



Using learner corpora to redesign university-level EFL Grammar education

Mick O'Donnell
Universidad Autónoma
de Madrid

1. Designing a Curriculum for EFL Grammar Teaching

Issues in Curriculum Design for EFL Grammar Teaching:

- **What to teach?**
 - Which grammatical structures should be taught?
 - How much attention given to each
- **In what order?**
 - How should topics be distributed over a course?
Over a curriculum?
- **How to teach?**
 - Explicit teaching of grammar or Implicit?
 - Grammar-centred or Situation-centred?
 - Classroom-based vs. Online vs. Blended Learning

1. Designing a Curriculum for EFL Grammar Teaching

Issues in Curriculum Design for EFL Grammar Teaching:

- **What to teach?**
 - Which grammatical structures should be taught?
 - How much attention given to each
- **In what order?**
 - How should topics be distributed over a course?
Over a curriculum?
- **How to teach?**
 - ~~Explicit teaching of grammar or Implicit?~~
 - ~~Grammar-centred or Situation-centred?~~
 - Classroom-based vs. Online vs. Blended Learning

1. Designing a Curriculum for EFL Grammar Teaching

- In 2009, English teachers at UAM and UPV got together to start exploring these issues.
- The idea was to use learner corpora of English to inform solutions.
- TREACLE project started officially January 2010.
- This talk will describe our ideas and progress.





2. The TREACLE Project

2. The Project

The TREACLE Project

- Project: TREACLE



Teaching
Resource
Extraction from an
Annnotated
Corpus of
Learner
English

Official Title: “Developing an annotated corpus of learner English for pedagogical application”

- A cooperation between:
Universidad Autónoma de Madrid and
Universitat Politècnica de Valencia
- Funded by Ministerio de Ciencia e Innovación
(FFI2009-14436/FILO)
- Runs: January 2010 – December 2012

2. The Project

People



Universidad Autónoma de Madrid

Susana Murcia (Principal Investigator)

Mick O'Donnell

Clara Molina

Rebeca García

Esther Mediero

Ainhoa Robles

(Margarita Vinagre)

Universitat Politècnica de València

Penny McDonald

Keith Stuart

María Boquera

Ana Botella


Laura Cardona



2. The Project

Goals of the project

- Use the learner corpora to produce **profiles** of each proficiency level (A1, A2, B1, etc.)
- Use these profiles to **redesign the teaching curriculum**: determining which grammatical features need to be taught, in what order, and with what degree of emphasis.
- Extract teaching **examples and exercises** from the corpus.
- Provide a **web-based language learning system** which dynamically adapts exercises presented to the student by reference to the students current performance and the proficiency profiles derived above.



3. The Proficiency Spread Problem

3. The Proficiency Spread Problem

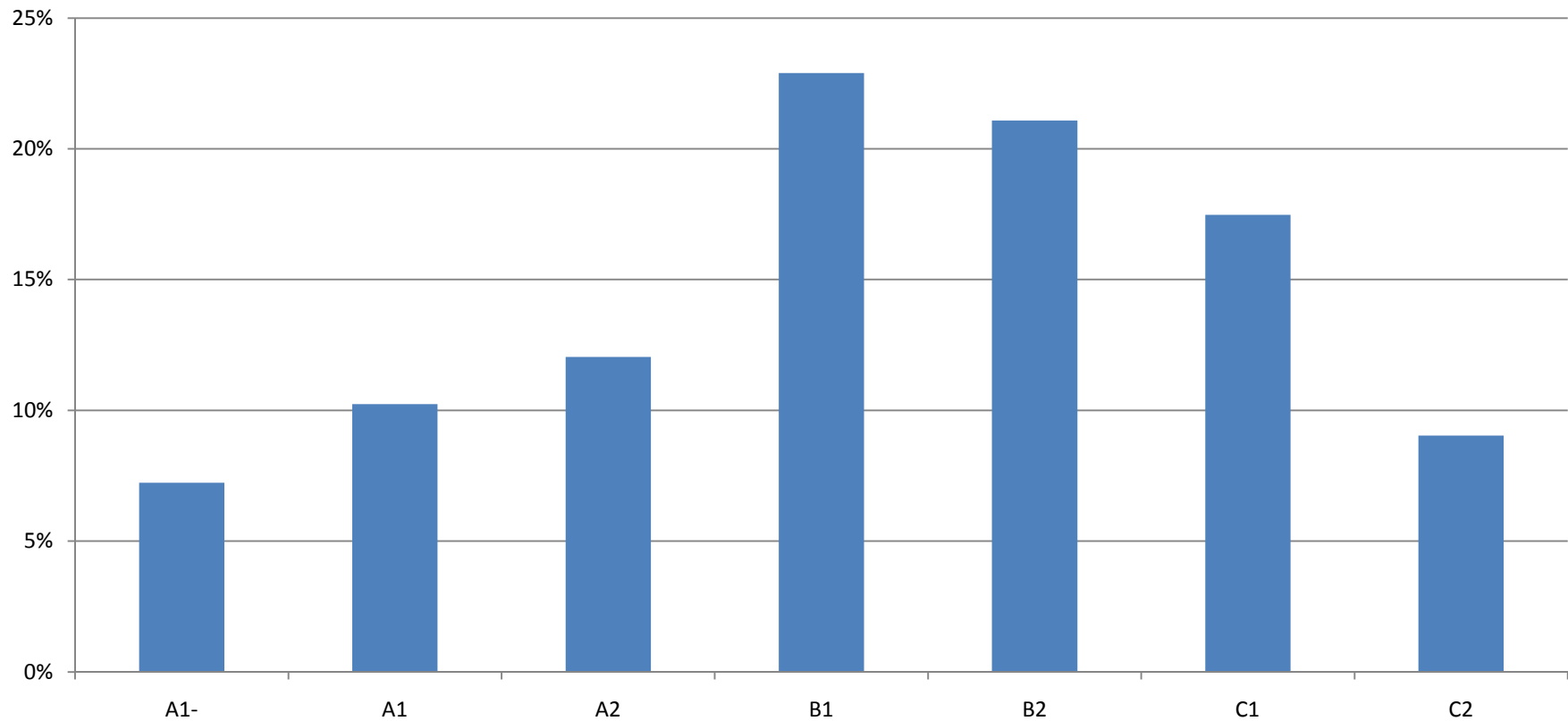
A problem for EFL Curriculum Design

- To teach a foreign language to a class of learners, we need to assume that the class is **homogenous** in their language skills.
- However, the students in a university-level foreign language classroom are **rarely all at the same level**.

3. The Proficiency Spread Problem

A problem for EFL Curriculum Design

Proficiency levels at enrolment 1st year UAM English Studies degree, 2010-11



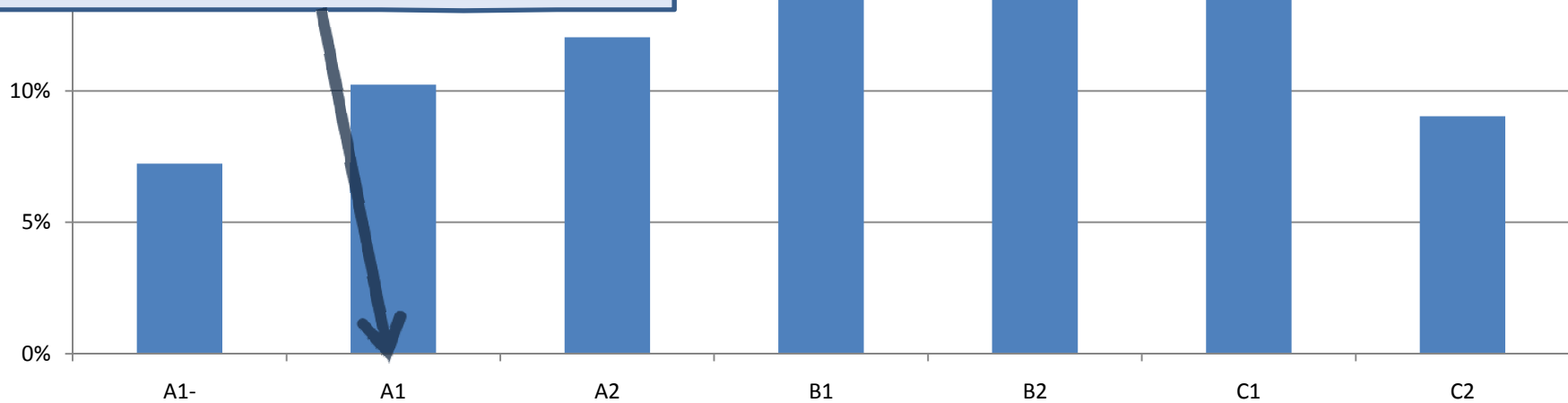
3. The Proficiency Spread Problem

A problem for EFL Curriculum Design

Proficiency levels at end of 1st year UAM English Studies

All proficiency measures
in this talk measured
using Oxford Placement
Test (UCLES 2001)

