



Comparing Instructional Reinforcements in Phonetics Pedagogy

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Phonetics taught
as a discipline

(Ashby 2008,
Ashby & Ashby
2013)



Inclusion of a
practical
component

(Ashby &
Ashby 2013,
Mills, Pollock &
Tucker 2015)



Emergence of high tech teaching tools

- Nissen 2015 (using blended learning)
- Pons-Moll, Carrera-Sabaté, Blanco-Piñol & Gil-Bordes 2014 (using a website)
- Vassière 2003 (using a variety of in-class and online technologies)
- Verhoeven & Davey 2007 (using an online transcription practice tool)

Research Question

- However, to our knowledge there is no research directly comparing different instructional methods for teaching phonetics. The current study addresses that gap.
- We compare four different instructional reinforcements, i.e., learning tasks that supplement a classroom lecture on a phonetic contrast.
- Our research question is: **which, if any, type of instructional reinforcement is the most effective for students to learn and retain the contrast?**

Structure of the experiment: Week 1

- Subjects: 152 students of Introductory Linguistics
- 4 groups of tutorials (4 conditions)
- Video-recorded lecture on a place-of-articulation contrast (palatal vs. velar vs. uvular)
- followed by one of instructional **reinforcements**

2. Methodology

All students watched a videotaped lecture about a **place-of-articulation contrast** (2'52'')



Instructional reinforcements: Week 1

(i) a baseline **textbook-style** handout explaining the contrast

(n = 44 students)



from Noun Project

(iii) **pairwise** production practice, in which students practice contrasts and give each other feedback

(n=21 students)



Created by Gregor Crešnar from Noun Project

(ii) classroom production practice, **repeating after an audio recording in unison**

palatal velar uvular



(n=43 students)



from Noun Project

(iv) watching **enhanced ultrasound videos** illustrating the contrast (5'25''). (introduction to ultrasound technology in Linguistics and three kinds of fricatives) (n=44 students)

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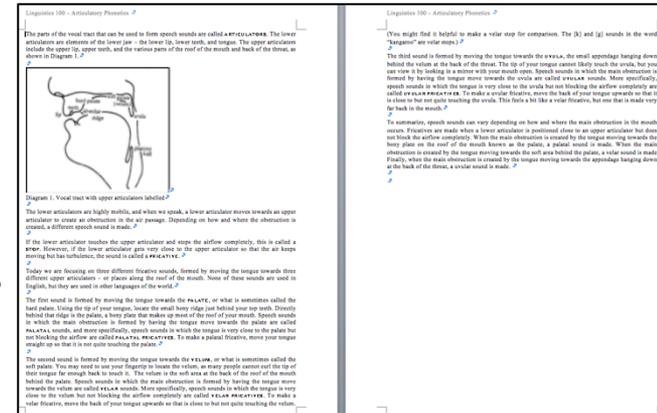
Textbook style

Keywords:

- The lower articulators and upper articulators
- Fricative
- Palate, velum, uvula

Diagram - Vocal tract with upper articulators labelled

... To summarize, speech sounds can vary depending on how and where the main obstruction in the mouth occurs. Fricatives are made when a lower articulator is positioned close to an upper articulator but does not block the airflow completely. When the main obstruction is created by the tongue moving towards the bony plate on the roof of the mouth known as the palate, a palatal sound is made. When the main obstruction is created by the tongue moving towards the soft area behind the palate, a velar sound is made. Finally, when the main obstruction is created by the tongue moving towards the appendage hanging down at the back of the throat, a uvular sound is made.



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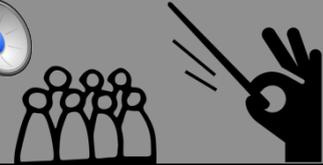


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(ii) classroom production practice, **repeating after an audio recording in unison**

palatal  velar  uvular 

(n=43 students)



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Instructional reinforcements: Week 1

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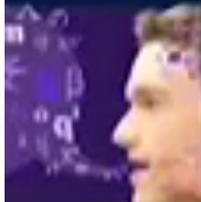


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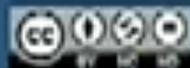
Created by Marie Van den Broeck from Noun Project

