CLOZE:

Designing an authoring tool for teachers with low computer proficiency

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TEM, MSR India 2010

Education is important

ICTs are playing a part…

Student access to PCs increases attendance in markets with poor attendance.

Strong anecdotal evidence in India that children attend school more, if they have an opportunity to interact with PCs.

Teachers
- PC labs keep students occupied

Students
- Excited by opportunity to interact with PCs

Parents
- Want children to learn about PCs

Governments and Administrators
- Eager to put PCs in schools
- *Constrained by limited budgets*

A Shanti Bhavan 6th grader, and potential computer engineer, with her mother

Sources: Pal, J., M. Lakshmanan, and K. Toyama, My Child Will be Respected': Parental Perspectives on Computers in Rural India, Proceedings of ICTD2007.
Various field notes by U. S. Pawar, D. Hutchful, S. Panjwani, L. Micallef, K.Toyama, 2005-2008

Very scarce evidence for PC value in basic (i.e., non-IT), school-based education.

Students drilling arithmetic in Pondicherry.

PCs are very difficult to incorporate into mainstream educational curriculum [data from India, Mexico, Brazil, USA]

- Little research or consensus on exactly what to do with a PC
- Poor match between software and curriculum
- Teachers frequently undertrained

A few exceptions exist, primarily in developed countries (e.g., Maine Learning Technology Initiative http://www.maine.gov/mlti/)

Technology as amplifier: PCs make good schools better, and bad schools worse.

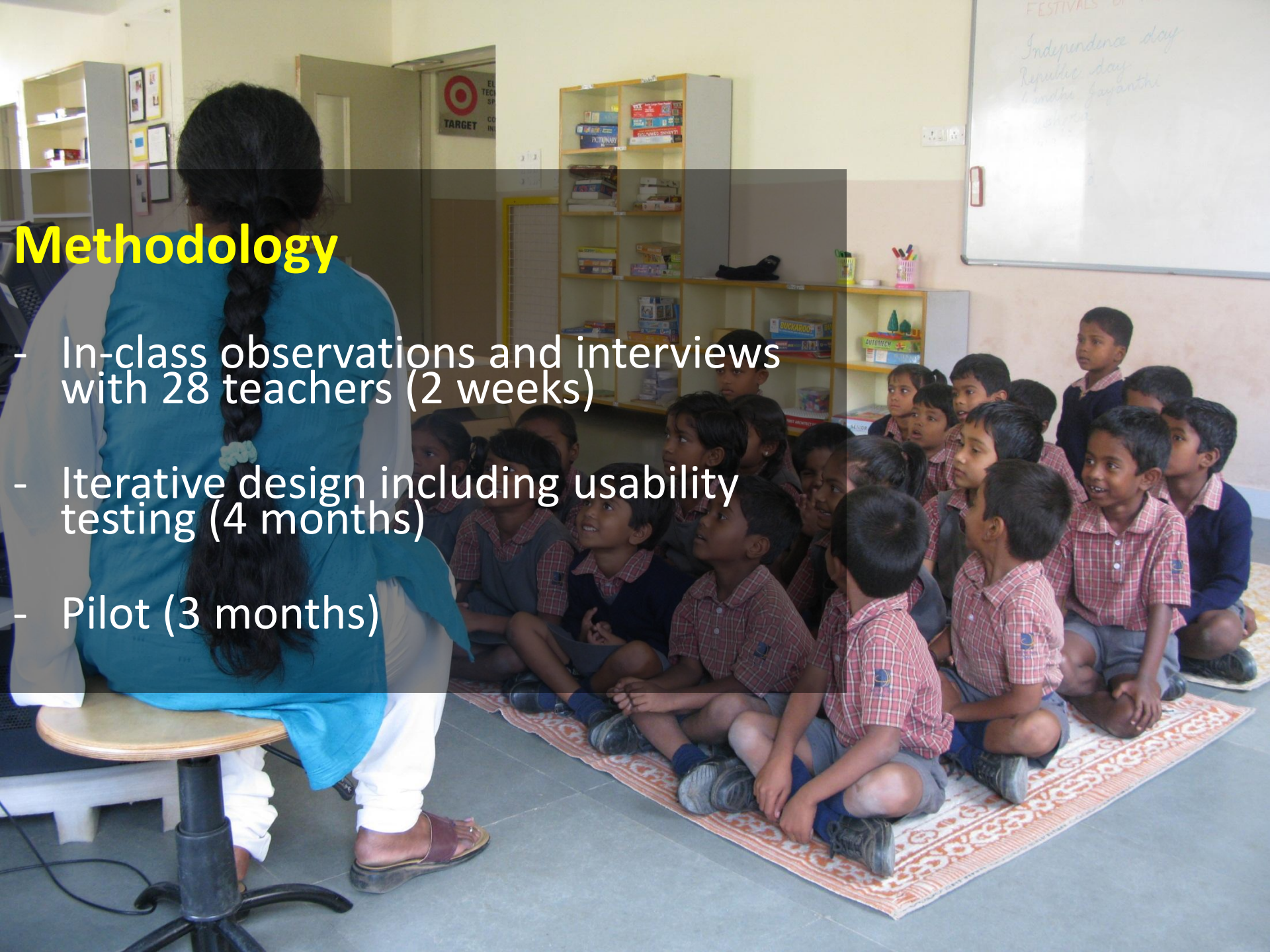
Sources: Mark Warschauer, (2003) Demystifying the digital divide. *Scientific American* 289(2), 42-47.
Todd Oppenheimer (2003) *The Flickering Mind*. Random House.
Leigh Linden, Felipe Barrera-Osorio. "The Use and Misuse of Computers in Education: Evidence from a Randomized Controlled Trial of a Language Arts Program" with Felipe Barrera-Osorio (under review)

