmt	47.6	14.3	19.0	7.1	0.0	11.9	-
<i>Release planning</i>							
Roadmap intelligence	46.5	23.3	4.7	2.3	14.0	9.3	-
Core asset roadmapping	48.4	21.0	19.4	6.5	4.8	-	
Product roadmapping	14.5	25.8	12.9	33.9	3.2	9.7	
<i>Product planning</i>							
Requirements prioritization	21.0	35.5	21.0	3.2	9.7	9.7	
Release definition	9.7	45.2	8.1	33.9	1.6	1.6	
Release definition validation	25.8	38.7	16.1	19.4	-	-	-
Scope change management	59.0	9.8	6.6	8.2	16.4	-	-
Build validation	9.3	32.6	55.8	2.3	-	-	-
Launch preparation	12.9	45.2	11.3	1.6	3.2	6.5	
<i>Requirements management</i>							
Requirements gathering	0.0	22.6	32.3	1.6	6.5	19.4	17.7
Requirements identification	25.6	11.6	14.0	46.5	2.3	-	-
Requirements organizing	17.7	21.0	38.7	22.6	-	-	-

Many organizations have low maturity

Percentage of organizations achieving the level

Intriguing data



3. Informed Consent

- The basis for a human-oriented empirical study (e.g. an experiment) is that subjects are participating **voluntarily**, and that they have enough information to make the decision to participate or not.
- Further, this includes the option to **withdraw** from the study any time, without any penalty for the subject.
- In order to make this decision process clear and explicit, consent should be given in **writing**.



Consent form

A consent form typically comprises the following elements

- **Research project title**: for identification purposes.
- **Contact information**: both research and ethics contact.
- **Consent and comprehension**: the subjects state that they understand the conditions for the project and accept them.
- **Withdrawal**: states the right to withdraw without penalties.
- **Confidentiality**: defined the promises about confidential handling of data and participation.
- **Risks and benefits**: explicitly listing what the subjects risk and gain.
- **Clarification**: the right for the subject to ask questions for clarification of their role in the study.
- **Signature**: mostly by both subject and researcher, one copy for each, to indicate



Informed consent: the case of the student subjects

Case B:

Dr. Bernard is on the faculty of a large research university. She is interested in how different **views of source code influence program understanding** and has therefore built a tool that offers a data flow view, a control flow view, and an architectural view of a system.

She wants to see which of the different views help software engineers design and maintain source code more effectively. Unfortunately, Dr. Bernard does **not have access to industrial** software engineers to test her tool. Consequently, she decides to use the students in her software engineering class as test subjects.

She divides the students into four sections. **Each** of three sections is given one of Dr. Bernard's tools with a **different view**. The fourth section uses the standard tools provided by the university programming environment. Dr. Bernard gives all four sections the same midterm project. She finds that some of the views offer **modest gains in productivity**.

- The design of the experiment conducted by Dr. Bernard is acceptable. True or False?
- What do you think about the arrangements of this project?



Kahoot 5: Is the design of the experiment conducted by Dr. Bernard is acceptable. ?

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True, convenient sampling is a valid technique



True, treatment is identical, only the view is manipulated



False, the data is not collected anonymously



False, students are no volunteers

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Kahoot 6: What are the elements of informed consent that are not satisfied ?

Dr. Bernard is on the faculty of a large research university. She is interested in how different **views of source code influence program understanding** and has therefore built a tool that offers a data flow view, a control flow view, and an architectural view of a system.

She wants to see which of the different views help software engineers design and maintain source code more effectively. Unfortunately, Dr. Bernard does **not have access to industrial** software engineers to test her tool. Consequently, she decides to use the students in her software engineering class as test subjects.

She divides the students into four sections. **Each** of three sections is given one of Dr. Bernard's tools with a **different view**. The fourth section uses the standard tools provided by the university programming environment. Dr. Bernard gives all four sections the same midterm project. She finds that some of the views offer **modest gains in productivity**.



Universiteit Utrecht



Students cannot withdraw



Students have insufficient knowledge about the topic



The scientific value is low with students

[Faculty of Science
Information and Computing Sciences]

Discussion

- What do you think about the arrangements of this project?

