

# Usability Recommendations for Annotation Tools

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# Talk outline



- (1) Introduction and usability fundamentals
- (2) Usability evaluation of annotation tools
- (3) Results: Design recommendations for usable annotation tools

# Introduction and usability fundamentals

# #01

# Annotation and usability...



# corpus annotation

## annotation practice

### annotation tool

### semi-automatic annotation

### manual annotation evaluation

## treebank

### parallel annotation conversion

### automatic annotation

### annotation format

## annotation scheme

### crowdsourced annotation



Usability..?

*Topical keywords from  
the LAW proceedings  
2007-2011.*



# Usability and Usability Engineering



- **Definition** of usability by **ISO 9241-11** (1999):  
“the extent to which a product can be used by **specified users** to achieve **specified goals** with **effectiveness, efficiency,** and **satisfaction** in a **specified context of use.**”

→ **Bad usability** = a product/tool cannot be used with ease in a context it was originally designed for

- Usability can be **engineered** systematically by using a set of available tools and methods → **usability engineering toolbox**

# Usability Testing: Goals



**(1) Comparison:** Find out which system is better

**(2) Summative judgment:** Judge how well a system works

**(3) Reveal usability problems:** Find out why a system is bad

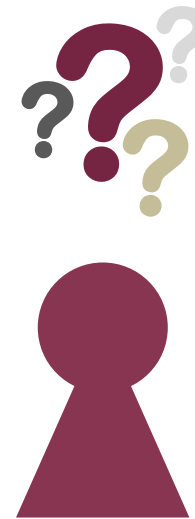
What's the problem with most of the existing annotation tools?

# Usability Testing: Methods



## **Empirical methods**

→ interviews, user observations, etc.



## **Analytic methods**

→ inspection methods

# Usability evaluation of annotation tools

# #02

# Heuristic Walkthrough



# Cognitive Walkthrough: Tasks



- **Basic annotation** tasks for the test
  - (1) Import a text document into the tool
  - (2) Create an annotation scheme with two annotation layers, one for parts of speech, and one for phrases
  - (3) Create some basic tags in each of the created annotation layers
  - (4) Annotate the first sentence of the imported text
  - (5) Delete an annotation

# Cognitive Walkthrough: Control questions

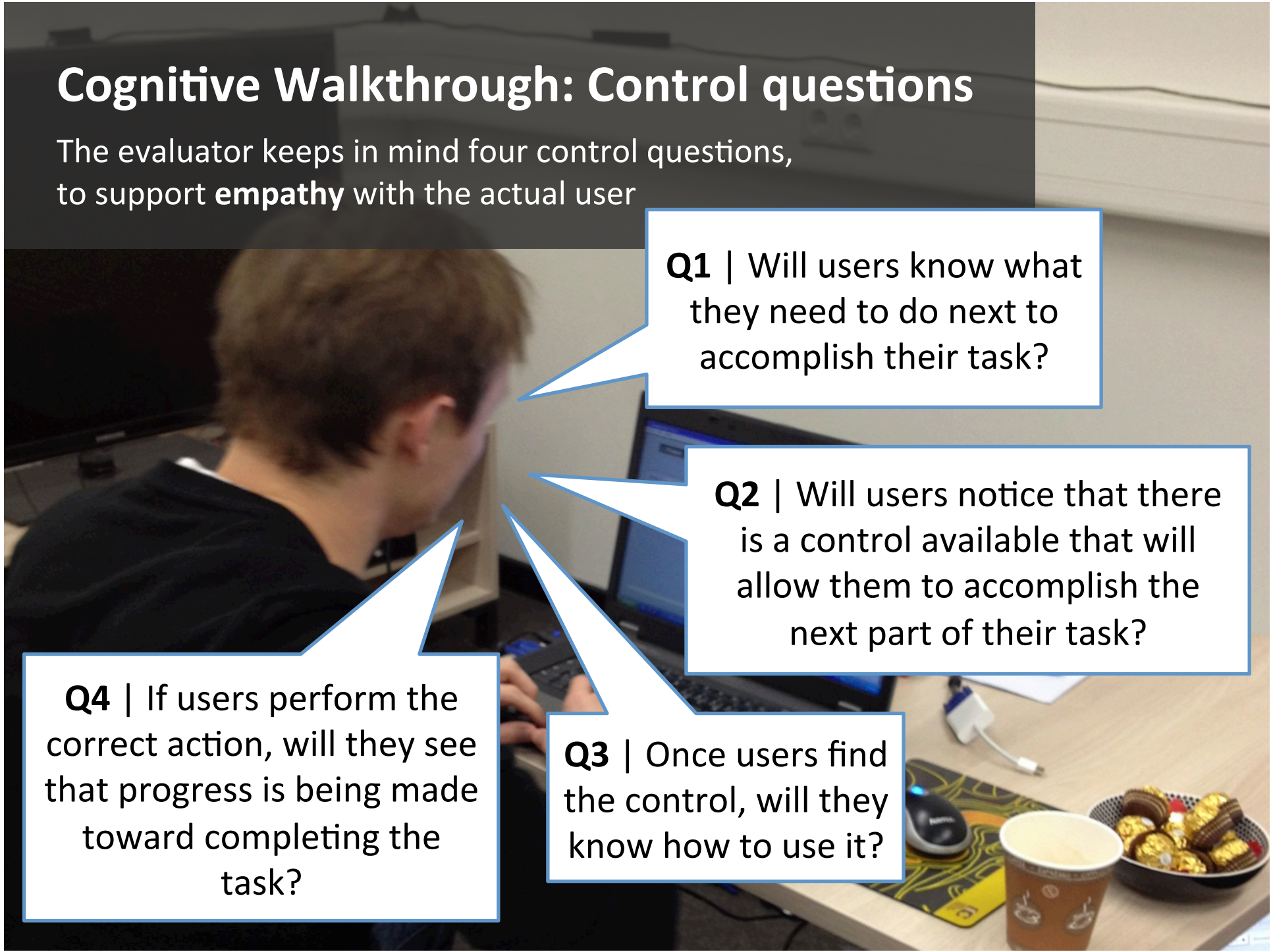
The evaluator keeps in mind four control questions, to support **empathy** with the actual user

