
Exposing the Myths and Realities of Web-Based Learning Tools

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Outline

- Website usability
- Web-based learning tools
- An experiment to evaluate web-based learning tools:
 - Research goals
 - Methodology
 - Results and observations
 - Suggestions and recommendations
 - Unanswered questions
- Discussion on the Ethics of using students to evaluate web based learning tools
-

Website usability

- Information Architecture is about understanding and conveying the big picture of a web site
- Users don't notice the information architecture of a site unless it isn't working!
- Known item searching versus casual browsing
- There are no natural landmarks
- “Scent of Information”
- Consistency is king!

What bothers users the most when using web?

- Delays/speed
- Lack of trust, privacy
- Traps, broken links, mystery meat navigation
- Easy to get lost
- Need for plug-ins
- Frames; overdone Flash animations; and gratuitous flashscreens
- Hard to read
- Availability
- Accessibility

Web-based learning tools

- *Web-based learning tools* provide integrated environments of various technologies to support diverse educators' and learners' needs via the Internet
- Goal -- enhance face-to-face instruction and to deliver distance-learning courses
- Main features:
 - course note posting
 - news
 - assignment submissions
 - quizzes, interactive exercises
 - communication features

“No longer is the student waiting for the teacher to teach. Rather the effective learner takes control of their educational program and utilizes the tools provided by the learning institute...”

From Both sides now,
by Laurie P. Dringus

Evaluation of web based learning tools

- Very little evaluation has been done...
- Not clear if the expected advantages outweigh potential disadvantages
- Do they positively or negatively impact students' learning?
- Few case studies
 - one exemption, students just used one tool (WebCT) the result – no undue burden placed on students, but many found it difficult to use (?)



Research goals

**Research
goals**

Methodology

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Issues

Suggestions

Questions

- Evaluate web-based learning technologies
- Make recommendations to the University of Victoria
- Make recommendations to the software developers



Research questions

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- How would students rate the usability of the separate components of these tools as well as each tool's overall navigation?
- How much effort was required by the students to learn how to use web-based learning tools?
- Are the tools usable from both the instructors' and administrators' perspectives?
- What are the students' perceptions of how these tools impact their learning?
- How do students feel about the deployment of these tools in university courses?



Research team

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- Professor from Computer Science (me)
- Professor from Experimental Psychology (Janet Bavelas)
- PhD (ABD) – Bruce Phillips, research interests were in computer mediated communication
- PhD student – Social Sciences background, interests effects of the internet on youth
- Masters student – Computer Science, web-based learning tool evaluation (HCI)



What we did

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- Selected web-based learning tools
- Simultaneously deployed tools in a university undergraduate course
- Compared and evaluated candidate tools



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Tool Selection

- WebCT 2.0
 - used by 1,350 institutions
 - cost (US)\$3000.00/per year/per institution
- Blackboard 4.08
 - used by more than 3,300 institutions
 - cost (US)\$5000.00/per year/per institution
- Generic website
- Learning space...



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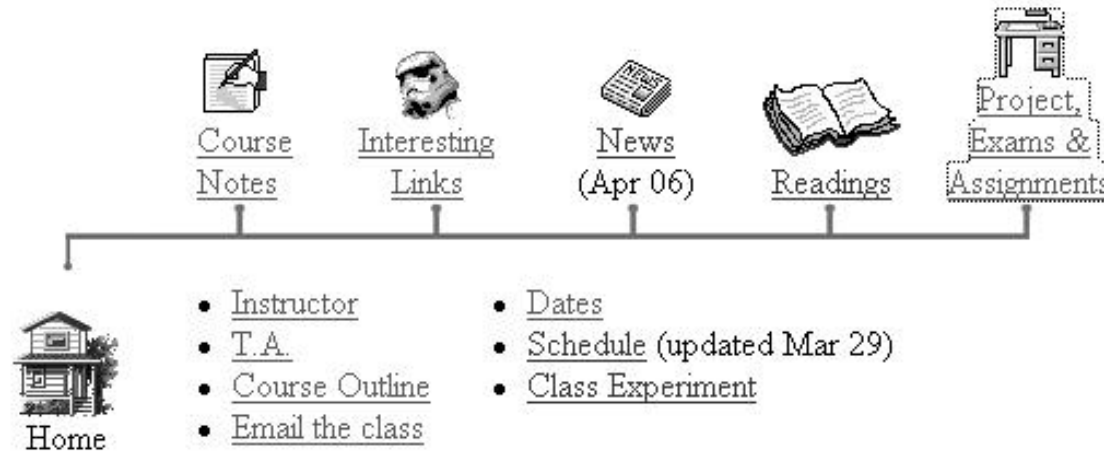
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Generic website

SENG 310 -- Human Computer Interaction



Instructor: Dr. Margaret-Anne Storey

TA: Bruce Phillips

Lecture Hours:

M 10:00 11:30 in CIT 116

R 10:00 11:30 in Cle A201

Office:

EOW 313

Office Hours:

Monday 12:15 - 1:15 pm

Thursday 1:30 - 2:30 pm

Or by appointment

Office:

TBD

Office Hours:

TBD

Email: bruce@uvic.ca



My Computer



**Research
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WebCT



**Human Computer
Interaction**



Announcements



Course Information



Staff Information



Course Materials



Assignments



External Links



Communication Tools



Student Tools



Course Map

[my WebCT]



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Blackboard

Tester2 BBTester

seng310: Human Computer Interaction

Human Computer Interaction

Announcements

Posted in the Last Two Weeks

Subject: Thursday, April 06th 2000

Posted by Mei Wang on Apr 6, 2000

Reminder: the final exam is on Monday, April 10th at 9am in CIT 105.