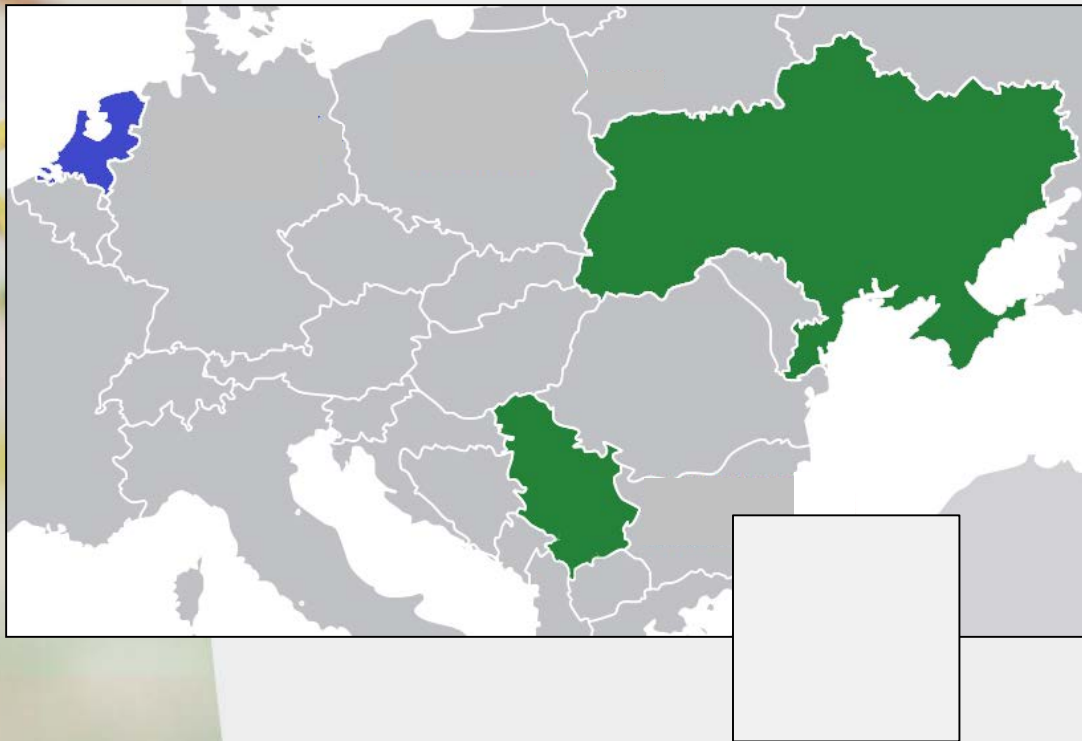


4. Confidentiality

- The subjects must be sure that any information they share with researchers will remain **confidential**.
- Aspects on confidentiality are:
 - **Anonymity of participation**
 - **Data privacy.**
 - **Data anonymity.**
 - **Disclosure after agreement**
- Avoid research in **controversial situations**
 - Ongoing reorganization
 - Poor management
 - Mis-alignment with company strategy



Full names: @ Outsourcing collaboration patterns



Anonymity of respondents @Enterprise Architecture study

Table 1. Roles occupied by respondents (multiple roles allowed)

Role		Frequency	Percentage
EA Creator	Enterpr Architect Business & Inform	97	33.1%
	Enterpr Architect Application & Infrastr	95	32.4%
	Manager	39	13.3%
	External EA Consultant	19	6.5%
EA User	Manager	42	14.3%
	Project Manager	39	13.3%
	Project Architect	56	19.1%
	Business Analyst/Designer	34	11.6%
	System & Information Analyst/Functional Designer	26	8.9%
	Software Architect	35	11.9%
	Technical Designer	19	6.5%
	Developer/Programmer	8	2.7%
	Maintenance Engineer	8	2.7%

Pseudonymisation of Cases @Configuration upgrading

Case Identification Code	Time	Interviewees	Informal interviewees	Organization size	Duration of study
ERPComp	Early 2004	15	24	1504	2 months
OCSCComp	Early 2005	4	8	115	1,5 months
HISCComp	Mid 2005	7	12	100	6 weeks
FMSCComp	Late 2005	8	8	160	4 weeks
CMSCComp	Early 2006	4	8	65	3 weeks
TDSCComp	Mid 2006	4	5	60	3 weeks

Pseudonyms (nick names) are used for the sake of readability of the paper. Instead of calling the companies A, B, C , etc.



