

Innovate UK

Technology Strategy Board

Directory of projects

Learning technologies:
design for impact 2015

**Collaboration
Nation**





Introduction

Learning technologies underpin the growth of education companies in a market where global demand for education and skills is increasing at an unprecedented rate. Innovate UK is seeking to kick-start the delivery of new products and services designed to improve learning.

Benefits from the digital realm can enhance the quality of education in the physical world. Good design can help businesses identify genuine economic and social opportunities that meet market needs with substantial and scalable potential.

Our investment of up to £1.1m in learning technologies will keep the UK at the forefront of world-class research and encourage the adoption of products and services that are appealing and meet learning objectives. It will also help develop new business models that are scalable and sustainable.

The feasibility studies we support will help businesses to attract further investment for research and development, validation and eventual commercialisation.

This directory showcases the businesses involved and the feasibility studies we funded in our 2014 *Learning technologies: design for impact* SBRI (Small Business Research Initiative) competition for design and development contracts. Projects were up to six months long and up to £80,000 in value. The profiles were provided by the companies.

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Anarkik3D is a software developer specialising in 3D haptics (virtual 3D touch). We are collaborating with Glastonbridge Software Ltd on development of own-brand 3D modelling software for artists. The third project member is Stakeholder Design Ltd.

What was the aim of your project?

Haptics enables people to feel digital information. We wanted to know if it was feasible to expand our 3D haptic platform (A-Frame) to be a middleware solution for creating haptic/virtual reality educational software products. Are there compelling opportunities to enter the schools software market as a middleware provider for immersive experiences?

What approach did you take to address the challenge?

We had an independent developer-built wireframe demonstrator to test the prototype A-Frame and to provide feedback for iterative development. Workshops and meetings with developers, educators, experience designers and pupils helped us to define requirements for vivid learning experiences. We investigated how educationally relevant hardware/programmes might adopt a common application programme interface for A-Frame plugins, and looked at the potential value and market appeal of innovative haptic/virtual reality products/experiences.

How will you make money from this?

We now have a better, clearer understanding of the market sector and the educational appeal of haptic/virtual reality software products, and of the cost/quality balance for different sectors. There is potential to make money through: licensing out our intellectual property; an A-Frame platform with a subscription fee targeted at developers; own-brand products and A-Frame marketed through our current and new networks; and training courses.

What are the next steps?

We need to first develop the A-Frame platform into a usable product. We aim to use crowdfunding for product development and to build a developer community for mutual support, feedback, and for jointly marketing haptic learning products. We will continue collaborating with Glastonbridge Software Ltd and Stakeholder Design Ltd, and work with business advisors on development costs, revenue streams, and projected returns on investment. We will approach investors when we are ready to scale for growth.

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The Centre for Evaluation and Monitoring (CEM) is part of Durham University. It is devoted to the improvement of teaching and learning across the world through the introduction of scientific and evidence-based monitoring systems and high-quality research information.

What was the aim of your project?

Our aim was to create a tool for teachers to enable the effective and fun teaching of computer science. This was motivated by the substantial concern expressed by teachers and parents over the introduction of the new computer science curriculum to such a young age group at year 1 (ages 5-6).

What approach did you take to address the challenge?

We have developed software, teaching materials and reports that guide year 1 teachers and pupils in a structured sequence of learning tasks designed to address the key skills identified in the new computer science element of the National Curriculum. The reports display pupils' progress towards task objectives and give advice for pupil enrichment and remediation activities.

How will you make money from this?

The product will be commercialised through CEM's existing commercial infrastructure. CEM is part of Durham University and has been developing assessment and monitoring systems based on world-class research for more than 30 years. CEM has a growing global customer base and works with more than 3000 schools in over 90 countries.

What are the next steps?