To discuss the results from the WebCT/Blackboard tool study, we have planned a pizza/debriefing party for April 14th at Noon. Everyone is welcome! Location is now confirmed in Cle A301. If you cannot make this time, please email mecht@uvic.ca to arrange an alternative session.

Subject: Questionnaire Two (After switching tools)

Posted by Mei Wang on Apr 5, 2000

The second **questionnaire** regarding your use of the learning tool has been posted online. Please fill it in before the end of Friday (April 7th) if at all possible so that we can open all of the tools for your use. Thank you for your participation!

Subject: Thursday, March 30th 2000

Posted by Mei Wang on Mar 30, 2000

See **here** for hints/tips/questions and extra office hours for the Final exam. We have planned a pizza/debriefing party for April 14th at Noon. Everyone is welcome! Location TBD.

Subject: Monday, March 13th 2000

Posted by Mei Wang on Mar 15, 2000

Chuck Hamilton is giving a guest lecture on March 20th. See here for an abstract of his talk.

Announcements

Course Information

Staff Information

Course Documents

Assignments

Communication

External Links

Student Tools

Resources

Course Map

My Blackboard

Search

Logout

Powered By
Bb
Blackboard



Setting

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- Deploy tools in a course to provide an in-depth and realistic comparison
 - Undergraduate course in Human Computer Interaction
- Qualitatively and quantitatively compare the two tools from three different perspectives:
 - Administrators
 - Instructors
 - Students



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Format

- Students used generic web site for the first few weeks of term
- Then students randomly assigned to two groups
 - Each group used one tool for 4 weeks
 - Then switched to the other tool for 4 weeks
 - Followed by a free period of 1 week
- Questionnaires
 - For each tool period:
 - One questionnaire at half way point to test for ease of learning on how to use the tool
 - A second questionnaire to test for effectiveness and ease of use
 - A final questionnaire to compare the two tools and the generic web site and solicit feedback



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Selected Results

- administrators
- instructors
- students





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Administrator opinions

The screenshot shows the Blackboard Control Panel for a course named 'seng310: Human Computer Interaction'. The user is identified as 'Mei Wang, System Administrator'. The interface includes a 'Return to Course' button and a 'Blackboard CourseInfo' link. The main area is divided into several sections:

- Page Editors:** Announcements, Course Information, Staff Information, Course Documents, Assignments, External Links.
- User Management:** Create/Enroll User, Modify User, Remove User, Create Group, Modify Group, Remove Group.
- Assessment:** Assessment Manager, Pool Manager, Online Gradebook, Course Statistics.
- Communication Center:** Send Email, Course Calendar, Course Tasks, Digital Dropbox.
- Assistance:** Online Manual, Contact Sys Admin, Join ListServ, Online Support.
- Site Management:** Communication, Course Options, Student Tools, Course Utilities.

The screenshot shows the WebCT Minihelp box and the footer of a WebCT course page. The Minihelp box is titled 'Minihelp: WebCT Homepage' and contains the following text:

Welcome to WebCT! This Minihelp box, located at the top of many WebCT screens, contains short instructions to assist you in using the various features of WebCT. Minihelp appears only to course designers; students do not see it. To turn Minihelp on or off for various sections of WebCT, click **Course Settings** --> **Minihelp** on the toolbar at the bottom of the page and then follow the on-screen directions. For more detailed online Help, click the *Dr. C* icon on the left side of the toolbar, which is located at the bottom of the screen.

The footer of the page features the WebCT logo and the text 'Human Computer Interaction'. Below this is a toolbar with the following buttons:

- Customize Page
- Organize Icons
- Course Settings
- Course Management
- Guided Tour
- Welcome Page
- File Manager
- Update Student View



Administrator opinions

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	Blackboard	WebCT
Installation	easy	easier
Registration	easy	difficult
Access Control	difficult	easy



Instructor opinions

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	Blackboard	WebCT
Post course content and information	easy	difficult
Construct online quizzes	easy/ moderate	moderate
Online grading, posting grades	flexible	inflexible



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Student Questionnaire Results *before* switching tools