**Q1** | Will users know what they need to do next to accomplish their task?

**Q2** | Will users notice that there is a control available that will allow them to accomplish the next part of their task?

**Q4** | If users perform the correct action, will they see that progress is being made toward completing the task?

**Q3** | Once users find the control, will they know how to use it?





# Heuristic Evaluation

Evaluators document **usability problems** by ranking the **severity** of the problem and by categorizing them by one or more **heuristics**.

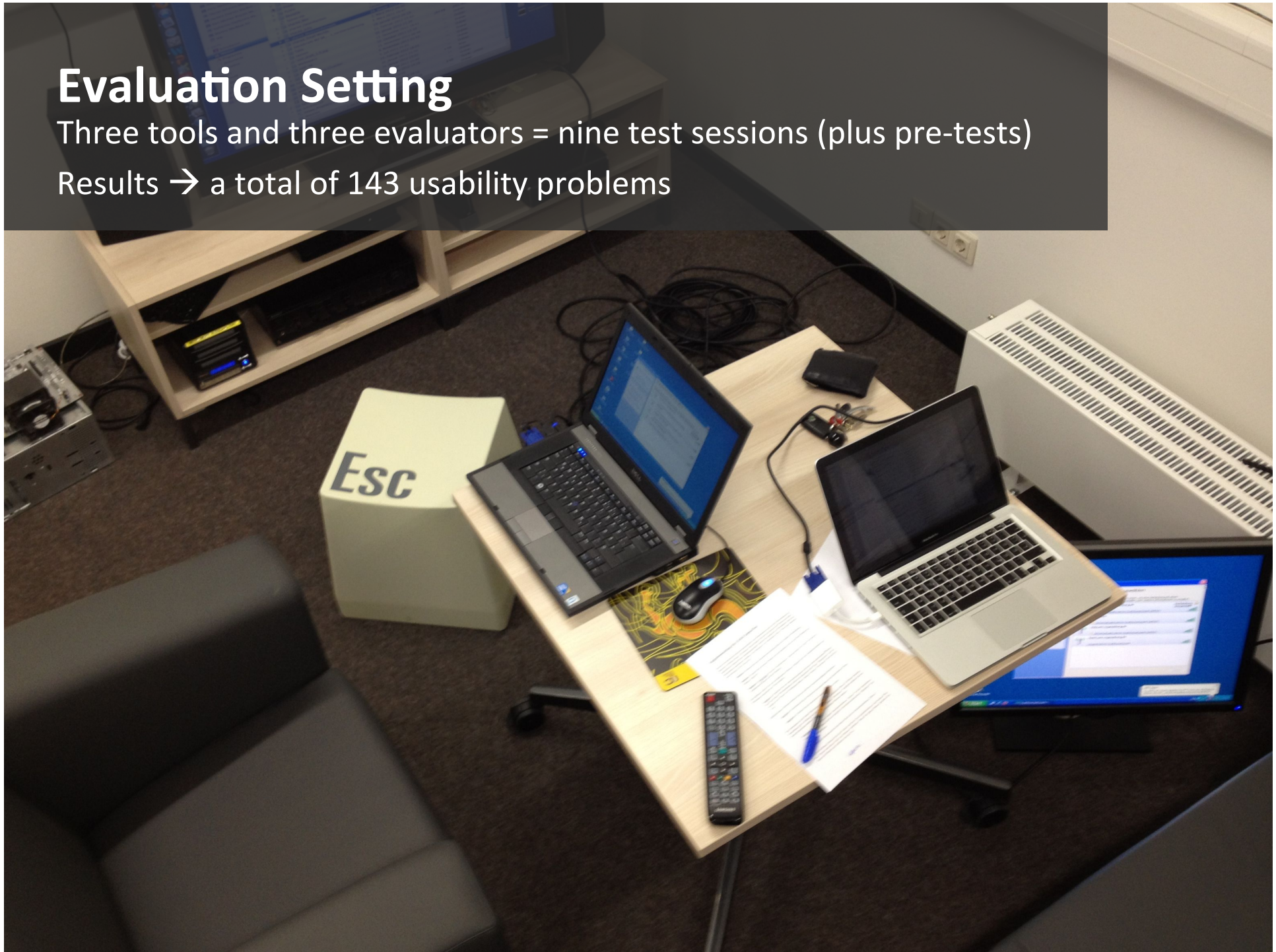
- (1) Visibility of system status
- (2) Match between system and the real world
- (3) User control and freedom
- (4) Consistency and standards
- (5) Error prevention
- (6) Recognition rather than recall
- (7) Flexibility and efficiency of use
- (8) Aesthetic and minimalist design
- (9) Help users recognize, diagnose, and recover from errors
- (10) Help and documentation