Introduction to Ultrasound Technology in Linguistics



LINGUISTICS

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Assessment

A quiz

- **2 perception questions (Q1, 2)**
- **2 knowledge questions (Q3, 4)**

Linguistics 100 Articulatory Phonetics Quiz

Name: _____

TA: _____

Tutorial Time: _____

1. Which upper articulator (part of the mouth) is involved in making the following sound? (The instructor will play an audio file)
 - a. Alveolar ridge
 - b. Palate
 - c. Velum
 - d. Uvula
2. Which order correctly corresponds to the order in which the following sounds are played? (The instructor will play an audio file)
 - a. Palatal, Velar, Uvular
 - b. Velar, Palatal, Uvular
 - c. Uvular, Palatal, Velar
 - d. Uvular, Velar, Palatal
3. Which type of sound is produced when the back of the tongue moves close to the soft area behind the hard palate, but does not obstruct the airflow?
 - a. Velar Stop
 - b. Velar Fricative
 - c. Uvular Stop
 - d. Uvular Fricative
4. Which type of sound is represented in the diagram below?
 - a. Alveolar Fricative
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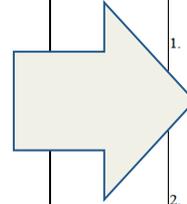


Question 1 (Perception Question)

Which upper articulator (part of the mouth) is involved in making the following sound? (The instructor will play an [audio file](#))



- a. Alveolar ridge
- b. Palate
- c. Velum
- d. Uvula



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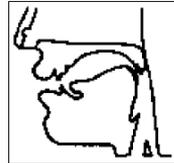
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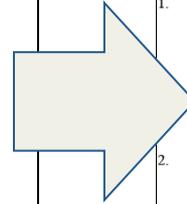


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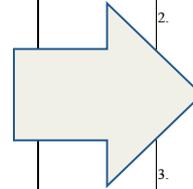
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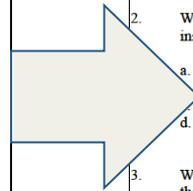
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2. Which order correctly corresponds to the order in which the following sounds are played? (The instructor will play an [audio file](#)) 

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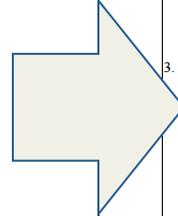
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Question 3 (Knowledge Question)

Which type of sound is produced when the back of the tongue moves close to the soft area behind the hard palate, but does not obstruct the airflow?

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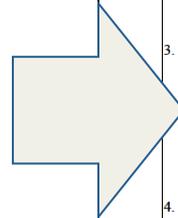
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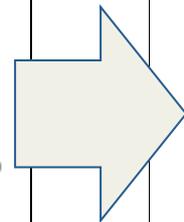
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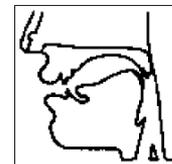
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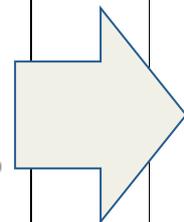
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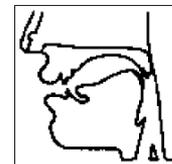
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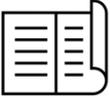
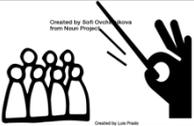


Structure of the experiment: Week 2

- At the beginning of the tutorial in the following week, the students did a second quiz (administered by the tutorial leader) to test their retention of the material
- Questions were the same, but in a different order
- Fewer students in total in this week (n=99)

