

InquiryCast Product Description Inquiry Technologies, LLC

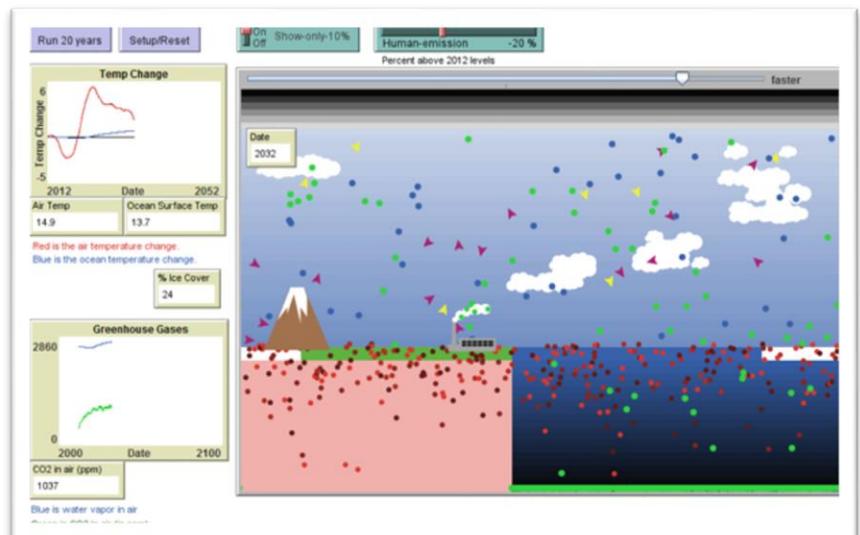
Measuring the achievements of a diverse student body requires a variety of content delivery and data gathering strategies. Instead of providing only one way to learn, advocates of Universal Design for Learning (UDL)* have shown that meeting this level of diversity requires a variety of learning paths with differing dependence on language, mathematics, graphics, and instructional designs [1-5]. **Helping all students** reach their maximum potential requires a degree of flexibility that is only possible with the use of digital materials and applications. Assessment methods and means of data input used with these materials should be equally flexible given the diversity of learning acquisition strategies that exist among individuals. In an effort to meet the learning needs for an increasingly diverse population of students, Inquiry Technologies, LLC is developing a universal assessment and learning facilitation toolset that can be applied to any browser-based digital learning materials and can accept student input through any combination of voice, text, or screen recording, in real-time or delayed. *InquiryCast's* patent pending flexible design will also benefit teaching as it reduces the need for separate testing and provides an effective and highly efficient means of documenting student progress with digital activities.

The key to the *InquiryCast* approach involves technology that captures the computer screen as a video clip or still picture along with an audio track. This screen and voice capture technology, commonly referred to as screencasting, **is independent of the learning materials being displayed**. *InquiryCast's* innovation is to use this universal capture technology as the heart of a flexible student learning and assessment strategy. Adapting this technology for student use within a classroom setting is unique. *InquiryCast* allows students to capture segments of digital materials they are working with and generate voice-over explanations and/or commentary. Using very simple technology, students can produce short summaries and answers to questions. *InquiryCast* provides students with a means to **think out loud**

about complexities associated with an activity, and enables opportunities to review/replay and improve their recordings at any time. The recorded visual context along with the soundtrack allows students to analyze their own explanations and re-examine the specific actions conducted with digital content before submitting the work in the form of an assessment to their teacher.

Unlike many traditional forms of assessment that prompt students to elaborate about an event after they have finished an investigation, our innovative **learner-based model** can obtain documentation of critical thinking processes **while students are engaged with actual activities**. *InquiryCast's* innovation reduces many barriers associated with memorization, reading ability, language acquisition, written expression, and can readily accommodate students requiring individual learning plans. We based this novel approach on research conducted by our Chief Technology Officer that involved more than 200 middle school science students that were engaged in four, one-hour long interactive computer activities [6, 7]. Students were exposed to a wide variety of assessment instruments, including screencast productions and text-entry responses. The screencast tool enabled students to combine video capture of interactive models (see Figure 1) with their voice-over explanations. The visual component recorded all of the events depicted through the main display window, the mouse

