

Especially language technology

Multimedia Technology in Educational Applications

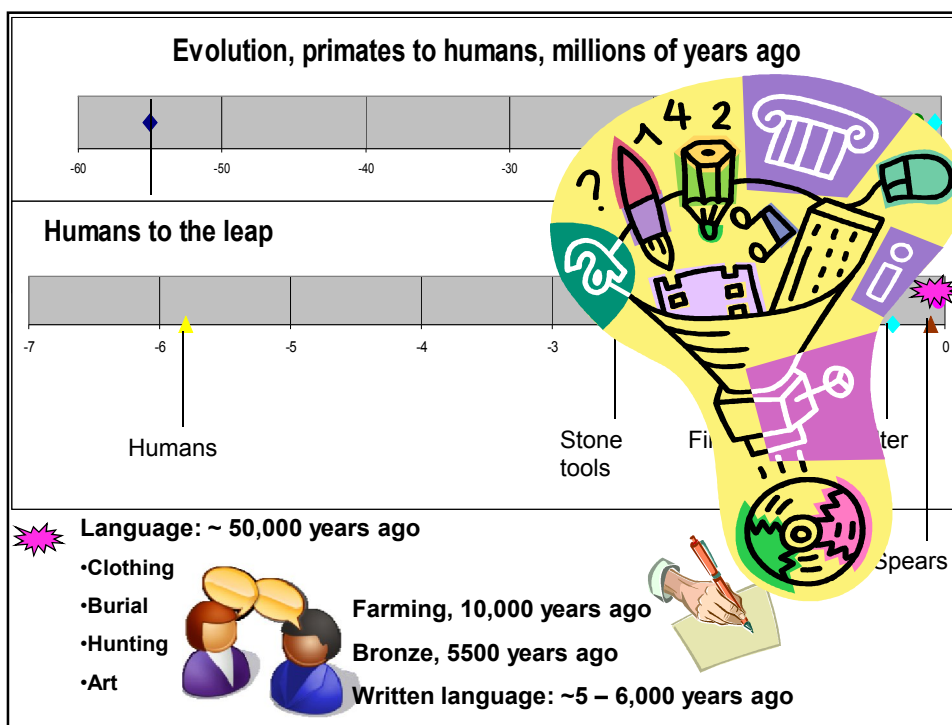
Especially applications for children

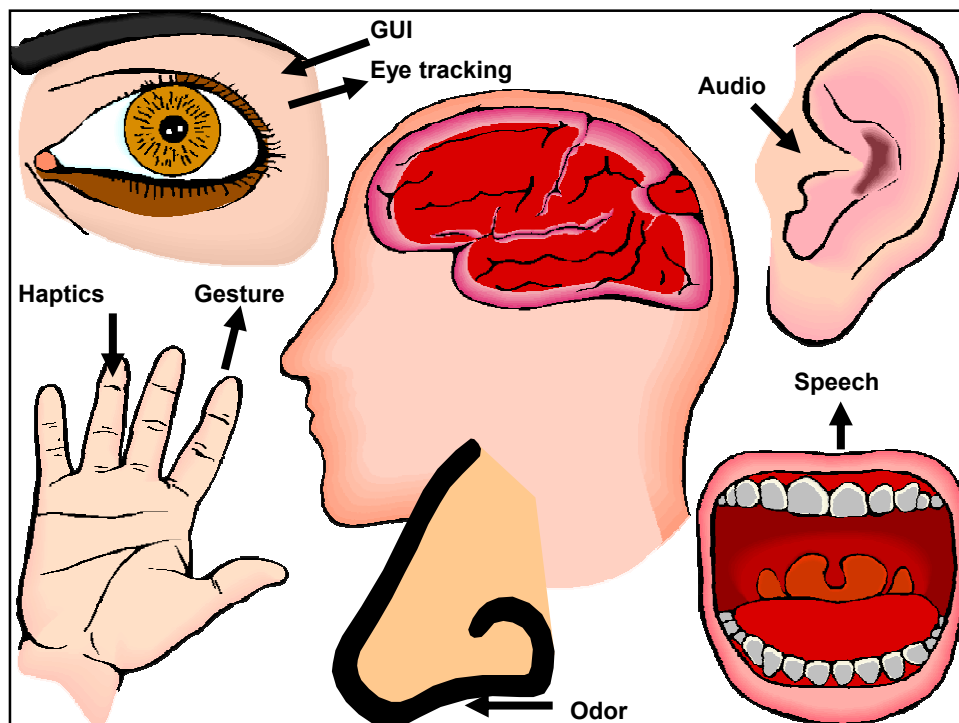
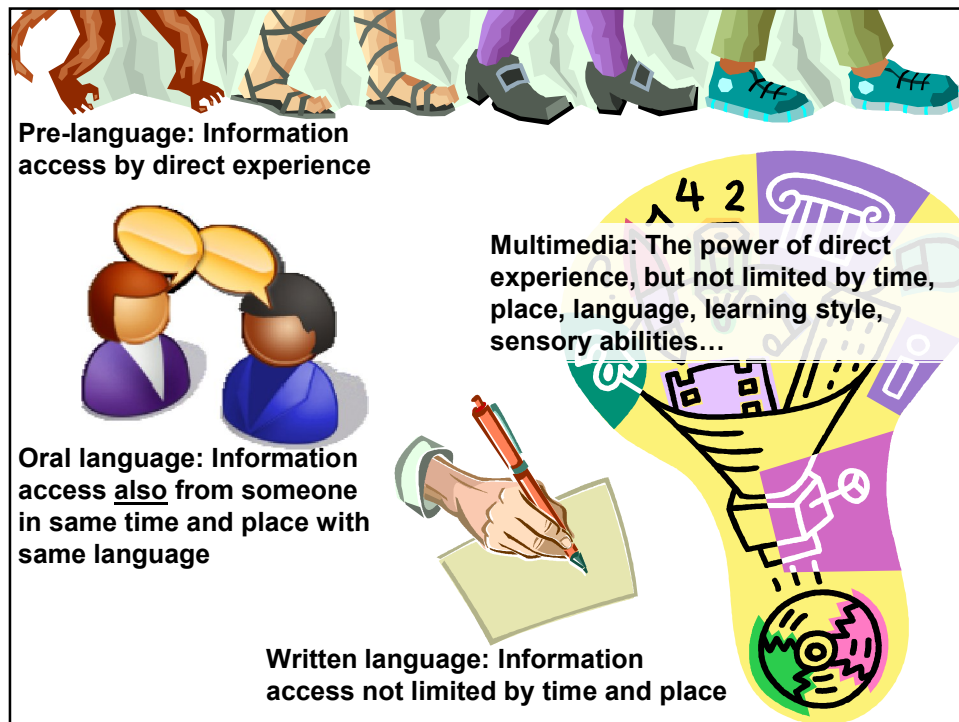
Patti Price

PPRICE Speech and Language Technology, pprice.com

Overview of Multimedia in Education Linguistics and Pedagogy Background Examples from the T-Ball Project Session Intro

Work supported in part by NSF







LiberatedLearning.com

RealOne Player
AVT3 - James
Dr. James Routledge

STOMER
DISPAC
X Price (1-5)
Availability
Hours of open

as something important
the
standardised weights you'll see that
as part
of your SPSS output
when
you've
standardised something what
does that mean

Discriminant Coefficient

- Each coefficient (or weight) reflects the relative contribution of a unit change of each of the independent variables on the discriminant function
- Coefficients are standardised (standardised weights) so that they can be compared to determine the relative contribution of variables

Standardized Canonical Discriminant Function Coefficients

	Function 1
Hours of study	-2.157
Mid-semester marks (20%)	.486
Assignment marks (30%)	1.184
Tutorial participation marks (10%)	.717

Because:

- Deaf students can't hear
- Blind students can't see
- Learning disabled students may have trouble following

