# *Tutoring with Stylus-enabled Tablets*

*SEUH 2020 — 26./27. Februar — Innsbruck*

Bernd Westphal

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# *Coursework Feedback*

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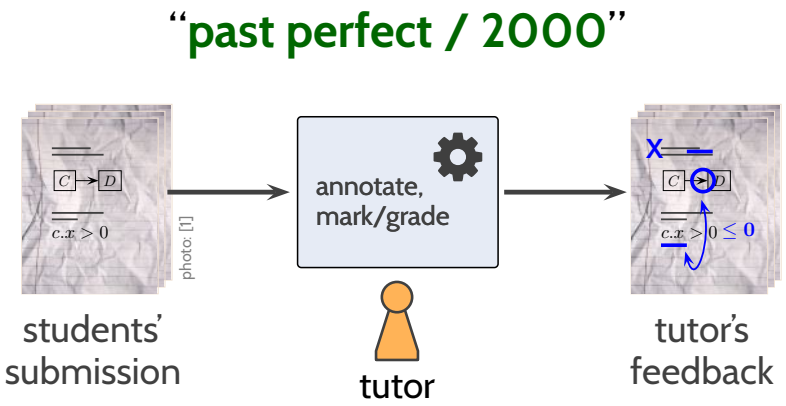

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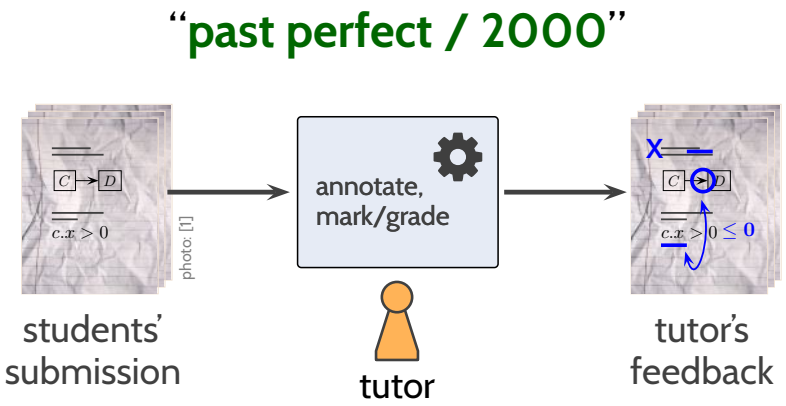