# Evaluation Setting

Three tools and three evaluators = nine test sessions (plus pre-tests)

Results → a total of 143 usability problems





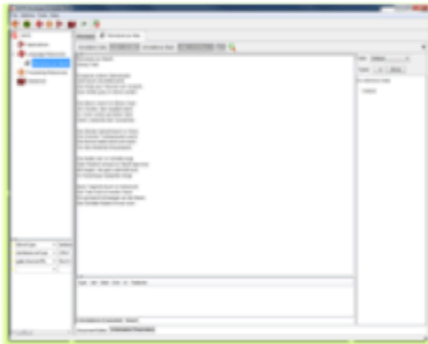
# Evaluation Setting

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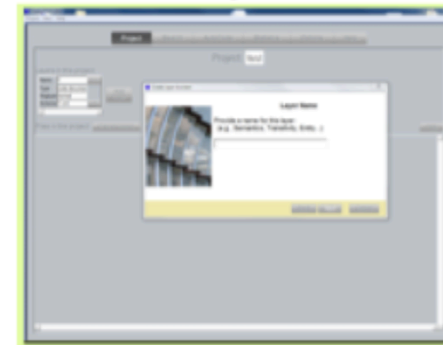
**GATE**



**MMAX2**



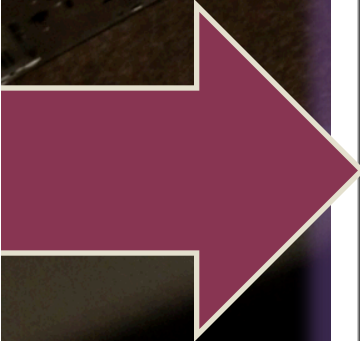
**UAM CorpusTool**



## Evaluation Setting

Three tools and three evaluators = nine test sessions (plus pre-tests)

Results → a total of 143 usability problems



<b>Tool</b>	<b>All problems</b>	<b>Unique problems</b>	<b>Average severity</b>
GATE	51	29	2.8
MMAX2	41	23	2.9
UAM CT	51	29	2.8

**Number of usability problems per tool**

**Results: Design recommendations  
for usable annotation tools**

**#03**



# Data analysis and problem clustering

→ Two main categories of usability problems:

(1) 30 general usability problems

(2) 51 domain-specific annotation usability problems

UAM	9	Beschreibung der Buttons ist wegen des geringen Kontrastverhältnisses schlecht lesbar und erzeugt den Eindruck eines deaktivierten Elements.	4	H1, H4, H5, H6
UAM	9	Schlechte Typographie und zu große Schrift	2	H8
UAM	9	Es gibt zwei GUI-Elemente „Project“, die allerdings beide etwas unterschiedliches machen	3	H5, H8
UAM	10	Die beiden Erklärungstexte im „what kind of segments, 2“-Schritt erreichen den Eindruck eines Buttons und der Möglichkeit einer Änderung der Werte	3	H5
UAM	10	Schema = Edit. Es gibt zwei Close-Buttons	1	H4