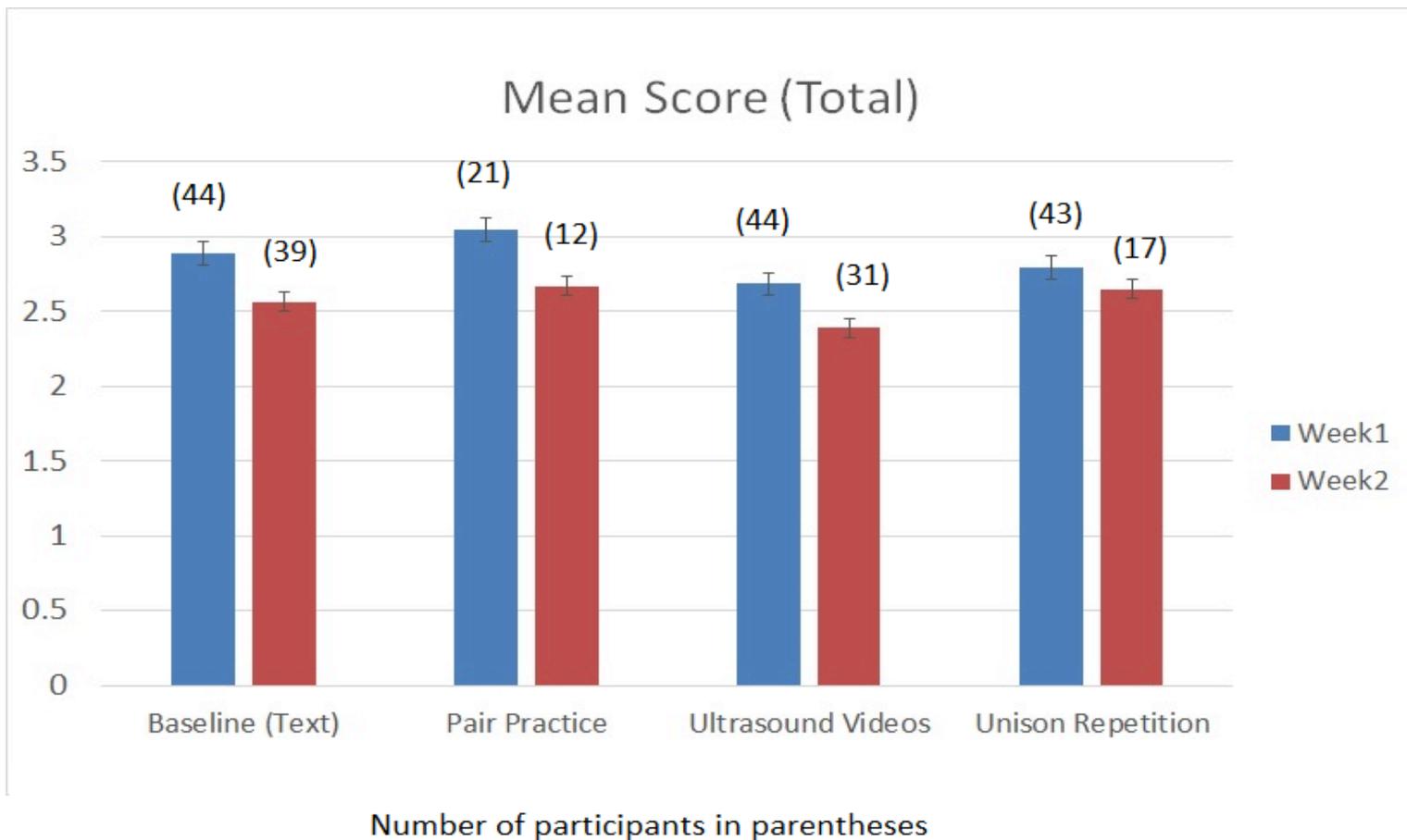
3. Results

Table 1: Means, Standard Deviations and Numbers of Participants, Weeks 1 and 2

| | | Week 1 | Week 2 |
|--------------------------|---|-------------------|-------------------|
| Baseline (Text) |  | 2.87 (0.92); N=44 | 2.56 (1.05); N=39 |
| Unison Repetition |  | 2.79 (1.04); N=43 | 2.65 (1.17); N=17 |
| Pair Practice |  | 3.04 (0.92); N=21 | 2.67 (1.23); N=12 |
| Ultrasound Videos |  | 2.68 (1.2); N=44 | 2.39 (0.99); N=31 |