Figure 1: Interactive NetLogo Challenge Model

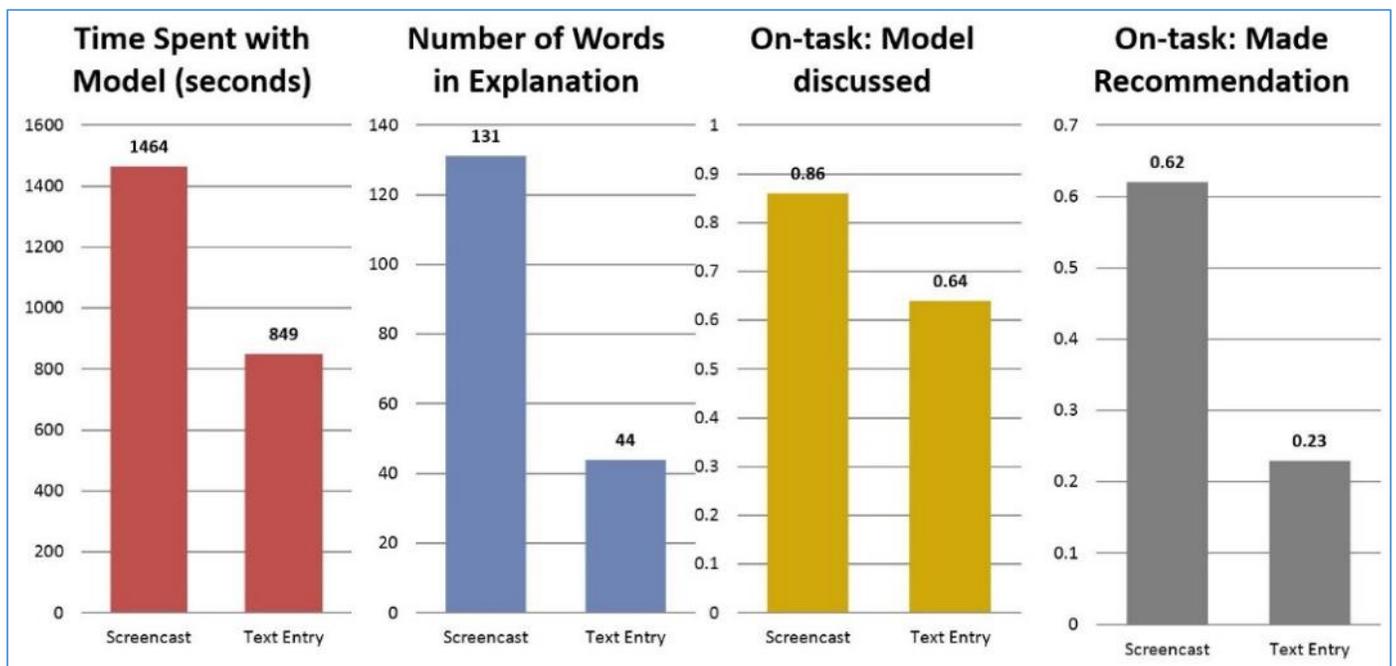


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movements and variable selections that were conducted, and the results as they appeared in data tables and graphs. The software also recorded the student's verbal description and associated reasoning for the events taking place. When compared to those writing explanations, students that screencasted *spent 72% more time* with the computer model, *used nearly three times as many words* in their responses, *remained on-task to a greater degree*, and were *far more likely to include ideas as to why and how* the events occurred as they did (see Figure 2). Findings from this research inspired a second investigation which showed that when high school students were provided the opportunity to create screencasts as part of a science lab report, they were able to produce clear and articulate explanations regardless of their demonstrated writing abilities [8].

nized there are no software products designed to combine learner-centered screencasting with the capture of student assessments in network environment that recognizes mandates regarding security, privacy, confidentiality, and protection for K-12 students. Additional funding from the SBIR program and/or outside investors will expand the capacity of *InquiryCast* to include a teacher dashboard capable of managing student accounts which reflect a master schedule, monitor activity within the system from school or home, and provide formative and/or summative feedback on an as-needed basis. Revisions to the playback module developed in this second phase will also include a simple word processing tool to allow students to use their screencast recordings to assist with their technical writing. Inquiry Technologies, LLC is also planning to integrate various adaptive

Figure 2: Charted Results Obtained from Preliminary Research Study



This preliminary research provided the foundation for our initial funding from the Small Business Innovative Research (SBIR) program sponsored by the National Science Foundation (NSF). Awards from this program are designed to promote research and development that has a potential for commercialization. By making the SBIR Phase I award, the NSF recog-

technologies into the *InquiryCast* base platform (see Figure 3). These adaptive technologies are not new, but combining them into one student tool that has a simple, intuitive user interface will permit individual students to select and efficiently use features that will help maximize both their learning potential and means of expression.

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InquiryCast also provides teachers with highly detailed documentation of student activities, which is very difficult to obtain with the vast majority of digital content delivery platforms where assessment is either often chaotic or missing entirely. Imagine a district making use of the very best materials from dozens of sources and instead of using assessments from each,

Figure 3: Enhancements for Phase II Integration

Adaptive Technology
Speech-to-text
Voice annotations
Spelling and grammar check
Screen readers
Object-oriented manipulations
Voice commands
Closed captioning
Contrast variation
Text-to-speech
Magnifiers
On-screen keyboards
Digital notebooks
Others as available

having one common, superior assessment that has UDL accommodation features and is used throughout. This will save teachers time, get more accurate and useable assessment data, and help students acquire better communication skills. Hosting an array of additional features for teachers to include accelerated video and/or audio, text-recognition, along with text and voice annotations would not only save tremendous amounts of time and valuable resources, but it would result in a form of feedback that would be far less likely to be ignored by both students and parents. Replacing red ink with a form of feedback that includes genuine inflection on behalf of the teacher and displays a students' actual work with digital content would improve buy-in from all parties involved – students, parents, teachers, and administrators.

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* For more information on Universal Design for Learning, please visit the following website: <http://www.cast.org/>