

Smart Sparrow IMS Global Awards Submission Summary

Challenge

In considering today's educational challenges, we look at the main modes of learning being offered to students to understand the opportunities for improvement. Today's higher education institutions still favor the one-to-many, one-way approach of face-to-face lectures. This is a 'one-size fits all' approach to a problem that is inherently a highly personal challenge - the pursuit of learning. We know that one-on-one private lessons are a far more effective mode of learning, due to the teachers ability to tailor each lesson to the needs of each individual student. The private lesson is what we call 'adaptive'. The teacher has the ability to adapt their feedback, the sequence of content, and the content itself based on the learning needs of the student. The challenge at hand is therefore: how do we deliver one-on-one learning experiences at scale?

The proliferation of LMSs (Learning Management Systems) has provided a way of connecting students with learning material, at scale, however this has resulted in teaching by PowerPoint, PDFs, multiple-choice quizzes, and videos (which are normally recordings of lectures). We believe that online learning can be, and should be so much more. Smart Sparrow's mission is to make online learning more interactive, more intelligent and more adaptive.

Solution

Smart Sparrow is an ed-tech start-up pioneering adaptive and personalized learning technology which emulates the educational benefits of one-on-one tuition. The company was founded by Dr. Dror Ben Naim who led a research group in the field of Intelligent Tutoring Systems and Educational Data Mining at the University of New South Wales (UNSW) in Sydney, resulting in the development of Smart Sparrow's Adaptive eLearning Platform. Adaptive learning technology is a significant departure from early mass 'broadcast-type' technologies initially used in eLearning. The platform is an authoring tool allowing instructors to create rich, interactive and adaptive content and providing students with an online learning experience that adapts to their levels of knowledge and provides the unique feedback they need, when they need it.

The types of content that can be created are:

- Adaptive lessons – that may include any web-enabled content, such as multi-media and text-based material
- Complete adaptive smart courses
- Virtual labs (with simulations)
- Interactive adaptive tutorials (with simulations)

Smart Sparrow's Adaptive eLearning Platform (AeLP) promotes 'learning by doing', enabling students to interact with educational content, to test concepts and to receive adaptive guidance as they work.

Smart Sparrow's Knowledge Analytics™ gives teachers insight into their students' learning paths/levels - what they're learning and how, what's not working and why.

Through use of the Adaptive eLearning Platform, teachers are able to provide 'adaptivity' in their online lessons in the following ways:

- Adaptive feedback
- Adaptive sequencing

- Adaptive content

Learning Impact Outcomes

When students get adaptive feedback, and a learning path that adapts to them - they are more engaged and learn faster, and better. We have published research data supporting this. Teachers access to individual learning analytics and group-level analytics provides them the ability identify problem concepts easily and therefore adapt and improve the lesson content.

Our platform introduces the concept of 'trap states' to identify when a student is in need of guidance or feedback and include it in the lesson as they learn, with the ability to tailor feedback based on student responses and behavior. Our interactive simulations such as the Oxygen Electrode virtual laboratory, developed for Biomolecular Sciences at UNSW, promote critical thinking by forcing students to 'do' rather than just listen or read.

We've also helped instructors from various universities have a far better understanding of how they teach due to the rich feedback and analytics the system provides to educators. Our knowledge analytics gives teachers a powerful way of assessing the effectiveness of their lessons through standard assessment techniques such as multiple choice quizzes, but more importantly through learning path data at individual and group levels.

As one documented example, starting in 2007, A/Prof. Gangadhara Prusty at UNSW, and subsequently in collaboration with 6 other leading universities of Australia in 2010, worked with Smart Sparrow's founder and CEO Dror Ben-Naim to create a pioneering suite of Adaptive Tutorials that teach key threshold concepts in first and second year mechanics courses in engineering, a project that came to be known as Adaptive Mechanics. As a result of using the Adaptive eLearning within his blended teaching for mechanics courses at UNSW, Prusty observed a reduction in failure rate from 31% to 7%.

Return on Investment

The current standard approach to translating a face-to-face university-level course to be online-ready is to employ or contract educational developers at a cost of many tens of thousands, and in many cases, in excess of one hundred thousand dollars. The result of which is neither personalized nor adaptive, and does not promote 'learning by doing'.

The AeLP is a highly affordable option for higher education institutions to bring the future of online learning to their students. By comparison, the licensing cost for an entire institution with 30,000 students would compare favorably against the costs of translating one standard university-level course.

Further, by investing in smart simulations and virtual laboratories, supported by the AeLP, institutions are exposed to significant cost savings through reduced reliance on laboratory infrastructure such as equipment, consumables and lab assistants.

Due to the consequent reduction in failure rates, improved student satisfaction and eventual increase in enrolments, the Smart Sparrow adaptive learning solution provides excellent return on investment for institutions.