1

**David Hatfield and Josine Verhagen**  
jverhagen@kidaptive.com  
Kidaptive

Hodoo English provides a virtual language learning world for children to develop their confidence in speaking English and expand their listening and reading comprehension skills. The game was designed and developed for Korean children, but we are in the process of expanding its accessibility to other first languages. We are also working to extend the game to better support the development of communicative competence. We would love to show you the game and discuss the challenges and opportunities of second language development and measurement.

2

**Michelle Zimmerman**  
m.zimmerman@agcschool.org  
Concordia University (Adjunct), Renton Prep (teacher/researcher)

Since 2011, I’ve presented research on Portal 2 in the classroom for American Education Research Association, SXSWedu, DigiPen, GBLNY at NYU, International Society for Technology in Education, TechEDGE (University of Nebraska-Lincoln), Northwest Council for Computer Education and Emerald City Comicon. In the years of teaching children to conduct their own research on working with younger student to develop skills through gaming in the classroom, I’ve developed a new understanding of how learning can be transferred from gaming to other skills. We have expanded the model across the school where students are now deciding on games and the skills they would like to teach younger students, then report out their findings. In this past year, they have used Sway to communicate their ideas. Here is an example: https://sway.com/jqJyNiScemHNOY64

In the Tech Demo, I’d like to give a brief overview of key points in gaming that are transferrable learning outside gaming to situate that in the context of using Sway for students to present and communicate their learning among peers and their work as student-teacher-researchers, furthering adult understanding through student perspective and voice. The most recent pilot work explored an 8th grade girl mentoring a kindergarten boy who wanted to create a tutorial for peers on building in Minecraft. They have plans for the upcoming school year to implement this design, teaching kindergarteners to document their process and create their own Sways on mobile and computer devices.

I have been working with Chris Pratley, GM for Sway at Microsoft and they were able to whitelist a request and make it a reality before school ended to begin pilot work with kindergarten students using Sway on Nabi tablets for accessibility. Here is a glimpse into that work: https://sway.com/GSvTkoKs5ayXK1Bs  This Demo focuses on the use of a mobile-ready technology to support communication, collaboration, and creation in the context of gaming and cross-age mentoring where students become teachers and researchers. Student voice and perspective is essential in innovation and learning. This is one solution.
## Demos

### 4  Christopher Cabrera Thompson  
ccthomspson@labschool.ucla.edu  
UCLA Lab School  
(UCLA GSEIS)

Technical Demo on incorporating Code.org K-5 curriculum in your classroom. This tech demo will be targeted to the teacher who is interested in elements of the Code.org curriculum and incorporating it into their classroom. Although the focus is on K-5 the tech demo will provide general tips and tricks as you dive into the curriculum. Specifically, I will show how you can integrate content related to your organization into the curriculum and build and rollout your own toolset. The Tech demo will be presentational but I will also have iPads for showing how tablets are incorporated into the sections of the course. To prepare for your workshop: Sign up for a teacher account at Code.org if you don’t already have one. Review the following introductory course materials. These will give you a head start into the course materials to be covered and maximizing learning time during the in-person workshop.

### 5  Ryan Lanier  
rlanier@epe.org  
Education Week

Education Week - edweek.org, featuring Digital Direction and the annual Technology Counts report, is America’s #1 news source for K-12 education technology, professional development and policy news and insight. Group access is available for educators, researchers, entrepreneurs, policy makers invested in having the most relevant K-12 resource in the industry.

### 6  Girlie Delacruz  
gdelacruz@cse.ucla.edu  
CRESST/UCLA

ENGAGE: Gamechanger for Early Childhood STEM, SEL, and Problem-Solving. For the CRESST/ENGAGE project, we developed a bundle of games that teach both physics and social and emotional concepts through problem solving. These games were designed for young children in grades K-3.

- **Go Vector Go:**
  - Build understanding of force, friction, slope, mass and gravity
  - Promote pattern recognition

- **Team Vector to the Rescue:**
  - Build understanding of force, friction, slope, mass and gravity
  - Teach anti-bullying and effective team social skills.