Sensitive Results

- For results sensitive to:
 - *Subjects*, make sure that confidentiality procedures apply, independently of facts revealed,
 - *Sponsors*, include clear statements on rights for independent publications of the anonymized results in the informed consent form for companies, and in research project contracts (typically in acknowledgement in footnote or endnote),
 - *Researchers*, consider having peers to perform statistical analyses on anonymized data (both subjects and scales) independently from the experimenters, especially when the treatment is designed by the experimenters themselves. This also reduces the threat of experimenter expectancies.



Case E: Novice programmer training

Dr. Eaton was interested in how **novice programmers gain expertise**. He contacted a personnel manager at a local company who was also interested in this research topic as the company was rapidly expanding and was therefore spending a great deal of money and effort training new employees. Dr. Eaton signed an agreement with the local company. The company would provide him with access to **experts (gurus) and novices**, and he would help the company improve its training procedures.

Dr. Eaton spent the next several months interviewing the experts and novices. Because it was a small company, however, he had access to only a very **small subject population**. In the end, he interviewed two experts and followed 10 novices' work over several months. In the final report, Dr. Eaton included a table showing the number of languages in which each of his subjects could program and their success in training. **Subjects were not named** but instead were identified by **numbers**. When the research was complete, Dr. Eaton made the report available to the personnel manager as he had promised.



Kahoot 7: Did dr Eaton treat the confidentiality agreement adequately?

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- ☐ A. No, the research data can easily be traced to the individuals
- ☐ B. Yes, he used numbers
- ☐ C. Yes, it was only disclosed within the company
- ☐ D. No, each subject should have received a personalized copy of the research report first.



Outline

- Ethics
- Four principles in Software Experimentation
 - Scientific Value
 - Beneficence
 - Informed Consent
 - Confidentiality
- Research Code of Conduct
- Conclusions
- Reading



European Research Code of Conduct: 8 Principles



1. Honesty in communication

- presenting research **goals and intentions**,
- in precise and nuanced reporting on research **methods and procedures**, and in
- conveying valid **interpretations** and justifiable **claims** with respect to possible applications of research results.

2. Reliability

- in performing research - meticulous, careful and attentive to **detail**, and
- in communication of the results - **fair and full and unbiased** reporting.

3. Objectivity

- interpretations and conclusions must be **founded on facts and data** capable of proof and secondary review;
- **transparency** in the collection, analysis and interpretation of data, and **verifiability** of the scientific reasoning



ERCC - 8 Principles (2)

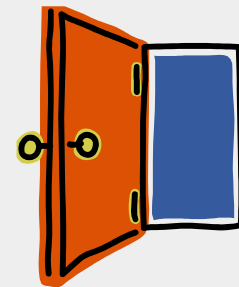
4. Impartiality and independence

- from commissioning or interested parties,
- from ideological or political pressure groups, and
- from economic or financial interests.



5. Openness and accessibility

- in discussing the work with other scientists,
- in contributing to public knowledge through publication of the findings,
- in honest communication to the general public.
- a proper storage and availability of data,
- and accessibility for interested colleagues.



ERCC - 8 Principles (3)

6. Duty of care

- for participants in and subjects of research
- human beings, animals, the environment or cultural objects
- principles of respect and duty of care



7. Fairness

- providing proper references and giving due credits to the work of others
- in treating colleagues with integrity and honesty

8. Responsibility for future science generations

- education of young scientists and scholars
- binding standards for mentorship and supervision



Good Practice Rules

1. **Good data practices**: availability and access
 - Data stored in accessible form; Archived for replication and elaboration
2. **Proper research procedures**
 - Careful execution; minify harmful impact on environment
3. **Responsible** research procedures
 - Sensitivity to age, gender, etc.; Subject procedures not violated
4. **Publication** related conduct
 - Authorship based on contribution; financial contributions acknowledged
5. **Reviewing and editorial issues**
 - Thorough and accurate; confidentiality



Integrity debates: Self-plagiarism

- **Self-plagiarism** while extending a conference paper to a journal paper?
 - Rule of thumb: 30-40% new material
 - Always mention the extension in letter to editor-in-chief
 - Also mention it in the Introduction
 - Plan conference and journal versions in data gathering and analysis strategy

Requirements Eng
DOI 10.1007/s00766-016-0250-x



RE 2015

Improving agile requirements: the Quality User Story framework and tool

Garm Lucassen¹ • Fabiano Dalpiaz¹ • Jan Martijn E. M. van der Werf¹ • Sjaak Brinkkemper¹

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Abstract User stories are a widely adopted requirements notation in agile development. Yet, user stories are too often poorly written in practice and exhibit inherent quality defects. Triggered by this observation, we propose the

1 Introduction

User stories are a concise notation for expressing requirements that is increasingly employed in agile environments.

