



CENTER FOR ADVANCED
STUDY OF LANGUAGE

Enabling Online Language Learning: LanguageNation Design and Pilot

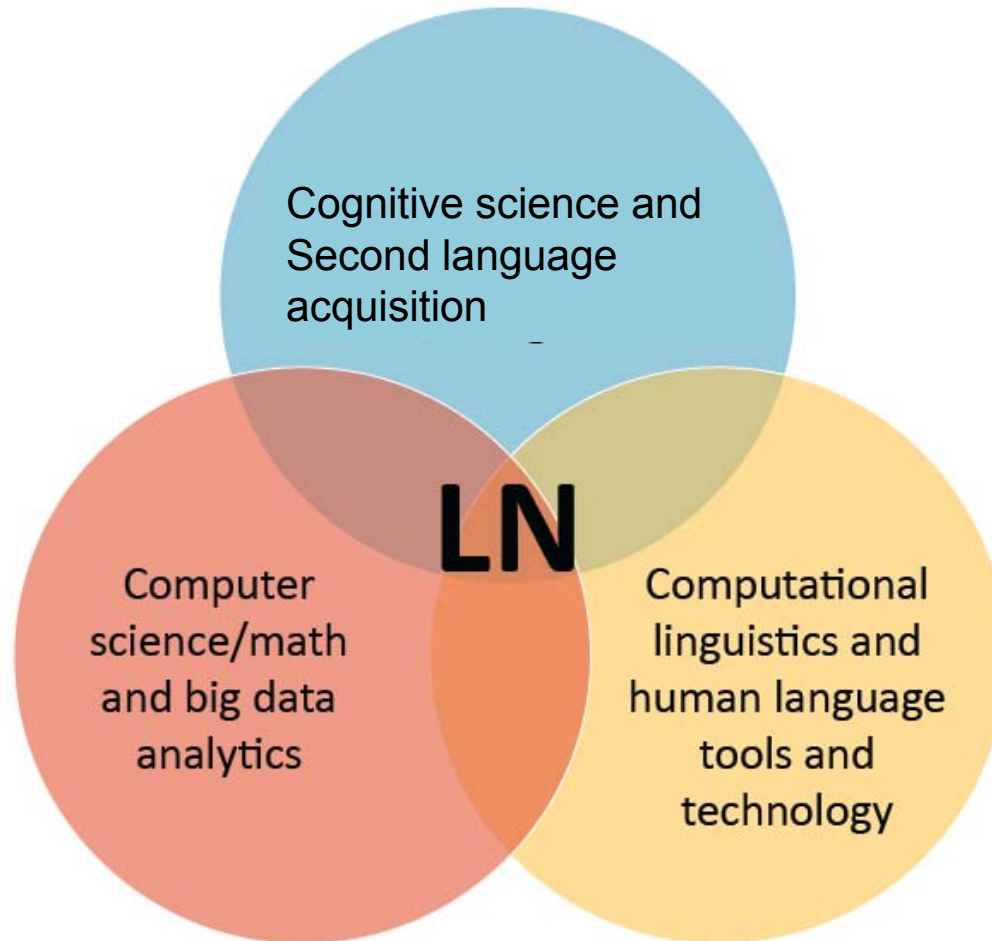
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Medha Tare, PhD, Jared Linck, PhD, Catherine Doughty, PhD

LanguageNation

- Anywhere, anytime, any device for professionals
- Not “canned” lessons, but truly adaptive learning
 - Aptitude Profile
 - Proficiency
 - Performance
 - Topic of interest
 - Mission needs
- Autonomous learning
(with a human-in-the-loop coach)



An HLT-enabled platform for adaptive language learning



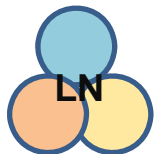
Cognitive Science and Second Language Acquisition

- LMS integrates a learner model: current proficiency, aptitude, learning style, mission needs, and learner interests

HLT

- fetches and LMS curates learning material tailored to individual
- analyzes learner-generated output

Big Data analytics track learner behavior to influence subsequent learning materials



System improves itself based on learner performance



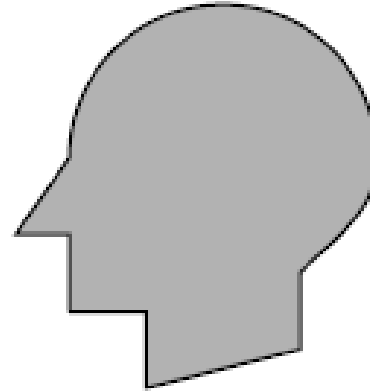
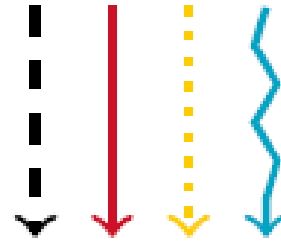
● Second Language Acquisition