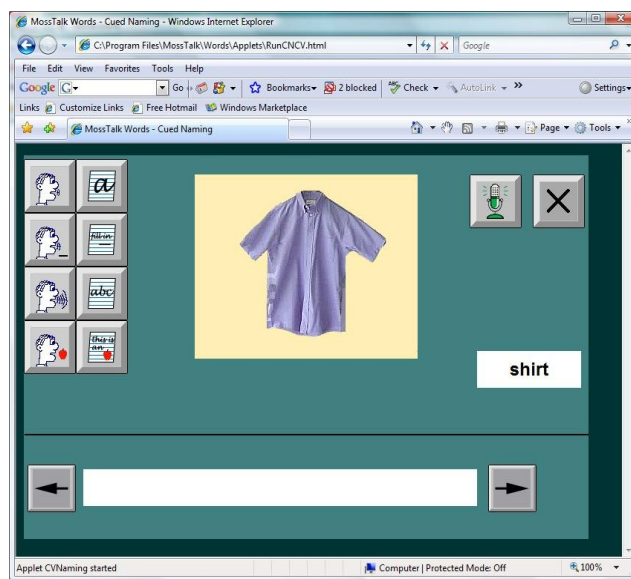
Uses IBM's ViaScribe

Thanks to Sara Basson

Baldi at Tucker-Maxon Oral School

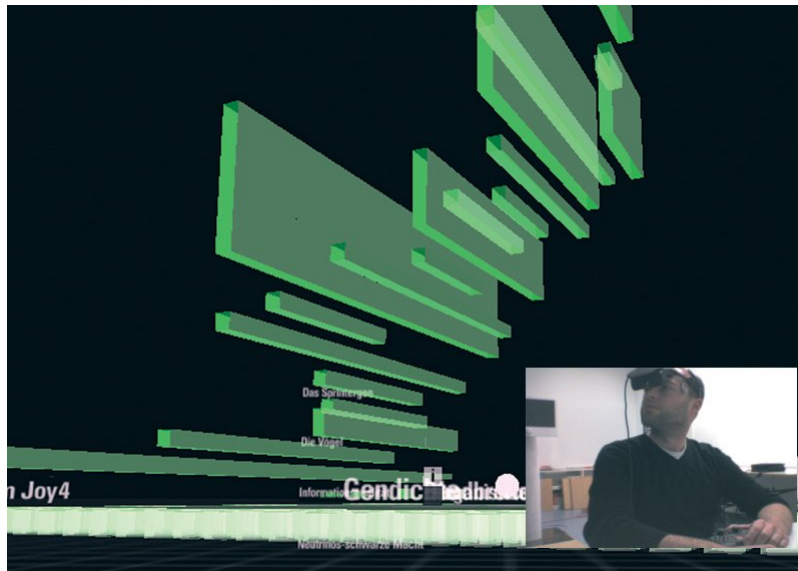


MossTalk.com

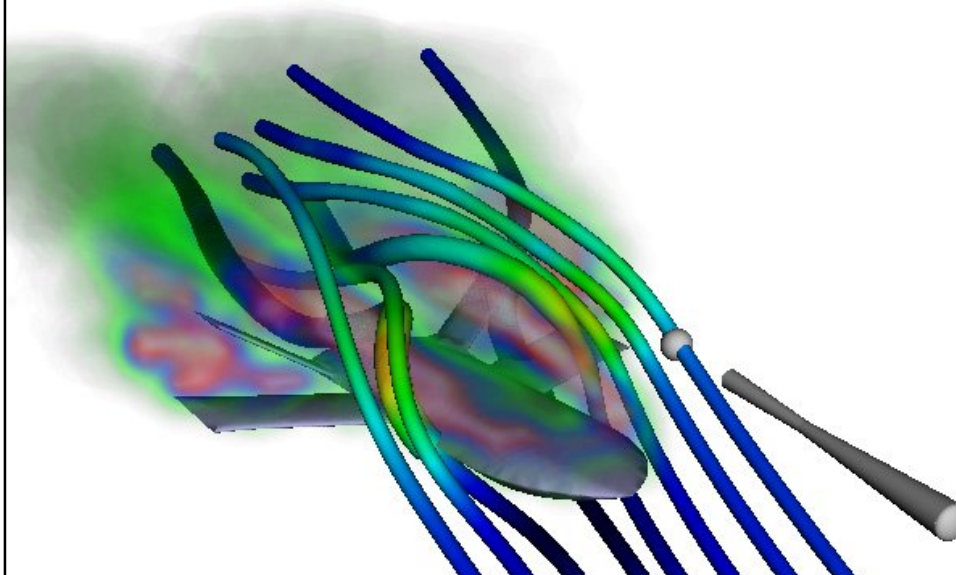


© Albert Einstein Healthcare Network, 2001

Web3d.org: Data Visualization



Web3d.org: senseGraphics.org



Web3d.org: Iraqi Checkpoint Training in Cultural Gestures



Olfaction is hard to study...