Hilfe funktion

UAM	9	Hilfefunktion ist zwar vorhanden, verändert aber für Leser mit schwer verständliche Begriffe. Bei grundrationalen Schritten wie das Importieren eines Textes war sie sonst nicht wirklich hilfreich.	2	H2, H10
UAM	8	Es gibt drei GUI-Elemente „Hilfe“, zwei davon sind redundant, das dritte macht beinhaltet mehrere Unterpunkte, u.a. auch Themen die nicht zu Hilfe passen (z.B. „Licence Terms“ oder Link zur Homepage)	4	H4, H5, H8, H10
UAM	9	Die Hilfe beinhaltet ist in Topics unterteilt deren Semantik nicht optimal ist, so finden sich bspw. Hinweise zu Schema und Annotation unter „Project Window“	2	H10

Darstellung des Annotieren im Text

UAM	10	Die unterschiedlichen „Wörter“ sind zu unterschiedlichen Symbolen, die untereinander geteilt werden, um schon bei einem kurzen Blick Unterschiede ausmachen zu können. Diese Vorarbeiten zu können, ist nicht klar und Teil.	2	H5, H8
UAM	10	Leider kann immer nur eine Annotation/Annotierung eingetrag werden. Für die symbolische Annotation wäre aber die die Markierung der bereits annotierten Wortarten möglich.	2	H5, H8

Annotation beginnen

UAM	10	Auch nach dem „Importieren“ eines Textes ist man verzogen auf die unterstrichenen Datennamen zu klicken um zu annotieren (bzw. über auf „Wörterbuch“ klicken)	2	H5, H8
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Fehlermeldungen

UAM	4	Die Fehlermeldung in einer .txt Datei beinhaltet keinen für den Nutzer verständlichen Lösungsweg (Fehlermeldung am Anfang wg. Sonderzeichen im Projektnamen)	4	H5, H9, H10
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Erstellung Annotationschema

UAM	9	Bei der Erstellung des Annotationschemas werden Begrifflichkeiten verwendet, die z.B. „system“ und „feature“ bei denen die tatsächliche Funktionalität nur schwer nachvollziehbar ist.	2	H2
UAM	3	Schema: Es ist nicht ersichtlich, welche Schnittstellen eine klickbare Interaktion ermöglichen (Baumstruktur) → Grafisches Schema-Editor, aber im UML wie mit ihm zu interagieren ist	4	H5, H6
UAM	15	Schema: Schlüsselemente des Systems werden unterschiedlich benannt. (Start Feature: Wortarten, Name: Wortarten etc.) (Zusammenhang zwischen Layername und Wurzelknoten/Beispielknoten unklar)	2	H1, H4
UAM	14	„Add Layer“ ist etwas unverständlich; besser wäre „Add Annotation Layer“	3	H2, H6
UAM	15	Im „Create Layer Assistant“ gibt es vier Auswahlmöglichkeiten für das Coding Object, von denen aber nur zwei erklärt werden	3	H5, H10
UAM	17	Um das Schema grundlegend zu definieren muss man auf einen kleinen „Edit“ Button drücken – warum nicht Teil des Wizards?	3	H5
UAM	18	Die System/Feature-Metapher des Schemas ist für nicht RST-Linguisten nicht intuitiv nachvollziehbar	4	H2, H5

Oh vom System

UAM	4	entscheidenden Stellen kein Feedback. („Sind jetzt abgespeichert“, Verändern des Wertes)	4	H2, H5
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UAM	3	ist unklar	3	H5, H10
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UAM 11, UAM 10, UAM 14, UAM 15, UAM 17, UAM 18

