"I want to tell you a joke… Are you ready?"

An introduction to the STANDUP Project

Graeme Ritchie

University of Aberdeen

Annalu Waller
Rolf Black
Dave O'Mara

University of Dundee

Helen Pain
Ruli Manurung

University of Edinburgh

Outline

1. Background
2. Aim of Project
3. Functional requirements
4. User requirements
5. The Development of the Lexicon
6. Designing the Interface
7. STANDUP demonstration

standup
EPSRC
UNIVERSITY OF DUNDEE
THE UNIVERSITY OF EDINBURGH
1495 UNIVERSITY OF ABERDEEN

1.1 Background

- Conversational narratives (story)
  - Different types of story, e.g. jokes
  - Punning riddles have question-answer format

- Role of jokes in language development
  - pragmatics ⇨ turn taking, initiation etc.
    ⇨ early development
  - vocabulary acquisition
    ⇨ word play (ambiguity)
    ⇨ phonetic and semantic awareness

standup
EPSRC
UNIVERSITY OF DUNDEE
THE UNIVERSITY OF EDINBURGH
1495 UNIVERSITY OF ABERDEEN

1.2 Background

- Humour research
  - laughability vrs understanding
  - comprehension studies begin at 5 years
- Computational humour
  - JAPE
  - STANDUP

1.3 Background

- Humour and Augmentative and Alternative Communication (AAC)
  - prestored jokes
  - pragmatics
  - little opportunity for independent vocabulary acquisition and word play
  - research mainly into enjoyment and fun

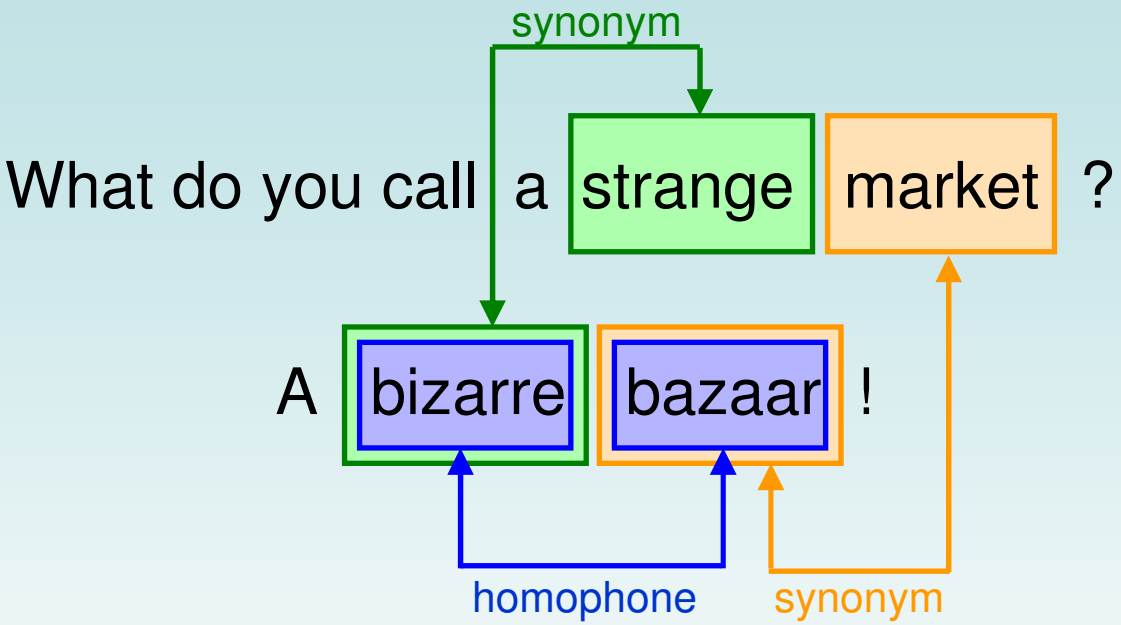
2 Aim of the project

System To Augment Non-speaker's Dialogue Using Puns

- to provide a language playground through the generation of novel puns!
- could we develop an interface to a joke generator for children with complex communication needs (CCN)?