- **Dialect**
- **Meaning**
- **Children's Speech**
- **Written vs. Spoken Language**
- **Reading Pedagogy**

➤ **Linguistics and Pedagogy Background**



Dialect



Language is a signaling system; those who share more of the signaling conventions can communicate better

Language:

- Set of mutually intelligible dialects
- Dialect with its own army and navy.

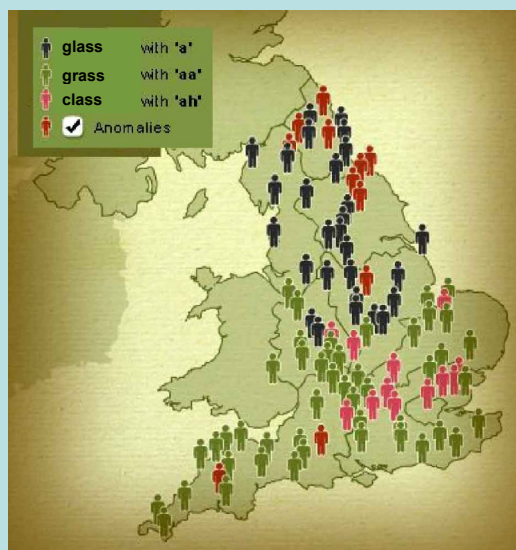
Dialect variation includes: grammar, lexicon, and 'accent' or how the words are pronounced.

Dialect can vary with

- Geography
- Time
- Social Class or group

Pronunciation Varies with Geography

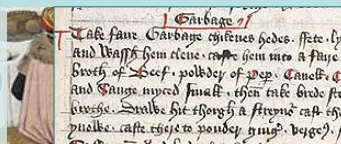
www.bl.uk/learning/langlit/sounds/changing-voices/phonological-change/



Language Varies with Time

Example from British Library web page:

Take faire Garbage chickenes hedes, ffete, lyvers, And gysers and wassh hem clene. Caste hem into a faire potte. And caste fressh broth of Beef, powder of Pep, Canell, Clowes, ...



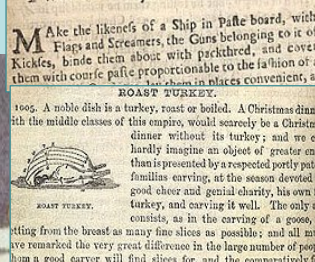
Medieval

...where lifting first the lid off one pie, out skips some Frogs, which makes the Ladies to skip and shreek; next after the other Pie, whence comes out the Birds...

Triumphs and Trophies in COOKERY, to be used at Festival Times, as Twelfth-Day, &c.

1600's

The breast is the only part which is looked on as fine in a turkey, the legs being very seldom cut off and eaten at table... to appear only in a form which seems to have a special attraction at a bachelor's supper-table...



1800's

Dialect Varies Demographically

- Age, sex, social class,
- Grammar, lexicon, pronunciation



RP, young, female: "I guess the first time I kind of went abroad really by myself was straight after A-Levels and I went to Paris"

Seldom Seen:

(Harry Belafonte
in *Kansas City*
By Robert Altman)

No subject
pronoun

1 Got to say this for you, you got guts.

Regular 2 no brains.

is Habitual 3 one don't mean nothin'

(be is 4 article. 4 F***in' pig got guts.

Blue here 5 be sittin' up all night long,
suckin' on some pig guts.

Negative on Peter L Patrick,
concord university of Essex

An accent is not just something someone else has.

Everyone has an accent. Everyone has a dialect.

Some are more prestigious than others.