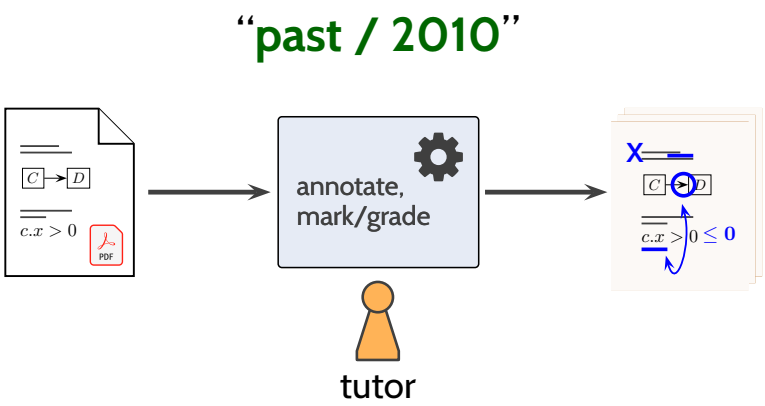

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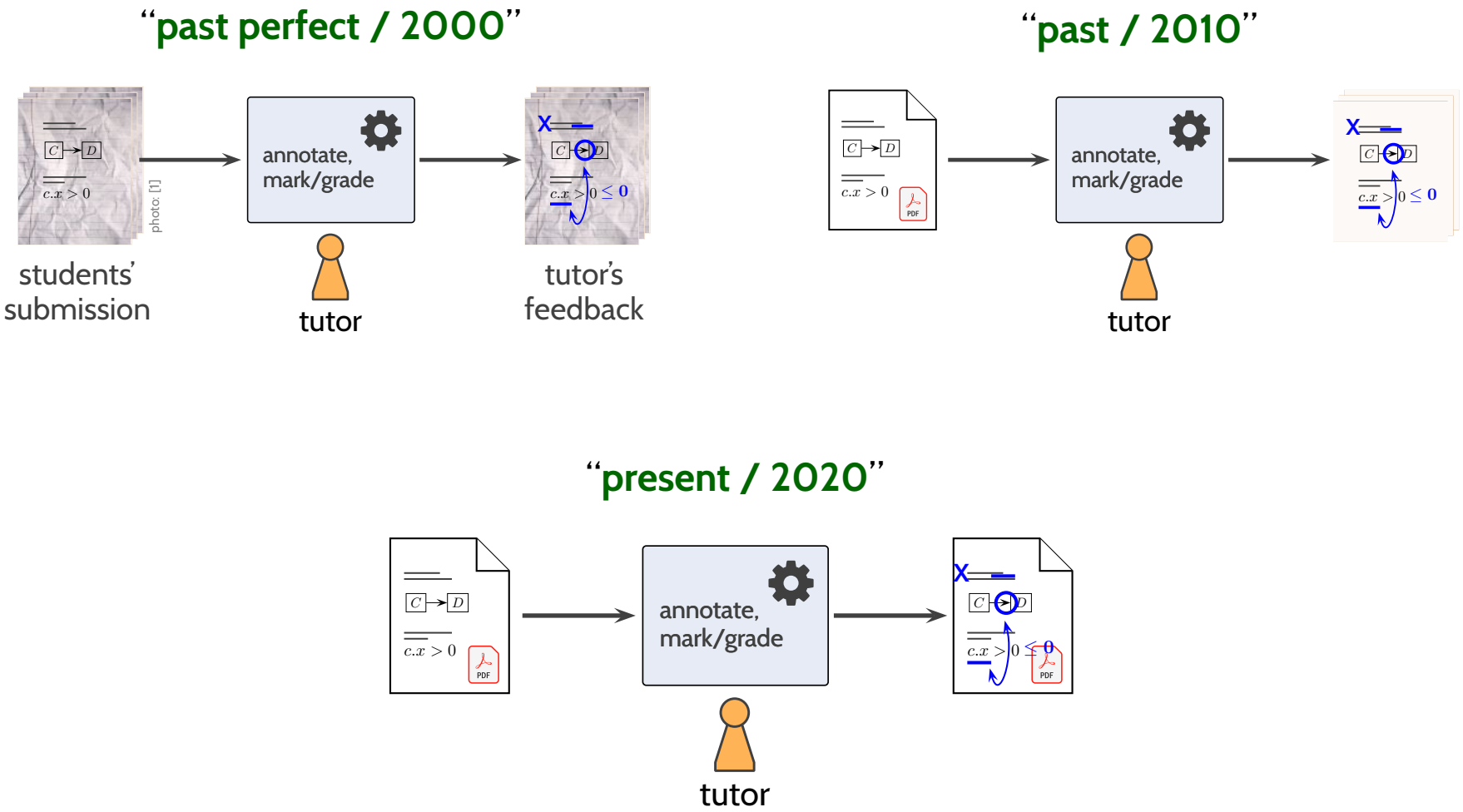

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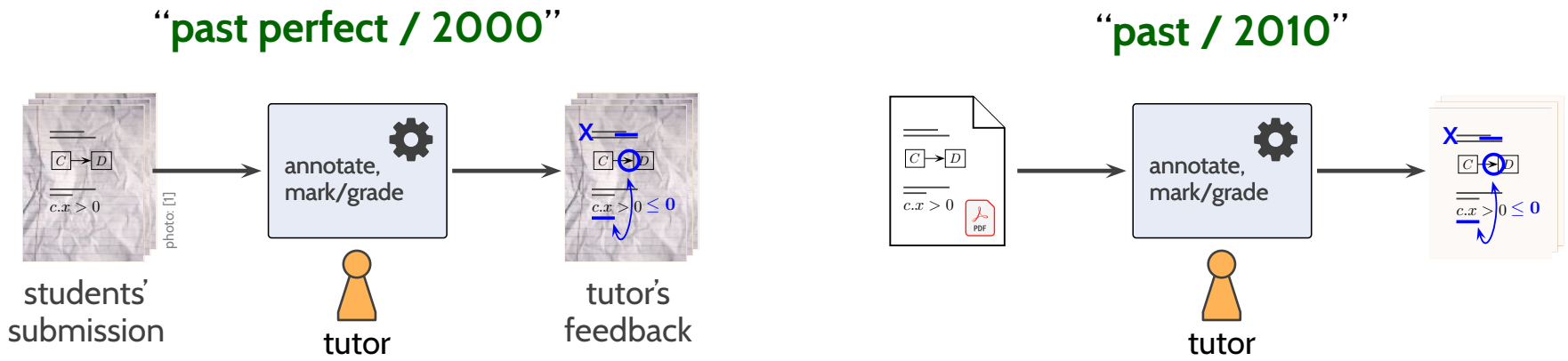