Our project adds value for schools through the interactive and diagnostic nature of the reporting and by enabling future adaptability of the learning experience. Next steps are the inclusion of reporting aimed at a wider range of ages, as well as the generation and trialling of additional materials, including new tasks designed not only by the project team but also by teachers and product suppliers already in schools.

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Daden Limited

VFTaaS – virtual field trips as a service

Daden is an SME specialising in the creation of immersive learning and visualisation environments. Our work has won awards in the US and UK. For this project we worked with the Open University and DesignThinkersUK – a specialist service-design consultancy.

What was the aim of your project?

Our aim was to establish the feasibility of a 3D immersive virtual reality field trip service. Field work is vital in many areas but educators face many challenges in organising it. Working from the Virtual Skiddaw project for the Open University we wanted to identify the technical, pedagogic and commercial challenges to scaling up to a national service.

What approach did you take to address the challenge?

We spoke to stakeholders across a variety of organisations to better understand the needs and issues. We worked closely with an academy school, holding workshops with pupils, teachers, ICT and leadership. Technically we looked at how to create a highly flexible 3D/avatar education-focused virtual reality application, and developed an XML standard to support easy creation and sharing of lessons.

How will you make money from this?

The aim is to establish a repository where authoring institutions can upload locations and lessons, and user institutions can download them and use them with their students. User organisations pay for access/use, and authors are rewarded on use. We make money from running the service, but leverage the community to help make the content that the community wants. There may also be opportunities for advertising and sponsorship revenues.

What are the next steps?

We need to take the test-bed elements created in the feasibility study and bring them together to produce a minimum viable product and identify beta-test authoring and user institutions. Where possible we will leverage existing Daden and third party code/services. We are looking at a variety of funding sources for completion from project and further grant activity to partners/sponsors and external investment, both in the UK and USA.

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Digital Assess

FormativeAssess

Digital Assess is changing learning for the better and making evidence-based assessment more reliable, easier to validate, more authentic and simpler to manage. Assess better. Engage more fully. Improve learning.

What was the aim of your project?

FormativeAssess uses data-mining techniques to allow an online application to support project-based teaching. Where social networks currently employ intelligent advertising to scan what users type in order to feed relevant product advertising, FormativeAssess scans what students type in order to provide valuable feedback to the student.

What approach did you take to address the challenge?

Our ambition was to model good practice so a substantial proportion of the initial project was focused on classroom observation to build a library of good practice. The data that we captured was then fed into a semantic indexing engine in order to create an interface that responds to learners' questions by providing feedback via appropriate conversational questioning.

How will you make money from this?

The application that we have created will be extended to cover a range of new teaching and learning contexts and will then be sold either as a standalone application or as a bolt-on for learner management system providers to integrate into their platforms as value-added service.

What are the next steps?

The project now needs to develop into a full blown prototype to demonstrate the value of this approach across a range of educational contexts. This will involve generating substantially more data to feed the intelligent aspects of the system.

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Dolphin Computer Access Ltd

Safereads: a productivity tool for learners with dyslexia

Dolphin is a medium-sized company, based in Worcester for over 20 years, specialising in providing assistive technology for the visually impaired and dyslexia markets worldwide. We worked with London Knowledge Lab on this project.

What was the aim of your project?

We researched an embedded productivity tool, providing personalised word-based and reading strategy for all learners, but those primarily with dyslexia, to be used in primary and secondary schools. The plug-in tool should be usable at home as well as at school.

What approach did you take to address the challenge?

We worked with students, teachers and parents to research technology trends and gather reading strategies used with students with dyslexia. We then ran participatory design workshops with these stakeholders and users to design the app, the output of which was a set of wireframes. Research into technology and commercialisation options ran alongside.

How will you make money from this?

The idea is to produce an app-based solution for use at school and home by students who struggle with reading (but specifically to support those with dyslexia). It will help with strategies to read and support teachers, initially in English but then available in other languages.

What are the next steps?

Further research is required based on the current prototype to evaluate if regular use leads to the learning outcomes we envision. The market opportunity and pricing also needs to be developed around the refined prototype.

