INTEGRATING VIDEO-CAPTURE VIRTUAL REALITY TECHNOLOGY INTO A PHYSICALLY INTERACTIVE LEARNING ENVIRONMENT FOR ENGLISH LEARNING
Outline

- Introduction
- Learning activities design
- System implementation
- Evaluation
  - Methods
  - Results
- Conclusion
Introduction

- Physically Interactive Learning Environment
  - Utilizing video-capture VR technology

- The learning activities comprise six stages
  - A conical cap, a fist, a pistol, a searchlight, a magnet, and a spray paint can
Learning activities design (1/6)

- Stage 1: identifying English letters
  - Poking with a conical cap
Learning activities design (2/6)

- Stage 2: understanding phrases
  - Punching with a fist
Stage 3: listening to phrases
- Shooting with a pistol
Learning activities design (4/6)

- Stage 4: speaking phrases
  - Exploring with a searchlight
Learning activities design (5/6)

- Stage 5: matching pictures with words
  - Dragging with a magnet
Learning activities design (6/6)

- Stage 6: listening and writing words
  - Writing with a spray paint can
System implementation (1/2)
System implementation (2/2)
Evaluation-Methods

- Second-grade students
- Study was a total of 120 min.
- Experimental group
  - PILE system
  - 30 students (18 boys and 12 girls)
- Control group
  - PowerPoint slides
  - 30 students (17 boys and 13 girls)
Evaluation-Methods (2/9)

- Pretest
  - Five items
  - 10 min to complete the pretest
- System interaction
Evaluation-Methods (3/9)

- Questionnaires
  - Five-point Likert scale
  - Eight-item learning motivation questionnaire
  - Eight-item Short Feedback Questionnaire (SFQ)

- Posttest
  - The items assessed in the posttest were same as in the pretest.
Evaluation-Methods (4/9)

- **Interview**
  - To explore the teacher’s experience regarding using the PILE system in English teaching.

- **Delayed test**
  - To assess the students’ English learning achievements one week after the study.
  - Nine items
Evaluation-Results (5/9)

- English learning achievement tests
  - Wilcoxon signed rank test
    - Pretest and posttest
    - Significant difference in experimental group
  - Mann–Whitney U test
    - Between the two groups in the pretest, posttest and delayed test
    - No significant differences between the two groups in both the pretest and posttest
    - Significant difference was found between the two groups in the delayed test
Evaluation-Results

- English learning achievement tests
  - The experimental group outperformed the control group in the delayed test

<table>
<thead>
<tr>
<th></th>
<th>Experimental group (N = 30)</th>
<th>Control group (N = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Pretest</td>
<td>2.70</td>
<td>1.622</td>
</tr>
<tr>
<td>Posttest</td>
<td>3.50</td>
<td>1.614</td>
</tr>
<tr>
<td>Delayed test</td>
<td>8.47</td>
<td>0.860</td>
</tr>
</tbody>
</table>
Evaluation-Results (7/9)

- Questionnaire on students’ learning motivation

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental group (N = 30)</th>
<th>Control group (N = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Did you like today's English class?</td>
<td>4.73 0.521</td>
<td>4.60 0.932</td>
</tr>
<tr>
<td>2. While the student was practicing English on the stage, did you also want to try?</td>
<td>4.30 1.119</td>
<td>3.83 1.577</td>
</tr>
<tr>
<td>3. While the student was practicing English on the stage, did you concentrate on the screen?</td>
<td>4.67 0.506</td>
<td>4.30 1.291</td>
</tr>
<tr>
<td>4. Did you speak the English phrases out during the class?</td>
<td>4.50 1.042</td>
<td>3.50 1.526</td>
</tr>
<tr>
<td>5. When you saw the questions on the screen, did you actively speak the correct answer?</td>
<td>4.30 1.208</td>
<td>3.30 1.664</td>
</tr>
<tr>
<td>6. When the student responded with the right answers, did you feel happy for him?</td>
<td>4.33 0.922</td>
<td>4.53 1.137</td>
</tr>
<tr>
<td>7. While the student was interacting with the objects, did you want to tell him the correct answer?</td>
<td>2.37 1.752</td>
<td>3.63 1.586</td>
</tr>
<tr>
<td>8. Would you like more pictures and questions available to help you practice English?</td>
<td>4.63 0.765</td>
<td>3.63 1.691</td>
</tr>
</tbody>
</table>
Evaluation-Results (8/9)

- Short Feedback Questionnaire (SFQ) for the PILE system

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Experimental group (N = 16)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td></td>
</tr>
<tr>
<td>Feeling of enjoyment</td>
<td>4.63</td>
</tr>
<tr>
<td>Sense of being in the environment</td>
<td>4.38</td>
</tr>
<tr>
<td>Success</td>
<td>4.44</td>
</tr>
<tr>
<td>Control</td>
<td>4.66</td>
</tr>
<tr>
<td>Perception of the environment as realistic</td>
<td>4.08</td>
</tr>
<tr>
<td>Comprehension of the computer feedback</td>
<td>4.54</td>
</tr>
<tr>
<td>Perception of difficulty while performing the task</td>
<td>4.19</td>
</tr>
<tr>
<td>Level of comfort during the experience</td>
<td>4.37</td>
</tr>
</tbody>
</table>
Evaluation-Results (9/9)

- Teacher interview
  - Stimulated students’ learning motivation and captured their attention
  - Actively interacted with the system
  - The system's user interface is colorful, attractive, and easily understood
  - The system’s feedback is very effective
  - The operation of the system is very easy and intuitive.
  - The editable interface provides more flexibility and allows the tailoring of learning materials
Conclusion

- Using the PILE system significantly improved student English learning performance.

- The experimental group performed better than the control group in the posttest and the delayed test by actively participating in the PILE system as compared to a one-way instructional method using a PowerPoint display.

- The learning motivation of student has also been significantly enhanced.
Thank you for attention