3 Functional requirements

Joke Generation System



- Based on JAPE developed by artificial intelligence researchers
- System creates new jokes (not pre-stored)
- Jokes can be saved by user

standup

EPSRC

UNIVERSITY OF DUNDEE

THE UNIVERSITY OF EDINBURGH

1495 UNIVERSITY OF ABERDEEN

4 User requirements - General

- Accessible to wide range of users
  - Scanning & direct access
  - Reduced selections
  - Recovery – e.g. “go back”, “go home”

- Different levels of access to manage language skills and possible progressions:
  - Task difficulty (keyboard input harder than simple selection of words)
  - Joke type (partial word matching harder then homophone substitution)
  - Vocabulary (measured by word frequency)

4 User requirements - Vocabulary

- Appropriate for Young Children
  - No Unsuitable Words
- Appropriate for Children with Emerging Literacy
  - Preference for Familiar Words
  - Speech output
  - Symbol support using Rebus and PCS symbol libraries e.g.:

- Access to jokes using subjects – lexicon grouped into subject-areas (topics) and clustered into a hierarchy

5 The Lexicon: Requirements

Lexicon Information

- Part-of-speech (POS) tags

- Phonetic spelling, for computing:
  - homophones — time — thyme
  - rhyme — pub — tub
  - spoonerism — bare/spank — spare/bank

- Compound nouns and their components
  e.g. long time, traffic jam

- Distinct senses of a word/phrase,
  e.g. match=sporting event, match=ignition stick

- Semantic relations:
  - synonyms — strange — bizarre
  - hypernyms — thyme — herb
  - meronyms — traffic — car

standup
EPSRC
UNIVERSITY OF DUNDEE
THE UNIVERSITY OF EDINBURGH
1495 UNIVERSITY OF ABERDEEN

5.1 The Lexicon: Resources

Word collections / Lexica

- **WordNet**: 200k word senses, synonyms (**synsets**), hypernym hierarchy, meronyms.
- **Unisyn**: pronunciation dictionary, assigning phonetic strings to >115k word forms. Edinburgh accent used.
- **SemCor**: subset of Brown corpus with >230k WordNet sense-tagged words. >35k WordNet entries have SemCor frequency>0.

Problems:

- **Unsuitable**
- **Unfamiliar**
- **Americanisms (e.g. baseball information)**

5.2 The Lexicon: Additional Resources

- **MRC Psycholinguistic Database**: various ratings relevant to familiarity.
- **BNC Spoken Corpus**: frequency ratings for compound nouns.
- **Widgit conceptcodes**: >11k concepts linked to >6k Widgit Rebus symbols, >4k Mayer-Johnson PCS symbols.
- **Schonell spelling lists**: spelling list of >3k words for children aged 7-12. Used as preferred source of "familiar" words.

5.3 The Lexicon: Data Preparation

- **Database**

  Lexical resources

- **WordNet+Unisyn**

  Disambiguation

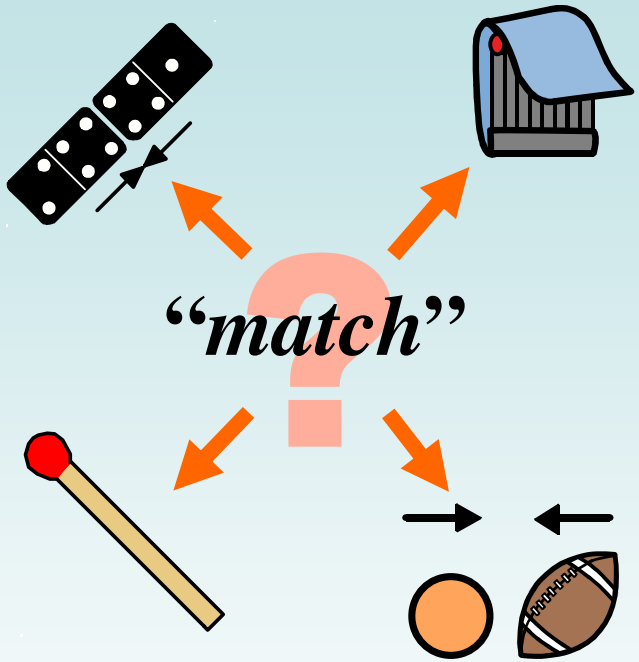
- **Phonetic relations**

  Similarity, rhymes, spoonerisms

- **Familiarity scoring**

  Word-sense: "F-score"

  Prioritising and combining sources (MRC>Schonell>Widgit>Semcor)