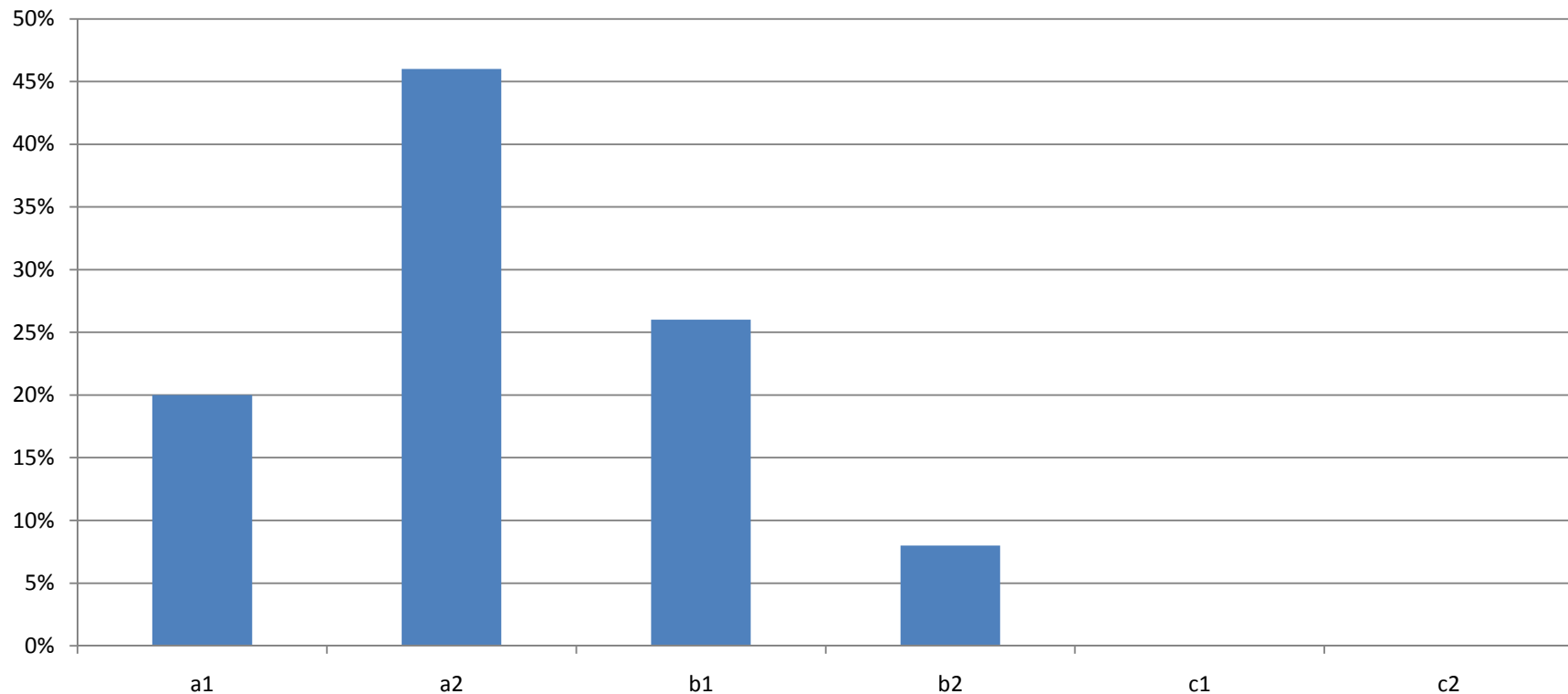
CEFR proficiency levels, range
from
A1 (basic language user) to
C2 (near-native competence)



3. The Proficiency Spread Problem

A problem for EFL Curriculum Design

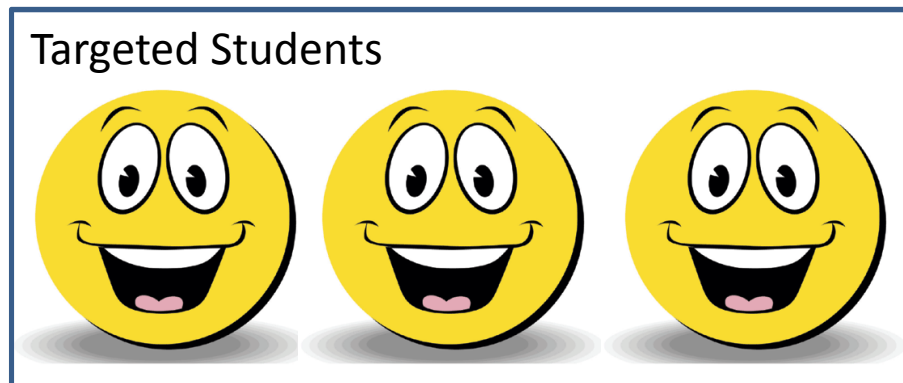
Proficiency levels of 1st year students studying English for Specific Purposes, UPV



3. The Proficiency Spread Problem

Usual Solution

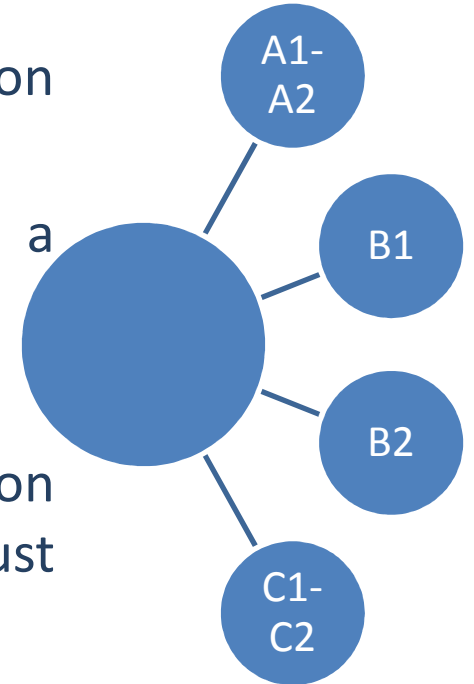
- Teachers manage by **targeting the class at one level** (e.g., B1 level assumed for starting classes in UAM).
- Students with proficiency **below the target** may **fail to learn** because they are not ready for the material being taught.
- Students with proficiency **above the target** may have already mastered the material, and thus become **bored** and lose interest.



3. The Proficiency Spread Problem

Partial Solution: Streaming

- Partial solution: Streaming of students
 - In the UAM, we have an intake of around 170 1st year students doing Lengua Inglesa.
 - We split these students into 4 groups based on their Oxford Placement Test scores.
 - Teachers can thus target their teaching at a reasonably homogenous group.
- But:
 - Assessment generally needs to be common between groups, so same material taught, just taught in a different way to each group.
 - Not possible in many EFL teaching situations.



3. The Proficiency Spread Problem

Solution: Blended Learning

- Teaching in each class targeted at the median point.
- Out-of-class activities for each student targeted at their particular weaknesses and strengths
 - **Traditional Paper-based activities** targeted at the particular needs of the student.

After completing the Oxford placement test, a report is generated for each student outlining their areas of weakness, and providing references into study materials which they are recommended to read up on.

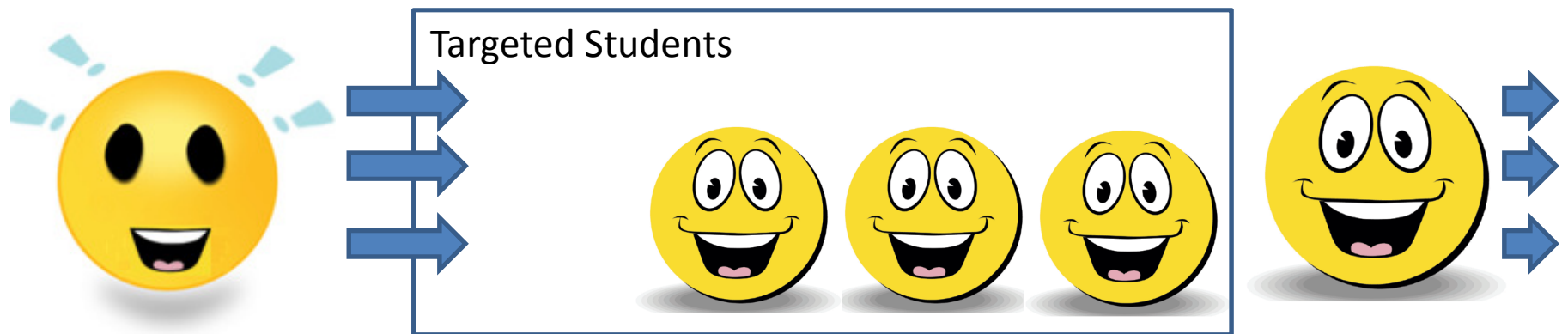
- **Computer-based activities** targeted at the needs of the individual.

Best systems will **adapt** to the level of the student, providing activities targeting their needs.

3. The Proficiency Spread Problem

Better Solution: Blended Learning

- The goal of out-of-class activities is to:
 - provide extra materials to below-target-level students to address their weaknesses and bring them up to target
 - Provide material for advanced students, to allow them to move forward, without waiting for the rest of the class.