Contemporary SLA theory and pedagogical findings suggest that

- Learning tasks should take into account complexity and sequencing appropriate to the proficiency level
- Different learning scenarios will have distinct implementations, but
- Language instruction should adhere to four key principles related to input, output, interaction, and feedback

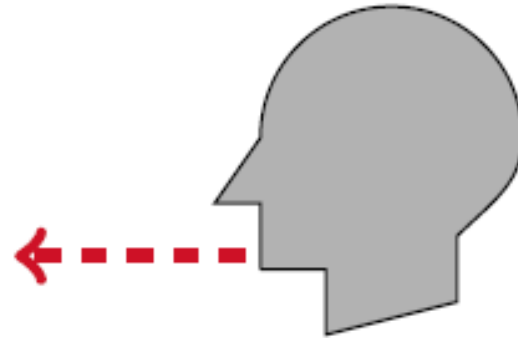


Input



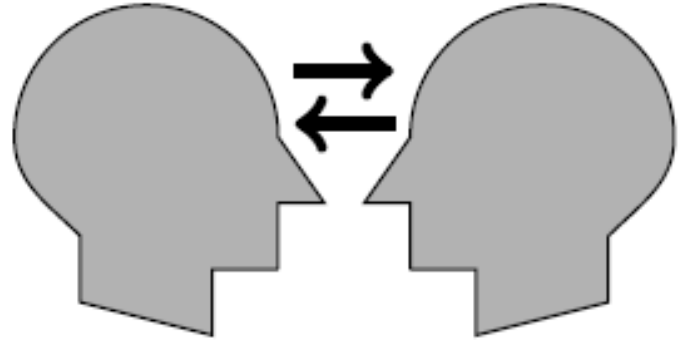
Target language input must be sufficient, varied, authentic, and rich, while still being comprehensible.

Output



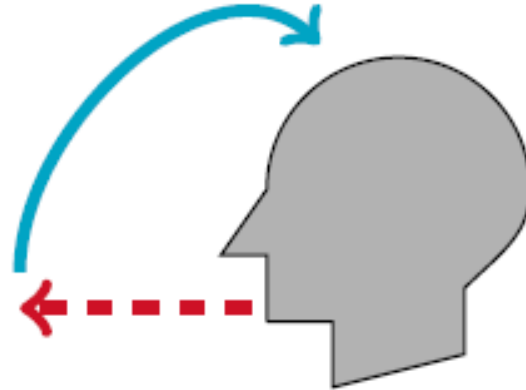
Learners need to produce the target language in various modes (oral and written), in various contexts, as well as in isolation.

Interaction



Learners must learn to interact in the target language, negotiate for meaning, and notice target language features.

Feedback



Feedback must be provided in order to allow learners to process and correct errors.

● Second Language Acquisition

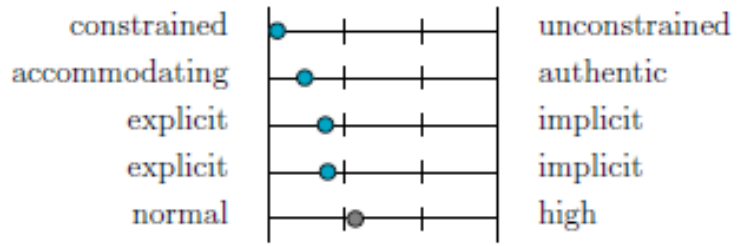
- General recommendations for course design
 - Needs analysis
 - Syllabus type: task-based, project-based, form-focused
 - Cognitive learning principles
 - Tailoring for cognitive aptitude: input, interaction, output, and feedback

CASL's Hi-LAB aptitude testing provides guidance

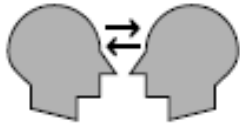
INPUT



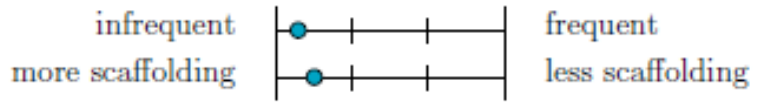
Variability
Authenticity
Pattern Learning
Meaning Association
Phonological Perception



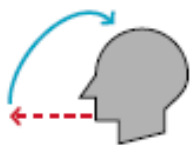
INTERACTION



Language Switching
Scaffolding



FEEDBACK



Adaptive Learning in LanguageNation

- Input – authentic materials fetched from internet and media, text-leveling
- Output – chat and discussion boards, possibility to record
- Interaction – chat and discussion boards
- Feedback – various types incorporated, but not intelligent yet
- Needs analysis – drawing appropriate materials and content
- Syllabus design – grammatical syllabus currently