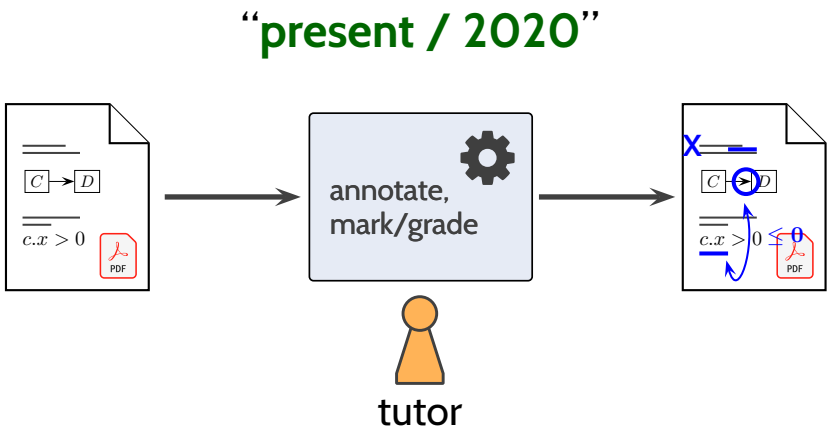


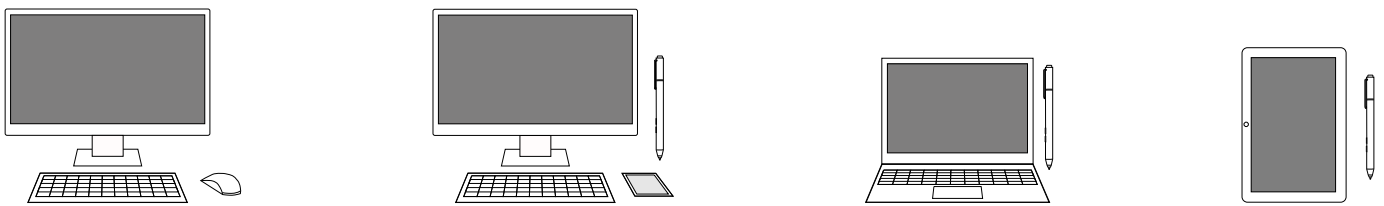

# *Research Questions*

***RQ 1***: *In how far do **today's hardware** and **readily available software** support stylus-based homework marking?*

***RQ 2***: *What is the **maintenance effort** for stylus-based homework marking (pre-semester and in semester)?*

***RQ 3***: *How do **tutors use** available **hard- and software**?*
*How do **tutors** rate overall **usability**?*

***RQ 4***: *How do **tutors use** the **stylus** in homework marking?*

# *Content Overview*

- **Problem**: Digital Coursework Feedback ✔
- **Research Questions** ✔
- **Related Work**
- **Background:** Process, Hardware & Software
- **Responses:** Usage and Usability
- **Conclusion**

# *Related Work — in Chronological Order*

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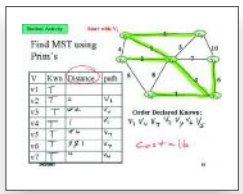
- Popyack et al. (2003): informal report, **2 devices**

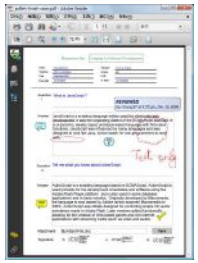
- Berque et al. (2004): classroom tablets

- Anderson et al. (2007b,a):
  tablet-based classroom interaction system



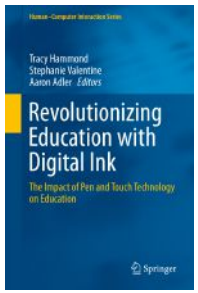
- Bloomfield et al. (2008); Bloomfield (2010):
  exam grading, **own software** (alive?), web-based; many devices, 768x1024 resolution; used (at least) 2007-16; **not tried on homework**

- Chang (2009):
  **own software** (dead?);
  focuses on digital workflow,
  does not use stylus/tablets



- Schneider (2014):
  **one device** (iPad, pre-pencil);
  **commercial software**;
  two teaching assistants
  (**one didn't like the setting**);
  focuses on student perception

- Palou et al. (2016):
  **3 subjects**; focus is students' perspective on 'provide-tablets'
- Romney (2016):
  investigate 'provide-tablets' (to students) vs. retention




- Hammond et al. (2016a):
  briefly mention the **administration effort**
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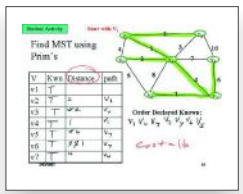