Blackboard Student Questionnaire Results *before switching tools*

Research
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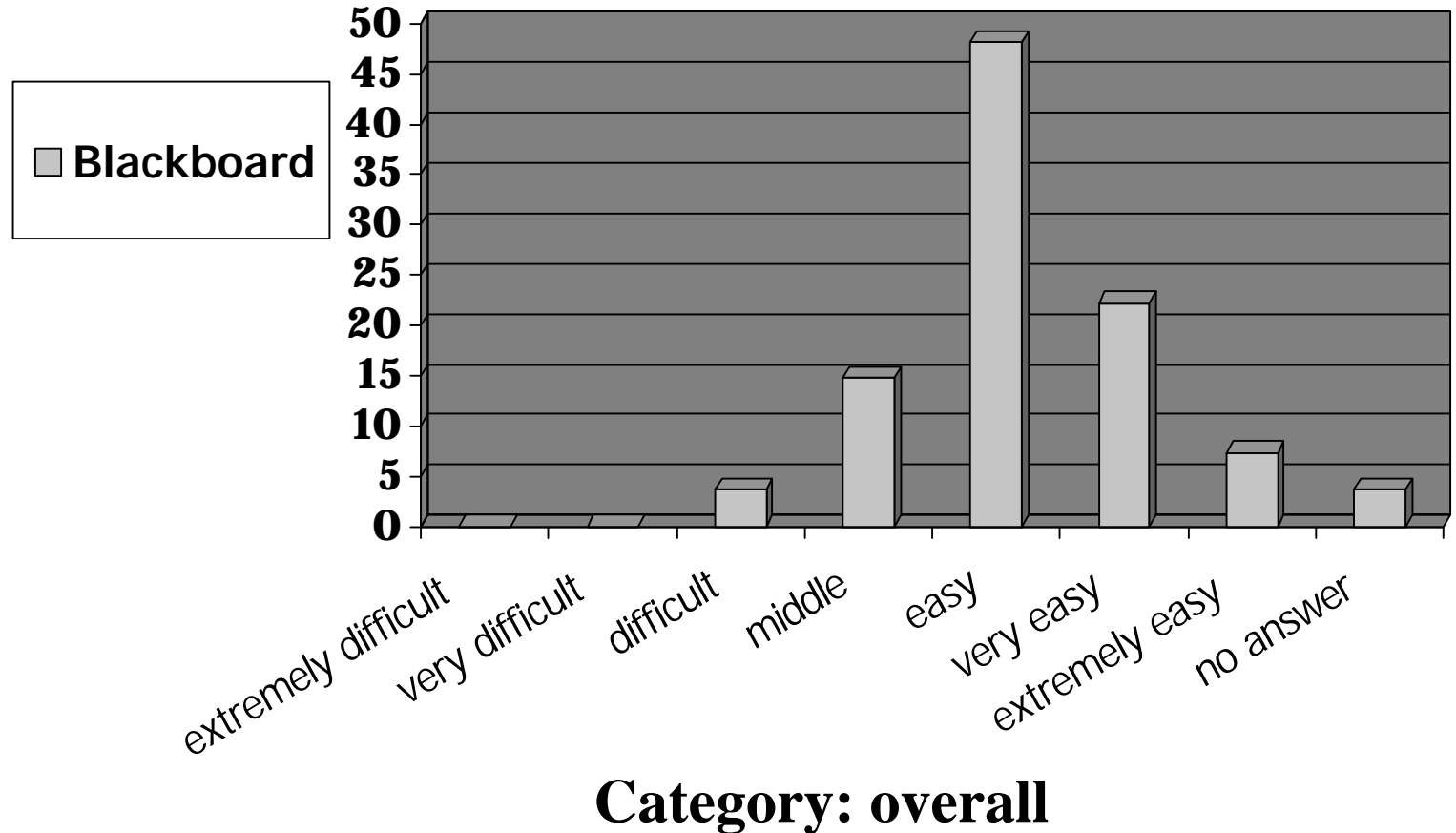
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WebCT Student Questionnaire Results *before switching tools*

**Research
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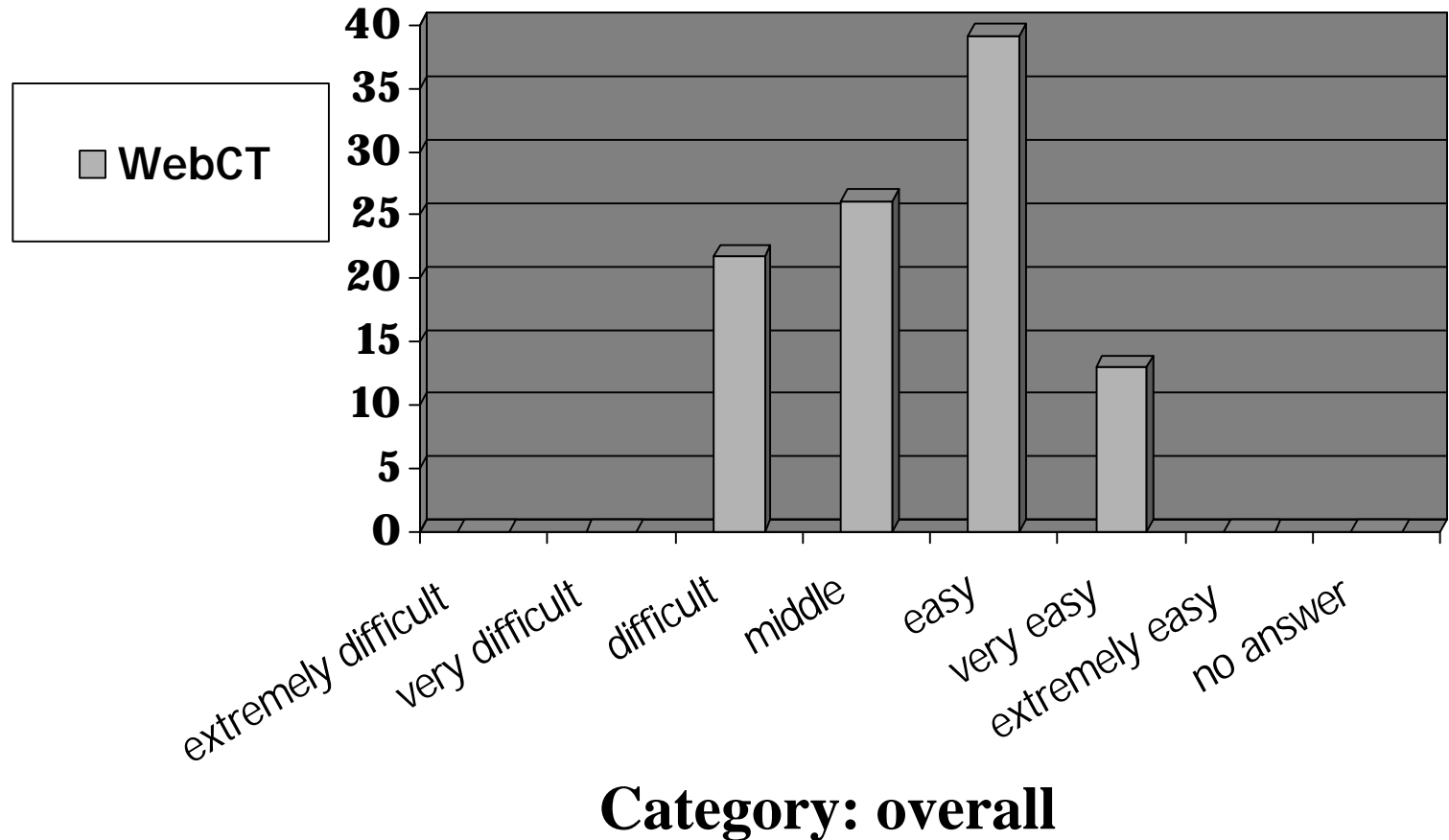
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Student Questionnaire Results *before switching tools*