Current LanguageNation Activities

Learning Activities:

Flash Cards
Fill in the Blank
Sorting
Correct the Machine-Translation
Closed Caption Cloze
Word Segmentation
Reordering Sentences
Identify Unspoken Utterance
Title Matching
Video Transcription
Taboo

Behind the Scenes:

- HLT Data Curation
- Error Analysis of Learner Response
- Human Data Curation
- User Model
- Planner Module



Flash Cards

Portuguese

conhecido



English

known

- Each flash card sequence contains 5 target words:
 - Record and listen to their own pronunciation
 - Hear four recordings of the target word



Fill in the Blank

This is Marivi.

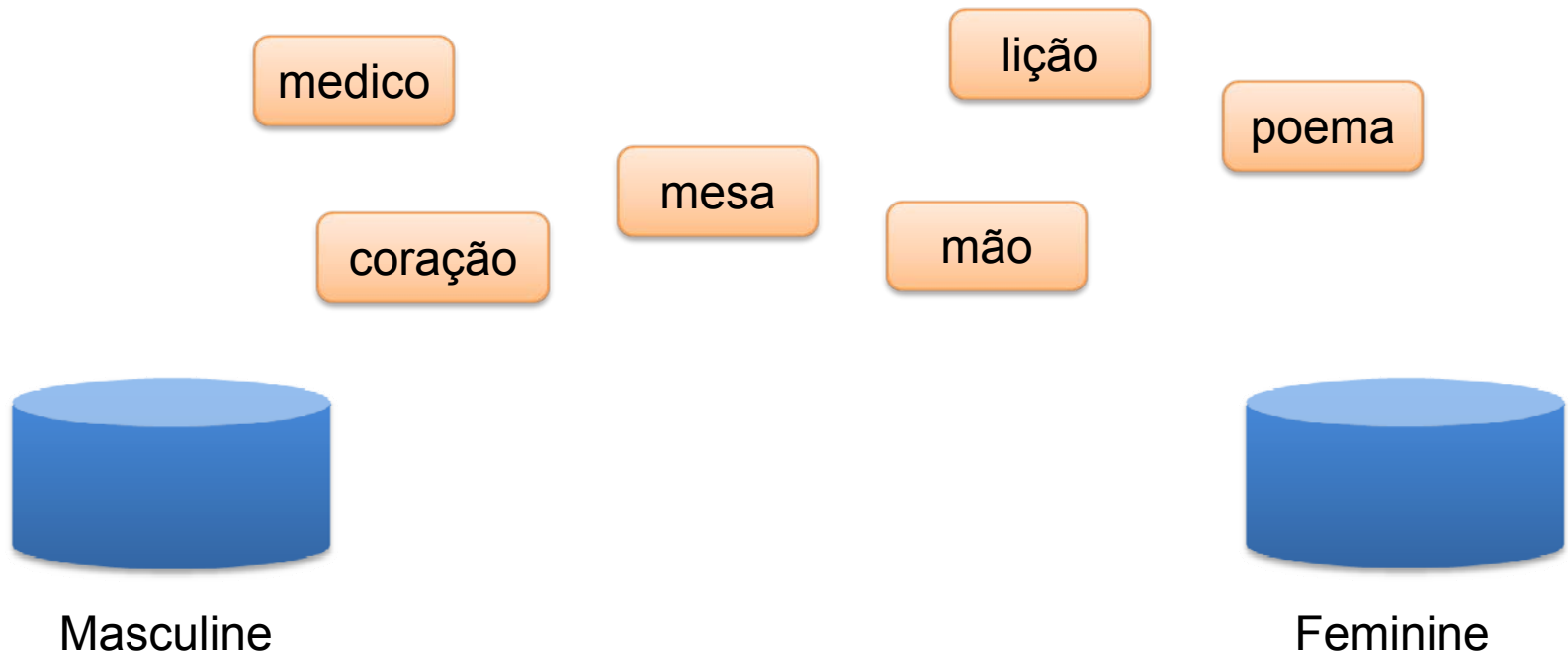
é a Marivi .

(Hint)

- Learners are quizzed on the flashcard words
- Options are given if the learner needs a hint
- Grammatical information is provided with the right answer



Sorting



- Learners move words into the correct box



Correct Machine Translation

Stingray's in the objective perimeter, sir.



Stingray no perimetro objective, senhor.

Stingray no perimetro objective,
senhor.