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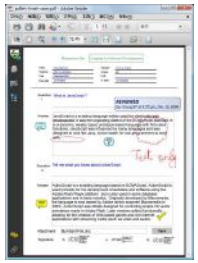

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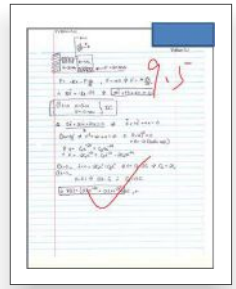

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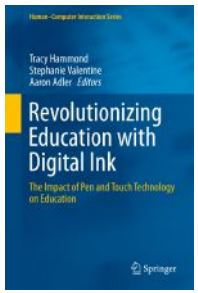


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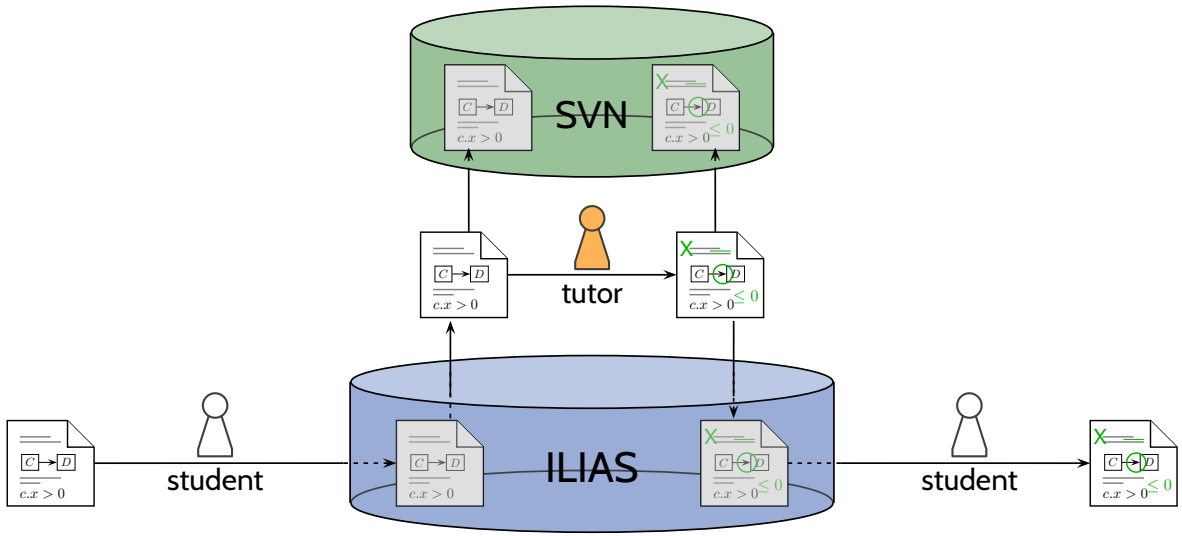
# *Tutoring Process & Schedule*




- $T - 8d$ : **exercise sheet available**
- $\cdots$ : students (and tutors) work on exercises
- $T - 1d$ : early submission to ILIAS, tutors' tutorial
- $T$ : **regular submission, tutorial**
- $\cdots$ : **tutors work on feedback and grading/marking**
- $T + 6d$ : finalise rubric in tutors meeting
- $T + 7d$ : **feedback available on ILIAS**

# *Hardware*

| “Device L” (1x) | “Device M” (3x) |
|---|---|
| **12.2″**<br>**900 g device**<br>300 g keyboard | 12.3″<br>768 g device<br>332 g keyboard |
| **1920 x 1200 (186 ppi)** | 2736 x 1824 (267 ppi) |
| i5-7200U / 2.5 GHz<br>8 GB<br>128 GB SSD | **m3-Y730 / 2.6 GHz**<br>**4 GB**<br>**128 GB SSD** |
| **2016** | 2017 |
| 999 € (incl. stylus) | 899 € (+ 110 € stylus) |

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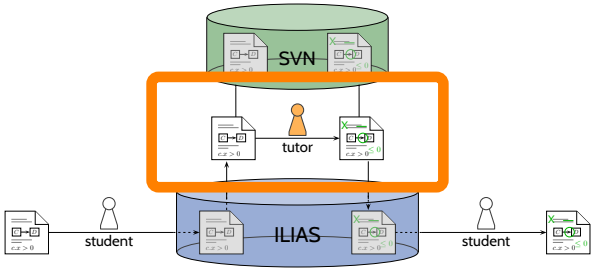