UAM 13 Die Fenstergrößen





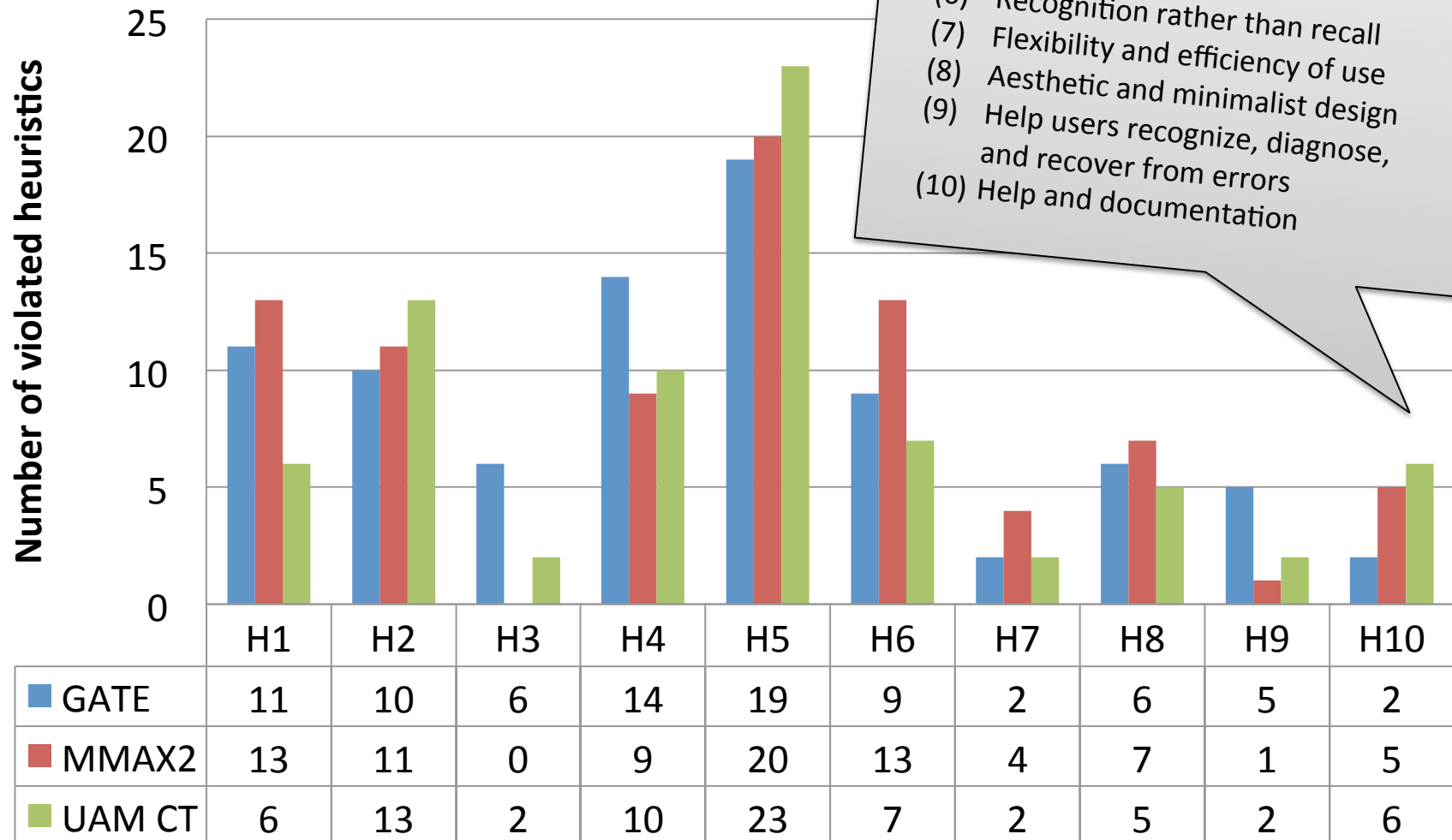
# Data analysis and problem clustering

- Two main categories of usability problems:
  - (1) 30 general usability problems
  - (2) 51 domain-specific annotation usability problems

main category	category	description	GATE	MMAX2	UAM CT	total
general usability problems	A	Feedback and user guidance, error messages	2	6	7	15
	B	UI elements and design	4	3	8	15
specific annotation usability problems	C	Wording and metaphors	4	1	2	7
	D	Import / edit primary data	4	2	3	9
	E	Import / create / edit annotation scheme	7	5	5	17
	F	Apply / edit / delete annotations	6	3	2	11
	G	Visualize (parallel) annotations	2	3	2	7
<b>number of unique problems</b>			<b>29</b>	<b>23</b>	<b>29</b>	<b>81</b>

# Nielsen's heuristics

- (1) Visibility of system status
- (2) Match between system and the real world
- (3) User control and freedom
- (4) Consistency and standards
- (5) Error prevention
- (6) Recognition rather than recall
- (7) Flexibility and efficiency of use
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# Results of the evaluation



→ **28 design recommendations** for annotation tools, to avoid the most common usability problems

**(1) Basic guideline for tool designers** → How to improve existing tools or design new tools...

**(2) Basic checklist for decision makers** → Which tool to choose from the plethora of existing tools, with regard to usability issues...