- Correct a machine translated phrase from English to Portuguese
- Starred character hints are given for errors



Fill in Closed Caption

VIDEO CLIP PLAYER



When you click on a word, play: just the word current +5 words current +7 words to end of transcript

Mihas obras s** v***** e***** . Mas assim é o mundo das artes um mundo de altos e baixos. De repente você tem muito êxito vende várias peças mas também pode passar vários meses ou anos sem ganhar nada.

Please play the audio and write down the highlighted words, you can click any word to start playing from there

Submit

- Natural language video snippets
- Transcript synced to video playback



Current Pilot Study

- Spanish to Portuguese conversion
- 20 IBM participants from IBM; 3 CASL researchers



Preliminary Results

Exposure to lexical items after using the system for 10-15 hours

- Participants encountered the majority of target words
- Opportunity for incidental acquisition of lexical items that are not part of the learning plan

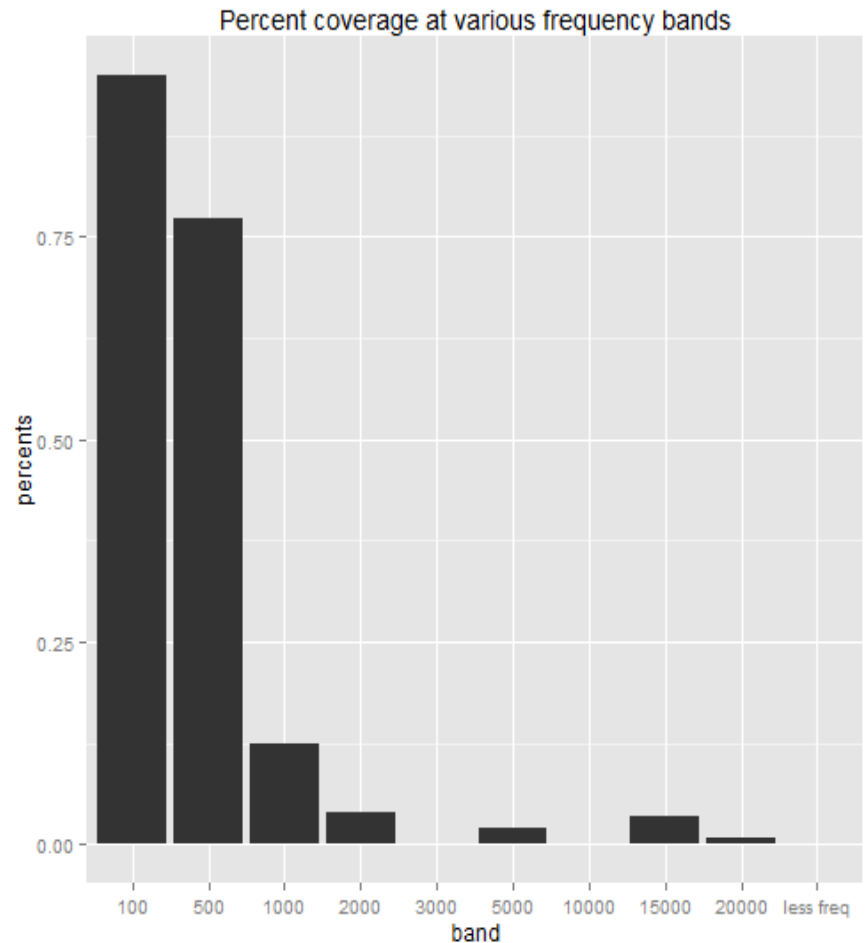
Participant	Total words (% challenged)	Target words (% challenged)
A	733 (0.62)	470 (97%)
B	603 (0.61)	398 (92%)



Preliminary Results

Word frequency

Learners received exposure to the most frequent words in the language with only several hours of exposure to the system.



Preliminary Results

Individual tailoring

Because the system tailors the experience based on the user's success, the number of times a word is encountered may vary between users.

Participant	Shown words	Shown average (SD)	Challenge average (SD)	Challenge max	Success rate
A	470	7.32 (10.07)	2.379 (2.43)	23	0.89
B	398	5.68 (8.77)	1.52 (1.77)	14	0.87



Ongoing Challenges

- Developing Big Data reasoning
- Pushing the limits of HLT to provide content analysis
- Supporting interactive, individualized learning opportunities at right level
- Providing learner/system dialog understanding and/or management beyond IBM Watson Jeopardy playing
- Developing truly adaptive learning
- Cognitive learner modeling: learner aptitude, proficiency, learning style, topic of interest



LanguageNation Team

- Jared Linck, PhD (Principal Investigator)
- Catherine Doughty, PhD (Area Director)
- Carol Van Ess-Dykema, PhD (USG)
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For more information

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