Research
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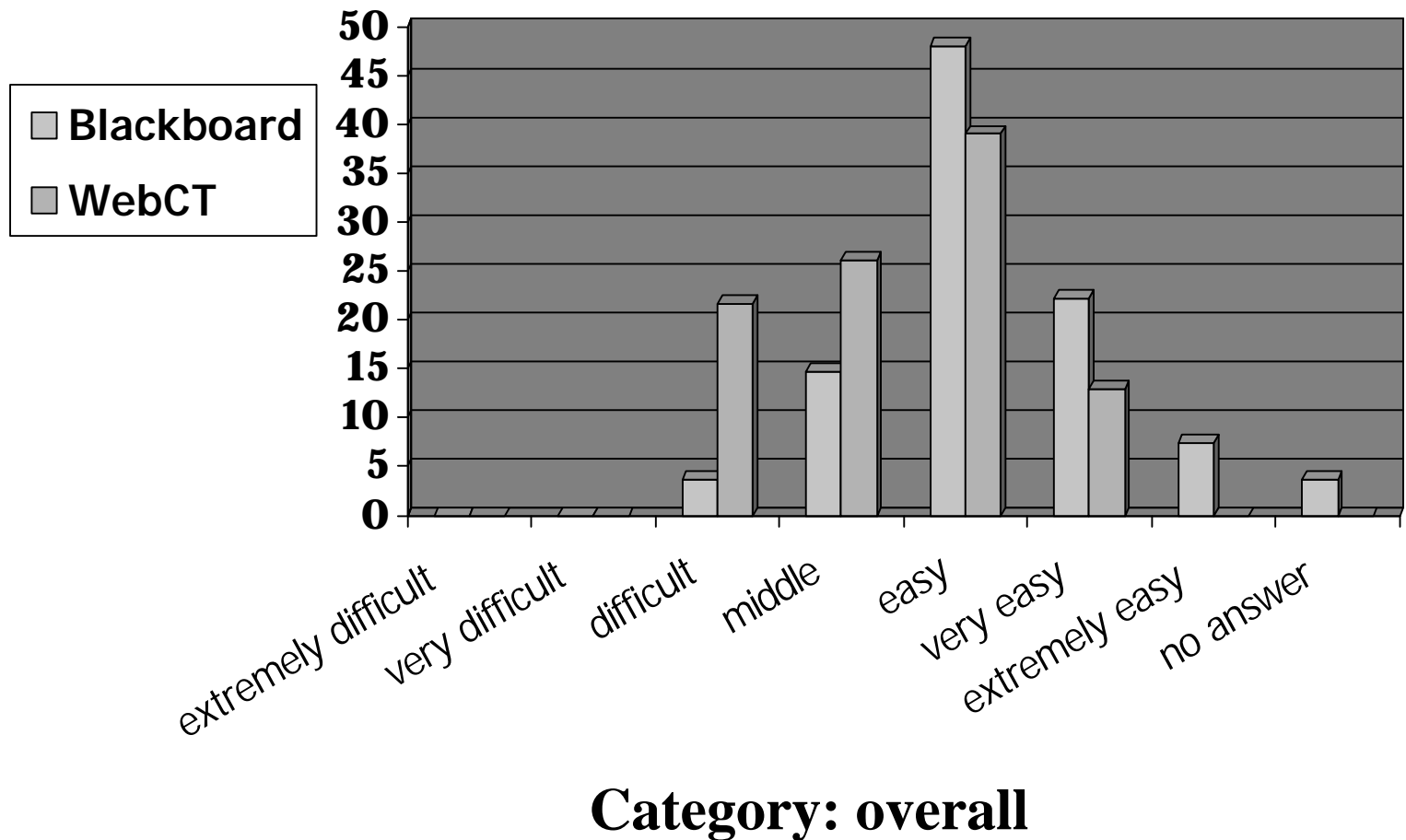
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Student Questionnaire Results *after* switching tools