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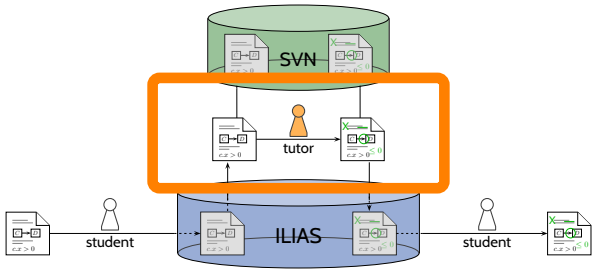
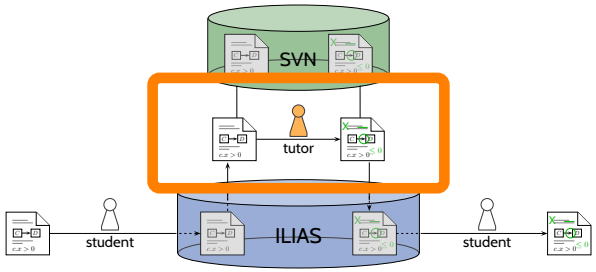



- basic software selection (incl. **web brower** etc.) **plus**:

| Subversion | Xournal | LibreOffice* | `make`(1), TeX Live | Java RE |
|---|---|---|---|---|
| versioning | PDF annotation | spreadsheet | tutorial slides | course tools |

- **plus**: **onscreen keyboard**, **screen setup**, screensaver | battery status,
- **plus**: text editor | PDF viewer | raster & vector* graphics editor,
- and one (non-standard) screen-rotation script & launcher.

# Software

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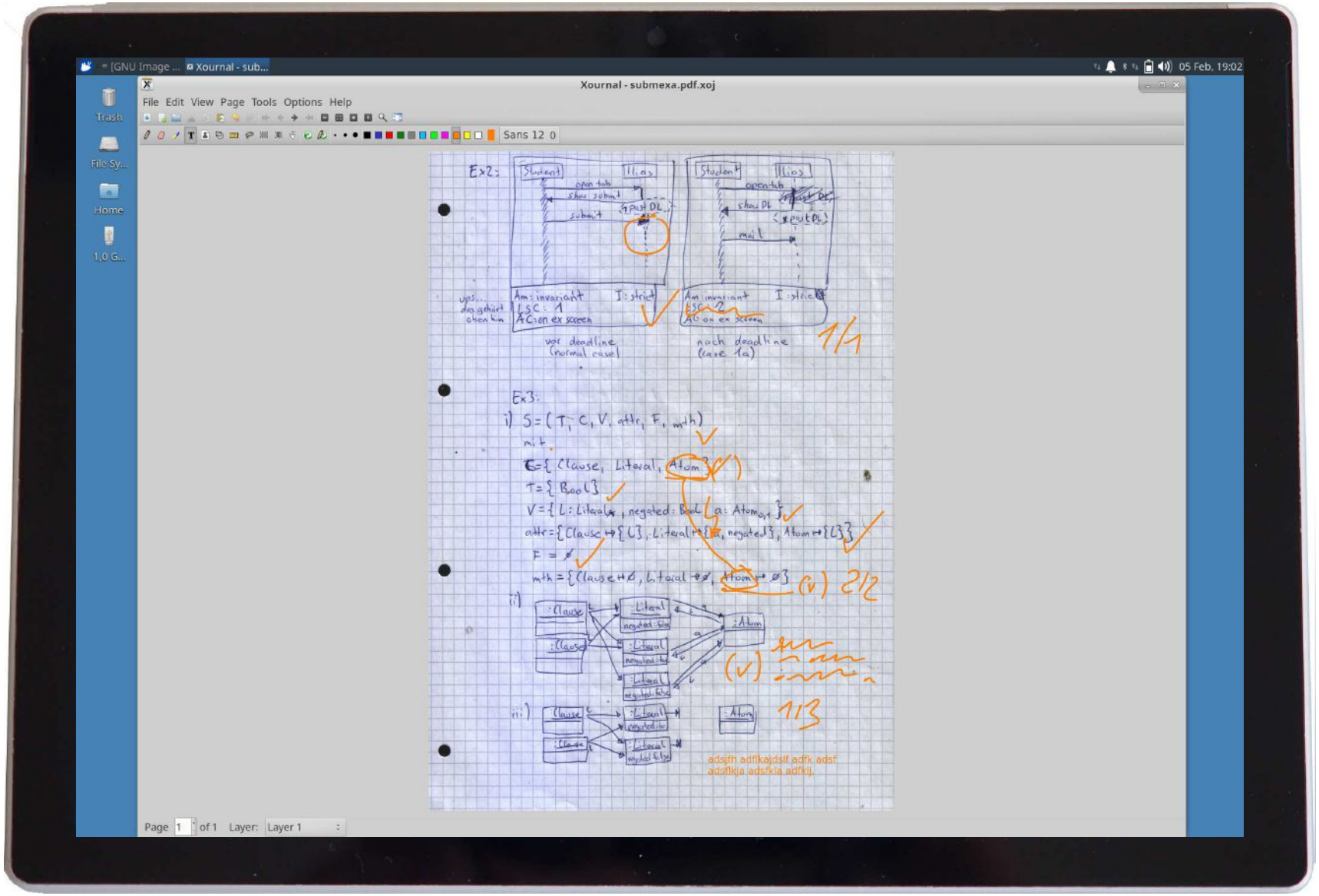
- **Operating System**: consider privacy & maintenance effort (Android, iOS, W10)
  → Xubuntu 18.04 LTS

