Second Language Acquisition in a Blended Learning of programming languages (SLA-aBLE): Students respond to new materials
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Implementations by Term

- **Fall 2015**
  - Graded Discussion Board: Weekly topics. Possible comments: questions, answers, examples, resources.
  - Open-ended questions in quizzes.
  - Videos followed SLA-aBLE methods: Concepts broken into smaller sections. Parts: Syntax, Keywords, Examples, etc.
  - Embedded quiz questions in videos.

- **Spring 2015**
  - Discussion Board: Used as resource. Includes Q&A from previous term as reference for students.
  - Open-ended questions: Rubric fixed to better meet the needs. Questions updated.
  - Videos followed SLA-aBLE methods: Videos divided. Length is shortened as much as possible.
  - Embedded quiz questions in videos: Prompt added to enable asking questions at the end of video.

- **Fall 2016**
  - Discussion Board: Includes Q&A from previous terms, as well as examples, discussion questions.
  - Open-ended questions: Incomplete script provided.
  - Videos followed SLA-aBLE methods: Captions and music added to videos.
  - Embedded quiz questions in videos: No changes.

Demographics: Fall 2015 - Spring 2016

<table>
<thead>
<tr>
<th>Language</th>
<th>Not at all fluent (%)</th>
<th>Not very fluent (%)</th>
<th>Moderately fluent (%)</th>
<th>Somewhat fluent (%)</th>
<th>Very fluent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>0</td>
<td>2.41</td>
<td>1.2</td>
<td>9.64</td>
<td>77.11</td>
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<tr>
<td>Chinese</td>
<td>25</td>
<td>3.85</td>
<td>0</td>
<td>0</td>
<td>7.69</td>
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<tr>
<td>German</td>
<td>31.75</td>
<td>6.35</td>
<td>4.76</td>
<td>1.59</td>
<td>3.17</td>
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<tr>
<td>Spanish</td>
<td>11.75</td>
<td>25.53</td>
<td>24.47</td>
<td>4.26</td>
<td>11.70</td>
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<tr>
<td>Vietnamese</td>
<td>27.45</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>French</td>
<td>22.73</td>
<td>15.15</td>
<td>10.61</td>
<td>4.55</td>
<td>6.06</td>
</tr>
<tr>
<td>Arabic</td>
<td>25.93</td>
<td>0</td>
<td>1.85</td>
<td>0</td>
<td>5.56</td>
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<tr>
<td>Korean</td>
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<td>4</td>
<td>0</td>
<td>0</td>
<td>2</td>
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<tr>
<td>Portuguese</td>
<td>26.63</td>
<td>7.69</td>
<td>1.93</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>19.12</td>
<td>11.76</td>
<td>2.94</td>
<td>2.94</td>
<td>14.71</td>
</tr>
</tbody>
</table>

- 49.75% have experience learning a second language.
- Student of Korean ascendance:
  - Saw relation between programming languages and a second language.
  - Final grade: 79.75%.
  - SLA-aBLE tests: 93%, 88.21%.

K-12, Outreach

- Flash-drive with SLA-aBLE contents distributed to professors at Digifest in Embry-Riddle.
- Included: Read-me file with instructions, quizzes, Think-Pair-Share, Discussion Board prompts, SLA videos, and publications.

- Frequency count of grades in SLA-aBLE and non-SLA-aBLE courses in three semesters

- Comparison of students’ final grades in the SLA-aBLE and non-SLA-aBLE sections for three semesters – Fall 2015, Spring 2016, Fall 2016

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SLA-aBLE started in 2014. The researchers have been implementing second language acquisition methods, frameworks, and cognitive skills to the learning process of programming languages in Introduction to Computing for Engineers (MATLAB) courses at Embry-Riddle Aeronautical University for four terms. The new materials are focused on developing problem-solving skills and including: new slides and videos with embedded quizzes to keep students engaged, open-ended programming quiz questions, discussion boards online and think-pair-share in class-activities. Surveys and one-on-one interviews were conducted to obtain feedback from students, which was used to improve the materials.