Student Questionnaire Results *after switching tools*

Research
goals

- Blackboard student users

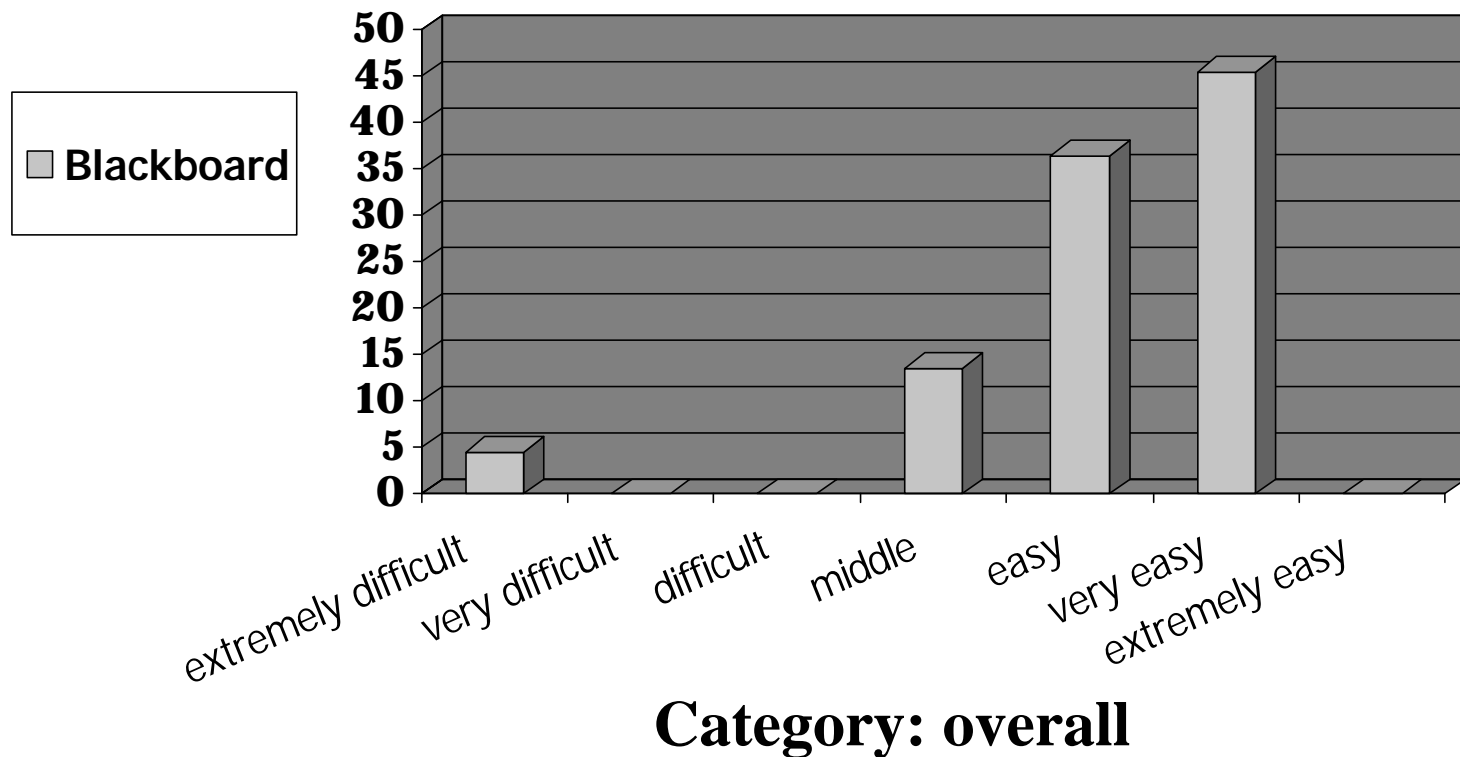
Methodology

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Student Questionnaire Results *after switching tools*

Research
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- WebCT student users