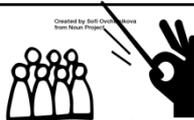


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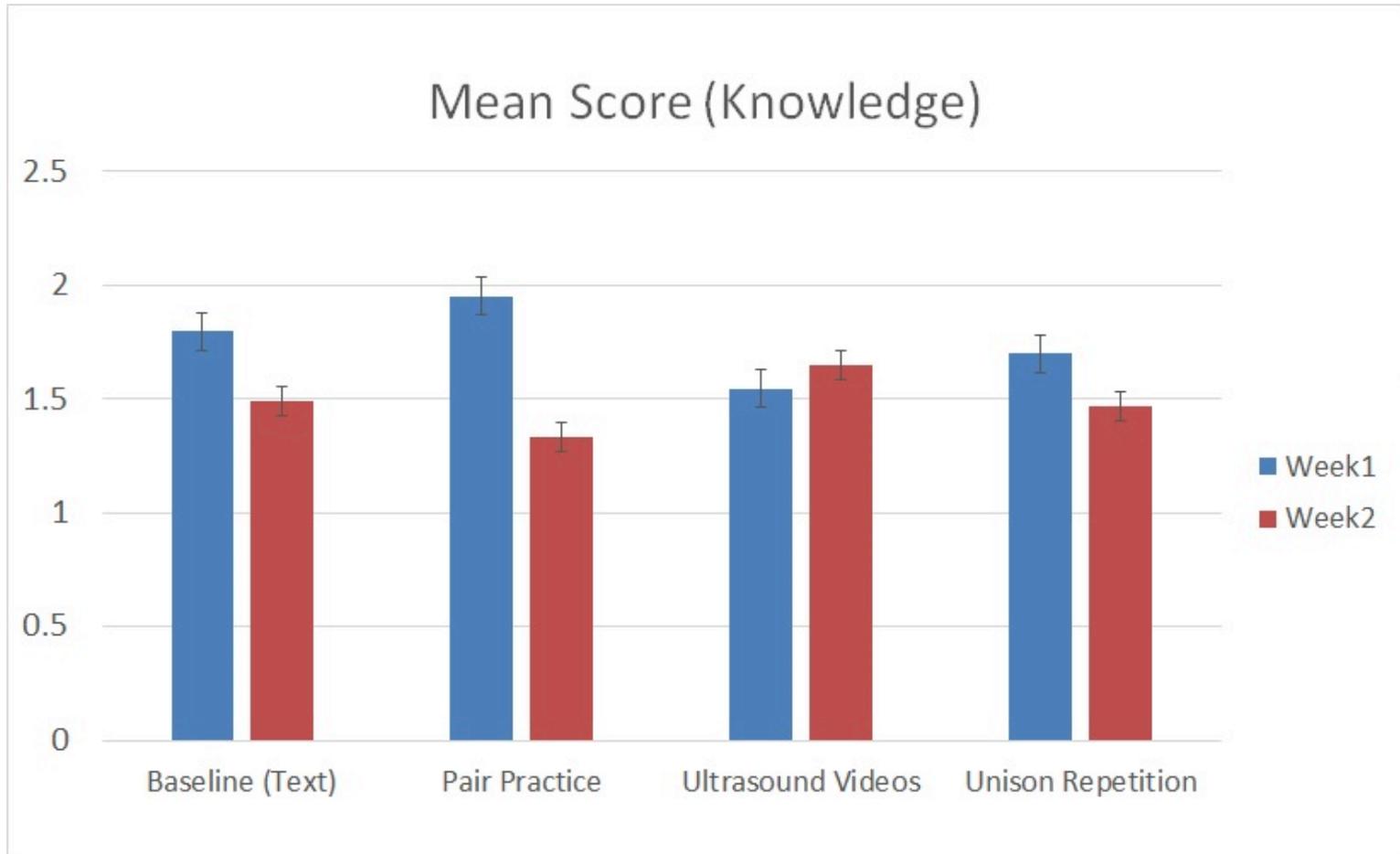
3. Results

Table 2: **Knowledge** Question Means and Standard Deviations

| | Knowledge Questions (Q3 & Q4) | |
|---|--|---------------|
| | Week 1 | Week 2 |
| Baseline (Text)  | 1.795 (0.461) | 1.487 (0.683) |
| Unison Repetition  | 1.698 (0.558) | 1.471 (0.717) |
| Pair Practice  | 1.952 (0.218) | 1.333 (0.778) |
| Ultrasound Videos  | 1.545 (0.589) | 1.645 (0.551) |