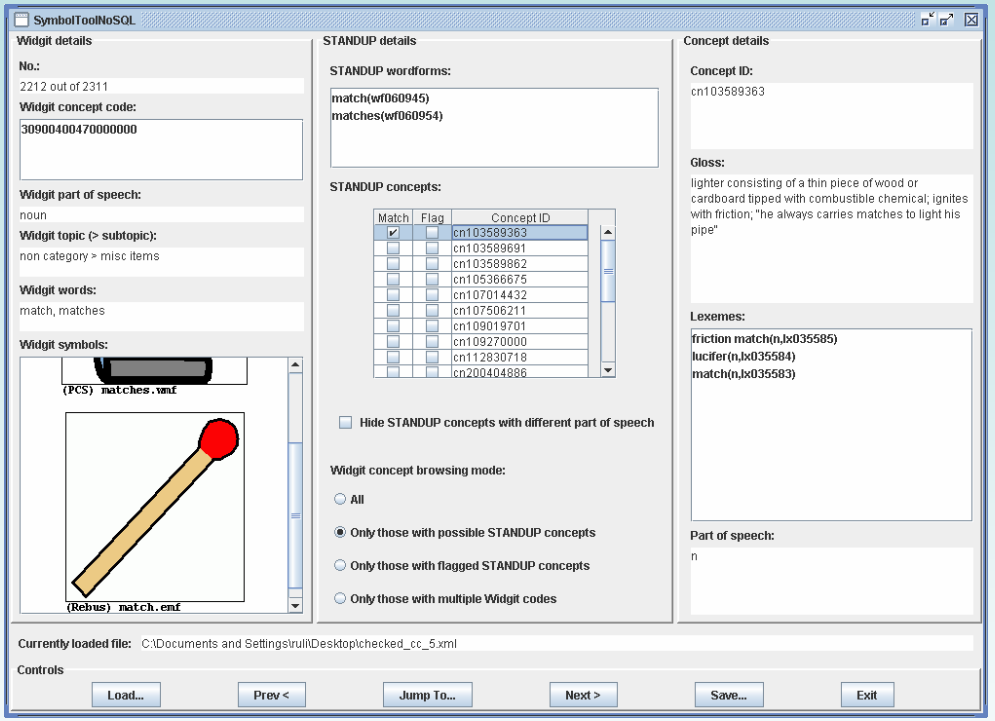


5.4 Data Preparation (2)

Auto disambiguation:
- **Widgit** & **Schonell**
- **MRC** database

Manual disambiguation:
- **Widgit** conceptcodes
- **Schonell** spelling list

Custom authoring tools were used.



5.5 The Lexical Knowledge Base (1)

Core lexicon:

- 130k lexemes
  - ✓Sense (synset)
  - ✓Part of speech
  - ✓F-score (in [0,1])
- 79k wordforms
  - ✓Orthography
  - ✓Phonetic spelling
- 32k compound nouns
  - ✓Head
  - ✓Modifier
- 85k concepts
  - ✓WordNet gloss
- 65k hypernym pairs, 7.5k meronym pairs
- 10k Widgit-to-WordNet matches
  (>8k POS matched)
- >500k phonetic similarity ratings (in [0.75,1])