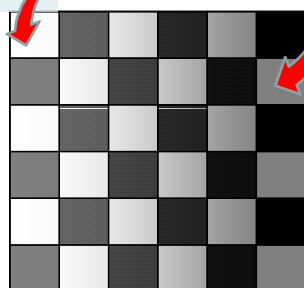
Dialect Modeling in ASR

Dialect is a system

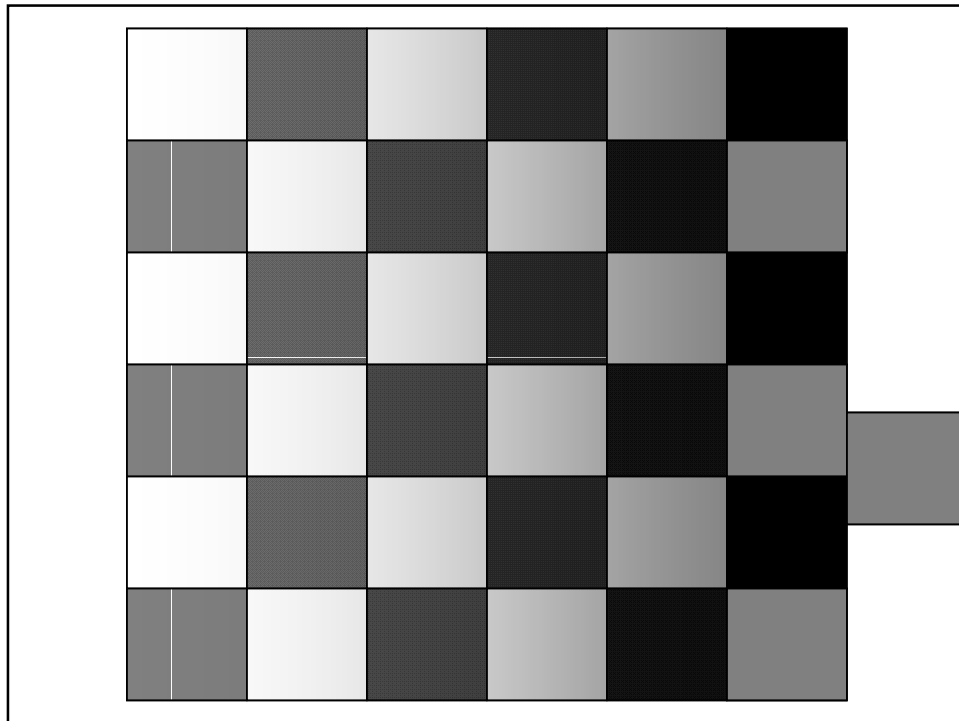
The system is not well modeled in ASR

These are
being merged

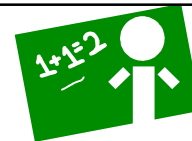
When the point is the
Contrast system



Head sections adapted from Gunnar Fant's *Acoustic Theory of Speech Production*



Language is not Logic



All dogs are animals.

If it's a dog, **then** it's an animal.

If it's not an animal, **then** it's not a dog.

If you're hungry, there's food on the table.

If there's no food on the table, then you're not hungry.

If language were logical, then we wouldn't need logic.



Language Needs to Adapt

Language needs sometimes to be vague
cartoon with 'help' not 'Could you pull me up please'

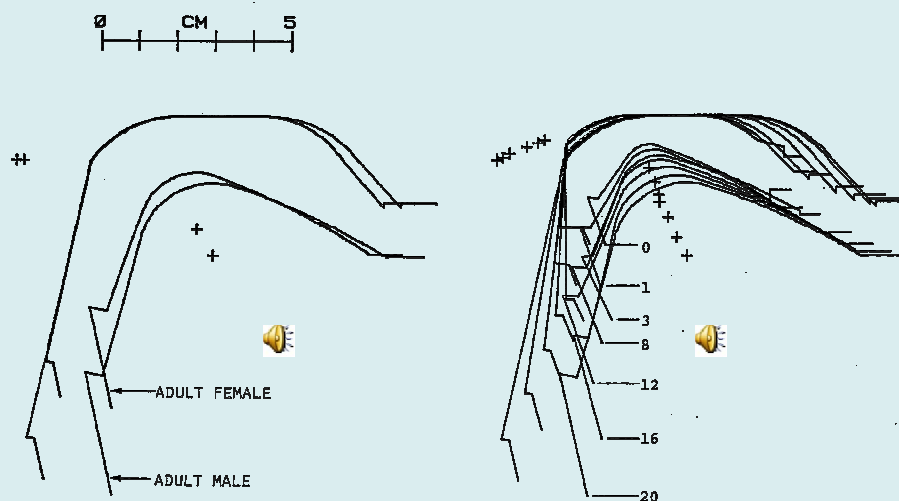
Language needs sometimes to be ambiguous
"This candidate is capable of working very hard."