Question: How do we improve on the effectiveness of computers in education?

Photo credit: BBC (http://news.bbc.co.uk/2/hi/in_pictures/7115712.stm)

Get the teacher involved?

Photo credit: http://ssa.nic.in/author/admin



Methodology

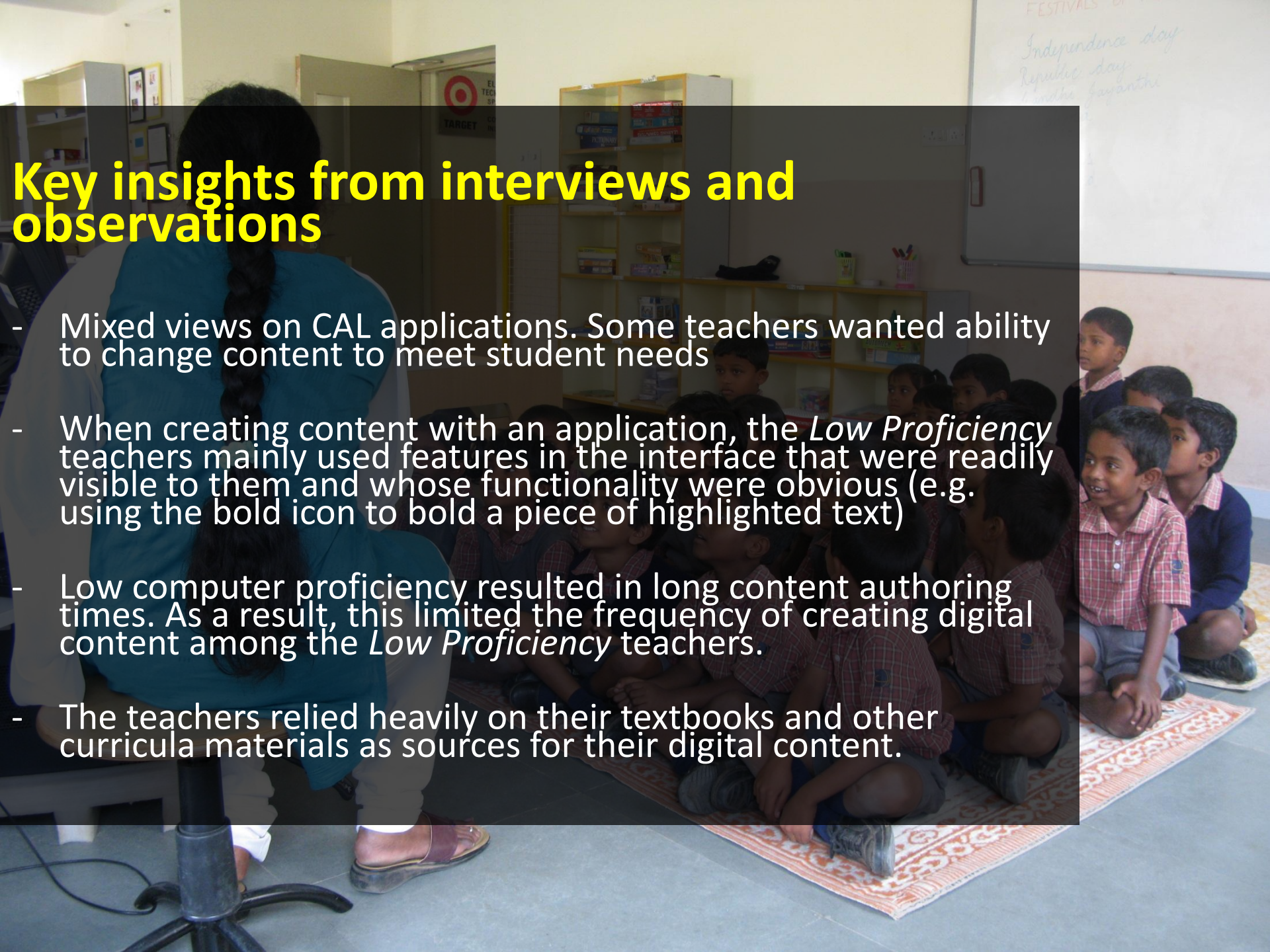
- In-class observations and interviews with 28 teachers (2 weeks)
- Iterative design including usability testing (4 months)
- Pilot (3 months)

Teacher profiles

- 28 teachers
- 1-20 years teaching experience
- 6^{th}-10^{th} standard
- Commuted, some an hour, to work
- Hectic schedule. Gravitated towards activities that took little time and effort to prepare
- Cared most about the academic welfare of their students
- Generally shared positive views on computer use in education

Teacher profiles

	Non-User	Low Proficiency	High Proficiency
Frequency of use (weekly)	0-1	0 - 3	5
Assistance Required	Most of the time	Sometimes	No
Familiarity with MS Word & MS PowerPoint	Low familiarity. Most times they delegated work to others more proficient.	Familiar. However, they only utilized the few features which they knew.	High familiarity. Could create PPTs with complex animations and manipulate Excel sheets.
Familiarity with other applications	None to Low familiarity	Low familiarity. Some could use Internet browsers	High familiarity. Some could create their own web pages and software code



Key insights from interviews and observations

- Mixed views on CAL applications. Some teachers wanted ability to change content to meet student needs
- When creating content with an application, the *Low Proficiency* teachers mainly used features in the interface that were readily visible to them and whose functionality were obvious (e.g. using the bold icon to bold a piece of highlighted text)
- Low computer proficiency resulted in long content authoring times. As a result, this limited the frequency of creating digital content among the *Low Proficiency* teachers.
- The teachers relied heavily on their textbooks and other curricula materials as sources for their digital content.

