

## Evaluation of Cerego's iKnow! Adaptive Online Software Learning Systems

Cerego commissioned researchers from the *Laboratory for Interactive Learning Technology* (LILT) at the University of Hawaii to conduct a series of studies to evaluate the effectiveness of the iKnow! adaptive online software learning system<sup>1</sup>. The studies were conducted using rigorous *randomized-controlled field trials*, in which experimental methods (e.g., randomly assigning participants to treatment groups) were used in naturalistic, “real-world” settings. The research findings, summarized below, were then reviewed by peer faculty from New York University's Games for Learning Institute and the CUNY Graduate Center.

Research participants in the studies were students from a two-year liberal arts college for non-native English speaking students in Oahu, Hawaii. The main findings from this research include:

- *Cerego's iKnow! learning system is superior to a conventional computer-based approach to vocabulary acquisition.*
  - To learn a set of 570 word groups, 26 Japanese college students were randomly assigned to use either *iTango* software or the *iKnow!* learning system. Whereas *iTango* presents vocabulary, definitions, and example sentences in a conventional fashion, *iKnow!* presents multimedia materials in a way that adapts to the specific needs of individual learners. After using either the *iTango* or *iKnow!* system for 4 weeks, the average vocabulary score for the *iKnow!* group was nearly 4 times better than for the *iTango* group (37% correct vs. 10% correct).
- *The advantages of the iKnow system are lasting.*
  - Students in the study above were given another test to assess their retention of vocabulary 5 weeks after the end of training. The *iKnow* group scored significantly better than the *iTango* group in the retention test (23% vs. 7%).
- *The advantages of the iKnow system are also found in a more concentrated learning situation.*
  - To learn a set of 60 word groups, 70 Japanese college students were randomly assigned to use either the *iKnow!* adaptive learning system or *iTango*, a conventional computer-based learning system, for in a minimum of 1 hour per week for 3 weeks. After 3 weeks, the *iKnow!* group had learned over twice as many word groups as the *iTango* group (23% correct versus 11% correct). The results suggest that *iKnow!* is effective for brief, intense learning.

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<sup>1</sup> The research presented here are results from experimental evaluations of the Cerego *iKnow!* system by the Laboratory for Interactive Learning Technologies (LILT) at the University of Hawaii. This report does not constitute an endorsement of that product by LILT. Full reports of the research are available upon request.

- *The adaptive components of the iKnow! system make a significant contribution to its effectiveness.*
  - Seventy Japanese students were randomly assigned to study 50 word groups using either the iKnow! system, the iTango software, which presents material in a conventional fashion, or the iKnow Lite system, which presents materials in the same way as iKnow!, but does not have the same adaptive learning features. The systems were used by participants for a minimum of 1 hour per week for 4 weeks. After training, the iKnow! group learned nearly 3 times as many vocabulary words as the iTango group (57% versus 21% correct). The iKnow! group also outperformed the iKnow Lite group on both learning outcome tests, but the difference was only statistically significant on recall.

### *Conclusions*

Considered together, these studies provide clear evidence for the effectiveness of the iKnow! system. Across the studies, iKnow!, with its innovative multimedia presentation of learning materials and adaptive learning components, resulted in students learning 2 to 3 times more vocabulary words than students who used a more conventional computer-based learning system.

The findings of this research are especially impressive given the relatively small sample size of the research. Additional analysis involving mining the data collected from users should be used to validate these findings with large numbers of participants.