Methodology

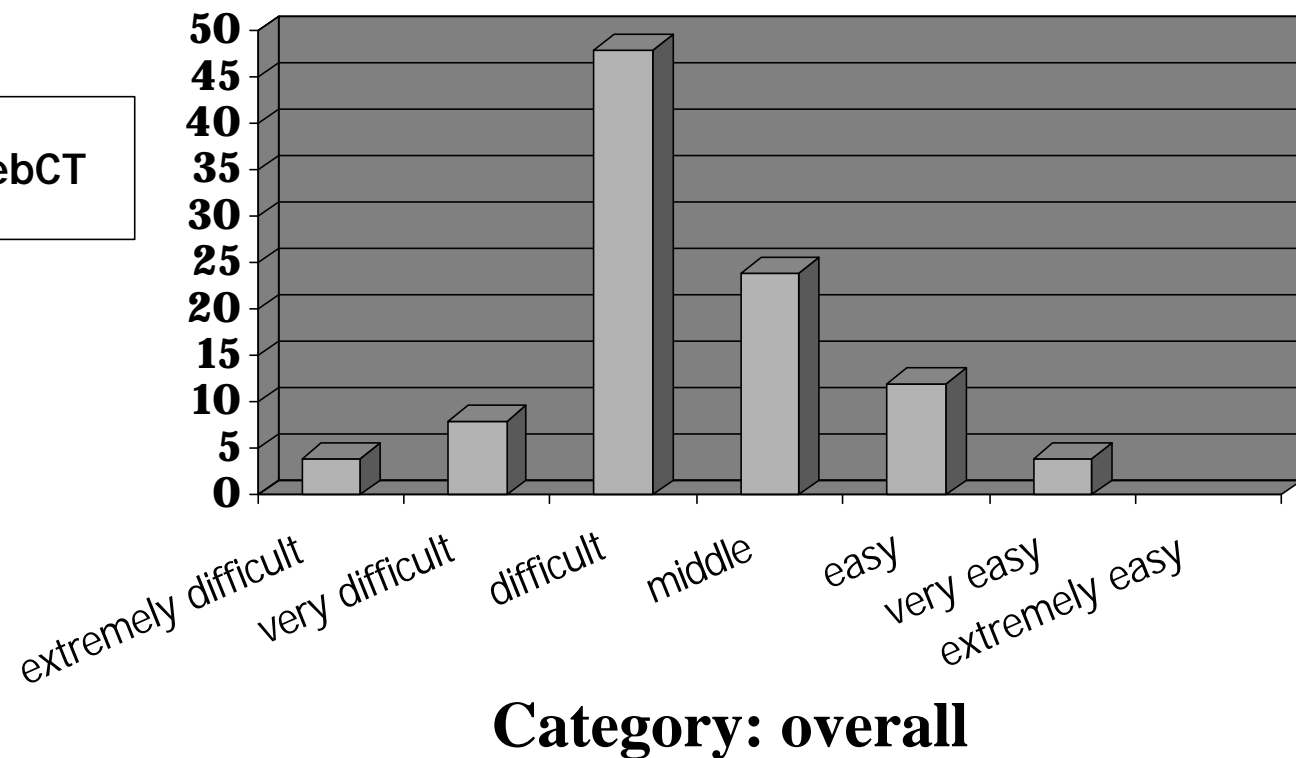
Results

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■ WebCT





Student Questionnaire Results *after switching tools*

**Research
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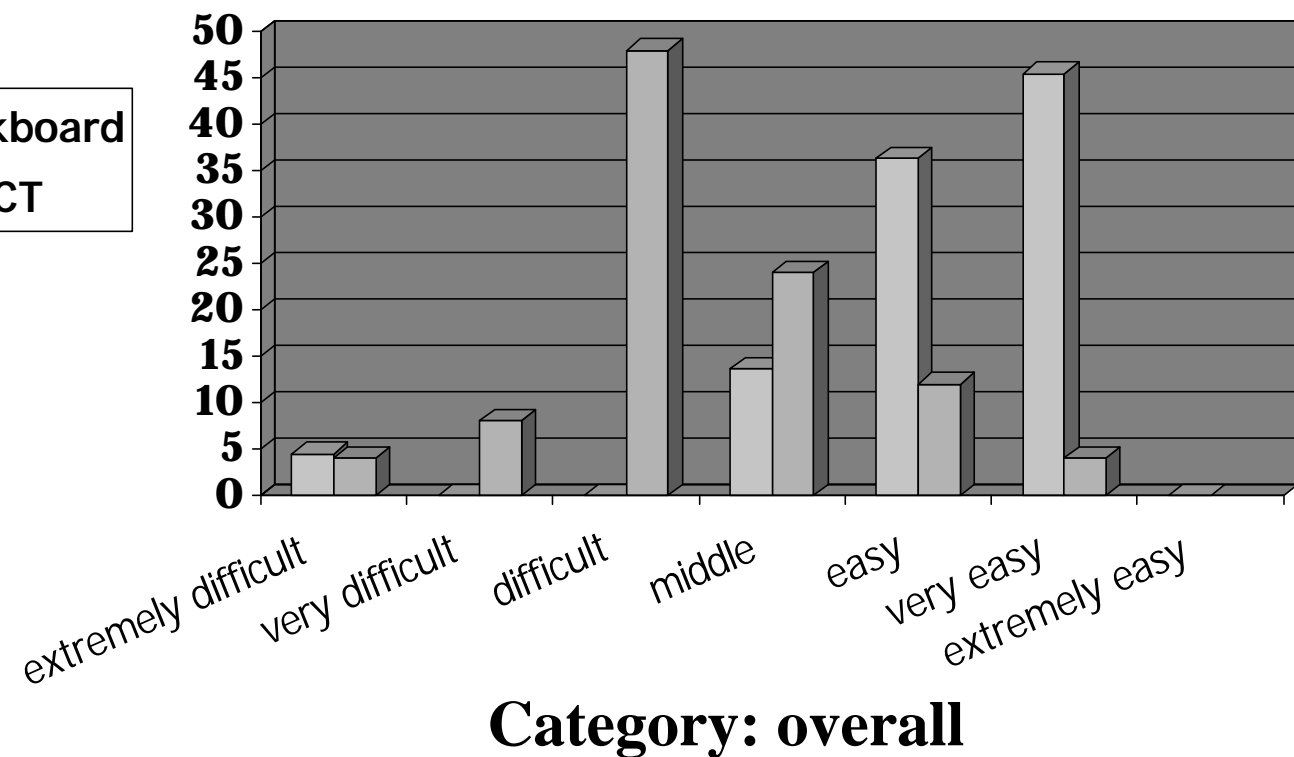