  **Reset/restore devices** with **one USB-stick** (core system) and **one SDcard**
  (pre-downloaded packages, custom kernels, **application configuration files**)
  following an instruction sheet.

# *Software: PDF Annotation*



# *Experts' Questionnaire & Responses*

# *Questionnaire & Participants*

- **Questionnaire**: 5 Sections
  - Correction Work and Workflow (15 questions)
  - Other Use (3 questions)
  - Working Place Setup (4 questions)
  - Particular Devices and Configurations (10 questions)
  - Free Text (5 questions)

  Single choice / multiple choice (incl. 'other (which?)') / estimations / open questions (incl. 'why?').

- **Season/device/setup**:

  3x 2019–M–Xubuntu, 1x 2019–L–Xubuntu, 1x 2018–L–W10

- **5 responses** (from 5 different tutors)

# *Responses: Workplace Setup*

3.4 With which workplace setups did you work? (**percentage of time**)

- ____% large desk, free space
- ____% smaller desk, tablet squeezed in
- ____% lounge-style (tablet on lap)
- ____% other (which?)

(5 responses; 5 different tutors; 4 in 2019, 1 in 2018; 3 on device M/X, 1 on device L/X, 1 on device L/W)

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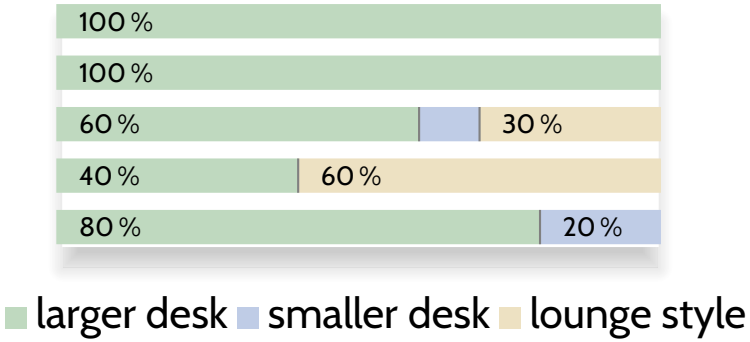


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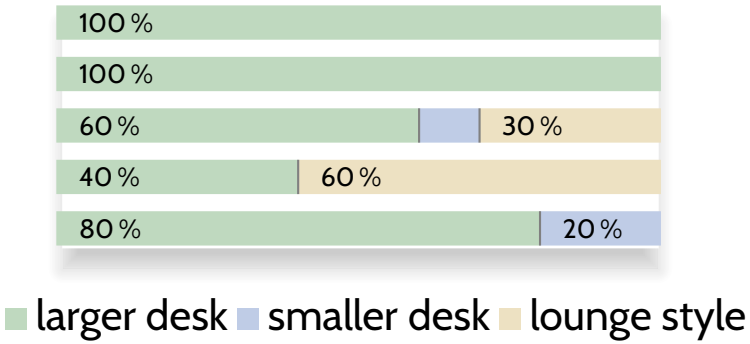


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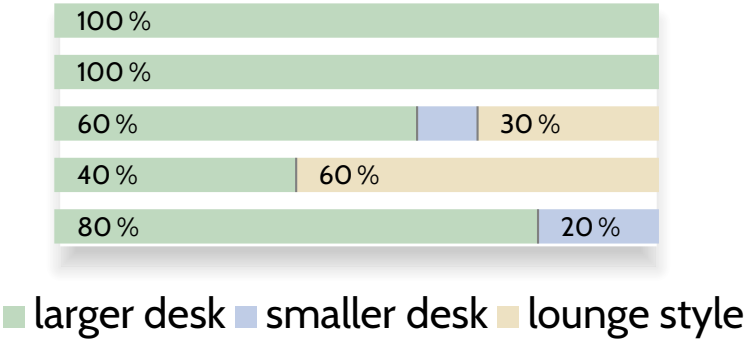


