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Our tools are from the Stone Ages

Towards Activity-Aware Tool Support for Change Tasks
Kevic and Fritz, *IEEE International Conference on Software Maintenance and Evolution (ICSME 2017)*

High-level Summary

Problem?

- Very rare for developers to work on one change task at a time.
- Often a lot of code that developers have to “keep in their head” during change tasks.
- Context-switching is expensive, but developers do it anyway.

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Proposed Solution

- Don’t try to change the existing workflows of developers.
- “… provide better and more tailored tool support, thereby reducing developer effort”

Research Questions

RQ1
What are the characteristics and types of developers' activities on change tasks?

RQ2
How accurately can we automatically detect (a) the boundaries of developers' activities and (b) the types of these activities during a change task?

RQ3
Can we use activity information to more accurately identify relevant code elements for a change task?

TABLE II: The six activity types identified in our two studies together with the number of reported instances of each activity type (# instances), the number of different developers that reported them (#devs), and exemplary instances.

Activity type	#instances field | lab	#devs field | lab	Exemplary instances
Changes to source code			
#1 Change functionality	8 | 5	6 | 4	(P11): implementation of the permission value connection (S7): Add config flag for global prefix
#2 Change test case code	6 | 10	4 | 7	(P8): Test the upload of user data (S6): Write new test to test the erroneous behavior [..]
Understanding source code			
#3 Underst. a specific code element	13 | 17	6 | 9	(P2): Check how to read the property pcy.[..].writer (S4): Try to understand Gson.create() method
#4 Underst. a larger context	6 | 17	4 | 9	(P9): [..] why is the data not read correctly? (S4): Find out how I can generate the output that is given [..]
#5 Change task examination	0 | 4	0 | 4	(S10): Inspect task
#6 Searching for specific string	0 | 6	0 | 4	(S11): Search for the setPrettyPrinting
Uncategorized	4 | 0	3 | 0	
	37 | 59		

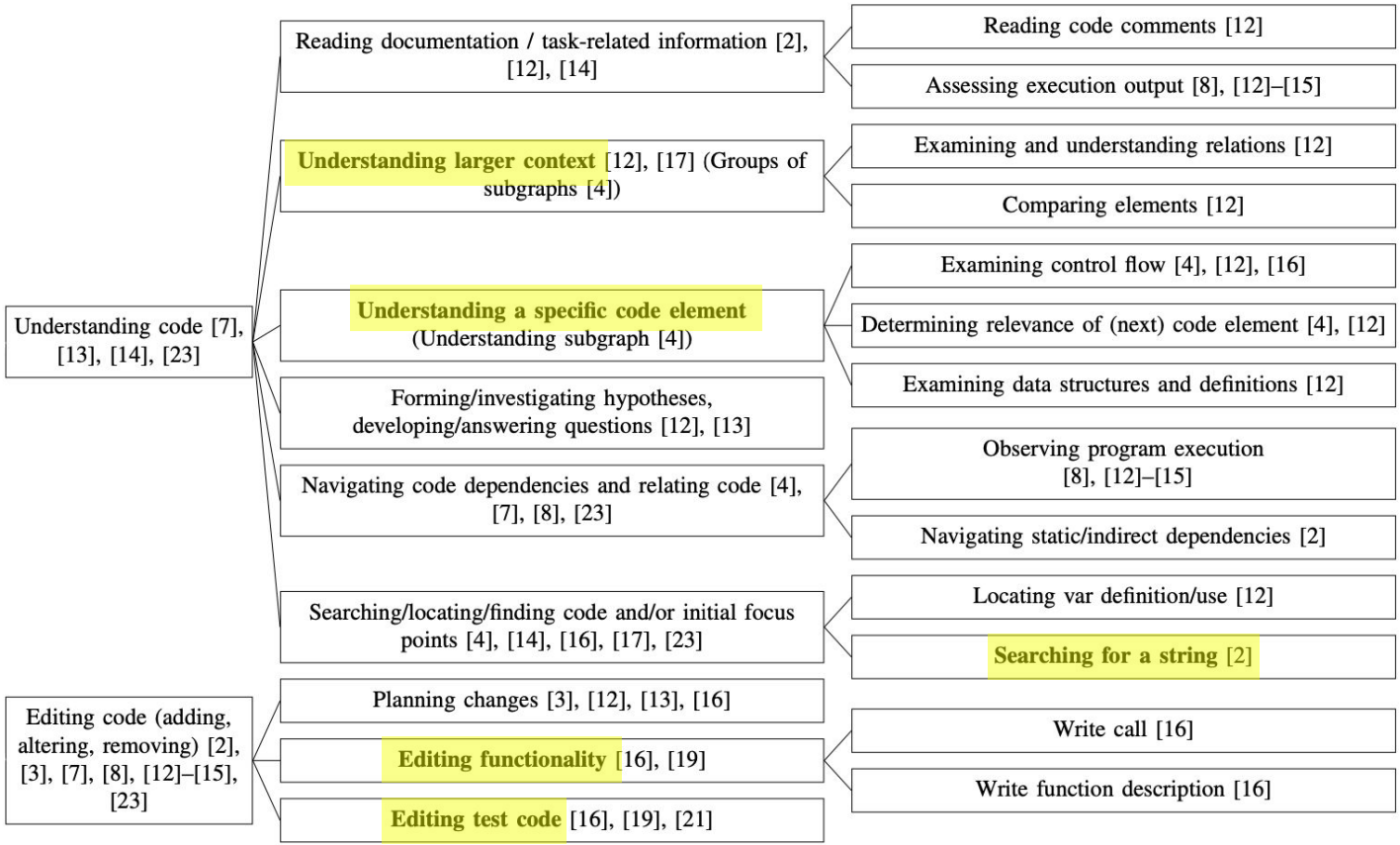


Fig. 1: Overview of developer activities within the IDE based on a coding of related work. (Elements in bold are the activity types we identified, see section IV)