3. The Proficiency Spread Problem

Consequence for TREACLE

- For EFL curriculum design, TREACLE thus assumes:
 - **For the class as a whole**, each English Language course can be modelled as a single proficiency level (in terms of the target level to be achieved by the end of the course)
 - **Individuals** who fall out of the target group will be addressed more strongly in out-of-class activities, targeted at their particular proficiency level.
- Using proficiency levels for non-homogenous classes thus makes sense.



4. Deciding What to Teach, and When

4. Profiling Proficiency Levels

The Approach

- The first step in the Treacle approach is:
 - to work out what students at each proficiency level can most benefit from.
- Error analysis is one way to explore the grammatical needs of students at each level (e.g. Dagneaux et al 1998).
- However:
 - Conservative students make few errors, because they avoid structures they are not sure about
 - Adventurous students take risks with more complex structures, and thus make more errors.

4. Profiling Proficiency Levels

The Approach

- We thus take a two pronged approach:

- ✓ The cat sat on th
- ✓ The mat was sat
- ✓ The sitting on t
- ✓ The reported sitt
- ✓ Who gives a stu

- ✗ Who give me th
- The man in the
- ✗ The society tod
- ✗ Do'nt let it get
- Tomorrow, I an

1. **(Automatic) Syntactic analysis** of the corpus, to see what structures students are using, and which they are not.
2. **(Manual) Error Analysis**, to see what language features each student is attempting, but getting wrong.

- Only both together give the full picture.

4. Profiling Proficiency Levels

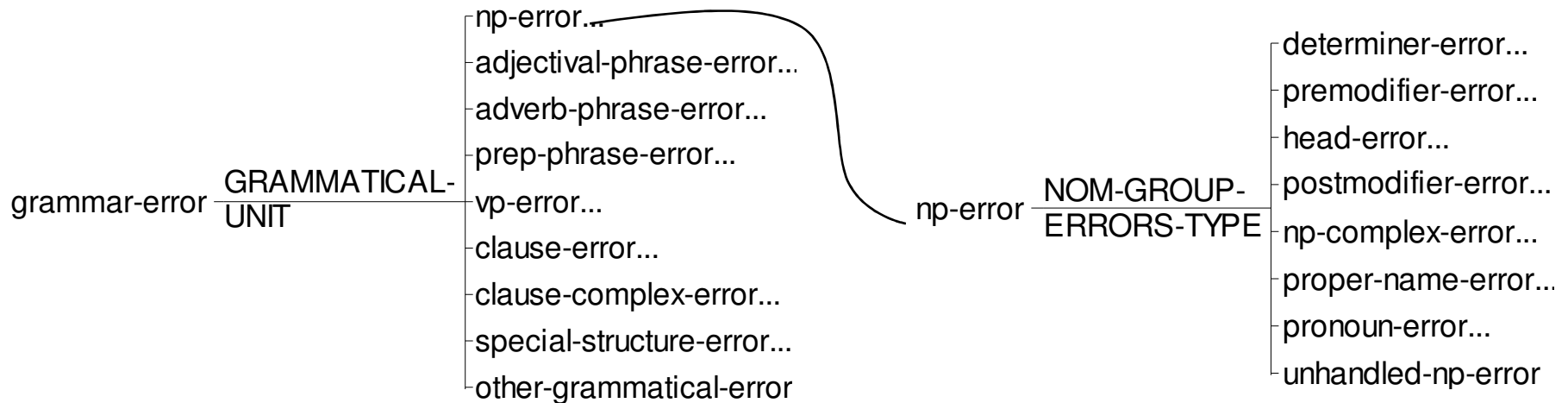
The Corpora

- The project uses two corpora:
 - ☞ The **WriCLE** corpus (UAM) - *Written Corpus of Learner English*. 521 essays of ~1000 words each, written by Spanish learners of English at University level (about 500,000 words)
(Rollinson and Mendikoetxea 2008)
 - ☞ The **UPV Learner Corpus** (UPV) containing 150,000 words of shorter texts by ESP students. (Andreu et al 2010)
- Oxford Placement test given at same time, to measure proficiency
- Other metadata: gender, academic year, degree, parent languages, time abroad, resources used in writing, etc.

4. Profiling Proficiency Levels

Error Annotation

- Each text annotated using a scheme of 147 different error codes, organised hierarchically.
- Errors are related to a typical grammar teaching curriculum (placing errors into the units to which they apply, e.g., NP-error includes errors in determiner usage, etc.)



4. Profiling Proficiency Levels

Error Annotation: Software

Error analysis for: Files/A101-4.txt

The legalisation of Marijuana has become a very polemic topic in our present society because it concerns a lot of different opinions and because the decision of legalizing it or not will directly affect a whole society. So, legalizing Marijuana is a social debate whose outcome couldn't possibly please everyone. In this essay, I will try to discuss the different perspectives and opinions of soft-drugs such as Marijuana.

The general opinion of people who are against the legalization of drugs is that if the government legalize this type of drugs the crime rates will increase and many youths will be able to obtain the drugs without any problem at all. They also believe that drugs are very dangerous substances that can cause enormous problems to the

1. Select text containing error.

<< < > >> Ignore Delete Other Action... Save Close Help

| Assigned | ERROR-TYPE | Gloss |
|---------------|-------------------------|-------|
| error | np-error | |
| grammar-error | adjectival-phrase-error | |
| | adverb-phrase-error | |
| | prep-phrase-error | |
| | vp-error | |
| | clause-error | |
| | clause-complex-error | |

Correction: the

Comment:

2. Provide the corrected text here.

3. Assign features to current segment here.

UAM CorpusTool <http://www.wagsoft.com/CorpusTool> (Free)

4. Profiling Proficiency Levels

Error Annotation: Coding

- So far 128 texts annotated
 - 57,000 words
 - 7,500 errors identified
- On schedule to double that by end of 2011
- Still early but tentative results possible...
- FOR FULLER reporting on ERROR analysis, see tomorrow's talk:

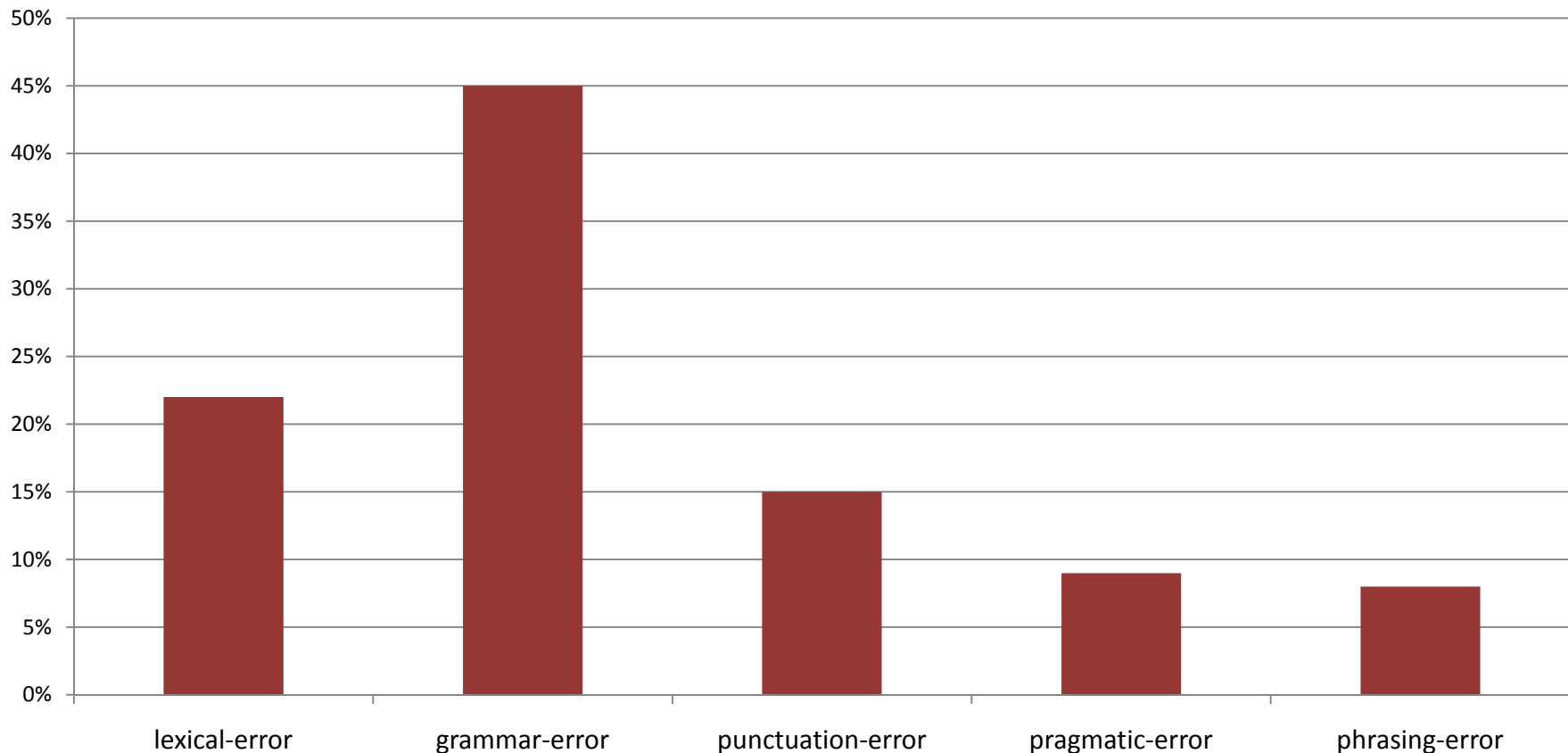
ERROR CODING IN THE TREACLE PROJECT

Penny Macdonald and Susana Murcia
Saturday, 10.00-11.30. Biblioteca, 2º piso/floor

4. Profiling Proficiency Levels

Error Annotation: Global Results

- By examining the types of errors made by students, we can determine how much teaching time to spend on each area.