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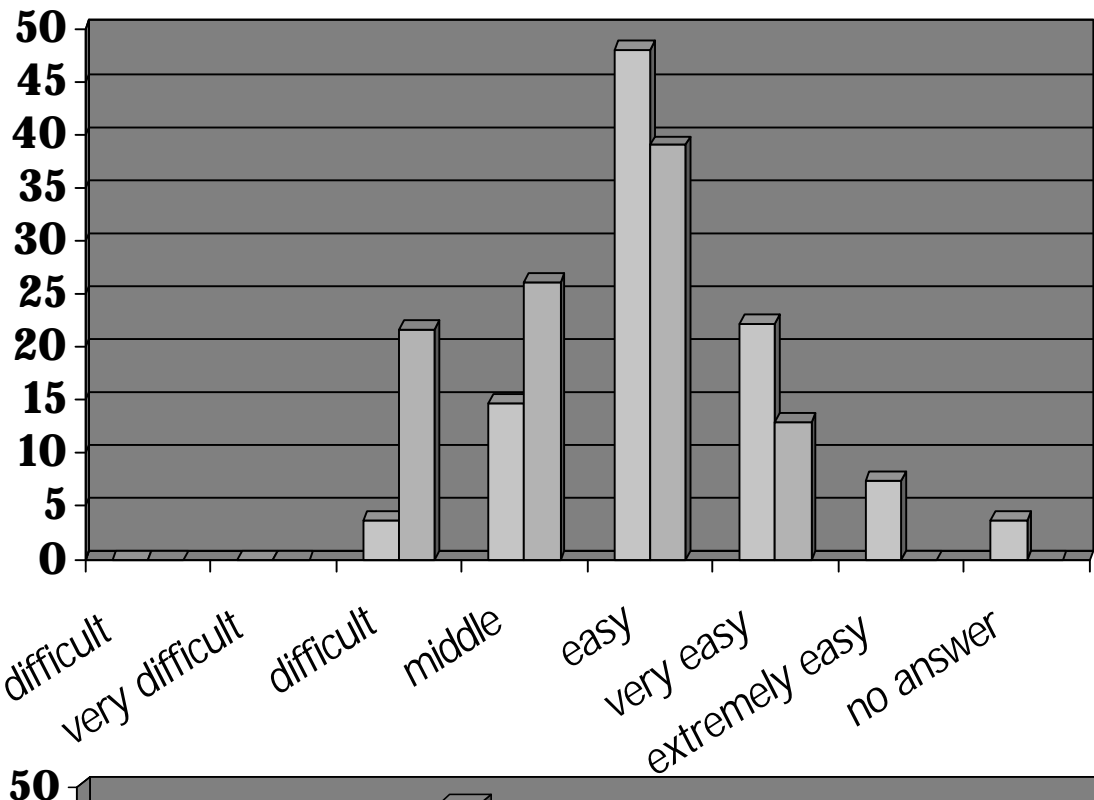
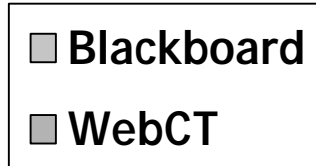
Results

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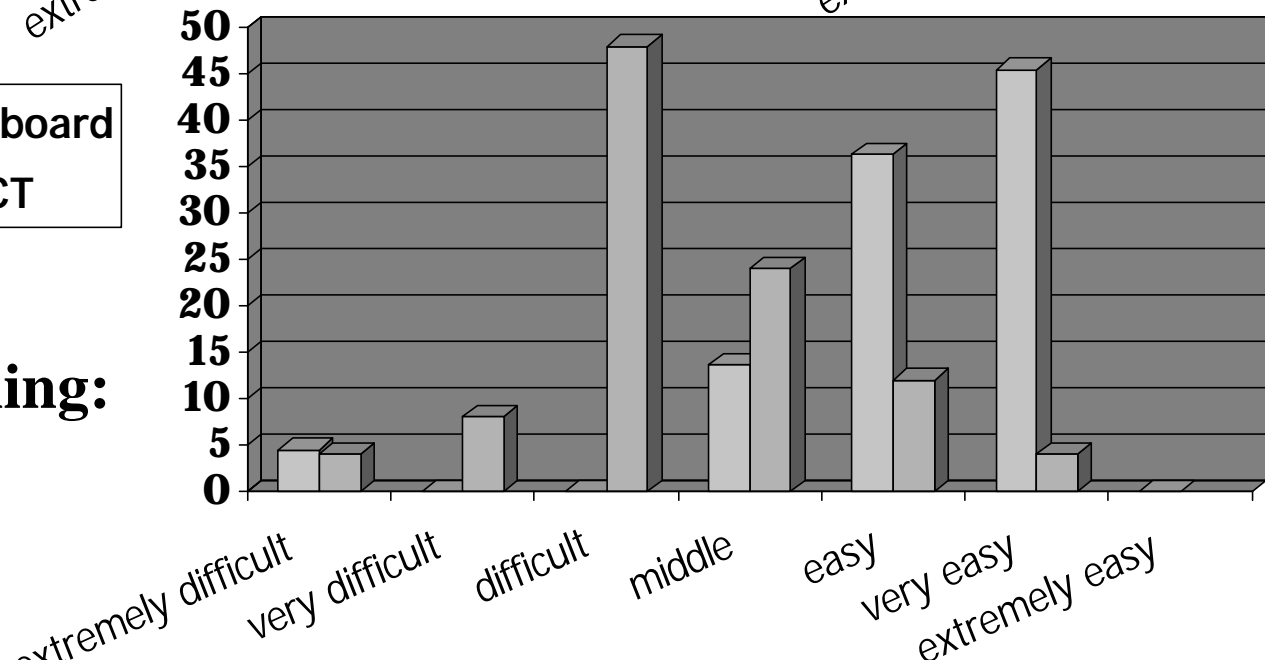
Suggestions