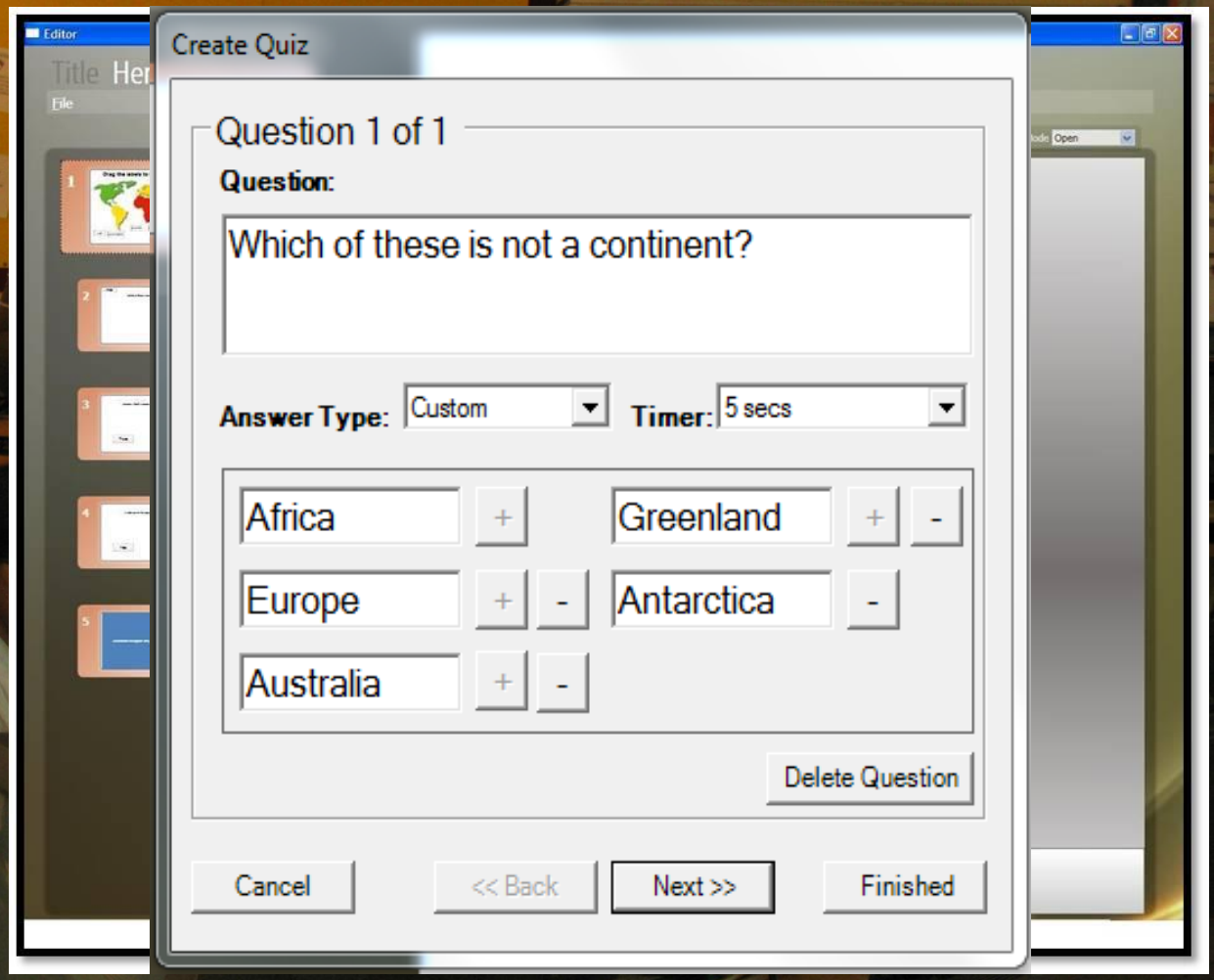
Design goals

- The application should have a simple and intuitive user interface.
- The application should require little of a teacher‘s time to generate content. The interface and interaction modes should also reflect this property.
- The application should facilitate the integration of textbook and other curricula materials to support the teachers' existing practices.