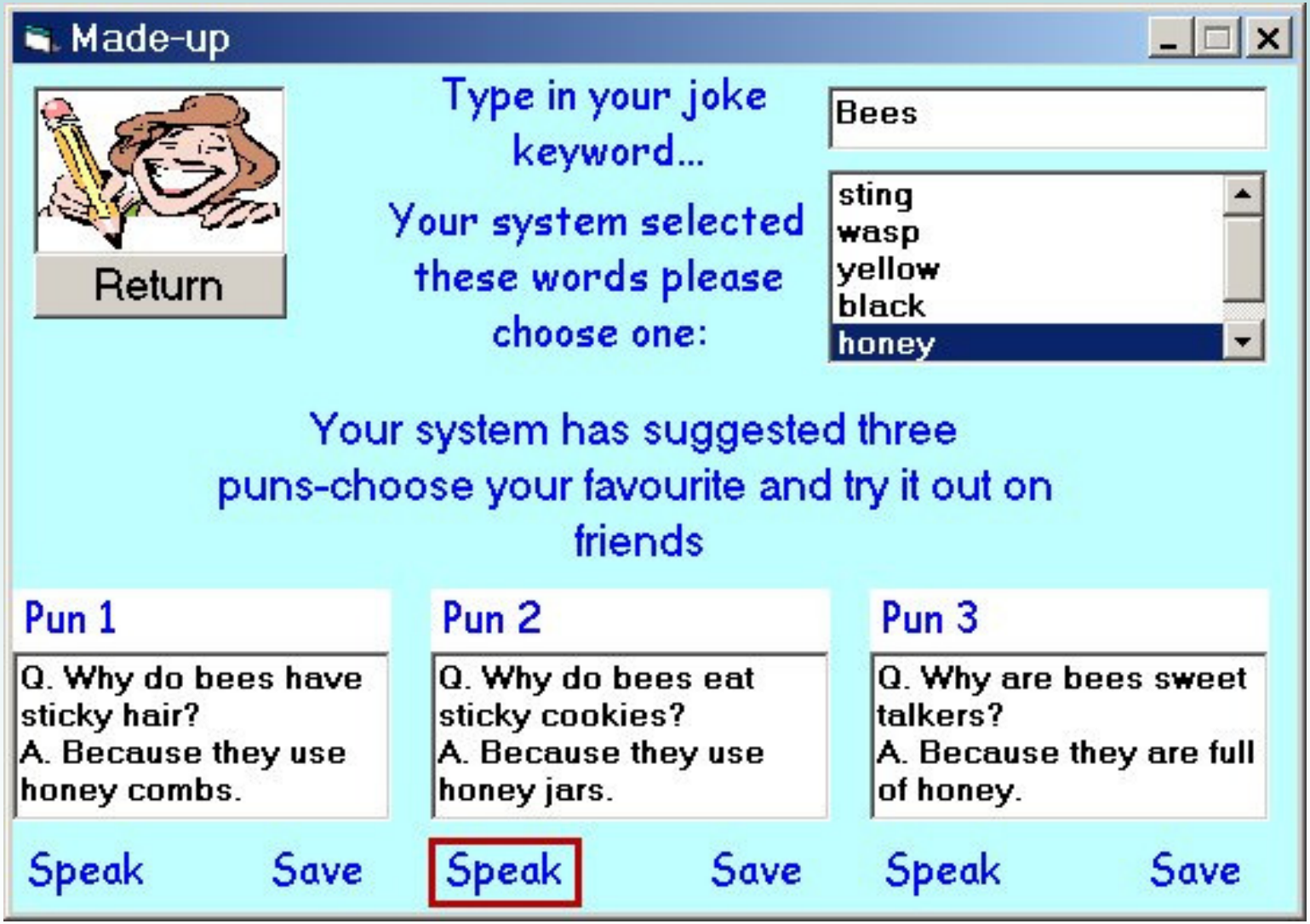
Lexical relations stored in additional cache tables:

- Syntactic:
  noun, verb, adj, mod, compound
- Semantic:
  synonym, hypernym, meronymy, alternate meaning
- Phonetic:
  homophone, rhyme, spoonerism, prefix, suffix

6.1 Designing the Interface

- User Centred Design
- Clinicians and adults who use AAC
  - Focus groups with clinicians
  - One to one sessions with adults
- Requirements gathering
  - Paper prototypes
- Design
  - Paper prototypes
  - Low fidelity mock ups