# Overview of recommendations



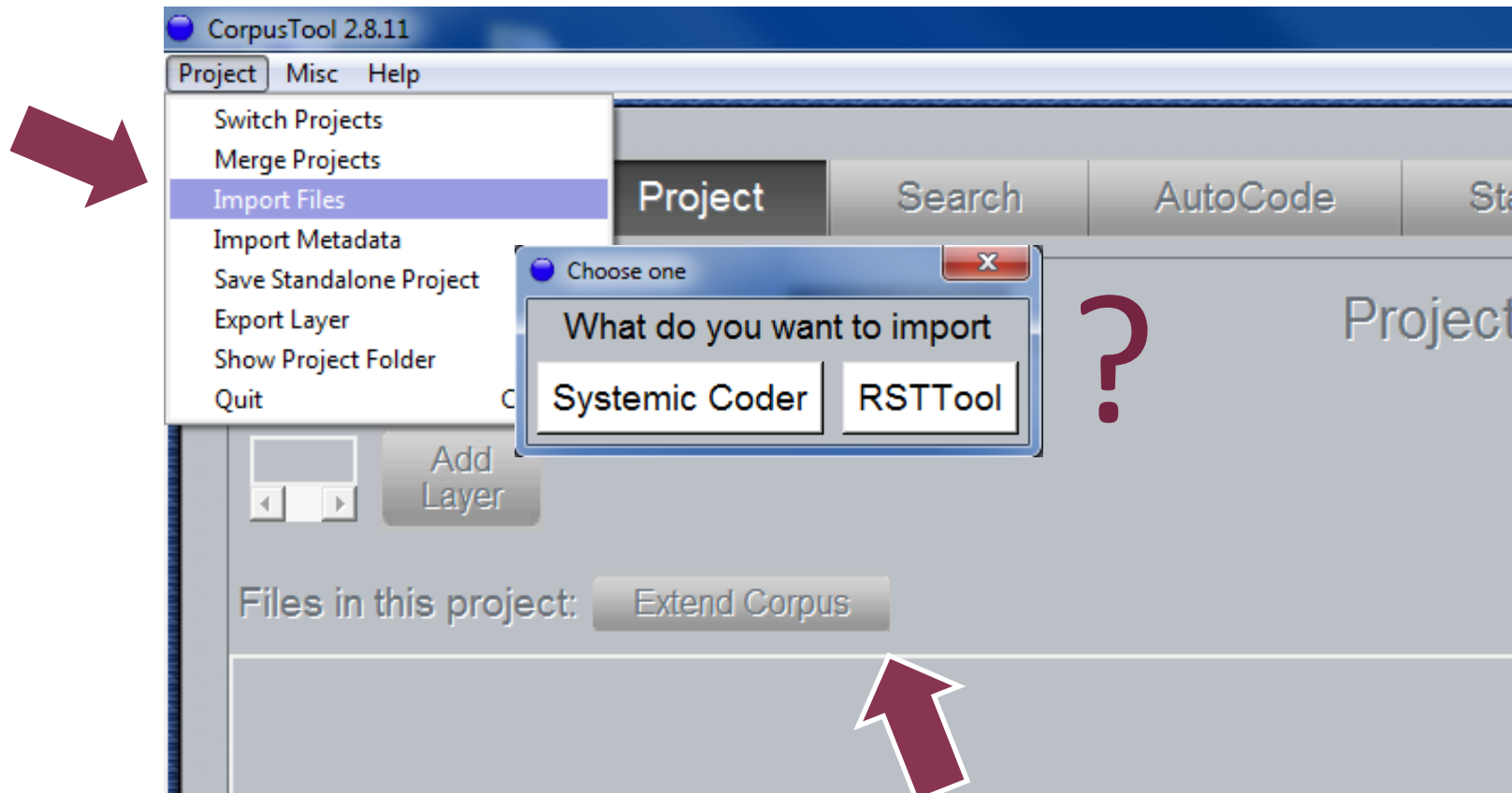
Problem category	Number of recommendations
Wording and metaphors	4
Primary data	7
Annotation scheme	6
Annotation process	6
Annotation visualization	5
Total	28

# Example from category „Wording and metaphors“



**Recommendation 01** | “Do not invent new metaphors for fundamental interaction paradigms that are known from numerous other tools, but rather stick to conventionalized wording for basic actions like e.g. importing or saving a file”

# Task: Import documents in CorpusTool



# Example from category „Primary data“



**Recommendation 05** | “Guide the user through the import process and make clear which parameters have to be set by providing default values and a list of options rather than free text fields”