We can agree more on what the words are than on what they mean

Which makes assessment of meaning components VERY difficult.

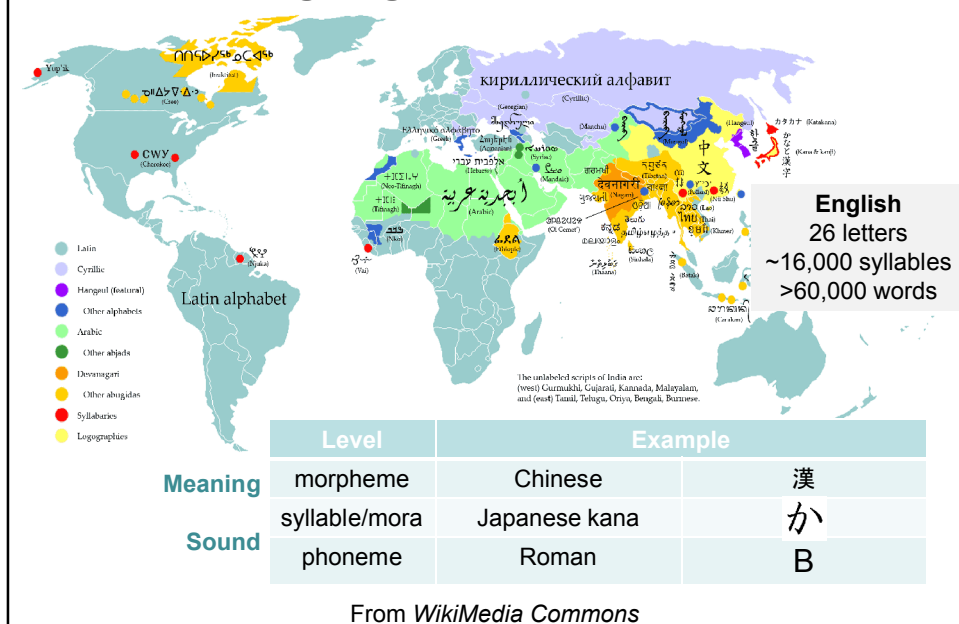


Child and Adult Speech



From Ursula Goldstein's *An Articulatory Model for the Vocal Tracts of Growing Children*

Written Language: Level of Representation



Written Language, Complexity

Language	Letter	Sound
English	c	/s/, /k/
	hot, car, walk, ah	/aa/
Spanish	a	/a/
French	a	/a/
	allo, pot, eau	/o/

Spelling	Sound
ache + past = ached	/ey k/ + /t/
aim + past = aimed	/ey m/ + /d/
paint + past = paint	/p ey n t/ + /ax d/

Writing and Reading

- These differences are important in learning to read.
- How difficult it is to spell (many letter combos to one sound)
- How difficult it is to read (many sounds for the same letter)
- How closely your dialect matches written conventions

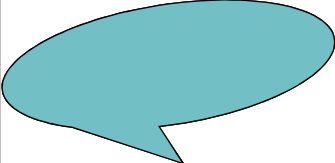
*"Got to say this for you, you got guts.
Guts and no brains. But guts alone don't
mean nothin'."*

*"I gotta say this for you-- you have
guts. Guts and no brains. But guts
alone mean nothing."*


**I've got to say this for you: You have
guts. You have guts and no brains,
but guts alone mean nothing.**

Differences Between Spoken and Written language

	<u>Written</u>	<u>Spoken</u>
Vocabulary	'things'...	'stuff'
Distinct words	20,000+	2,000+
Sentence length	10 – 30 words	?
Sentence structure	Complex	shallow
Grammar	Conservative	Liberal
Prosody	A . , ! ? ; : () ☺	Rich



Example



~130 words

(1) I've been talking – I've been multiplying matrices
discuss the rules for matrix multiplication.

(2) And the interesting part is the many ways you can
answer.

(3) So it's – and they're all important.