Questions

**Before
switching:**



**After
switching:**



Some comments from students:

“I think they definitely aid my learning, especially if I have to miss class. It makes it much easier to keep up to date.”

“The layout of WebCT is very very very poor. ... The webpage from the beginning of the class is way better and if anything my mark is suffering from using this tool...”

“Major interface improvement needed before I would happily use this tool. I found that I spent most of my time learning WebCT and not course material. A “learning” tool should not be making life more difficult for me.”



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In general....

- Students generally feel positive about web-based learning tools, when they are:
 - well-designed, easy to learn, easy to use
 - when the tool is good as support, not as replacement of lectures
 - when the use of diverse tool features, i.e. chat, bulletin board, is relevant and tied into the specific course structure and content



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- Central issues to be considered in tool implementation:
 - Connectivity of tool features to course content
 - Maintenance (keep up to date, readable documents)
 - Training of instructors and students in tool use
 - Administration time
 - Accessibility for all students





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Issues (2)

- Do web-based learning tools enhance learning?
 - Tools seem to enhance learning when they are perceived as being invisible
 - When tools are hard to navigate (i.e. frustrate the user), then students responses suggest that they can not only have a neutral but negative effect on learning
 - Tool usability can impact students' learning



Suggestions for tool designers

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- From students point of view:
 - Keep navigation and layout simple and clear, make tool easy to learn and easy to use (follow basic HCI principles)
 - Ensure compatibility with other platforms and programs
 - Maintain tool simplicity and functionality of features (no unnecessary features, such as popup windows)
- *Usability testing is important!*



Suggestions for university

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- Provide adequate training for instructors and students
- Carefully consider the needs (of instructors, students, administrators) before selecting a technology
- Provide integration, standardization, flexibility and accessibility in tool/program choices
- Ensure universality in access and usability across campus and universities for every student



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Open Questions

- When is a tool preferable over a customized web site?
 - Limitations
 - Advantages
- Standardization versus diversification of environments for learning
 - Can one solution meet all needs?
- How do we measure learning enhancement?



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Is it ethical to evaluate web-based learning tools using students?

Some ethical issues we faced were:

- relationships among research participants (students) and experimenters (instructors and graduate students)
- research process (informed consent, minimization of harm, competence and confidentiality) and
- unevaluated tool deployment within a university class



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Common issues in codes of ethics

- informed consent
- minimization of harm in relation to merit
- competence
- confidentiality



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Informed Consent

Free and informed consent refers to the dialogue, information sharing and general process through which prospective subjects choose to participate in research

- **Issues:**
 - We carefully followed the procedures... but there may have been some coercion to participate (due to bias of the instructor involvement)
 - Alternative assignment (harder, less attractive?)
 - Students could withdraw from the experiment but not the assignment!
- **Justification:**
 - we needed this tight integration to evaluate the tools in this way
 - participation would enhance student learning in HCI



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Minimization of Harm

- **Issues:**
 - Additional stress of learning two new web-based environments
 - Tools had bugs (maintained almost 24/7 vigil to ensure access)
 - Some students *did* feel the tools impacted their learning
- **Justification:**
 - More experience in learning about interfaces
 - Would know what it is like to be a “user” in a study
 - Tools have bugs anyway and are being deployed without as much support or vigilance



Competence

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- **Issues:**
 - Inadequate experience with the tools
 - The way we set up the environments may have negatively impacted the results (there were choices)
- **Justification:**
 - We had technical background, and these tools are supposed to be used by all teaching professionals



Confidentiality

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- **Issues:**
 - Collection of electronic data not well understood by traditional ethics review boards
 - Tools collected masses amount of data which was identifiable!
- **Justification:**
 - We didn't access the non-confidential data
 - We were careful not to collect any unnecessary data and to remove any identifying data



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Summary thought....

Although there may be ethical concerns about doing this study using students, is it ethical to deploy these tools without such an evaluation!



Discussion