- **Deep Sea Dash:**
  - Build understanding of velocity and vector addition

### 7  Alan Koenig  
enginerds@g.ucla.edu  
CRESST/UCLA

This demo will highlight the automated assessment engine (AAE) developed by CRESST for the US Navy that can do real time assessment of shiphandling (driving of a guided missile destroyer class ship). Examples include mooring to a pier (like parallel parking) and underway replenishment (UNREP) where the ship comes alongside an oiler to refuel and send over supplies.

### 8  Chris Fink and Markus Iseli  
hoboxia@gmail.com  
iseli@cse.ucla.edu  
CRESST/UCLA

CRESST is currently designing a narrative interface for math instruction throughout a student’s career. The application uses a questing motivation to build a spacecraft on a moon colony, launch it to Mars, and develop an advanced city on Mars, beginning in secondary school — all the way through high school. All along the path, activities and tasks draw the connection between mathematics theory (based on the new standards) and real-life tasks and contexts. The application intends to encourage activities such as exploration, help-seeking, help-giving, as well as the rating and creation of new tasks. Using potential 3rd-party plugins that would provide intelligence such as learning progression maps and data analysis, recommended next tasks could be provided based on student performance data and teacher-assigned learning goals. Extension of the application to other grades and learning domains is intended.

### 9  Ariel Paul  
ariel.paul@colorado.edu  
PhET Interactive Simulations

PhET Interactive Simulations is developing a new line of Interoperable HTML5 PhET simulations, designed to enable advanced integration into a wide variety of educational technologies and provide event and state data for analytics. Each simulation provides an open exploratory environment, is built on state-of-
The goal of the Teaching Teamwork project is to teach students to work effectively in teams, whether face-to-face or remotely, and by monitoring and analyzing their actions to assess the contribution of each team member. The content area is electronics. Students work on realistic simulations of electronic components and circuit boards that are linked together over the Internet. The project addresses the mismatch between the value of teamwork in the modern STEM workplace and the difficulty of teaching students to collaborate while also evaluating them individually. Our demo session will give conference participants an opportunity to interact with each other in solving a simple problem that we have used with students. It is recommended, therefore, that attendees bring their own laptops to the session. The Teaching Teamwork project is funded by the National Science Foundation’s Advanced Technological Education Program. The Concord Consortium (CC) is the lead institution in partnership with Tidewater Community College, CORD, and ETS. Paul Horwitz is a senior scientist at CC.

Classting is a social based adaptive learning platform created by a teacher to provide a safe and enjoyable class environment for his own class. In just 3 years, it grew into the largest social based learning platform in Korea covering over 95% of K-12 schools. Classting pursues an educational service that reflects the trend of the students, lead active participation of the students, and is easy for the teachers to use. Our class connection, Classting.

BBN learning platform (Learnform) is a domain-independent, problem-solving based online learning platform. Students can solve problems at their own pace, or request a decomposition of the problem into steps which leads them through a carefully-crafted solution to the problem. Student actions during problem-solving are captured at a fine-granularity to inform cutting-edge feature-based student modeling which is used to assess individual performance and competency. Teachers can view automated reports as well as manage student assignments through a dashboard. Learnform also includes a completely web-based workbench for authoring and publishing new content as well as for developing state-of-the-art example-tracing tutor models. Standalone mode enables rapid
Demos

integration of Learnform’s problem-solving tasks with third-party courseware. The Physics edition of the BBN Learning Platform showcased here was developed under the Office of Naval Research funded STEM Grand Challenge. Raytheon BBN Technologies has made this Physics learning system available at no cost to high schools in the Greater Boston area.

14 Rajesh Jha
rkjha1@siminsights.com
SimInsights

We will demo the Go Vector Go game developed as part of DARPA Engage, PiGames and SimPhysics.

15 Jim Diamond
jdiamond@edc.org
Education Development Center|Center for Children & Technology

Zoom In is a free, Web-based platform that helps students build literacy and historical thinking skills through “deep dives” into primary and secondary sources. Zoom In’s online learning environment features 18 content-rich U.S. history units that supplement your regular instruction and help you use technology to support students’ mastery of both content and skills required by the new, higher standards: Reading documents closely and critically; Identifying author’s point of view and purpose; Engaging in higher-order, text-based discussions; and Writing explanatory and argumentative essays grounded in evidence.