(4) So matrix multiplication, and then, uh, come in

(5) So we're – uh, we – mentioned the inverse of a

(6) Lots to do about inverses and how to find them

(7) Okay, so I'll begin with how to multiply two matrices

(8) First way, okay, so suppose I have a matrix A and
a result – well, I could call it C.

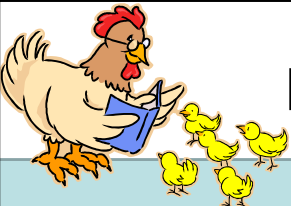
(9) A times B. Okay.

(10) Uh, so, I- let me just review the rule for w- for this entry.

~45 words

We've been multiplying
matrices. Now let's
discuss the rules for matrix
multiplication. Note that
there are many ways to do
it and get the same
answer. One way to
multiply two matrices, A
and B, to get a new matrix
C is the following rule:

Transcript from a linear algebra lecture (From Glass, Hazen, Lee and Wang, *Analysis and Processing of Lecture Audio Data*, 2004)



Reading Pedagogy

Many people are shocked that there are no
acoustic traces of word boundaries generally
(writing becomes ingrained)

Reading = spoken language skills (sound to
meaning skills)

- + written language skills (differences in grammar,
vocabulary, usage)
- + writing conventions (left to right, front to back,
punctuation)
- + decoding (symbol to sound rules)



Phonics vs. Whole Word

4
four

- Phonics = decoding emphasis, LTS rules
- Whole word = go to meaning
- Phonics is good when LTS rules are regular
- Whole word is good when sounding out doesn't work (as for Chinese)
- Both are needed for English

English 'Sight Words'

Example: pronunciations of 'o'

Pronunciations of the letter 'o' observed in the 100 most frequent words of English

- 9 OW: go, home, most, no, only, over, so (know, own)
- 6 UW: into, to, who, do, (too, you)
- 6 AH: from, of, other, another, (some, come)
- 6 AO: for, or, on, often, (your, more)
- 5 OU: (about, hour; down, how, now)
- 3 UH: (good, goodbye would)
- 3 -: (people, work, world)
- 2 AA: got, not
- 1 W AH: one





Multimedia and Pedagogy



Correlated with more active learning

Redundancy for learning styles

Redundancy for accessibility issues

Easier to replicate good examples of
multimedia than of a good teacher

Especially language technology

Multimedia Technology in

- **Dialect, idiolect and reading assessment**
- **Comprehension assessment overview**
- **Comprehension assessment example**

PPRICE Speech and Language Technology, pprice.com

➤ **Examples from the T-Ball Project**

Dialect, Idiolect and Assessment



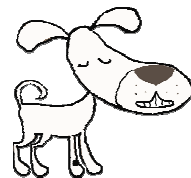
Comprehension Assessment Intro


GRADE 2: ...Kim has a dog. The dog's name is "Dot." Dot is a very white dog, and he has a black dot on his leg. Sam, Ben, and Kim like to play with Dot. They play ball with Dot all day long. Ben lost the ball in the mud, and Dot went into the mud to get the ball. Now, Dot is a brown dog from the mud! ...

What does Dot look like? 🗣️

- 🗣️ Like a dog
- 🗣️ A white dog
- 🗣️ A white dog with a black dot on his leg
- 🗣️ White... and a dot ... on his leg
- 🗣️ Well he's white and he has a brown dot on his leg
- 🗣️ Like a rat
- 🗣️ I don't remember
- 🗣️ A Dalmatian
- 🗣️ Brown

Please describe Dot's physical appearance?





Accent adjustment Prosody Find words	Vocabulary Syntax Morphology	Print adjustment Punctuation Decoding (LTS)
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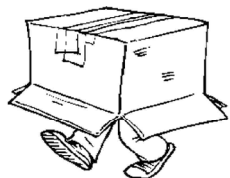
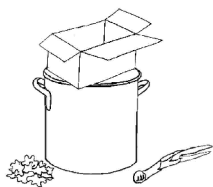
In your first language, this might be easier