Highly literate prototype



standup

EPSRC

UNIVERSITY OF DUNDEE

THE UNIVERSITY OF EDINBURGH

1495 UNIVERSITY OF ABERDEEN

J evaluating paper Prototype

standup

EPSRC

UNIVERSITY OF DUNDEE

THE UNIVERSITY OF EDINBURGH

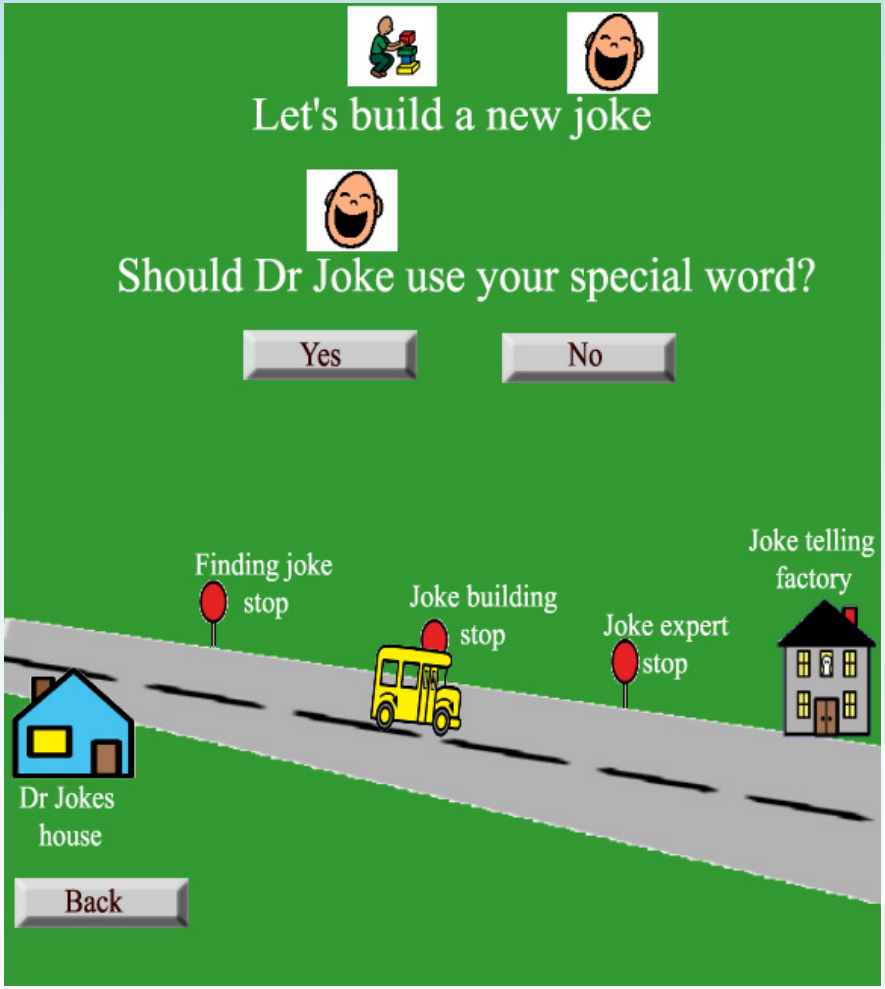
1495 UNIVERSITY OF ABERDEEN

Results Paper prototypes

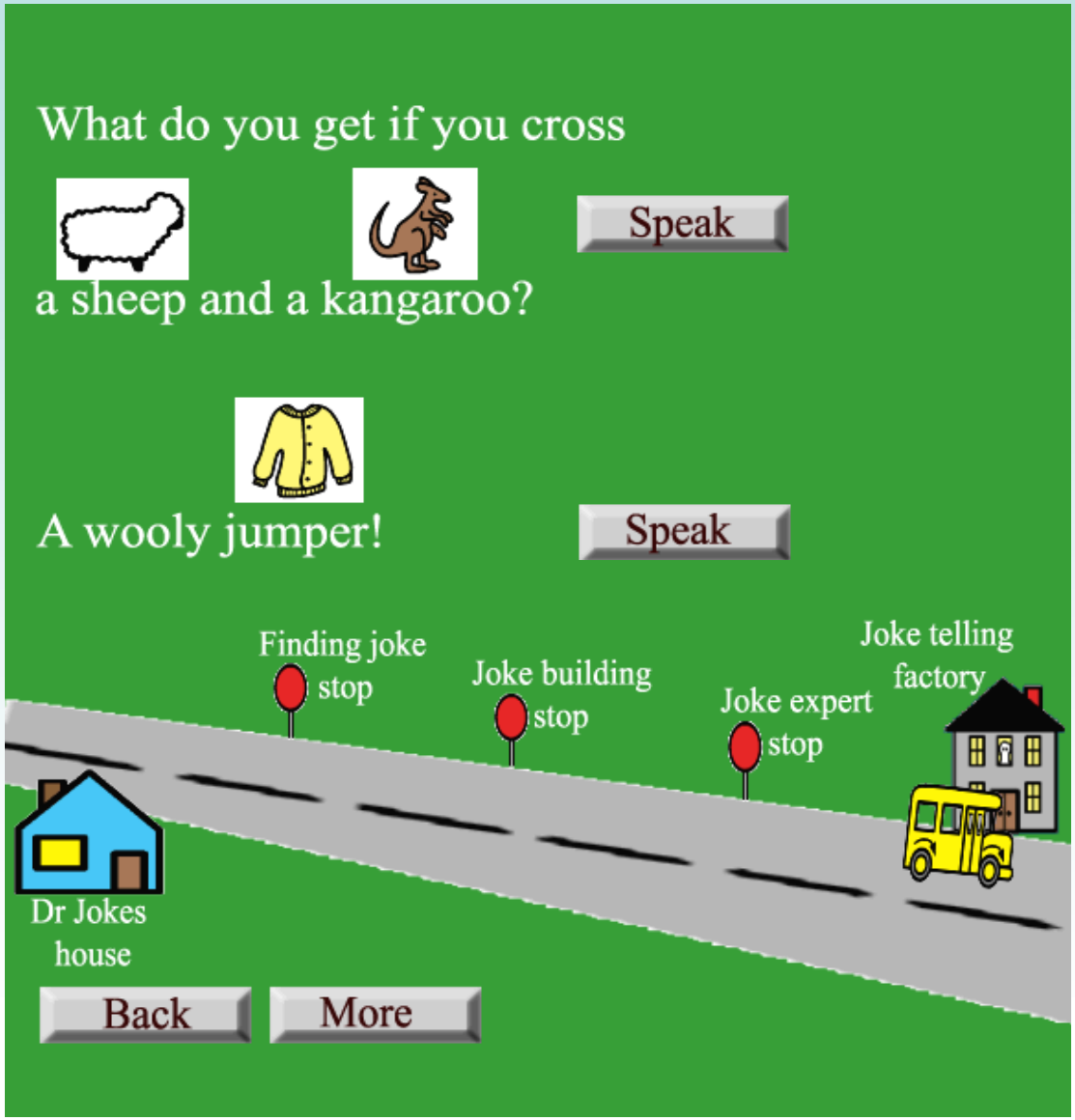
- suggested too much reliance on text
- needed picture language interface
- suggested various ways of use

