WAP: Cognitive Aspects in Unit Testing

The Hunting Game and the Hunter's Perspective

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Imagine a world...

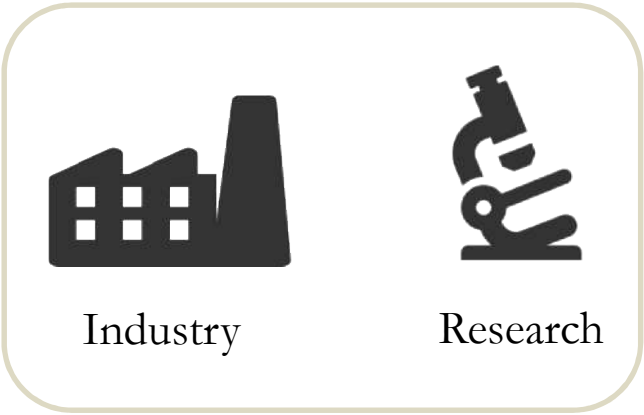
The real world:

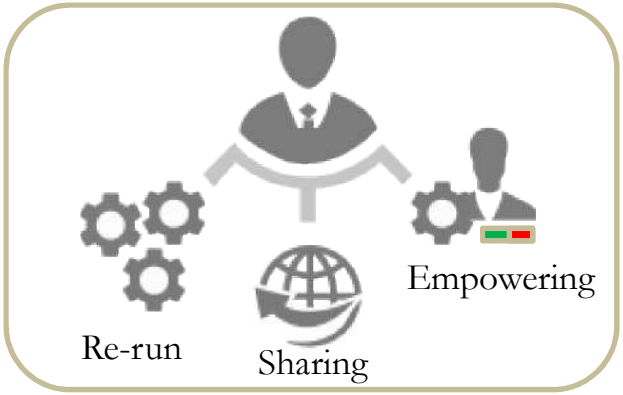
The real world:

Industry

Research

The real world:

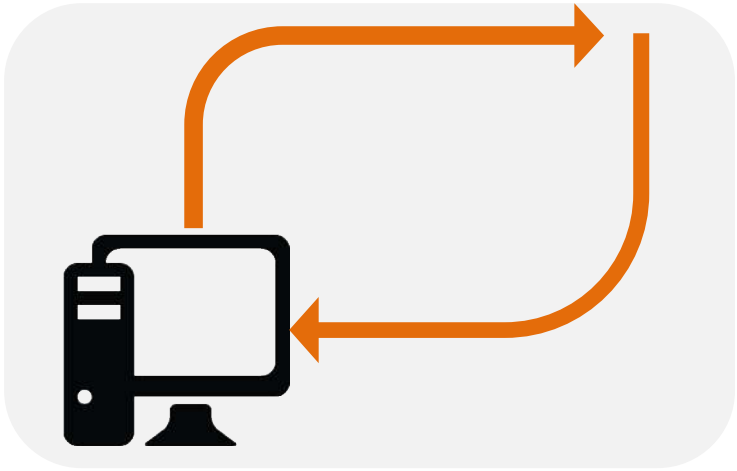




Why Is Automation so Important?

Software testing involves dynamic analysis

Goal: (try) exhaustive testing → feasible solution



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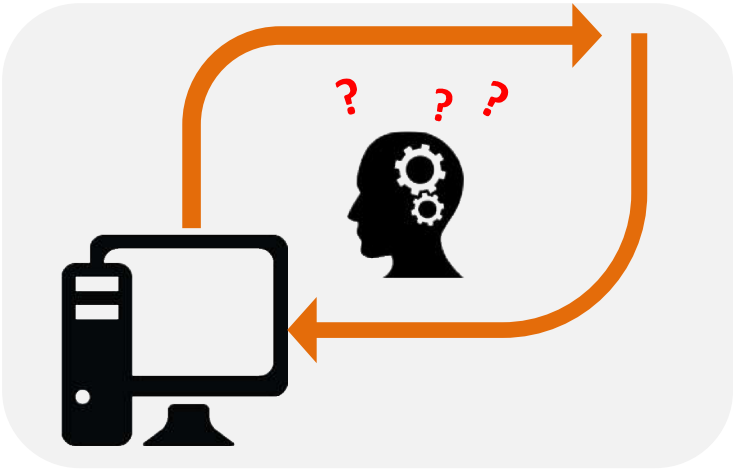


Human Aspects in Software Testing

... a hunting metaphor

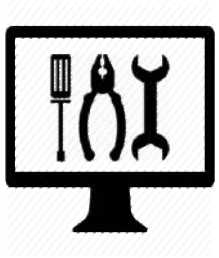
Testers

=

Hunters

=

Game Animals



Tools

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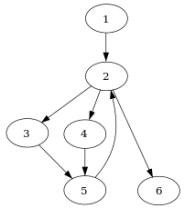
Snares