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Interactive Scientific Ltd

Nano Simbox: immersive science resources

Interactive Scientific Ltd is a micro company formed in 2013 that uses visualisation, education, human-computer interaction and scientific expertise to create products/experiences that connect people to the world around them through immersive simulations of the molecular nano-world. Our products are Nano Simbox and Danceroom Spectroscopy.

What was the aim of your project?

We investigated the feasibility of deploying immersive scientific simulations and visualisations into the classroom, aiming to develop software required for both the current and future classroom. The challenge was to create an enjoyable experience that was useful to the curriculum, commercially viable and engaging, allowing exploration and play, and ultimately leading to a deeper understanding of fundamental physics and chemistry.

What approach did you take to address the challenge?

In addition to intensive internal software development and design we have: worked with designers to develop imagery and interactive components; tested and shaped the product in schools, and developed simple components to drive the system whilst aligning content to the curriculum; and worked with commercial expertise to examine and understand the market and generate interest from partners and investors.

How will you make money from this?

We are currently examining a number of business models with potential partners. This project has unveiled great potential in: the classroom (delivered directly or with partners); lifelong learners/at home learning – delivered as an app to be used for increasing knowledge or general interest with a small cost plus in-app purchases of additional content; and science learning centres – the Nano Simbox could be easily adapted as a permanent installation.

What are the next steps?

More investment is required to make this a market ready product. We are meeting potential investors and partners; carrying out marketing/buzz creation – including high-profile individuals curating content, PR, demonstrations at events, and online video tutorials; and developing a commercial model. We need to develop more content, online delivery and porting to tablets and hold teacher and student hack days to create more content and refine interaction. Our full business plan is available on request.

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MakerClub is a young start-up from Brighton that makes 3D printed robotics kits with high educational value. We are dedicated to bringing the latest technologies and industry-experienced educators to the next generation, while making it as fun as possible.

What was the aim of your project?

There is a huge discrepancy between the pace of change in digital technologies and what is being taught in digital education. Our project set out to understand the commercial and technical viability of building a cutting-edge learning platform designed to teach about 3D printing and microcontrollers. These technologies, when combined, will have a huge effect on almost every industry.

What approach did you take to address the challenge?

We aimed to identify both the commercial and technical viability of our range of products and of our business plan. The learning platform that we wish to create is complex and required numerous prototypes to test the various technologies. We consulted pedagogy, business, and design experts throughout the process and ran user experience studies and surveys.

How will you make money from this?

While conducting the Innovate UK study, we have run two successful crowdfunding campaigns, demonstrating demand for our products and generating over £17,000 in pre-orders. We will sell our 3D printed robotics kits direct to the consumer, with the step-by-step instructions and code compilation performed on our learning platform. We have teamed up with a distribution partner to distribute these worldwide. Furthermore, we will be running workshops in our network of MakerLabs.

What are the next steps?

A number of necessary features and improvements have been highlighted through our feasibility study, which will form the basis of our next development push as we turn the prototypes into a complete platform. We expect to be selling an introductory version by October and to present our products at the BETT 2016 education technology event. With a second round of Innovate UK funding we would be able to grow considerably faster and compete globally by 2017.

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Seeper is a pioneering London studio working at the intersection of art and technology for the experience economy. At the forefront of interactive, experiential technology since 1998, Seeper has spearheaded innovations including multi-touch surfaces, architectural projection mapping and motion control.

What was the aim of your project?

Project Immersion will transform learning spaces into interactive multi-sensory environments for learners aged 8-25 with support needs (particularly learning disabilities and autism). Learners benefit from experiences that promote and enhance learning outcomes around social engagement, collaboration, more confident communication, and that challenge learners' perceptions of their own abilities to exercise choice and control through digital technology.

What approach did you take to address the challenge?