Each lesson on Zoom In’s online platform supports a dynamic 1-to-1 device environment. Throughout the different stages of the inquiry arc, the class shifts between teacher-led instruction, whole-class and small-group discussions, and independent student work.

Zoom In’s instructional design is deeply rooted in current research about historical thinking; teaching with primary sources; supporting the development of argumentation skills; and supporting middle-grades students’ emergent skills as readers and writers. At every phase of development, teachers and students have used Zoom In and let us know what works, what doesn’t, and what they need in order to be successful. We’ve been field-testing Zoom In with 32 teachers in five states across the country. We’re looking closely at the impact of Zoom In on how teachers teach and what students write. Keep an eye out for the results, available in September 2015.

16 Stacy Kruse
stacy@pr-sol.com
Pragmatic Solutions / simSchool

We will be demonstrating simSchool, an artificially intelligent teaching simulation platform at the center of a nationwide Clinton Global Initiative America Commitment in improving education in under-resourced schools (www.simschool.org/calltoaction) and the foundation of an emerging research pilot with the Council for the Accreditation of Educator Preparation (caepnet.org). Central to both efforts is the evaluation of simulation-based technology to improve effectiveness of educators, as well as its potential as a substitute for live field hours required for teacher practicum and teacher performance evaluation.

17 Jon Wetzel
jon.w.wetzel@gmail.com
Arizona State University

Dragoon is a freely available, web-based, intelligent tutoring system designed to help students learn dynamic systems modeling, knowledge about specific systems (e.g. physics, population growth, blood sugar), and concepts and principles (e.g. Newton’s laws of motion, predator-prey effects, homeostasis). At this demonstration you can see or try Dragoon and learn about options for using it in a classroom or other settings. Dragoon is developed by the Dragoon Lab at Arizona State University. Our PI is Professor Kurt VanLehn. Visit http://dragoon.asu.edu for more information. The demonstrations will be given by Dragoon’s project manager, Dr. Jon Wetzel.
Demos

Scott Moss
smoss@sandi.net

This demo will show examples of the student built games, simulations and interactive art described in the poster (Poster #1).

Posters

1

Scott Moss
smoss@sandi.net

Innovation Middle School, San Diego Unified School District

This poster session will describe and illustrate the benefits to K-12 of creating their own computer programs such as games, simulations and interactive art. Examples of programs created by seventh and eighth grade students will be reviewed and analyzed in terms of cognitive and affective benefits. This session also examines evidence describing the benefits of such activities including improved computational thinking, as well as the transfer to other subjects. The session draws upon the work of various authors to support its findings. Finally, the session will include information regarding the assessment of student created programs. In addition to teacher created rubrics, the session examines the use of written and video journals where students reflect on the process of game-creation.

2

Natalie Bursztyn
nbursztyn@me.com

Cal State Fullerton
Department of Geological Sciences

Bringing Grand Canyon to the College Campus: Assessment of Student Learning in the Geosciences Through Virtual Field Trip Games for Mobile Smart-Devices

Geoscience educators have long considered field trips to be the most effective way of attracting students into the discipline. A solution for bringing student-driven, engaging, kinesthetic field experiences to a broader audience lies in ongoing advances in mobile-communication technology. This NSF-TUES funded project developed three virtual field trip experiences for smartphones and tablets (on geologic time, geologic structures, and hydrologic processes), and then tested their performance in terms of student interest in geoscience as well as gains in learning. The virtual field trips utilize the GPS capabilities of smartphones and tablets, requiring the students to navigate outdoors in the real world while following a map on their smart device. The results of this study, involving 873 students from five institutions, show that students who completed all three virtual field trip modules were statistically significantly more interested in learning the geosciences than control students who did not complete any (mean interest for 3 modules was 58.12 out of 70, for 1 module was 51.58 out of 70, and for 0 modules was 50.01 out of 70). Hierarchical linear modeling results indicate three strong predictors for student interest toward learning the geosciences: 1) initial interest, 2) STEM major, and 3), the number of virtual field trip modules they complete. Analysis of covariance (ANCOVA) and multiple regression were used to address the research questions on gains in learning. These gains are minor across all participants, and not statistically different between intervention and control groups. Predictors of gains in content comprehension for all three modules are the students’ initial interest in the subject and their base level knowledge. For the Geologic Time and Structures modules, being a STEM major is an important predictor of student success. Most pertinent for this research, for Geologic Time and Hydrologic Processes, gains in student learning can be predicted by having completed those particular virtual field trips. Gender and race had no statistical impact, indicating that the virtual field trip modules have broad reach across student demographics. In related research, these modules have been shown to increase student interest in the geosciences more definitively than the learning gains here. Thus, future work should focus on improving the educational impact of mobile-device field trips, as their eventual incorporation into curricula is inevitable.