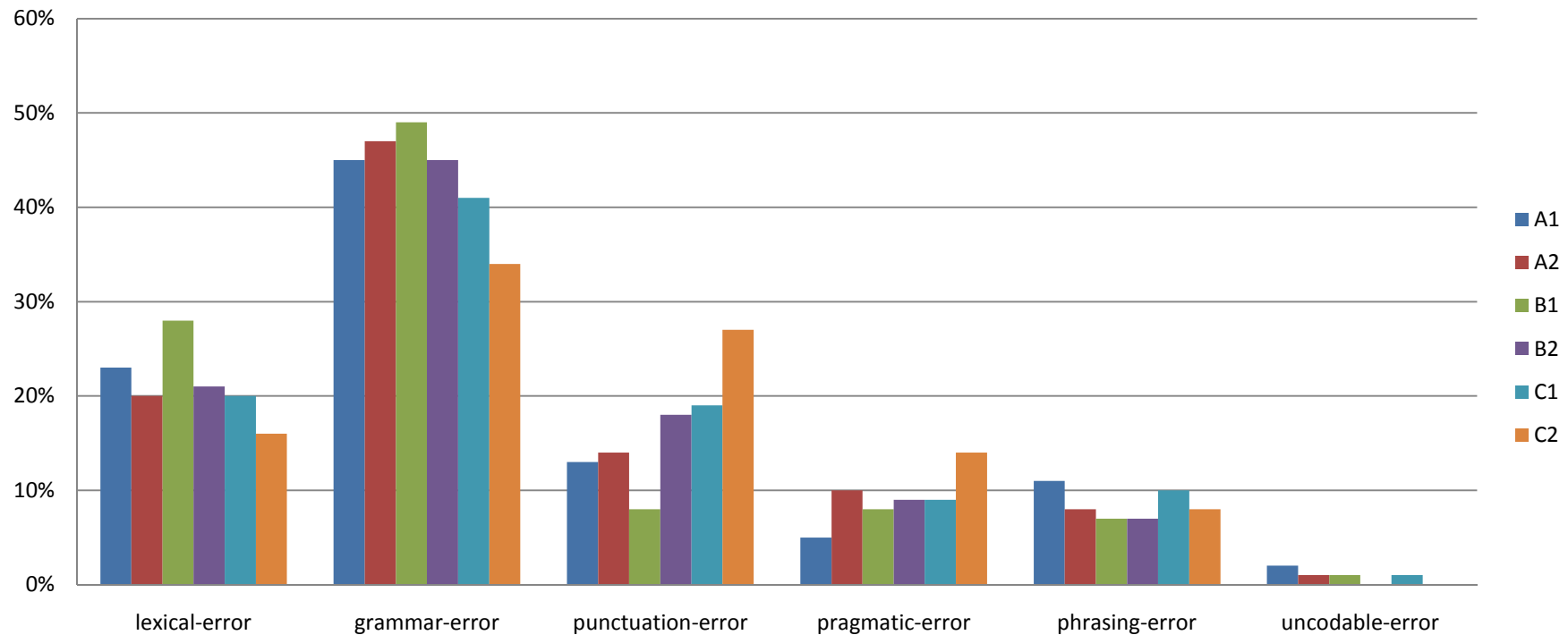


4. Profiling Proficiency Levels

Error Annotation: Results by proficiency

- By examining the types of errors made **at each proficiency level**, we can adapt teaching to each group's needs.

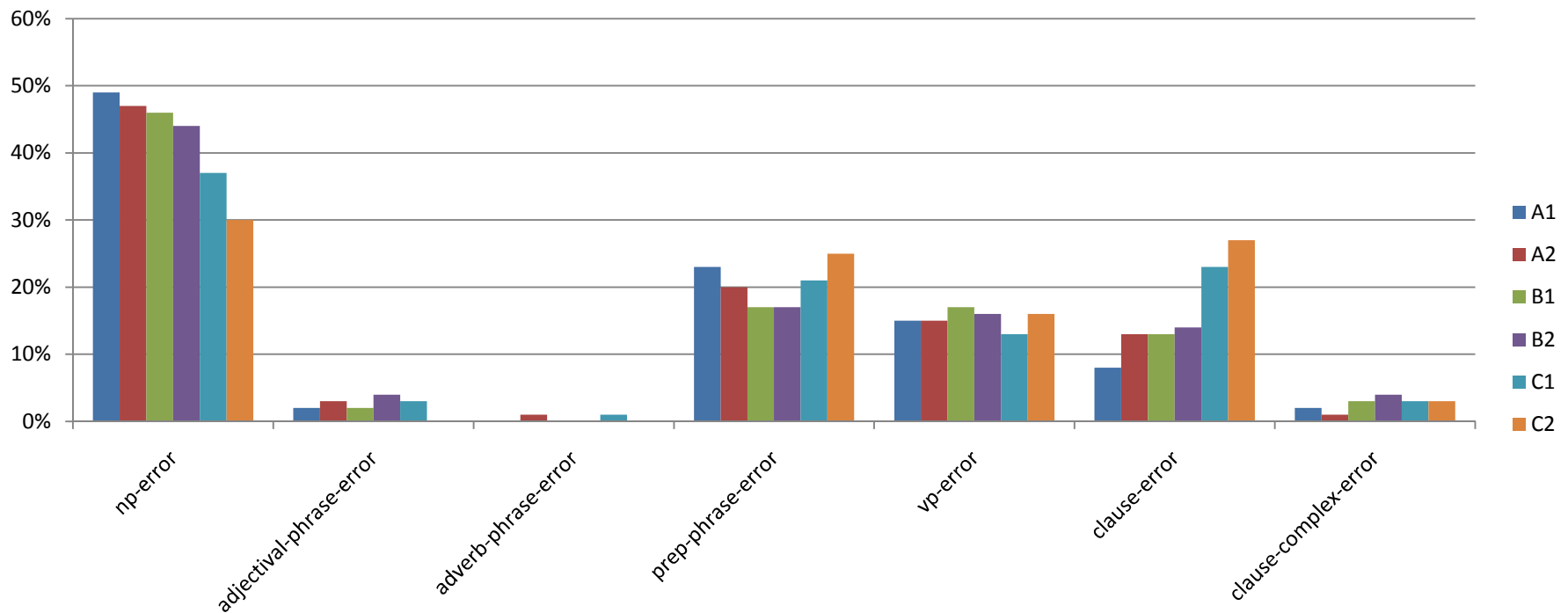
General Errors (by type)



4. Profiling Proficiency Levels

Error Annotation: Results for Grammar

- For all students, more attention needed on NPs and PPs!
- As students progress, more attention needed on clause structure issues.



4. Profiling Proficiency Levels

Syntactic Analysis

- UAM CorpusTool also produces **automatic syntactic analysis** of the sentences in the text. (embeds Stanford parser)
- We can then explore what grammatical structures each student uses in their essays.
- We can explore how often grammatical structures are used at each proficiency level.
- We can thus construct “grammatical profiles”: the degree to which each proficiency level uses each kind of structure
- From these we can see when it is best to teach particular structures.