The 'ImmersionBox' will contain video projector, speakers, camera, sensors, and bespoke software to project applications onto walls in a darkened room, to create multi-sensory immersive experiences controlled through user gesture or touch. The box is designed for ease of use by individual learners and educators and to support inclusive educational practice that is democratic in nature and 'discovery-based'.

How will you make money from this?

We will sell ImmersionBoxes for between £7,000 and £10,000 plus an annual service fee. Inferior competing products are currently selling for £6,000. Customers would be schools and parents caring for children and young people with learning disabilities and autism. Our initial focus on the UK could be rapidly expanded to other markets in which we could work with local distributors as required.

What are the next steps?

We are completing trials and a research study with our partners Linkage College and Lincoln University. This will prove the benefits of our unique approach. We will then seek further funding to develop branding and marketing materials in order to promote ImmersionBox as a product.

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Solvexx Solutions Ltd

Problem-based learning in a 3D virtual laboratory

Solvexx Solutions makes Learnexx 3D, a 3D virtual environment used for laboratory teaching and equipment demonstrations. The project consortium also includes University College London, Institute of Education, University College Dublin and Dublin Institute of Technology.

What was the aim of your project?

The majority of laboratory based teaching involves following a step by step 'recipe', mainly for reasons of cost. However, many commercial laboratory jobs require problem-solving through experimentation, something new graduates are consequently unable to do. The aim of the project is to design a 3D virtual laboratory that enables cost-effective learning through experimentation in schools and universities.

What approach did you take to address the challenge?

Market research undertaken as part of the project showed strong demand in the US for K12 (an online individualised teaching programme) and university experimental lab-based learning and also for a virtual lab capable of experimental assessment. Experimental lab scenarios applicable to university and schools were therefore developed, simulation models have been designed and 2 prototypes developed as proof of concept demonstrations.

How will you make money from this?

We intend to create a package of scenarios tailored for the different markets, for example US K12 chemistry, and European higher education medical schools. These will either be marketed directly where we have established network and relationships or through distribution partners. We have ongoing discussions with zSpace and Stampede to distribute in the USA and with one of the largest providers of international education programmes for adoption across their worldwide school network.

What are the next steps?

Although the project has successfully proven that it is possible to create a 3D virtual lab capable of supporting experimental learning, there is still a huge amount of work to be done to create a saleable product with sufficient educational content that will be necessary for a teaching or assessment body to adopt it. The next step is to raise the funding necessary to create such a product.

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Stepping into Business Ltd

Stepping into Business: primary enterprise app for learning

Donna Irving, Dylan McCarthy and Dinah Turner established Stepping into Business in 2013 in response to teachers wanting to use our unique blend of engaging classroom enterprise learning activities in their schools. We bring enterprise learning to life . . . for life.

What was the aim of your project?

Can children really learn about enterprise in an online game app and get the same – or better – engaging experience as they do in our classroom enterprise lessons. And can we commercialise it? The good news? Yes they do, yes we can. Even better news? It's interesting, different and still fun.

What approach did you take to address the challenge?

We established great relationships with digital and education experts and collaborated during our innovative research – online and in person – with academia, thought leaders, competitors, technology advisors, teachers and, most importantly, children. We have been creative, responsive, customer driven and really listened when building our research into effective designs that enable young people to learn and teachers to feel confident in delivery.

How will you make money from this?

We have designed something desirable and marketable that will make a difference. We have defined an initial plan for return on investment and we are confident we can access and optimise the UK enterprise education market with complementary products and services, with bold plans to grow. The challenge laid out in the Young Report is to make enterprise popular. We will meet that challenge with engaging, fun and inspirational products.

What are the next steps?

We really want to take this opportunity to the next stage, to be successful and to make this way of learning enterprise a reality. We know it works. Children, teachers, parents and businesses we engage with want to help us make this happen in their schools and reach more children, and so do we. If we progress, we will create opportunities to learn enterprise skills across diverse schools and communities.