3

Kathleen M. Sheehan
ksheehan@ets.org

Educational Testing Service

Defining Reader/Text Matching Algorithms for Use in Online Learning Environments. Reader/text matching algorithms have been proposed as a way to ensure that the texts presented within online learning environments continue to present sufficient levels of reading challenge even when significant increases in students’ estimated reading ability levels are expected. This study examines a key issue in the development of such systems: ensuring that students’ estimated reading ability scores are expressed on a common vertical scale so that growth in reading competency can be accurately assessed.

Two possible scaling solutions are examined: the iterative algorithm proposed in
Mislevy, Beaton, Kaplan & Sheehan (1992), and the iterative algorithm proposed in Swartz, Burdick, Hanlon, Stenner, Burdick & Kyngdon (2014). These two solutions are alike in some respects, yet different in others. One key similarity is that, in each case, two sources of information are considered when generating an updated reading ability estimate for each student: (1) evidence extracted from the student’s observed responses to test questions; and (2) evidence determined from a collateral information model constructed to predict item (or text) difficulty as a function of observable item (or text) features.

Differences are also present. One important difference concerns the methods used to account for the additional uncertainty introduced into the item calibration process through the use of an imperfect collateral information model. Mislevy and his colleagues present a series of simulation analyses designed to investigate the strengths and weaknesses of alternative approaches for addressing this additional source of item parameter uncertainty. In each study, certain subsets of observed responses were treated as missing so that the characteristics of alternative estimation techniques could be evaluated. The specific techniques investigated included: (1) a variation of Rubin’s (1987) multiple imputations approach; and (2) using “best estimate point predictions” of item parameters as if they were known true values.

The evaluation suggested that, while Rubin’s multiple imputations approach yielded item difficulty estimates that exhibited little, if any, bias, the strategy of using “best estimate point predictions” of item parameters as if they were known true values resulted in two types of errors: (1) item difficulty estimates that were shrunken towards the values predicted by the assumed collateral information model; and (2) standard errors that substantially understated true levels of item parameter uncertainty.

Since the algorithm proposed in Swartz, et al. (2014) employs “best estimate point predictions” of text complexity as if they were known true values, this study considers whether the parameter shrinkages detected by Mislevy and his colleagues were present, and that validity statistics based on those values were significantly inflated. Implications with respect to the goal of defining reader/text matching algorithms that are more appropriate for use in online learning environments are discussed.
Museums exhibits are often considered passive experiences that do not engage their audience, especially with younger students. However, to provide a more engaging learning experience, museums have begun re-inventing themselves by creating interactive exhibits that are supplemented with mobile technology. The objective of our study was to determine whether the design of Play the Past, an augmented reality game embedded in a historical exhibit at the Minnesota History Center, facilitated engagement and learning among the students who participated. Specifically, we focused on studying learning and engagement in one hub called the Iron Mine where students take on the role of a miner in the 1900’s and are given the task of earning a day’s wages using a variety of mining techniques. To investigate engagement and learning of students in the Iron Mine, our analysis used data that was collected from the mobile devices that were used by 4,549 4th through 6th grade students. A linear mixed-effects model was fitted to the data to model the change in wages earned over time. Because of the non-linearity observed in the data, wages were log-transformed prior to analysis to better meet assumptions of the model. Only students that earned a wage in the Iron Mine were included in the analysis.

The analysis showed that in general students do learn how to play the game and earn $2.00 in wages in the Iron Mine. Interestingly, their pattern of learning begins with several failures, which may reflect the student trying to figure out the systems in the game. The information from this analysis could be used to help students in the Iron Mine by providing those who are not progressing at the expected pace with additional support.