# Task: Import document in GATE

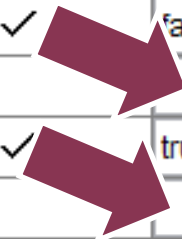


Parameters for the new GATE Document

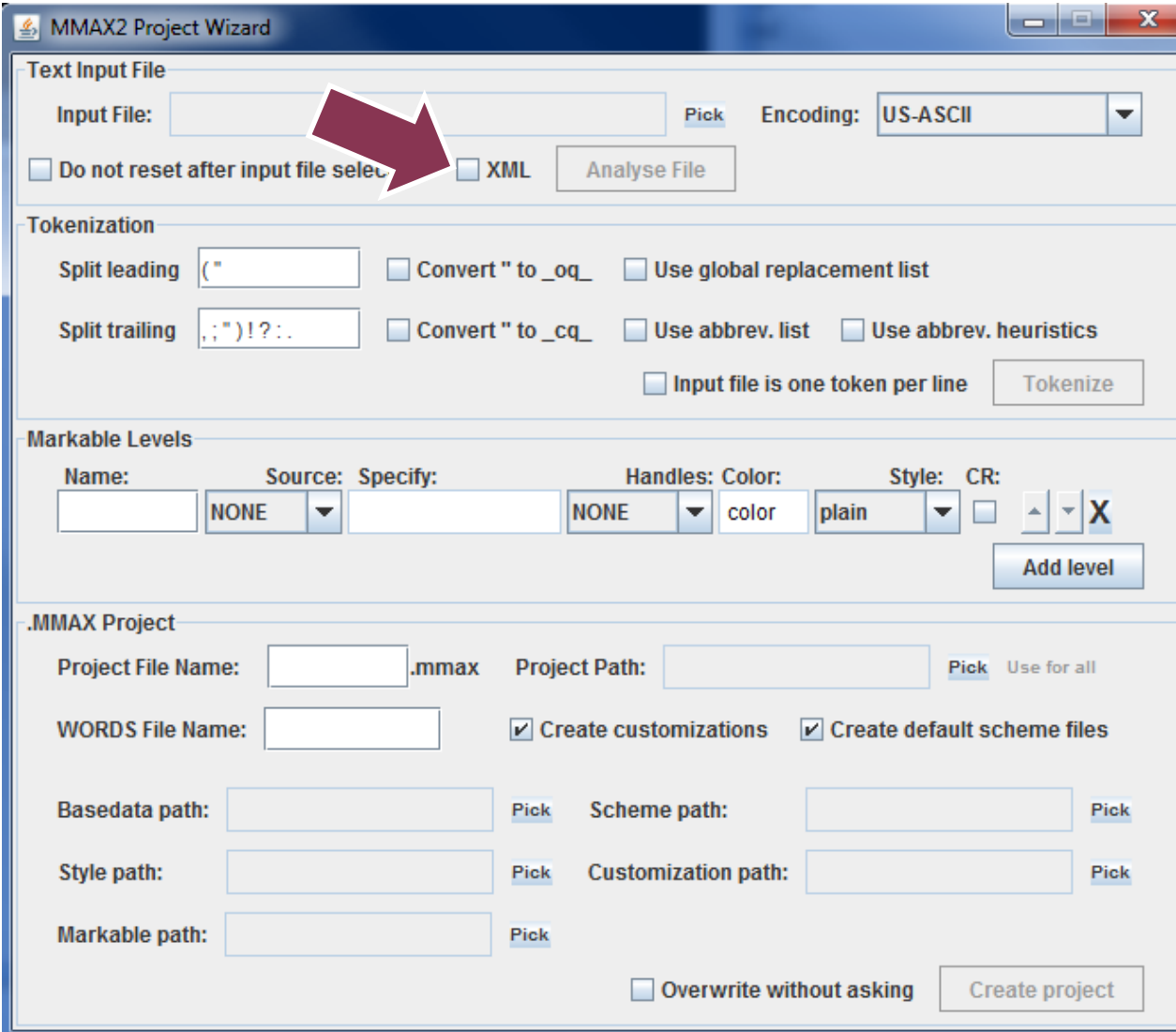
Name:

Name	Type	Required	Value
collectRepositioningInfo	Boolean	<input checked="" type="checkbox"/>	false
encoding	String	<input type="checkbox"/>	
markupAware	Boolean	<input checked="" type="checkbox"/>	true
mimeType	String	<input type="checkbox"/>	
preserveOriginalContent	Boolean	<input checked="" type="checkbox"/>	false
sourceUrl	URL	<input checked="" type="checkbox"/>	<input type="text"/>
sourceUrlEndOffset	Long	<input type="checkbox"/>	
sourceUrlStartOffset	Long	<input type="checkbox"/>	

OK Cancel Help



# Task: Import document in MMAX2



The image shows the MMAX2 Project Wizard dialog box, which is used for configuring the import of a document. The dialog is divided into several sections:

- Text Input File:** Contains an "Input File:" text box with a "Pick" button next to it. A red arrow points to this text box. To the right is an "Encoding:" dropdown menu set to "US-ASCII". Below this are checkboxes for "Do not reset after input file selection" and "XML", and an "Analyse File" button.
- Tokenization:** Contains two text boxes for "Split leading" (with a quote character) and "Split trailing" (with punctuation). There are checkboxes for "Convert " to \_oq\_" and "Convert " to \_cq\_". Other options include "Use global replacement list", "Use abbrev. list", and "Use abbrev. heuristics". A checkbox "Input file is one token per line" and a "Tokenize" button are also present.
- Markable Levels:** Features a table with columns for Name, Source, Specify, Handles, Color, Style, and CR. The current values are: Name (empty), Source (NONE), Specify (empty), Handles (NONE), Color (color), Style (plain), and CR (checkbox). An "Add level" button is at the bottom right.
- .MMAX Project:** Contains fields for "Project File Name:" (with ".mmax" suffix), "Project Path:" (with "Pick" and "Use for all" buttons), "WORDS File Name:", "Basedata path:", "Style path:", and "Markable path:". There are also checkboxes for "Create customizations" and "Create default scheme files". At the bottom, there is an "Overwrite without asking" checkbox and a "Create project" button.

# Example from category „Annotation scheme“



**Recommendation 13** | “Allow the creation and editing of an annotation scheme from within the tool; hide technical details by providing a graphical scheme-editor and offer an optional XML-mode for advanced users”

# Task: Create annotation scheme in CorpusTool (only tool with GUI)



The screenshot shows the CorpusTool interface for editing an annotation scheme. The title bar reads "Scheme: pos.xml". Below it is a control bar with the following settings: "Start Feature: pos", "Depth: 4", "Zoom %: 100", and an "Options" button. The main workspace displays a tree structure for the "pos" feature, with "POS-TYPE" as the root and two child nodes, "pos-1" and "pos-2". A context menu is open over the "pos-1" node, listing the following actions: "Add Feature", "Rename System", "Delete System", "Change Entry Condition", "Move Up", and "Move Down". A red callout box points to the "pos-1" node with the text "Metaphor: Rethorical structure theory..."



# Example from category „Annotation process“



**Recommendation 20** | “Allow easy modification (expand or shrink the range) and deletion of existing annotation bases”

# Task: Change the range of the annotation base in GATE



Egypt's ruling generals sought on Monday to soften the appearance of their :  
they entered a period of negotiations with the prospective president over the  
legislative and military power.

na two-hour news conference, members of the ruling military council made  
hed Morsi of the  
sni Mubarak's las  
nt. The ballots w  
around the coun  
on by a margin o

The creation of the new constitution will not formally begin until later in the wee  
Ahmed Sarhan, a spokesman for Mr. Shafik, insisted on Monday that the ge  
and the Brotherhood had "terrorized" voters. He offered no evidence, and bo  
unofficial media reported that Mr. Morsi had a decisive lead in the vote coun

A screenshot of the GATE annotation tool interface. A maroon arrow points to the 'Extend start' menu. The menu is open and shows the following options: 'LEFT = 1 character', '+ SHIFT = 5 characters,', and '+ CTRL + SHIFT = 10 characters'. Below these options is a button labeled 'Open Search & Annotate tool'. The background text is partially obscured by the tool's interface.

# Example from category „Annotation visualization“



**Recommendation 24** | “Display an annotation when clicking on or hovering over an annotated text unit”

# Task: Show annotations in CorpusTool



The screenshot shows the CorpusTool interface. At the top, there is a window title bar with standard minimize, maximize, and close buttons. Below the title bar, the text "Files in this project:" is followed by a button labeled "Extend Corpus". A red arrow points to a dropdown menu labeled "Action" which has "pos" selected. The main text area displays the following content:

Texts/nytimes article 001.txt  
nt Favors Islamist

Source:  
[http://www.nytimes.com/2012/06/19/world/africa/islamist-candidate-is-apparent-victor-in-egypt-as-military-cements-its-powers.html?\\_r=1&hp](http://www.nytimes.com/2012/06/19/world/africa/islamist-candidate-is-apparent-victor-in-egypt-as-military-cements-its-powers.html?_r=1&hp)  
CAIRO — Faced with the popular election of the first Islamist head of state in the Arab world, Egypt's ruling generals sought on Monday to soften the appearance of their supreme authority as they entered a period of negotiations with the prospective president over the balance of executive, legislative and military power

Below the text area is a control bar with buttons: <<, <, >, >>, Ignore, Delete, Other Action..., Save, Close, and Help.

At the bottom, there are three panels. The left panel is titled "Assigned" and contains a list of annotations: "pos" and "pos-1". A red arrow points to this list. The middle panel is empty. The right panel is titled "Gloss" and is also empty.



**Thank you for your  
attention!**

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