Techniques

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Tactics

Test Cases Are the Shots

The quality of the hunter's shot determines if the target is hit or not

Test case: embodies tester's intention

Hunters Left out of the Game

Orso and Rothermel, 2014

Challenge and Opportunities

Human Aspects in Sof. Testing
Transfer of Technology

Jia and Harman, 2011

Human-related problems...
Little consideration to human participation

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Daka and Fraser, 2014

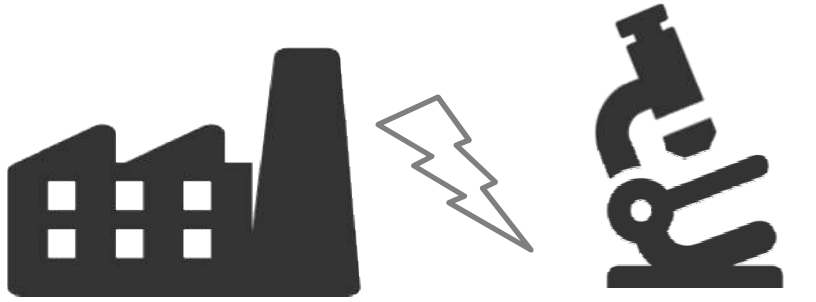
Practitioner's Motivation : "Own Conviction"

Only ½ of respondents report having a positive feeling writing unit tests

Lee et al., 2012

Major barrier: "difficulty of using"

Hunters Left out of the Game



Industry Research

Literature Review

Cognition → interdisciplinary

Common idea: "A mental process is applied to build and use knowledge"

Daka and Fraser, 2014

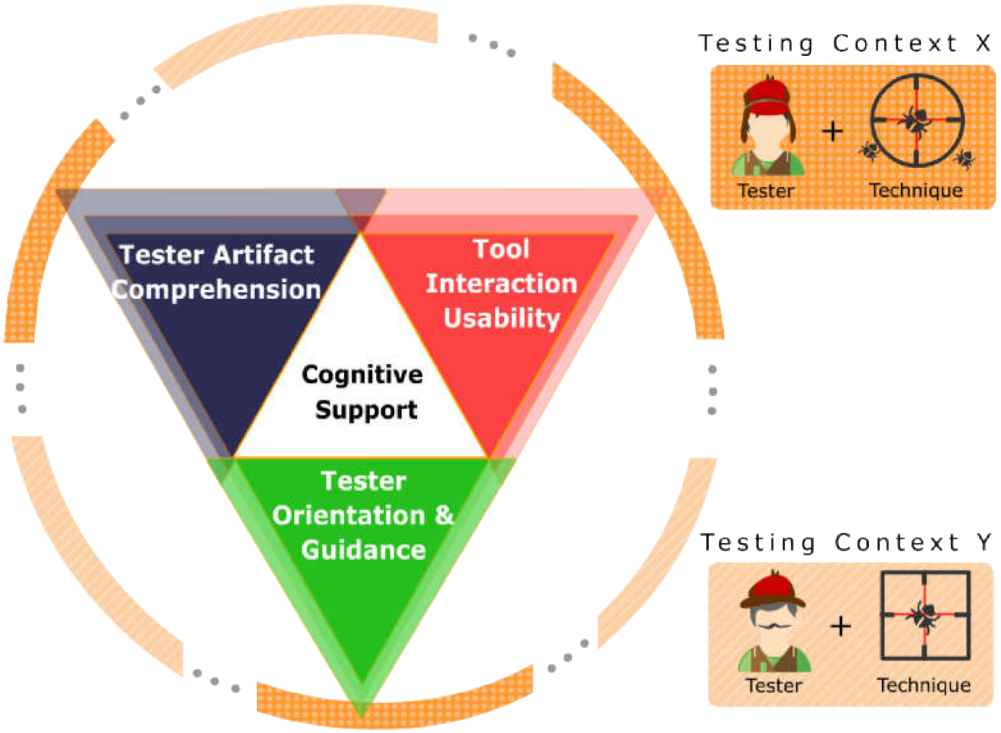
"Developers tend to treat failing tests as defects in the test cases themselves more often than defects in the code."