standup
EPSRC
UNIVERSITY OF DUNDEE
THE UNIVERSITY OF EDINBURGH
1495 UNIVERSITY OF ABERDEEN

Pictorial Journey Metaphor



Pictorial Journey Metaphor



K evaluating metaphor design

standup

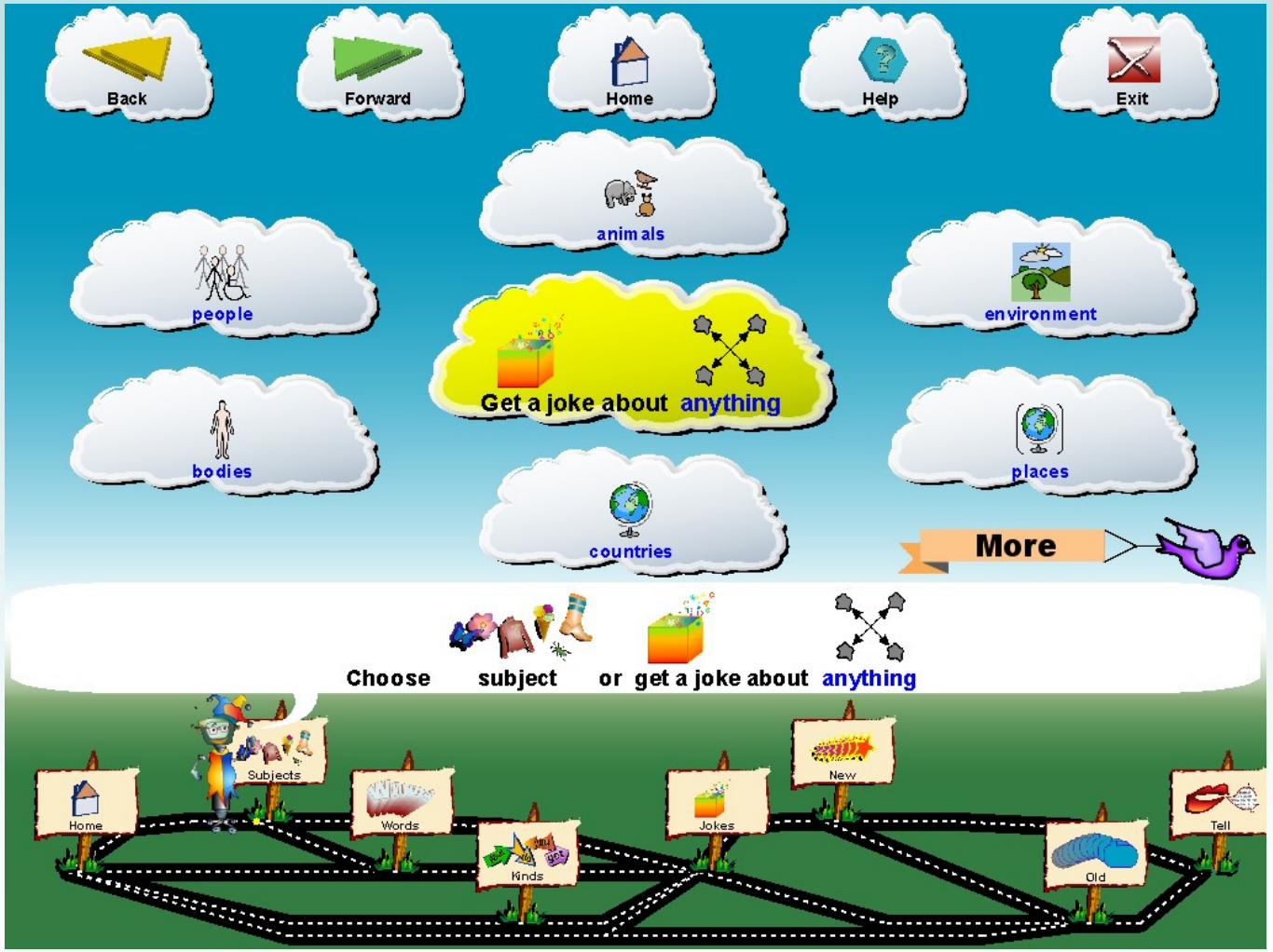
EPSRC

UNIVERSITY OF DUNDEE