The new points system for driving offences will be established in Spain before summer o

| | | | | | | | | | | |
|---------|-------|-------|---------|--------|-------|------|---------|--------|-------|--|
| Subject | | | | Mod | Pass | Pred | Adjunct | | A | |
| Deict | Epith | Thing | Thing | Qualif | | | Op | Pphead | Op | |
| | | | Op | Pphead | | | Thing | | Thing | |
| | | | Classif | | Thing | | O | | | |

With this new system , the driving licence will consist of a number of points that c

| | | | | | | | | | | | |
|---------|--------|-------|---------|---------|-------|--------|---------|-------|--------|--|------|
| Adjunct | | Sep | Subject | | Mod | Pred | Adjunct | | | | |
| Op | Pphead | | Deict | Classif | Thing | Op | | | Pphead | | Conj |
| Deict | | Epith | Thing | | | | Deict | Thing | Qualif | | S |
| | | | | | Op | Pphead | | Thing | | | |

I personally agree with the establishment of this new law , as I feel tha

| | | | | | | | | | | | |
|---------|---------|-------|---------|--------|--------|-------|-------|--|---------|------|--|
| Subject | Adjunct | Pred | Adjunct | | | | Sep | | | | |
| Thing | Head | Op | | Pphead | | | Conj | | | | |
| | | Deict | Thing | | Qualif | | | | Subject | Pred | |
| | | | Op | Pphead | | | Thing | | | | |
| | | | Deict | | Epith | Thing | Cor | | | | |

<< < > >> Ignore Delete Other Action... Save Close Help

Assigned

Gloss

grammatical-unit
group
np
common-phrase
singular-phrase
nonwh-noun-phrase

Comment:

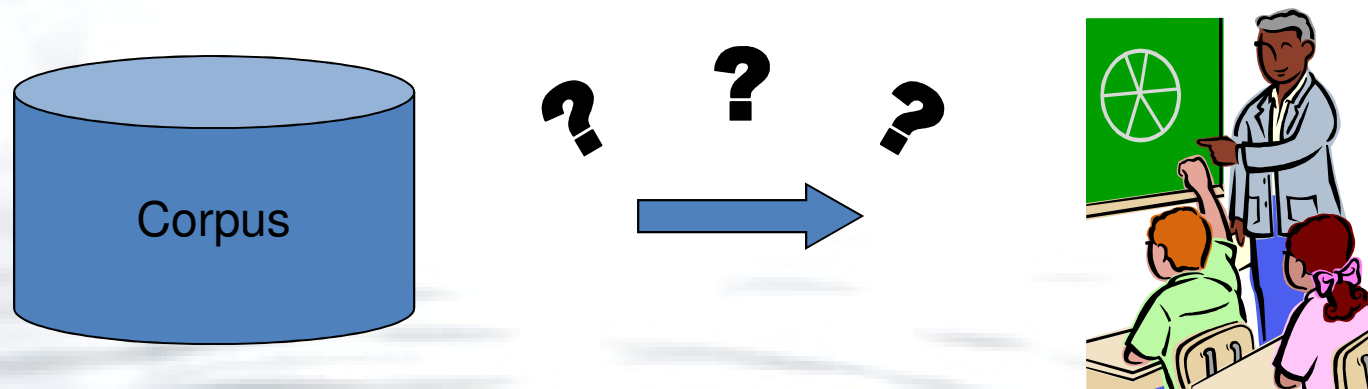
| | | |
|---|---|---|
| <p>TENSE</p> <p>simple-present present-perfect present-progressive simple-past past-progressive past-progressive simple-modal modal-perfect modal-progressive</p> | <p>FINITENESS</p> <p>simple-finite finite-with-connector relative-clause that-clause wh-nominal-clause infinitive-clause pres-participle-clause past-participle-clause</p> | <p>VERB-TYPE</p> <p>intransitive-verb monotransitive-verb ditransitive-verb ergative-verb relational-verb verbal-verb mental-verb</p> |
| <p>MODALITY</p> <p>nonmodal-clause true-modal-clause future-clause</p> | <p>DO-INSERTION</p> <p>do-inserted no-do-inserted</p> | <p>POLARITY</p> <p>positive-polarity negative-polarity</p> |
| <p>PROCESS TYPE</p> <p>material-clause verbal-clause mental-clause relational-clause</p> | <p>VOICE</p> <p>active-clause passive-clause</p> | <p>MOOD</p> <p>declarative-clause imperative-clause interrogative-clause</p> |

4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

- After the parsing process, we have a corpus of 1300 texts, 660,000 words, 90,000 clauses, 150,000 NPs.
- Each clause provided with syntactic function and a range of syntactic features.
- So, what do we do with it?

How do we use the corpus to inform us about **what** students need to learn and **when**?

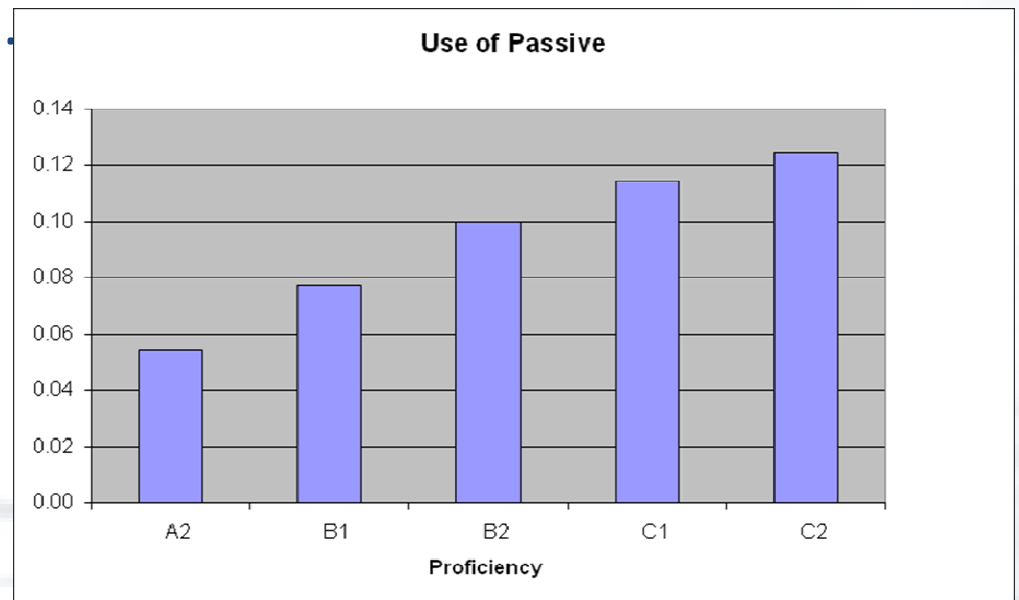


4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

Simple Frequency Approach

- Some researchers contrast the learner's degree of usage of a syntactic feature with the degree of usage of natives
- Where students under-use the feature, more emphasis is needed in teaching.
- Over-usage also needs to be corrected (perhaps by teaching alternative lexico-grammatical strategies, or teaching appropriate contexts of use).



4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

Simple Frequency Approach: Problems

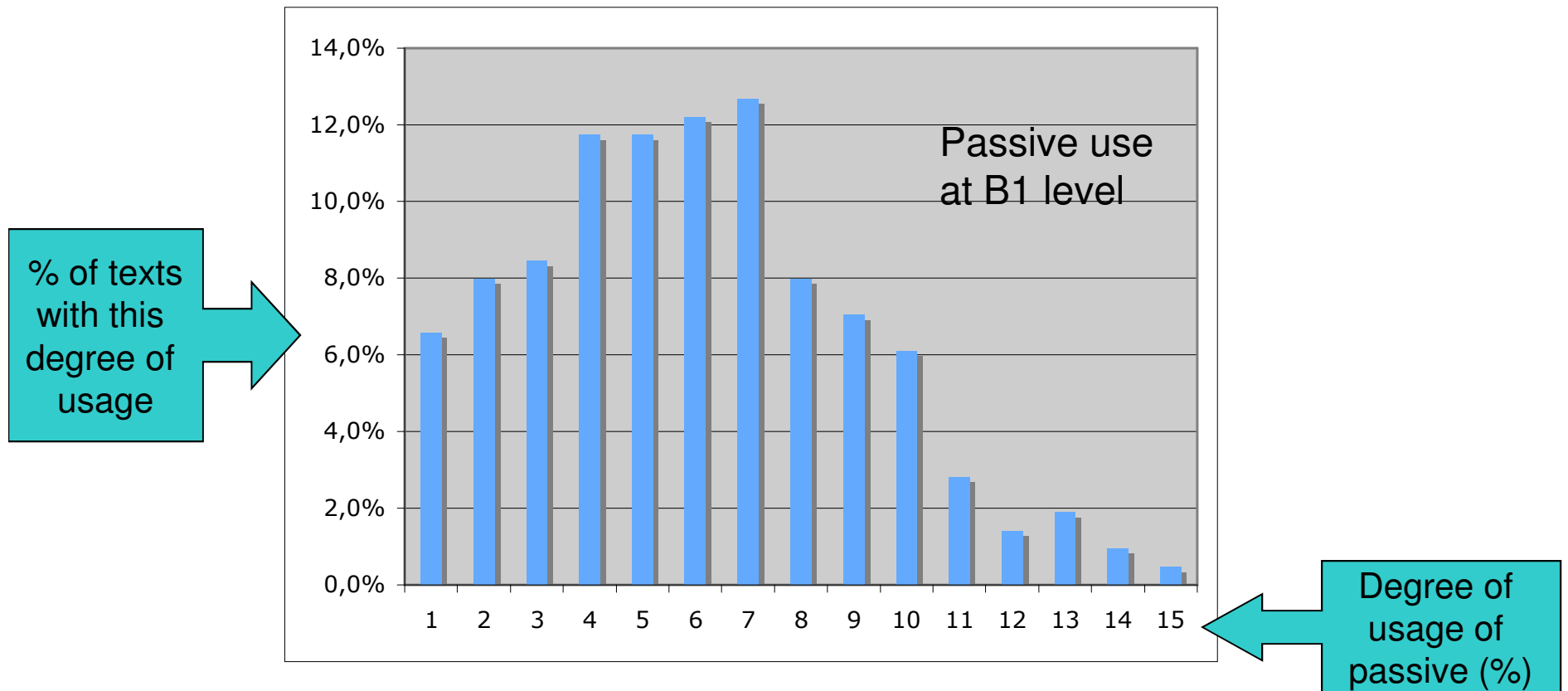
- The degree of usage of many features is **task** or **register-dependent**, so we cannot really compare with native corpus unless we have a task and register-matched native corpus.
- **Treating all students in a proficiency band as homogenous:** if we say that average usage of passives at a particular level is 10%, that ignores the fact that some students will over-use passives, and others will not use them at all.