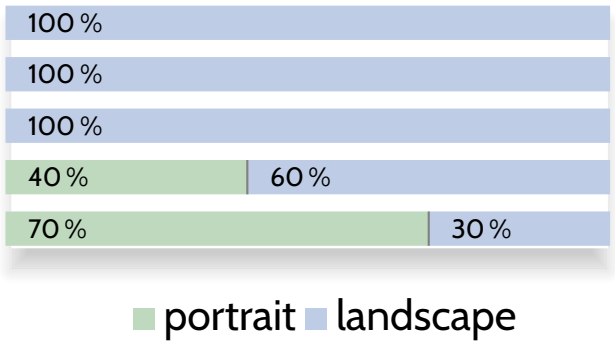


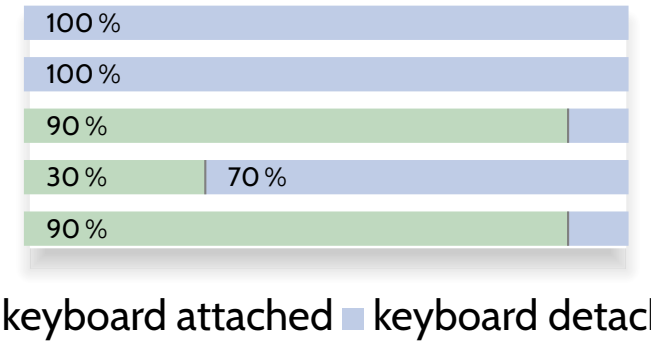


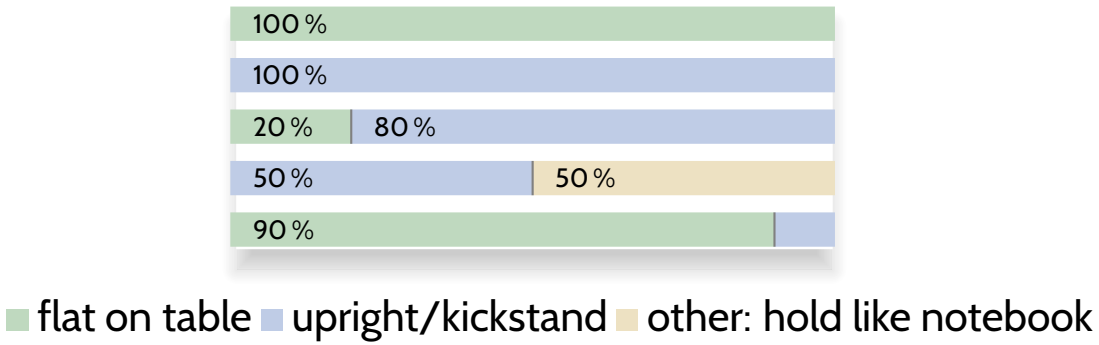


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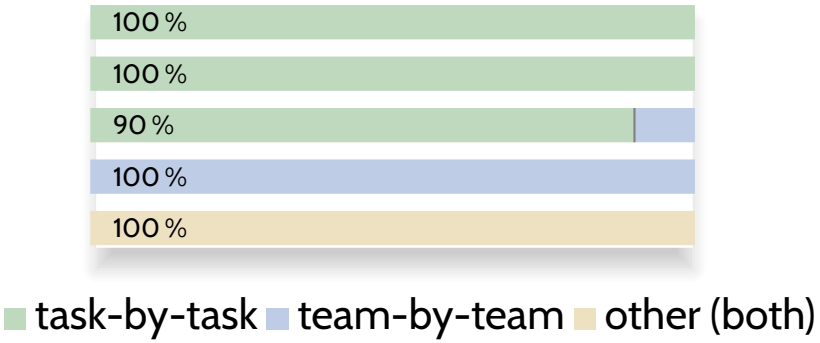
# *Responses: Approach*

1.1 Which correction strategy did you follow? (**percentage of time**)

- ____% task-by-task
- ____% team-by-team
- ____% other (which?)