NLP occurs [47]. Nevertheless, these tools serve as an inspiration and some of their components are employed in our work.

Our previous paper [35] proposed the QUS framework for improving user story quality and introduced the concept of the Automated Quality User Story Artisan (AQUSA) tool. In this paper, we make three new, main contributions to the literature:

- We revise the QUS framework based on the lessons learned from its application to different case studies. QUS consists of 13 criteria that determine the quality of user stories in terms of syntax, semantics, and pragmatics.
- We describe the architecture and implementation of the AQUSA software tool, which uses NLP techniques to

Integrity debates: Author sequence

■ Author sequence

- Be clear from the start of writing, or even of project
- Sequence based on contribution
- Include author of funding proposal
- PhD students be clear when MSc students provide material
- MSc students first? Dependent on the research and writing quality of the student



Computers in Human Behavior

Volume 59, June 2016, Pages 39–48



Full length article

The sociability score: App-based social profiling from a healthcare perspective

Paul Eskes^a, Marco Spruit^a, Sjaak Brinkkemper^a, Jacob Vorstman^{b, 1}, , Martien J. Kas^c, , 1, 

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<http://dx.doi.org/10.1016/j.chb.2016.01.024>

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Journal of Systems and Software

Volume 85, Issue 7, July 2012, Pages 1495–1510

Software Ecosystems



Shades of gray: Opening up a software producing organization with the open software enterprise model

Slinger Jansen^a, , , Sjaak Brinkkemper^a, , Jurriaan Souer^b, , Lutzen Luinenburg^b, 

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UU Information Sciences Education on Scientific Integrity

BSc

- General introduction to ethics: Man, Machine, and ICT
- Professional ethics in IS development: Information Systems

MSc

- General introduction to SI: start of MSc study
- Ethics in research: Adv Research Methods
- Ethics in writing (plagiarism): Method Engineering
- What about Societal Implications of ICT research?



Review Question 1

I now know enough of the topic of Scientific Integrity

☐ A. Yes, and I can apply it in my study and career

☐ B. Yes, but I need to know more about ...

☐ C. No, this is too short introduction

☐ D. No, I am not interested in this subject



Review Question 2

And to be honest ...

- ☐ A. I sometimes performed some plagiarism in the past
- ☐ B. I cheated with some data in a research project
- ☒ C. I always perform according to scientific standards



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Conclusion on Ethics

- Singer and Vinson ask in their early work for **a code of ethics for empirical software engineering**. 15 years later the community has **not yet developed** one; the closest is Vinson and Singer's guidelines.
- Research funding agencies start to **require** general codes of ethics be applied, which may not fit the purpose.
- Concrete and tailored ethical guidelines for empirical software engineering research would **benefit** both the **subjects**, which they aim to protect, and the development of the **research field** as such.
- **Students** should be trained in research ethics



Reading

- European Science Foundation: European Code of Conduct for Research Integrity, March 2011
- Vereniging van Samenwerkende Nederlandse Universiteiten (VSNU): Nederlandse Gedragscode Wetenschapsbeoefening, revised, 2012.
- Ch. 2.11 Ethics in Experimentation from Claes Wohlin et al.: Experimentation in Software Engineering. Springer 2012.
- Janice Singer, Norman G. Vinson: Ethical Issues in Empirical Studies of Software Engineering. IEEE Trans. Software Eng. 28(12):1171-1180 (2002)
- Vinson, N.G. & Singer, J.A. (2008). A Practical Guide to Ethical Research Involving Humans, In Guide to Advanced Empirical Software Engineering (Shull, Singer, Sjøberg Eds.) pp. 229-256, Springer.
- Examples taken from papers authored by MBI faculty