Any teacher will tell you that the students within a proficiency band can have different strengths and weaknesses.

Taking the average of non-homogenous students is like averaging apples and oranges!!

5. Extracting profiles (ii): Signatures

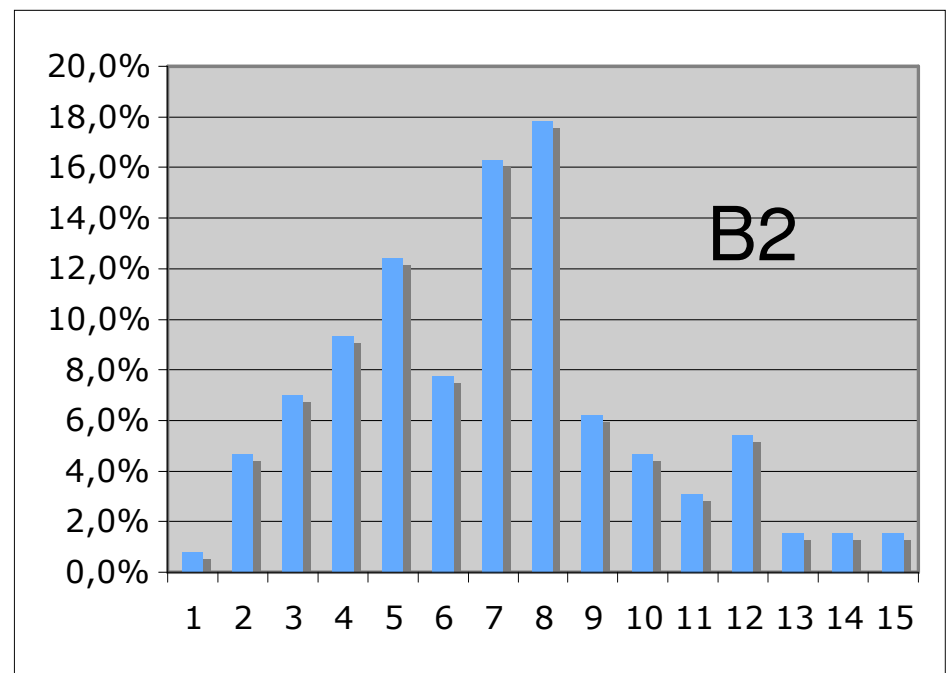
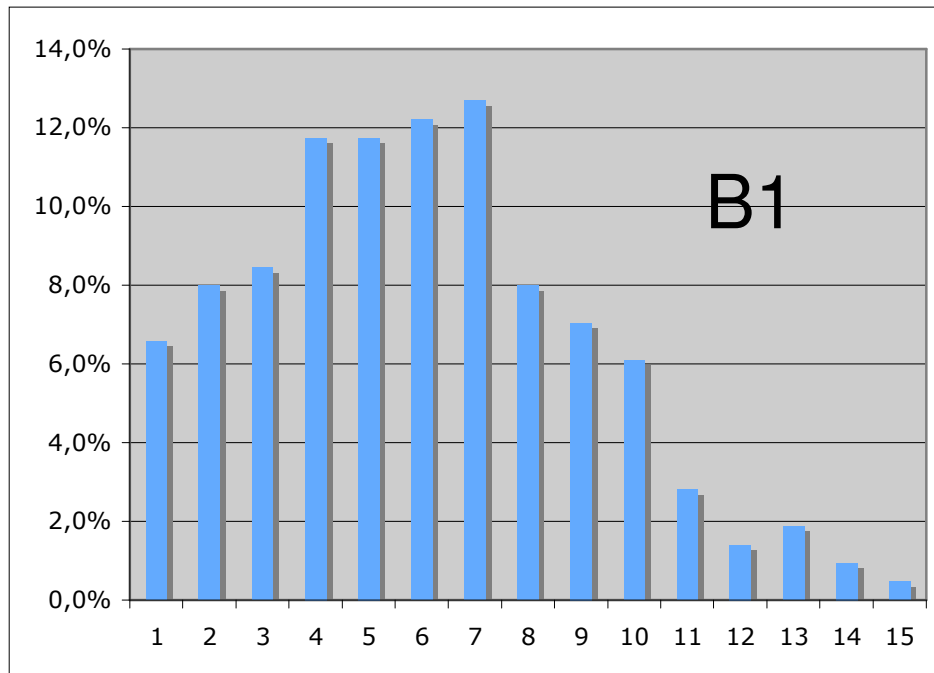
- Rather than averaging the students in a proficiency band, we could instead look at the distribution of students within the band.
- The distribution graph within each band shows us the levels of proficiencies **with this feature** at this proficiency level



5. Extracting profiles (ii): Signatures

Main thing the graph reveals to us is that:

- Students at a given proficiency level do not perform the same in regards to a particular structure.
- Different proficiency bands have different profiles for this feature, but lots of overlap
- E.g. Use of passive:



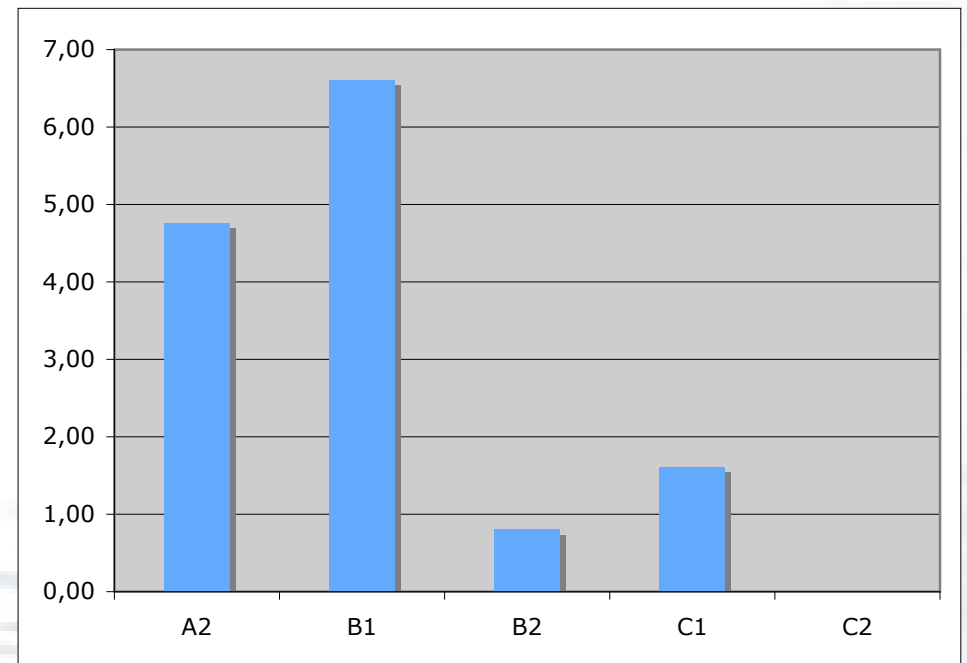
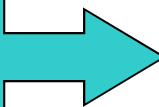
4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

'Onset of Use' approach

- Our belief is that a first concern should be with whether a learner is capable of producing a structure at all.
- We thus look at each text individually, to see if the structure is present or not.
- We then measure the percentage of texts which do not use the feature **at all**:

Texts which don't use passive (%)