Iterative prototyping

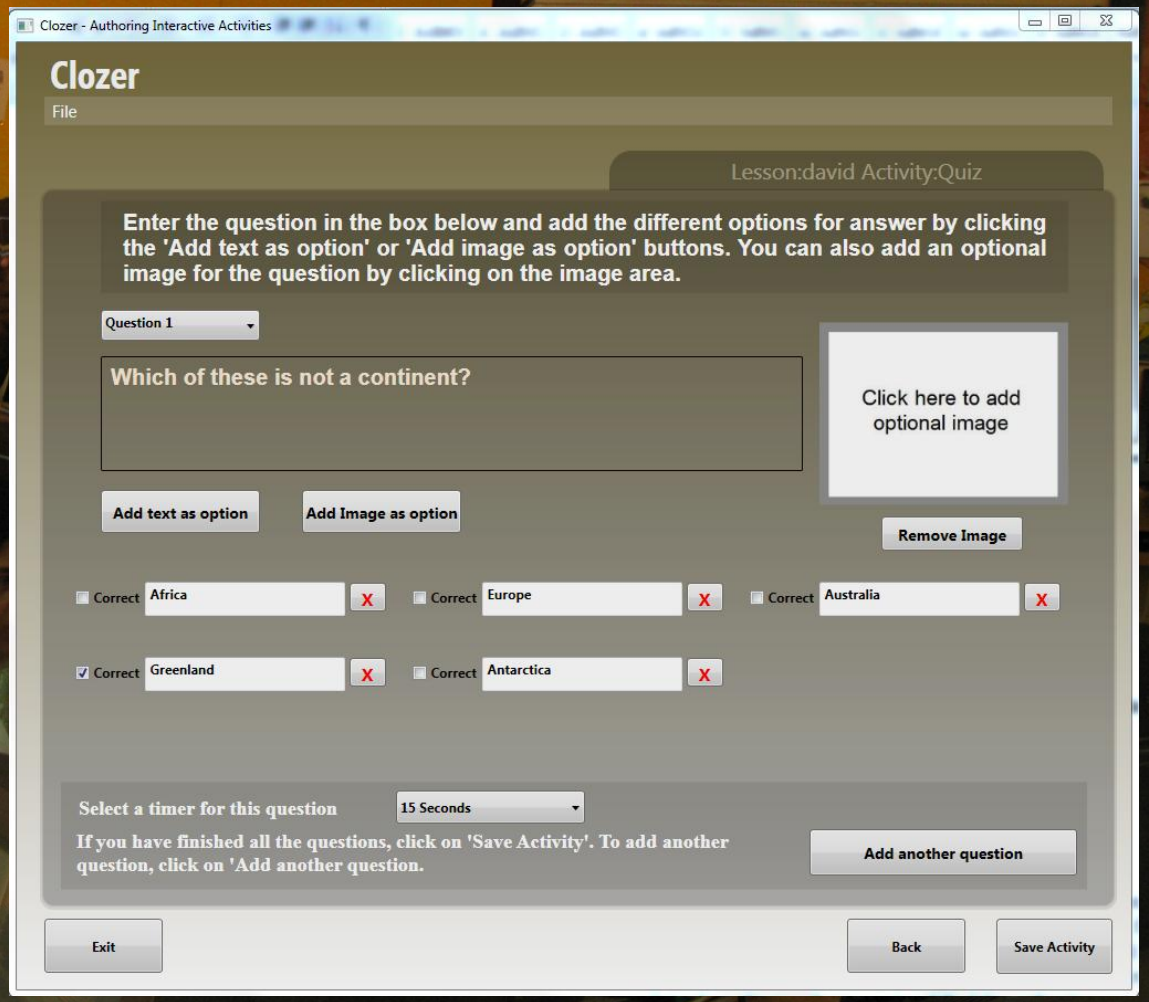
Prototyping

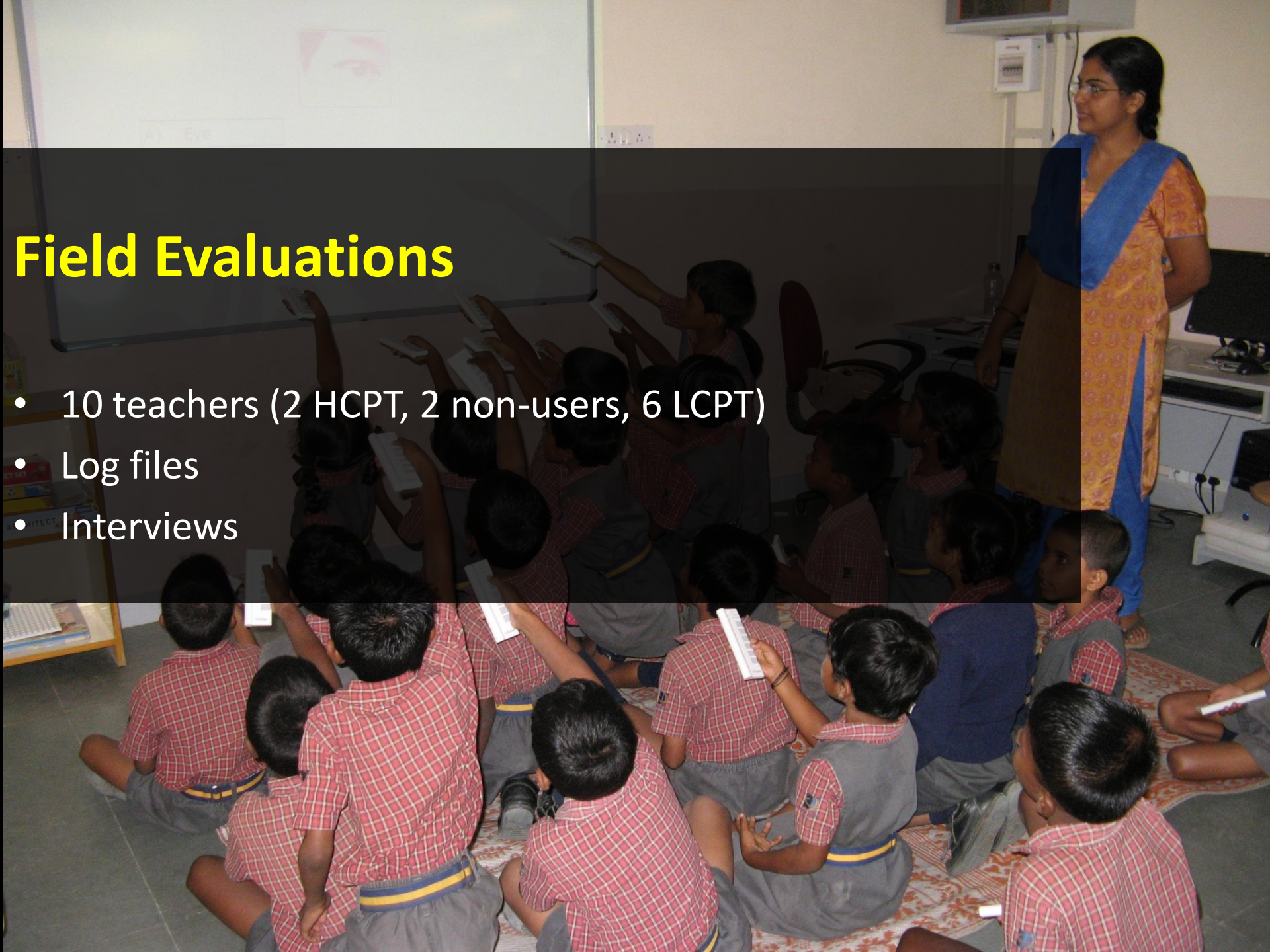
Low proficiency teachers found the mouse difficult to use for interactions that went beyond single click.