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# *Responses: Kinds of Annotations*

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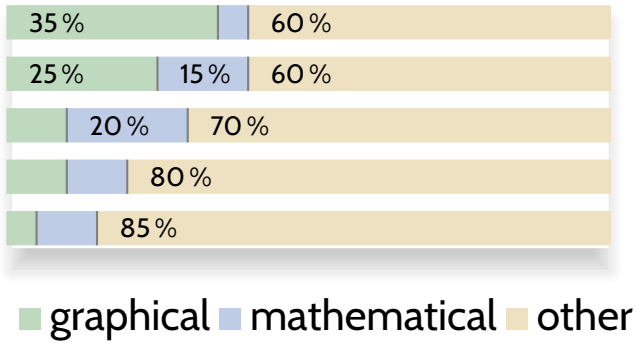
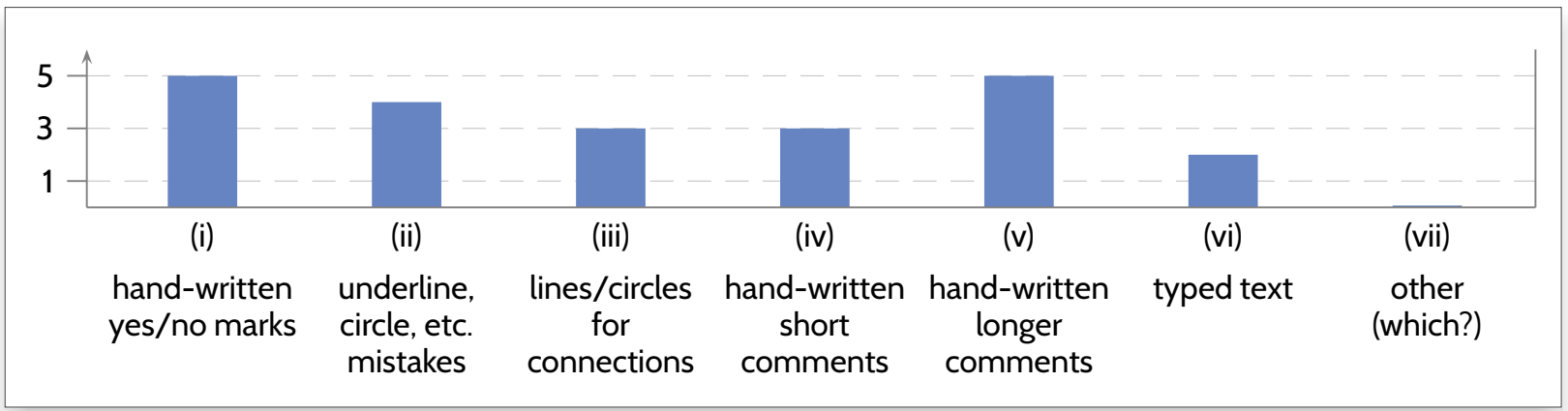
1.3-4 To what amount did your annotations involve…(**percentage of time**)




1.1 What kind of annotations did you add to the submissions? (**at least once**)

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# *Responses: Input Device Usage*

1.5-10 For which tasks did you use …(**at least once**)

- **stylus**: 'draw, erase, operate menus, (scroll/pan, operate icons)', 'everything but typing', 'pretty much everything'
- **touchscreen**: 'zoom', 'nothing', 'none'
- **touchpad**: 'open shell/exercises+solutions', 'right-click', 'none'
- **device keyboard**: 'really long comments', 'save, enter file name, etc.', 'note down points', 'habitual Ctrl+S (saving)', 'logging on', 'none'
- **ext. keyboard**: 'enter filenames, use shortcuts',
- **mouse**: 'browse folders, upload files'

→ **stylus used** (and preferred over touchscreen), some **keyboard/mouse-equivalent useful**.

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# *How do the Tutors Like their Tablets?*

4.8 What was inconvenient about the tablet?

stylus-button ergonomics • font size • screen a bit small • stylus holder shape

5.1/5.2 What did you **like**/**dislike** about using a stylus-tablet for tutoring?

feels like writing • no 'paper chaos' • work at different locations (without needing paper stuff)
clean fixing of own corrections • straight annotation (no need to insert text fields, or print)
everything erasable • corrections always accessible • realistic feeling during writing

needs battery (no problem) • nothing • nothing • device needs charging • nothing bad to say

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4.4 Provisioning: (a) **get-preconfigured-device** (organisers install software)
or (b) **get-blank-device** (tutor installs everything)?

**5x** 'get-preconfigured-device'

(5 responses; 5 different tutors; 4 in 2019, 1 in 2018; 3 on device M/ X, 1 on device L/ X, 1 on device L/ W)

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- Our **tutors** did use the potential of styluses in coursework correction.

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- **Goal**: Reach a **professional**, **digital** working environment for **tutors**, like professional visual artists, video editors, radio hosts, etc. have:

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and that is **at least as convenient and effective** as paper & pen (on relevant aspects).

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- Under development:
  - further **improve device setup**,
  - further explore and exploit potentials of the (relatively) new technology, e.g., meaningful **correction stamps** for efficient and effective tutor/student communication.

*Thank You!*

# References


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