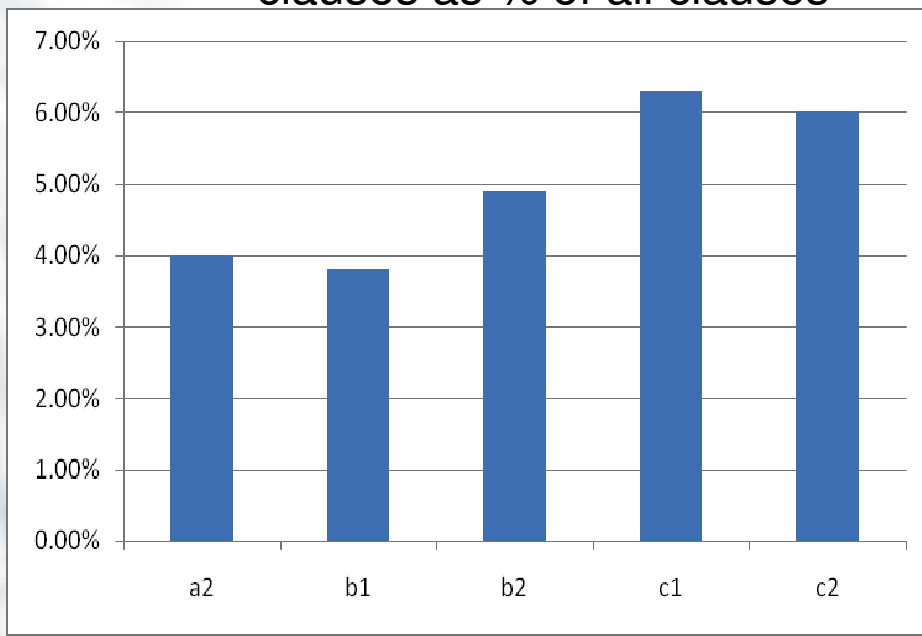
4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

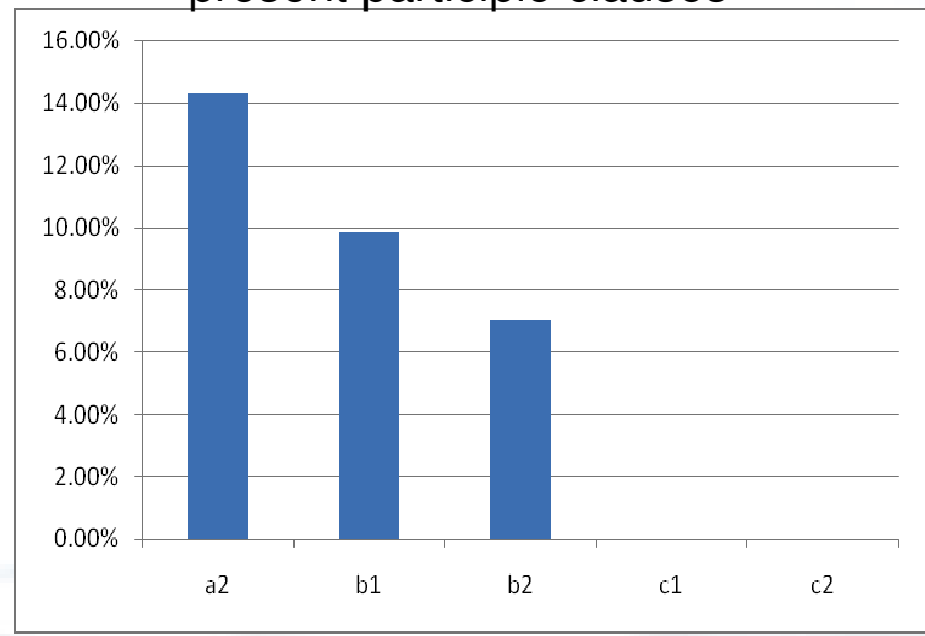
‘Onset of Use’ approach: another example

Use of Present-participle clauses: “*He likes going to the zoo*”

Present participle clauses as % of all clauses



% of Texts with no present participle clauses



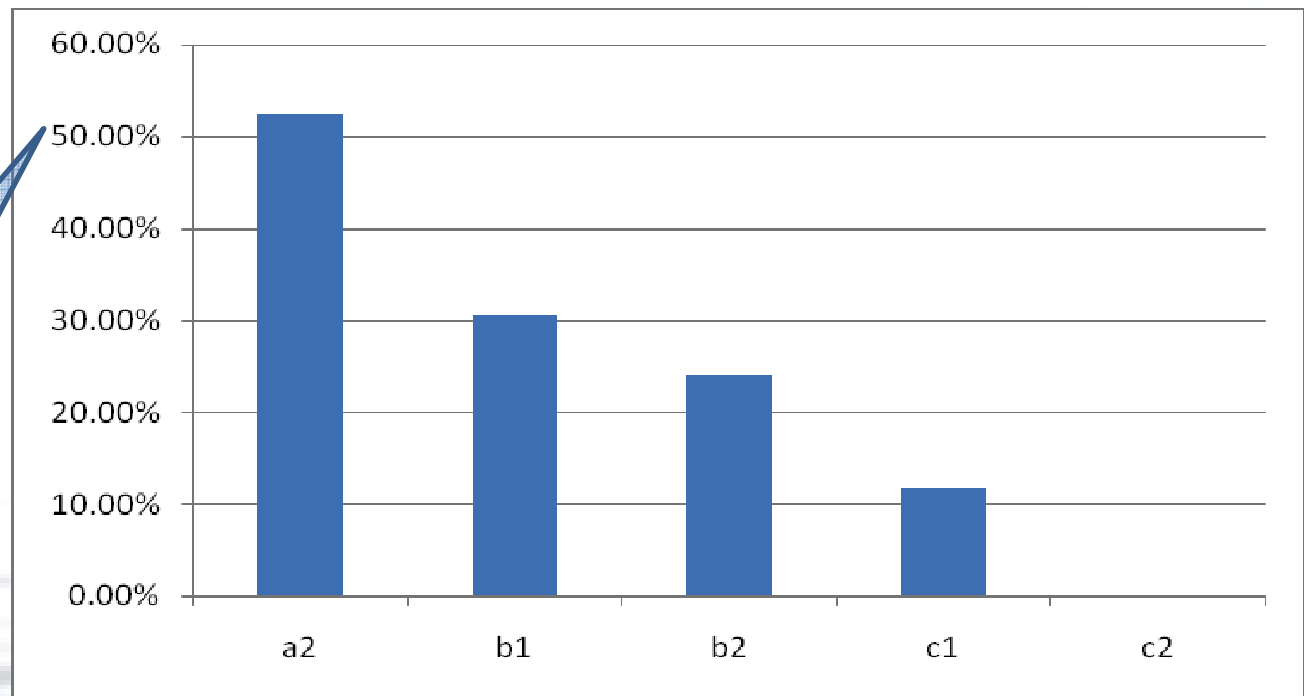
4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

'Onset of Use' approach: another example

- Use of Past-participle clauses:
 - *The man driven by hunger*
 - *Burnt by the sun, he marched on*

% of Texts with no past participle clauses



Obviously, this structure is acquired much later, and thus should be taught later.

4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

- By analysing the degree of non-usage of each grammatical feature at each proficiency level, we can determine when the feature is most critical to the group as a whole
 - **When** the early adopters have started to use it
 - **Before** the cautious have started to use it
- Exactly where in this range a structure is best taught needs to be decided.
- Some flexibility good, to fit into a structured grammar teaching environment

4. Profiling Proficiency Levels

Syntactic Analysis: Extracting Profiles

- So, far, only applied to a range of clause structures
- We need to explore the full range of structures taught in grammar courses (e.g., noun phrases, cohesion, reference, etc.)
- Also need to merge results from error analysis with the syntactic results.

4. Syntactic Analysis

Extracting Profiles from the Corpus

- How much are figures of grammatical usage of structures affected by the task?
- Modals more common when given an essay task about the future.
- Less common when asked to describe your holidays.
- Does the choice of task invalidate proficiency studies of the kind we are doing?
 - We use a wide range of task questions, and thus the effect of the task is diminished.
 - In a separate study currently underway, we are exploring which grammatical structures are most affected by the task.



5. Adaptive Online Learning Assistant

5. Online Teaching

The Treacle Learning Assistant



!Ghostware
Warning!

- The project **plans** to build an online (web) system to complement classroom teaching.
- The system will consist of three parts:
 - A grammar reference system of the areas covered in university English
 - An online exercise system (driven by a database of exercises connected to grammar topics)
 - An online writing submission system, allowing online error correction by the teacher.