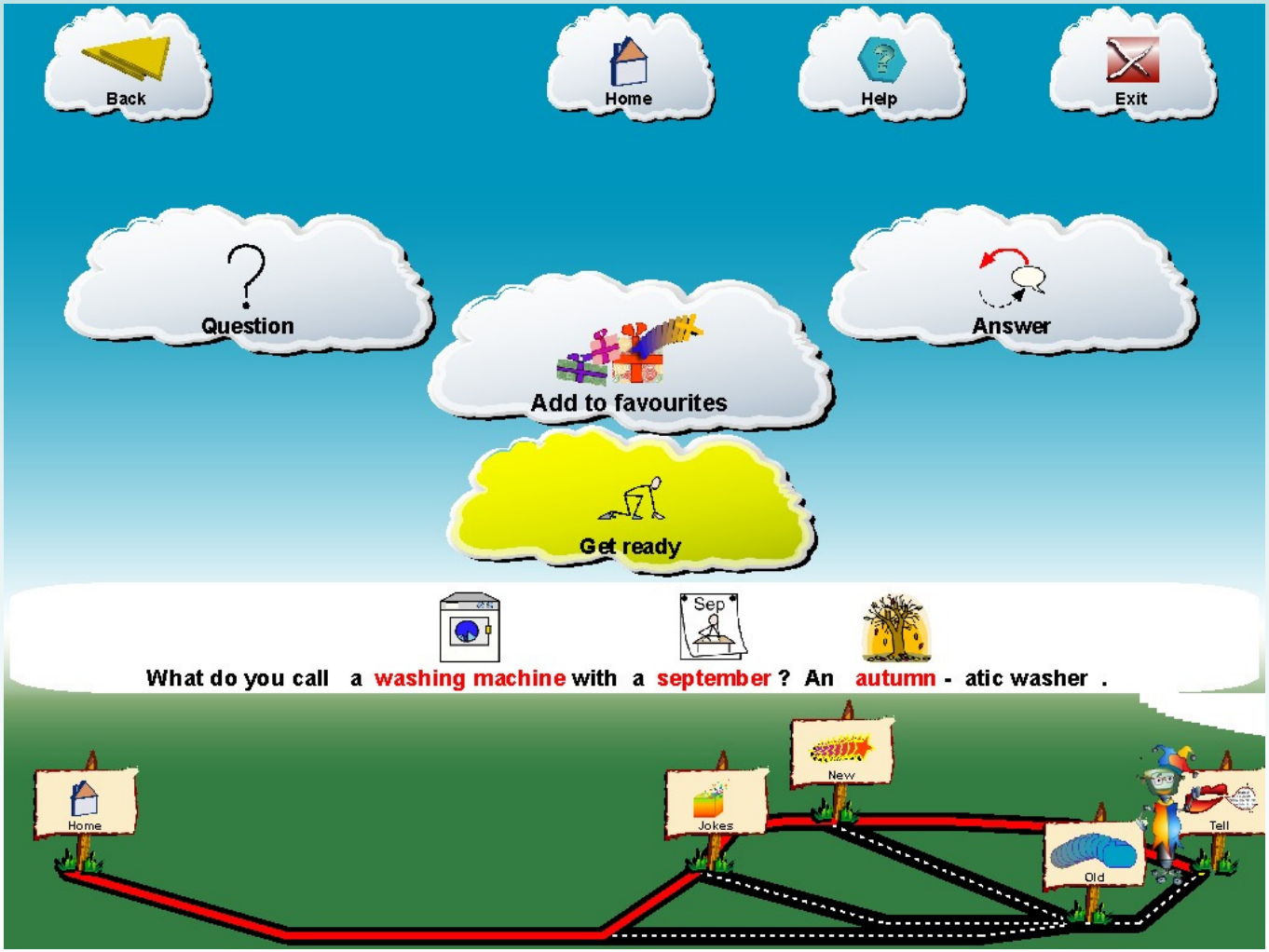
THE UNIVERSITY OF EDINBURGH

1495 UNIVERSITY OF ABERDEEN

6.2 Using STANDUP – Screen layout



6.3 Using STANDUP - "Are you ready?"



standup

EPSRC

UNIVERSITY OF DUNDEE

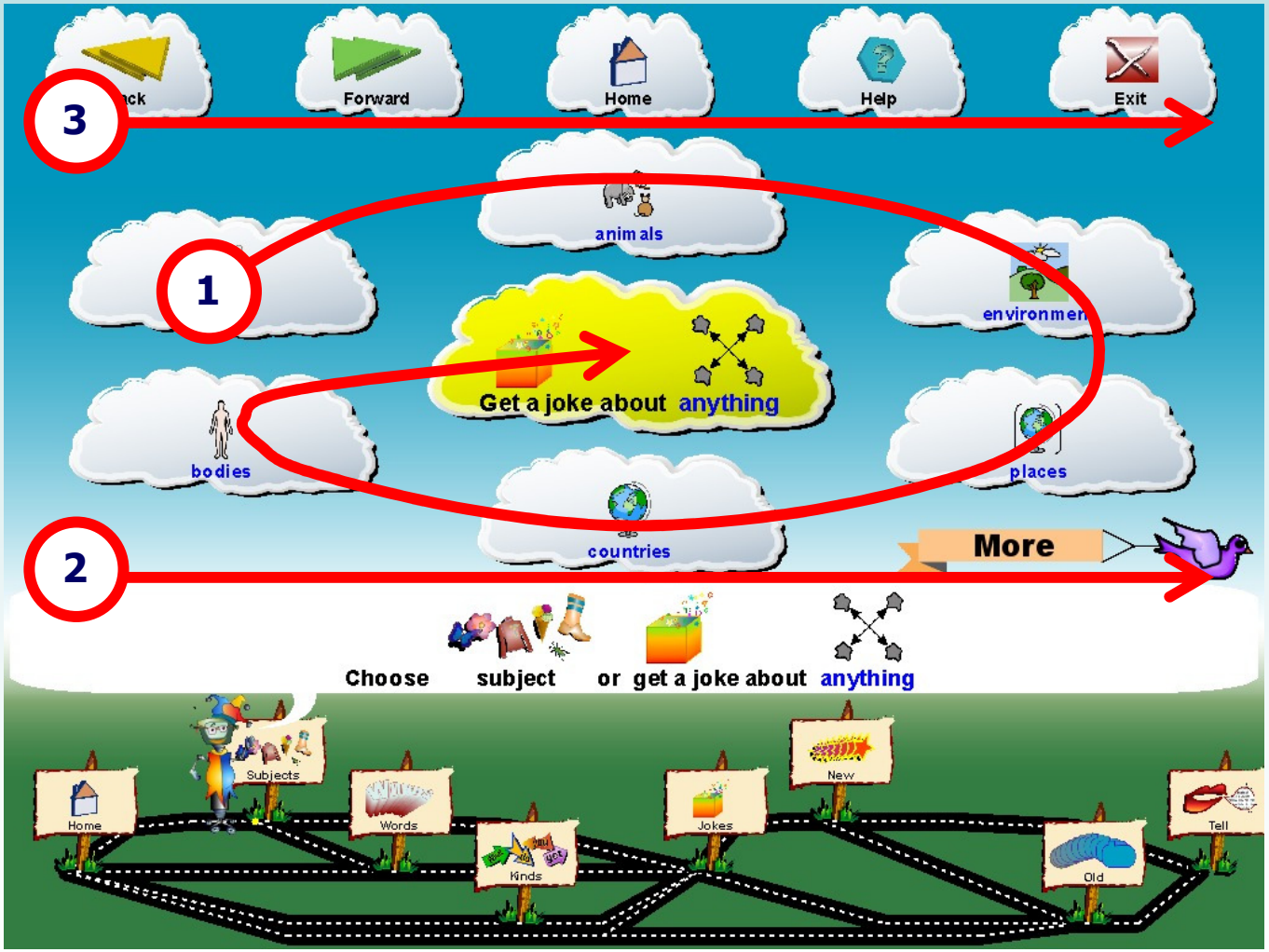
THE UNIVERSITY OF EDINBURGH

1495 UNIVERSITY OF ABERDEEN

6.3 Using STANDUP - "Are you ready?"

6.3 Using STANDUP - "Are you ready?"

6.4 Using STANDUP - Scanning



standup

EPSRC

UNIVERSITY OF DUNDEE

THE UNIVERSITY OF EDINBURGH

1495 UNIVERSITY OF ABERDEEN