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Technology Will Save Us Ltd

POP Kits

Technology Will Save Us is one of the UK's most exciting design-led, technology start-ups focused on learning. Founded 3 years ago, we are on a mission to spark the creative imagination of young people using hands-on technology.

What was the aim of your project?

The aim of 'POP Kits' is to engage young people from key stages 1 and 2, their teachers and families with the principles of programming. 'POP Kits' combines programmable software and hardware to form a coherent and progressive learning experience that young people can access at their kitchen table or in the classroom.

What approach did you take to address the challenge?

We took a user-centred, agile approach to designing 'POP Kits'. First, we researched existing tools and observed how they are used in practice before building a prototype kit to deploy at user workshops in a number of schools. We then developed the prototype kit over two build, measure, learn iterations, before testing at scale in 80 schools and 30 homes.

How will you make money from this?

'POP Kits' has two target learning environments: the kitchen table and the classroom. We intend to market single POP Kits to families and 'education packs' of 16 or more POP Kits to schools.

Technology Will Save Us has built its business around selling tech-making kits to families and schools. Our established relationships with key procurement, marketing and retail partners will ensure that 'POP Kits' is commercialised quickly and effectively.

What are the next steps?

To commercialise POP Kits we need to undertake: design for manufacture; negotiation with procurement, production and assembly partners to optimise for cost and quality; further market research to understand in more detail the opportunity in the UK and abroad; roadshow demonstration, taking POP Kits to industry events and meet-ups to demonstrate and solicit feedback from attending stakeholders; and sales and marketing.

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Building entrepreneurial capability of HE students through gamification

The Women's Organisation was established in 1996 as a non-profit-distributing social enterprise to promote a range of high-quality business support for women. Drawing expertise from over 20 staff, the team for this project includes business advisors and education specialists.

What was the aim of your project?

We wanted to expose students in higher education to entrepreneurship and build their entrepreneurial capacity by designing an entrepreneurship 'serious' app that can be integrated into the courses and extra-curricular enterprise activities. This seeks to provide an enjoyable stand-alone 'starting a business' game experience, whilst also offering structured learning opportunities to those seeking to deploy its use within academic programmes.

What approach did you take to address the challenge?

Through co-creation, the development of the game has harvested insight from academics, students/groups and business advisors. A key technical challenge has been balancing user experience with the demands of a robust learning experience. This has required the development of simple/effective game play that provides explicit learning points, without compromising the engaging nature of the app.

How will you make money from this?

As primarily an education product, the business model needs to sustain additional testing as well as academic materials to support and increase adoption by institutional users. Therefore, significant sponsorship from the financial services sector has been identified as the most viable route to market, with an option of in-game purchases providing longer term revenue.

What are the next steps?

Following this phase 1 feasibility study, phase 2 has been scoped to fully test the robustness of the learning experience with academics and users, secure the required sponsorship and continue the technical development to launch. Further work is planned as part of an adoption strategy with key user groups within the academic market, including identified potential early adopters among staff and student groups.

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Tinder Foundation

EduMakers: transforming adult and community learning through technology

Tinder Foundation is a not-for-profit social enterprise that makes good things happen with digital technology. Established in December 2011 as a staff-owned mutual, our 40-strong team supports 5000 community partners with inspiration, leadership, and tools and services to people, communities and organisations.

What was the aim of your project?

We aim to disrupt the adult and community learning sector by radically increasing the adoption of digital technologies within teaching and learning. This project tested both the feasibility and co-design of an open collaborative content-creation, sharing and learning platform. It will allow tutors, volunteers and learners to create, share, organise and manage interactive online content, linked to a learning management system.

What approach did you take to address the challenge?

We followed an iterative approach – based on feedback from the users and purchasers of the potential solution – that considered: the feasibility of the concept, through research with leaders and managers; its desirability and usability, through user needs analysis; its technical feasibility, through design and user testing; and its commercial viability, through market analysis and business modelling.