Recurrent issue in **Runeson, 2004**

Lappalainen et al., 2010

Difficulties with novice developers applying TDD + unit testing → Tool to make test cases more readable and easier to write

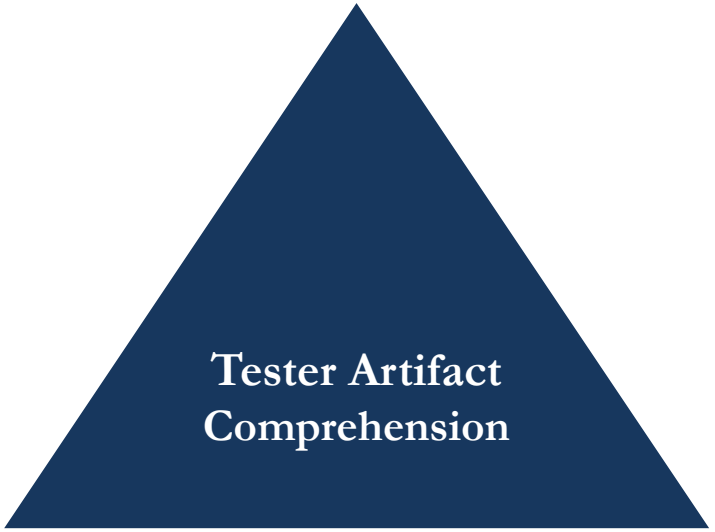
Turning Hunter Needs into a "Research Compass"



Framework with three cognitive dimensions

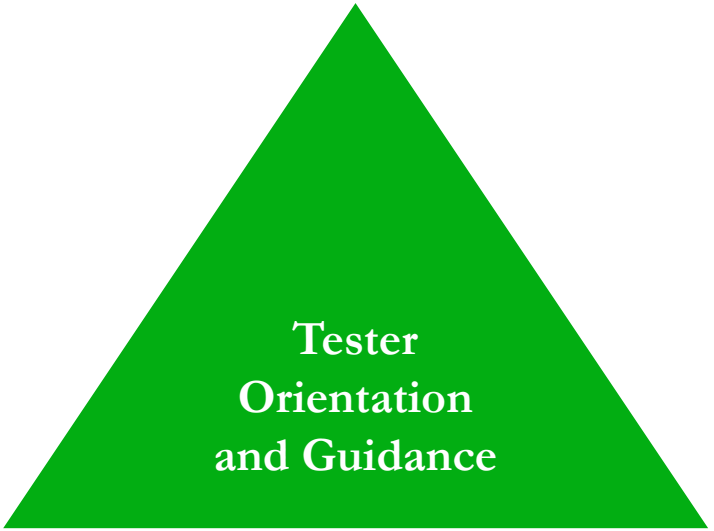
Turning Hunter Needs into a "Research Compass"

Reformulating artifact information to improve comprehension.



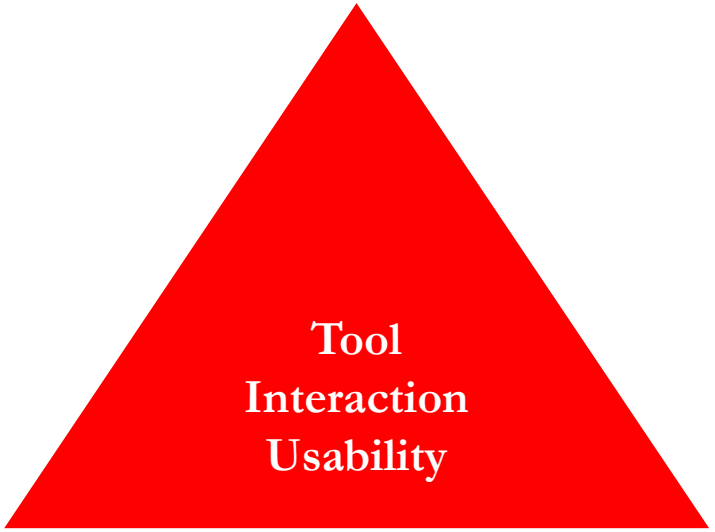
Turning Hunter Needs into a "Research Compass"

Testers may experience disorientation, confusion → Guidance, reference, restrictiveness



Turning Hunter Needs into a "Research Compass"

Issues to set up and operate → visibility of operations, clear feedback.