Twenty-two years ago I published my dissertation entitled “Effects of visual cues and verbalization on students’ acquisition and transfer of problem-solving search strategies embedded in computer-based game and simulation environments” (Novak, John, 1993), and I think that it is both topical today and would provide an interesting contrast between what was available at that time and what is available now. In addition to embedding the search strategies and scaffolding structures within game/simulation formats, I also captured performance data that was used to track the development of expertise in searching.

We will describe results from a project exploring the use of interactive science simulations for assessment. A multidisciplinary team worked, over a number of phases, to modify the user interface of an interactive simulation in order to make intentionality of students more evident; devise test questions that would maximize meaningful interactions by students and target specific science inquiry practices; and implement back-end data capture capabilities and logging structures to facilitate analysis and meaningful inferences from the process data. In cognitive labs we gathered in-depth data from students while they were using the simulation to solve problems and answer questions, including think-alouds and eye movements. We used the data from these cognitive methods, along with a priori theoretical predictions, to help us characterize the log files of student interactions in meaningful, construct-relevant ways. A central goal was to examine whether any new insights could be gleaned from the process data that were not otherwise evident in students’ responses to traditional assessment questions. We will present analyses that begin to reveal the potential of automatically captured interactive behaviors as a window into cognition, when the characterization of the sequences of actions and events are informed by cognitive theory and cognitive methods. The studies are part of an exciting multi-year collaboration between Educational Testing Service and PhET Interactive Simulations, University of Colorado Boulder (http://phet.colorado.edu), funded in part by the Moore Foundation.
Towards Surfacing Salient Learning Game Data at Scale: The GlassLab Analytic Engine

As digital games afford deeper and richer learning data streams, the potential for learning impact increases—both at the individual level (in understanding event-stream learner trajectories), and at the community level (scaling these digital learning experiences across a broad range of subjects). A major challenge in leveraging this potential, however, lies in identifying salient learning evidence within the massive deluge of event-stream data. This becomes particularly tricky in learning games, since they are a playful medium—which by definition provides roles, goals, and agency, often engaging the players in a narrative and challenging them to discover an underlying rule system through boundary testing in play. Thus, student play trajectories can often include vital interactions “off the beaten path” that may be unanticipated by learning game designers. To systematically surface learning evidence in this complex medium—and help enable game-based learning at scale—the GlassLab (1) research team presents a multi-tier, modular learning data reporting system. The newly developed GlassLab Analytics (GLA) system integrates principles of game-based assessment and educational data mining, implementing a modular game-based data schema to streamline game design, salient data collection, and learning analysis visualization. This poster introduces three main levels of the GLA system (unified by a system-wide learning data framework): 1) core game-based learning design; 2) event-stream data collection and feature engineering; and 3) learning data analysis and reporting tools. The GLA engine supports the alignment of core learning design with a system-wide data framework, which then fuels powerful analysis and learning visualization for several key stakeholders: game developers, students, and teachers. With data visualization and reporting tools for each group, the system allows learning insights to be surfaced across games for students and teachers, and facilitates efficient onboarding of quality learning games onto the GlassLab platform. The GLA system thus supports impact at scale for immersive, game-based learning—providing individualized, event-stream learning insights, while supporting an increasingly broader array of playful learning experiences across games, genres, and subjects. (1) https://www.glasslabgames.org/

Engaging Preschool Families in Early Mathematics Learning through PBS KIDS Transmedia Games. The study addresses a program to foster low-income communities’ support for preschool children’s mathematical development through PBS KIDS Lab transmedia game suites. The study used a quasi-experimental, non-equivalent control group design, which assigned 160 parent/child dyads from two Head Start and state preschool centers to an intervention or comparison group. The results indicate that the intervention was positively associated with gains in children’s knowledge and skills in mathematics, as measured by Test of Early Mathematics Ability (TEMA-3), after accounting for differences in baseline assessment and demographic characteristics (p. ≤.05). In addition, a pre- and post survey and focus group data suggest that parents grew in their awareness and support of their child’s mathematics learning. Findings suggest that the use of these age-appropriate digital media led to increases in parents’ awareness of strategies to support their child’s mathematics learning and their direct support of mathematics learning in the home environment. The presentation will also discuss preliminary results of a new study of parent engagement and student learning with the PBS KIDS Lost Lagoon app for children and the PBS KIDS Super Vision app for parents.