Prototyping

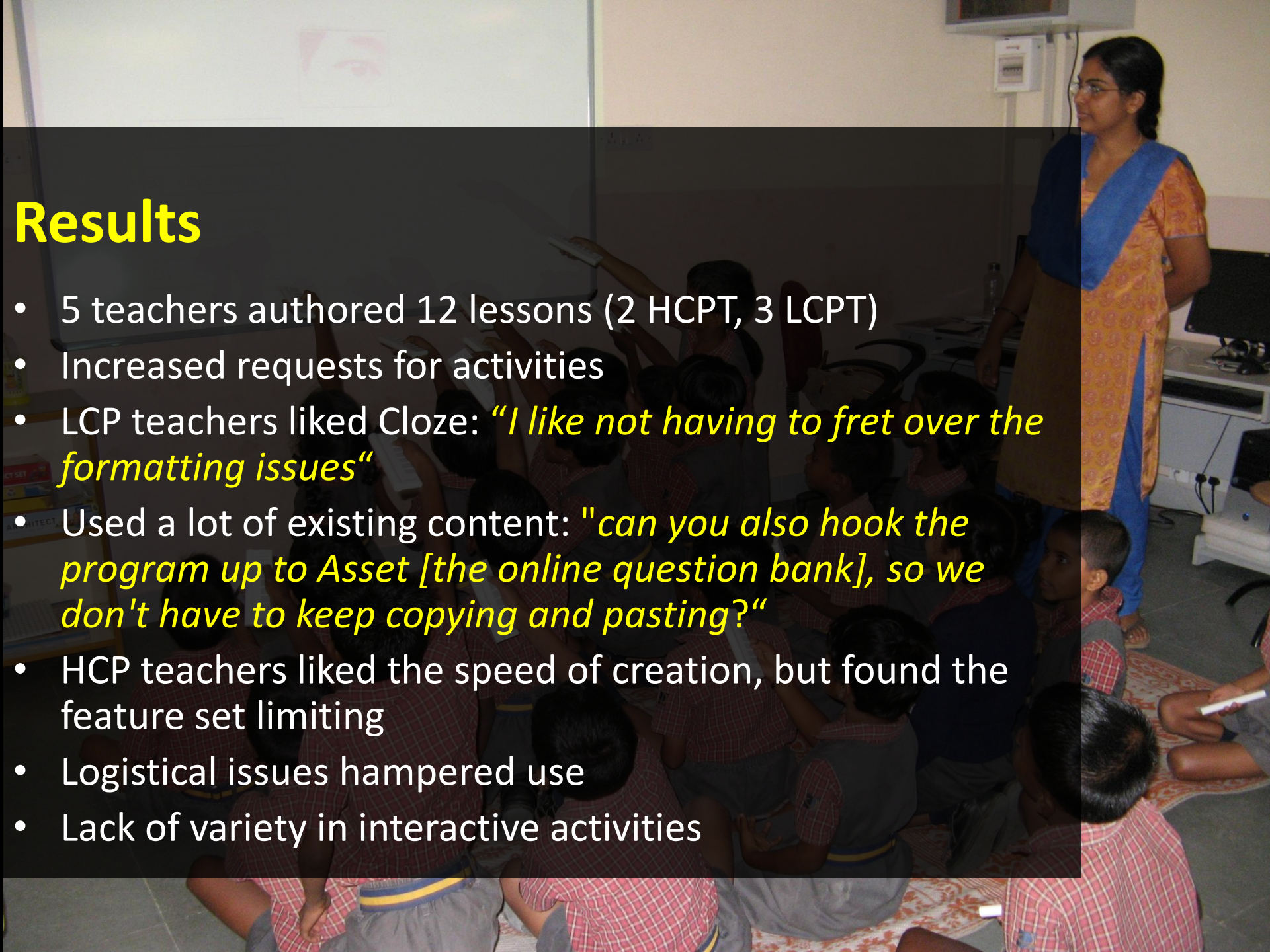
Low Proficiency teachers prefer a task-oriented interface for content creation.