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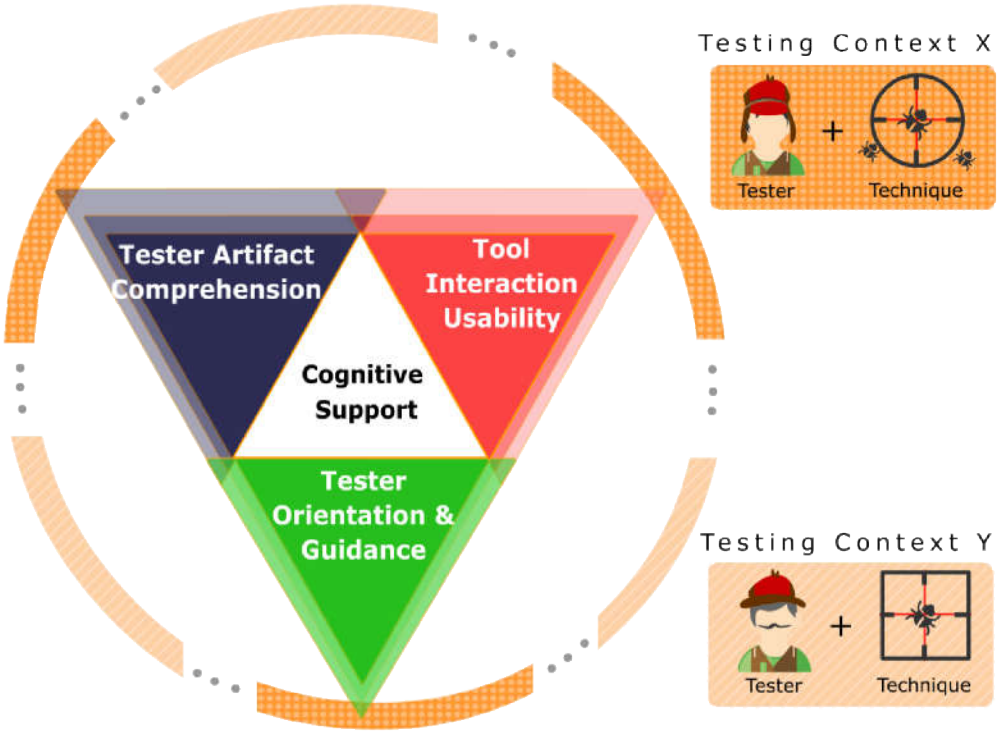

Framework with three cognitive dimensions

Conclusions and Future Work

Tester's perspective not sufficiently emphasized

Focus on the Testers

Literature research

Cognitive issues

Framework to orient problems/solutions

Work in progress

Validate the framework

Survey/prototyping/subject

Questions?

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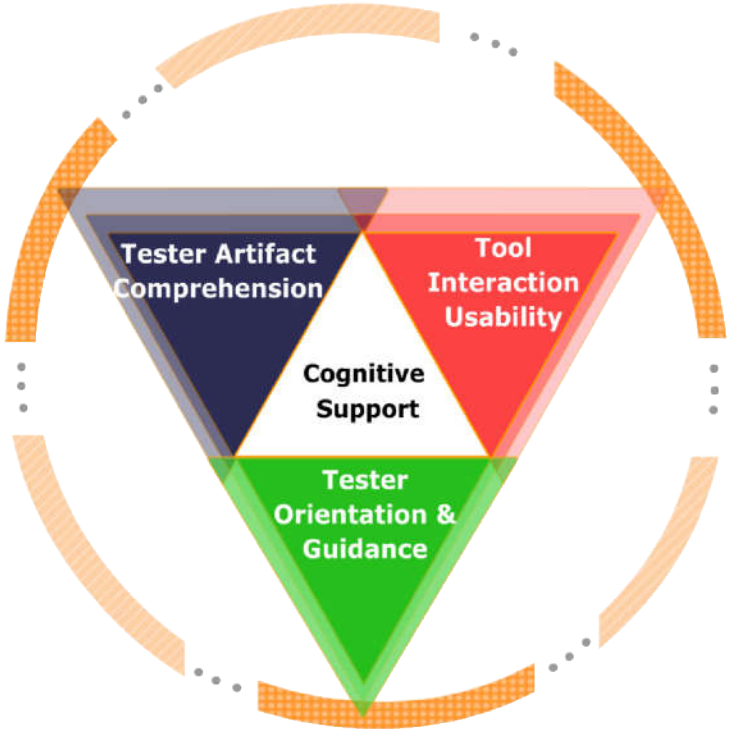
Conselho Nacional de Desenvolvimento Científico e Tecnológico



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Problem

Unit Testing Literature

Evidence of cognitive issues in practice

e.g. False-Positive (F.P.) test cases

Goals

- Getting insight of F.P.'s detection current practice.
- Understanding the role of test case's misjudgement in F.P.'s detection.
- Improvement of tools' GUI interaction during unit testing practice.

Approach

Survey with real practitioners

***Mixed format (open-ended and closed question)**

***Total of 11 questions (approx. 30 min.)**

***Requirements: Experience with unit testing and Black-box technique**