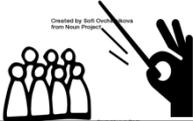


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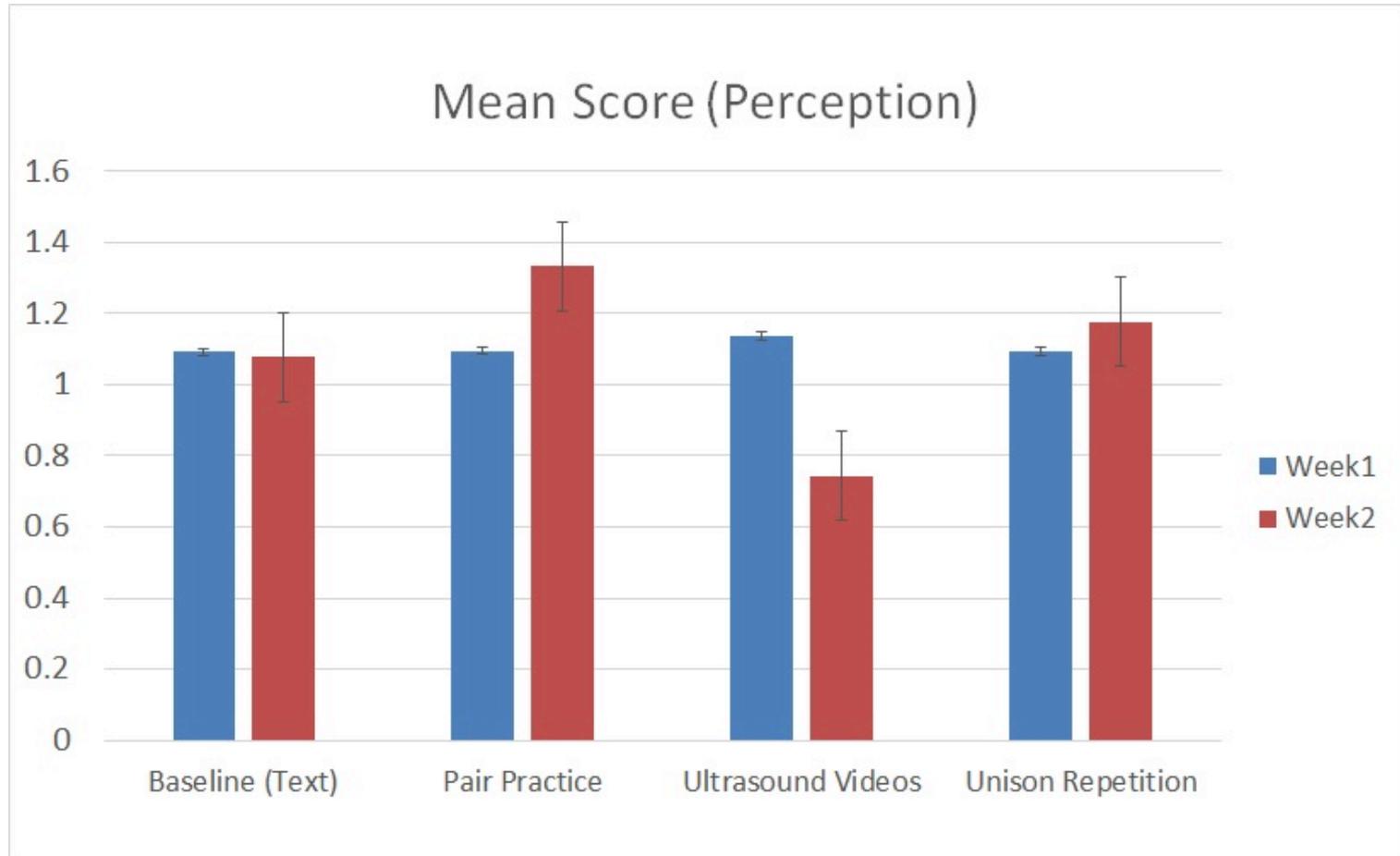
3. Results

Table 3: **Perception** Question Means and Standard Deviations

| | | Perception Questions (Q1 & Q2) | |
|--------------------------|---|---|---------------|
| | | Week 1 | Week 2 |
| Baseline (Text) |  | 1.091 (0.91) | 1.077 (0.839) |
| Unison Repetition |  | 1.093 (0.868) | 1.176 (0.728) |
| Pair Practice |  | 1.095 (0.944) | 1.333 (0.778) |
| Ultrasound Videos |  | 1.136 (0.905) | 0.742 (0.773) |



3. Results



Necessity of Engagement & Interactivity?

- **Engagement** (Chan 2015, Setter 2013, Smith 2011)
- **Interactivity** (Ashby & Ashby 2013)
Including Pairwise practice (Gavaldá and Lundquist. 2007).

Ultrasound group:

- None of these reinforcements
- But they performed as well as the other groups

Future research
(on April 1):

Ultrasound
+
Engagement
&
interactivity

Conclusion

- While the availability of high tech teaching tools is not a guarantee of improved learning, it is not a hindrance either.
- We predict that exposing students to enhanced ultrasound videos via methods that are engaging and interactive would improve their learning outcomes.

Acknowledgements

- Students of LING100 at UBC, and its instructor Dr. Martina Wiltschko
- Centre for Teaching, Learning and Technology, particularly instructional designer, Dr. Bosung Kim
- Teaching and Learning Enhancement Fund at UBC
- A grant from the UBC Faculty of Arts

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