In general: activity information may prove to be more helpful to developers when finding relevant/irrelevant methods

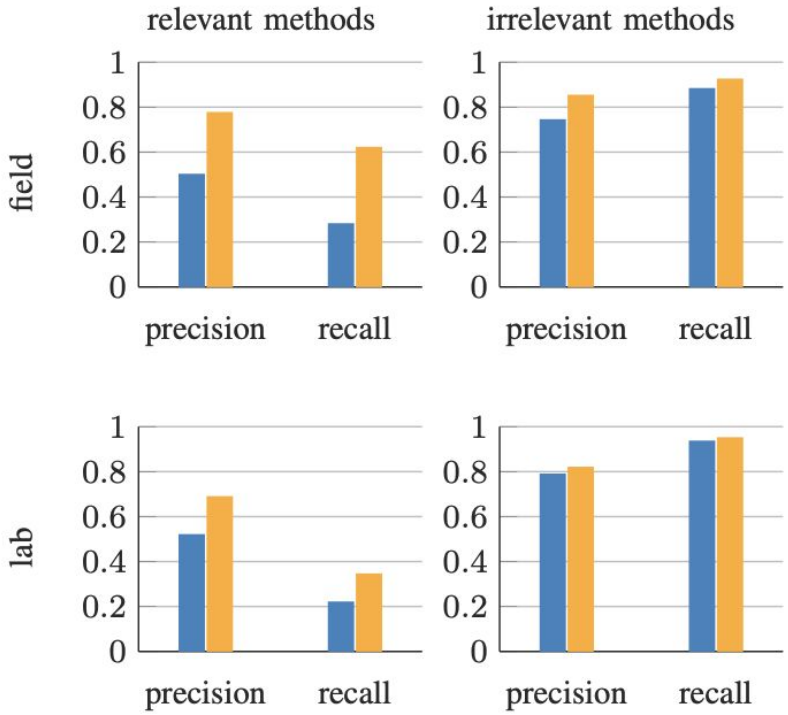


Fig. 5: Identification of relevant and irrelevant methods without (■) and with (■) activity information.

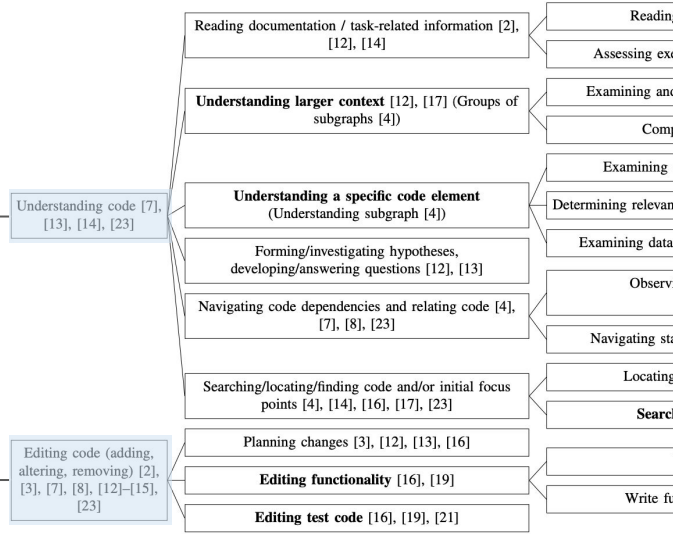
Discussion

- Which is more useful: activity **boundaries** or activity **types**?
- What did you think about the design of the study?
  - Lab participants did not have a ton of experience with the system.
- What is their definition of a relevant code element?
  - “participants identified only 38.4% of the explored code elements—**methods and classes**—as relevant to the activity”
  - Why did **professional take longer** to locate relevant code?
- How much does coding account for a developer’s work-day?

The Work Life of Developers: Activities, Switches and Perceived Productivity

André N. Meyer, Laura E. Barton, Gail C. Murphy, *Member, IEEE,* Thomas Zimmermann, *Member, IEEE,* and Thomas Fritz, *Member, IEEE*

Activity Category		% of time over whole period
Development		
Coding	reading/editing/navigating code (and other code related activities)	21.0%
Debugging	debugging (inside the IDE)	0.4%
Code Reviews	performing code reviews	1.3%
Version Control	reading/accepting/submitting changes	0.7%
Email	reading/writing emails	14.5%
Planning	editing work items/tasks/todos; creating/changing calendar entries	4.8%
Read/write documents	reading/editing documents and other artifacts, e.g. pictures	6.6%
Planned meeting	scheduled meeting/call	6.5%
Informal meeting	ad-hoc, informal communication; e.g. unscheduled phone call / IM, or colleague asks a question	3.4%
Work related browsing	Internet browsing related to code/work/task	11.4%
Work unrelated browsing	Internet browsing work unrelated	5.9%
Other	Anything else; aggregates several small subcategories, such as changing music, updating software, using the file explorer or having a break	11.4%
Other RDP	Remotedesktop use which could not be mapped to another category	12.0%



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