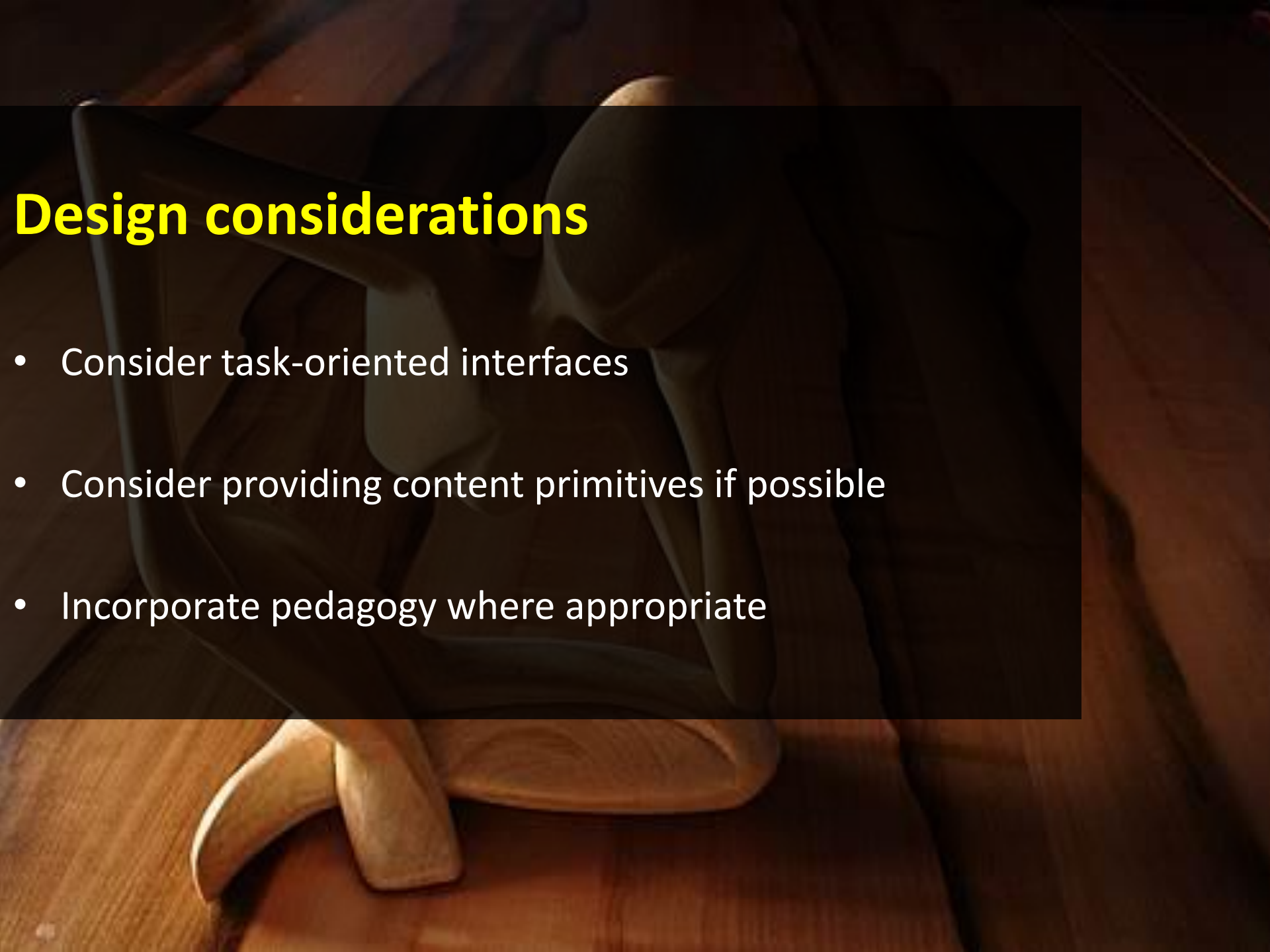
Field Evaluations

- 10 teachers (2 HCPT, 2 non-users, 6 LCPT)
- Log files
- Interviews



Results

- 5 teachers authored 12 lessons (2 HCPT, 3 LCPT)
- Increased requests for activities
- LCP teachers liked Cloze: *“I like not having to fret over the formatting issues“*
- Used a lot of existing content: "*can you also hook the program up to Asset [the online question bank], so we don't have to keep copying and pasting*?“
- HCP teachers liked the speed of creation, but found the feature set limiting
- Logistical issues hampered use
- Lack of variety in interactive activities



Design considerations

- Consider task-oriented interfaces
- Consider providing content primitives if possible
- Incorporate pedagogy where appropriate

Thanks