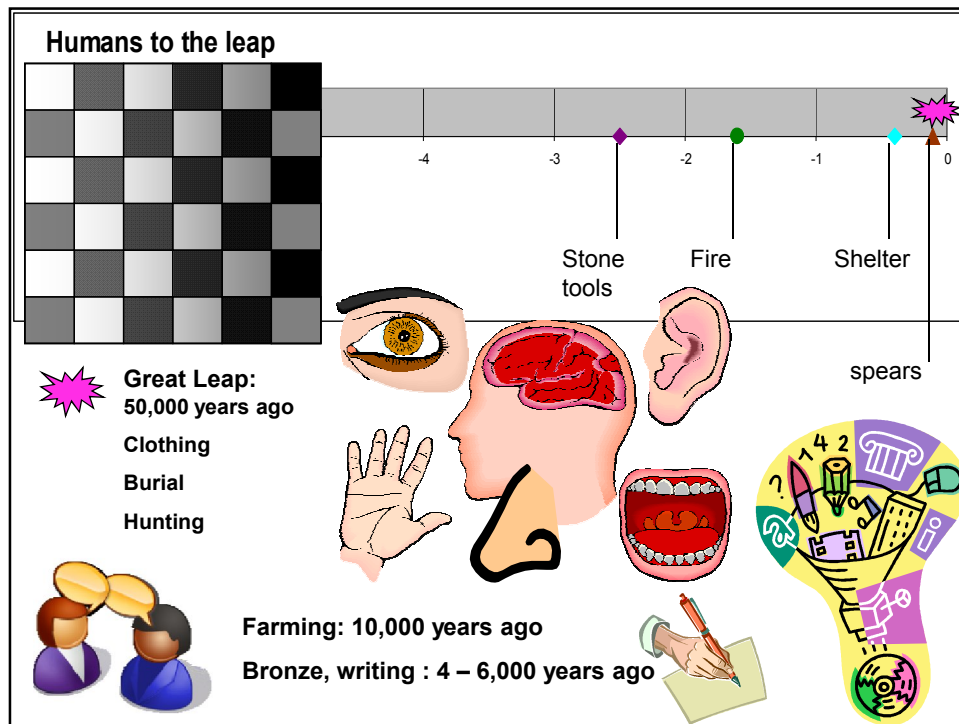
In a new language, this might be easier

Comprehension Assessment Example

BARLA (Bay Area Reading-Listening Assessment)

The box is on a pot.





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➤ Session Intro

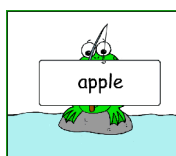
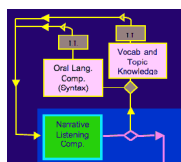
“Enhancing Social Communication in High-Functioning Children with Autism through a Co-Located Interface,” Nirit Bauminger, Eynat Gal, Patrice L. (Tamar) Weiss, Rachel Yifat, Judi Kupersmitt

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Reliable and objective automatic reading assessments
Instructional framework for diagnosis and intervention
Use of task-appropriate modalities

- Elicitation
- Scoring
- Reporting



PA - blending phonemes 17-Sep-2007

HERNANDEZ VICTORIA
SID: 061799F078

[Overview](#)

	Recognized	Target	Test Date
✗	PICK	pick	30-Jan-2007
✓	FAN	fan	30-Jan-2007
✓	SHIP	ship	30-Jan-2007
✗	CASH	cash	30-Jan-2007
✓	LACK	lack	30-Jan-2007
✓	FAD	fad	30-Jan-2007
✓	SHIN	shin	30-Jan-2007
✓	HATCH	hatch	30-Jan-2007
✓	PICK	pick	15-Nov-2006
✗	FAN	fan	15-Nov-2006
✗	SHIP	ship	15-Nov-2006
✓	CASH	cash	15-Nov-2006
✓	LACK	lack	15-Nov-2006
✓	FAD	fad	15-Nov-2006
✗	SHIN	shin	15-Nov-2006
✗	HATCH	hatch	15-Nov-2006

“Enhancing Social Communication in High-Functioning Children with Autism through a Co-Located Interface,” Nirit Bauminger, Eynat Gal, Patrice L. (Tamar) Weiss, Rachel Yifat, Judi Kupersmitt

- Computer mediated social interaction may lessen the repetitive behaviors typical of autism
- These positive effects also appear to be transferred to other tasks following the intervention