How will you make money from this?

We will follow a freemium model with our network of existing centres serving as our primary audience. Creating, organising and sharing resources will be free for all users, while collaboration across courses and institutions will be premium features for tutors. At an institutional level, paid licences will include integration and advanced analytics. Pricing will range from £36 to £72 per user (depending on number of users).

What are the next steps?

In phase 2, we aim to develop and launch the platform and develop a 2-3 year product roadmap. The development will continue to leverage centre research partners for continuing needs/feature assessment and user interface testing. The launch will include extensive promotion through our outreach group.

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Tonguesten

Engage – a new, motivational tool for primary school literacy

Tonguesten is a social enterprise education start-up. We improve literacy outcomes with interactive learning materials using gamified music videos. We create natural language processing and machine-learning-based artificial intelligence using proprietary data. Our expertise is in education, psychology, research, music, technology.

What was the aim of your project?

The UK literacy crisis is a key national policy issue. Approximately 120,000 primary school leavers a year need urgent help. Engage is a web-based English tool for primary years 5 and 6 that uses music video content. Engage individually teaches and tests literacy objectives mapped onto the National Curriculum, through games, to help teachers close the literacy gap.

What approach did you take to address the challenge?

Research validates the impact of subtitled music on literacy outcomes. Our innovation lies in our original artificial intelligence, our adaptation of computational linguistics and our mapping of popular music content onto the National Curriculum, creating a unique offering. We have developed and built a personalised, adaptive classroom tool with original intellectual property that can potentially radically improve learners' achievement and assessment.

How will you make money from this?

UK schools allocate funds to close the literacy gap (a key Ofsted assessment criterion). We interviewed head teachers/education experts and trialled with 5 schools, confirming market opportunity. Key regional head teachers will actively promote Engage. We've created a buzz around Engage, building key relationships for market entry. Marketing opportunities at foreign English schools are also substantial.

What are the next steps?

We need to carry out further development to add gamification techniques to the user experience. We also have to map the remaining primary school English syllabus, and we must build on our existing network of head teachers ready for a national rollout. We will trial extensively to prove impact. Presence at education conferences and partnership with existing nationwide networks like NATE will be a core marketing strategy. Beyond that, we have entry points into regional and national schools networks internationally, with Italy and India being initial key territories.

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University of Portsmouth

Life-3D: a new tool for interactive visualisation of 3D molecular interactions

This is a cross-disciplinary project between the schools of biological science and creative technology at the University of Portsmouth. We are a team of 3 researchers, combining our skills in molecular biology and virtual reality to create a new bioscience teaching tool.

What was the aim of your project?

We identified a need for a new way to engage and teach university undergraduate bioscience and medical students about molecular biology. This is classically done in most higher education institutions by textbook, lecture and practical. Our aim was to design and build a new type of learning kit to promote deep rather than shallow learning about important molecular biology themes.

What approach did you take to address the challenge?

Our approach was to combine our expertise in biochemistry, 3D printing, virtual reality and user-experience design. The prototype kit we have developed blends tactile, visual and interactive computer-enhanced learning about biological molecules. The tactile and visual element comes from handling high-resolution 3D printed models and is enhanced by onscreen interaction with a computer model controlled by a Leap Motion sensor.

How will you make money from this?

We are in the process of starting a small company called Molecular Models to sell these new LIFE-3D learning kits to university bioscience departments.

What are the next steps?

Our plan is to greatly expand the number of kits and also make kits that are aimed at A-level and school science curricula. We believe that combining physical handling of hi-res scientific models with an interactive experience offers a strong pedagogic experience for learners of all ages.

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Innovate UK is the new name for the Technology Strategy Board – the UK’s innovation agency. We know that taking a new idea to market is a challenge. We fund, support and connect innovative businesses through a unique mix of people and programmes to accelerate sustainable economic growth.

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