Student
Writing
Correction
System

Student
Models

Language
Model

Online Reference
Website

Adaptive Quiz
System



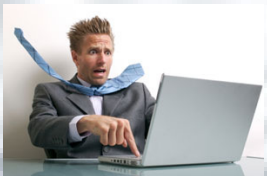
Student Writing Correction System

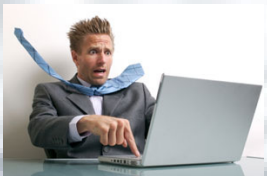
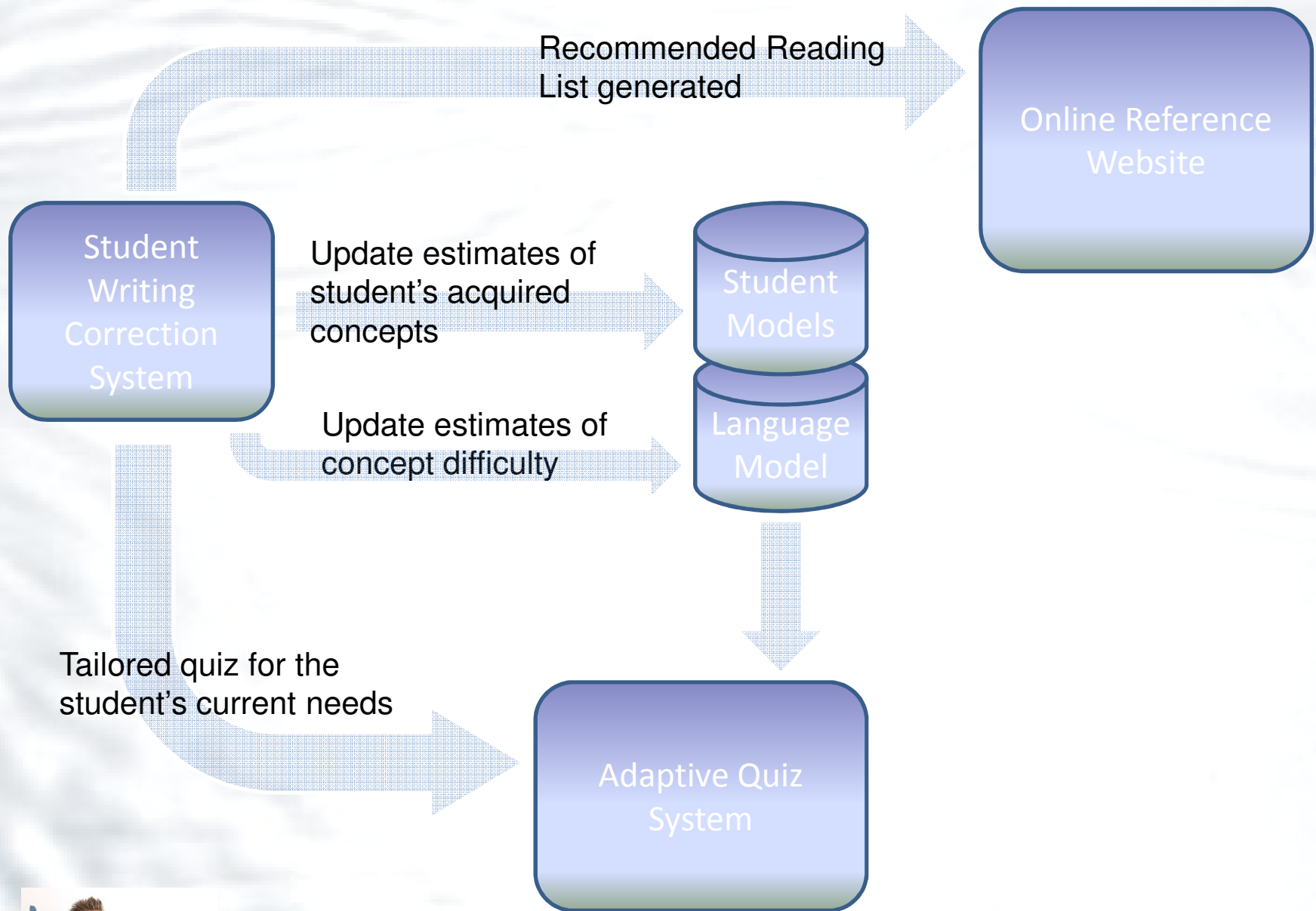
Student Models
Language Model

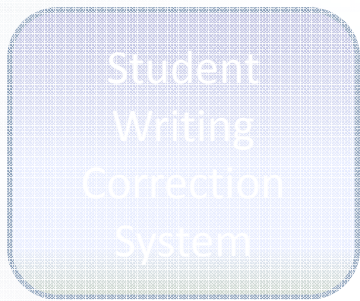
Online Reference Website

Adaptive Quiz System

Test Generated in relation to current topic in reference system adapted to student's proficiency

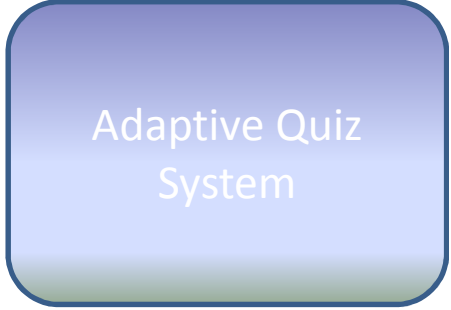
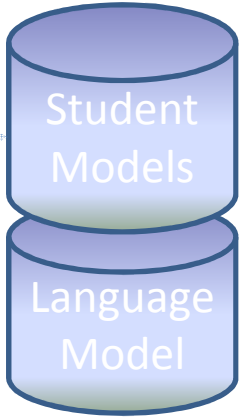






Update estimates of student's acquired concepts

Update estimates of concept difficulty



Recommended Reading List generated as result



5. Online Teaching

An **Integrated** Learning System

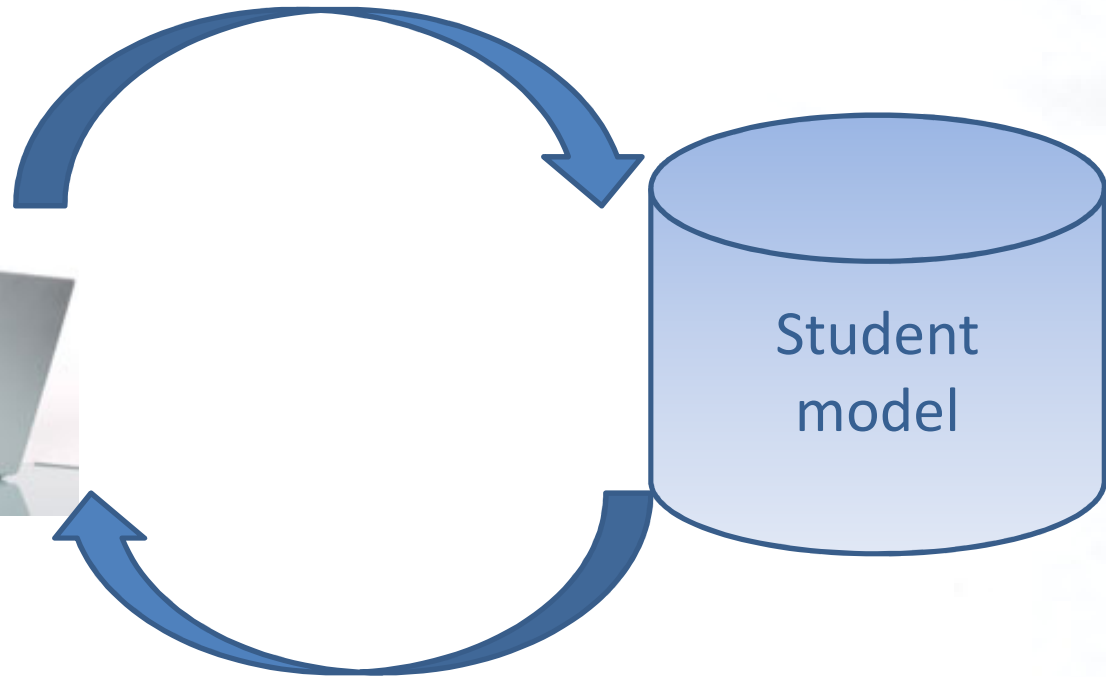
- The idea is that the three components are inter-connected:
 - Within a topic in the reference, students can click on a link for exercises on that topic.
 - After doing some exercises, students are given links to recommended sections in the reference system, based on their problems.
 - After an essay is corrected by a teacher, the report returned to the student will include both links to topics to read, but also a tailored set of exercises to help them work on their problems.

5. Online Teaching

An Intelligent Learning System



Student answers
update recorded
student model



Each quiz based on
learner's current
critical problems

5. Online Teaching

An **Intelligent** Learning System

- Students start the year with an online placement test.
- This test automatically places the student on an overall proficiency level.
- The test also identifies particular weaknesses and strengths of each student compared to their peers with similar scores.
- The students are thus assigned a list of topics to study.
- Alternatively, they are given a set of exercises selected to strengthen their weaknesses.
- As students get questions right, the topics are removed from their agenda.
- As students progress, new topics are added to their agenda, slightly more difficult.
- Engagement is optimal when exercises are neither too hard nor too difficult.

1. A Problem for EFL Education

1.3 Adaptive Quiz

- Grammar and error information will provide initial “proficiency” values for each grammar “concept”, and thus the quiz questions associated to that question.
- As students interact with the quiz system, getting questions wrong or right (on first attempt), the system will upgrade or downgrade the question’s value, depending on its assessment of the student’s proficiency.
- Thus, the system will continually adapt the difficulty of questions as student’s interact with the system.
- Students should thus see quiz questions which are appropriate to their current level.

5. Online Teaching

An **Intelligent** Learning System

- Current status: bare bones quiz system implemented, with login system.
- The adaptive quiz planner still to be implemented.
- The online
- SHOW **ONLINE QUIZ** AND FEEDBACK SHEET as the basis of where we are going.

6. The END

- Treacle Web page:
<http://www.uam.es/treacle>
- UAM CorpusTool (Free) Macosx, Windows
<http://www.wagsoft.com/CorpusTool>