

## Western and Northern Europe

### Case Study 2: Bridge 21, an education programme that can be adapted for use in Irish Secondary Schools, based in Trinity College Dublin

#### Success factors

- Collaborative inquiry-based learning experience where technology is embedded within the overall experience
- Teamwork is at the core
- Developing leadership competencies in young people promoting confidence and capacity to take ownership of their own learning and their life choices
- Learning should be fun and useful.
- Mediate learning through technology
- Engage mentors and support peer-to-peer learning
- Promote learning by doing
- A multi-layered approach across students, schools and at national policy level
- Continue to build new partnerships with schools
- Working with teachers is key to promoting and scaling the Bridge21 teaching and learning methods
- Engage academic researchers at home and abroad to investigate and validate their methodologies.
- Partner with other youth organisations, such as *ReachOut* to help create exciting learning opportunities for young people.
- Global promotion, engagement and collaboration



#### About the project

Bridge21 is both an action research project and a highly innovative model of technology mediated, collaborative, 21st century teaching and learning. The Bridge21 education programme is based in Trinity College Dublin and offers a new model of learning that can be adapted for use in Irish secondary schools. Designed to support an innovative 21st Century learning environment within schools, they have developed a learning model for second level education that is team-based, technology mediated, project based and cross- curricular.

Bridge21 has three core strands:

1. A schools programme to scale and adapt their learning model for use in Irish secondary schools nationwide.
2. The Bridge21 Transition Year programme, based in Oriel House – a team-based experience for young people to explore learning through technology.
3. A learning and research centre in Oriel House, Trinity College Dublin, to innovate, evaluate and refine 21st century learning methodologies.

The project's mission statement is that all young people should have the opportunity to raise their educational aspirations and fully reach their potential. A core principle of the project is that issues of disadvantage, lack of interest in STEM and gender issues cannot be tackled by outreach activities alone and that a multi-layered approach is needed across students, schools, the provision of professional development for teachers and work at the policy level to help shape a national agenda in which a 21st century model of teaching and learning is used rather than the current didactic, rote learning, focused model: “We see the need to overhaul the way we educate so that our young people can meet the demands of a knowledge-based society. We think that developing how students learn will fuel new innovation, opportunities, and help all students fulfil their potential.”

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Trinity Access 21 (TA21) is a flagship project from Trinity which aims to raise educational horizons for students in deprived communities. TA21 deepens the existing collaboration between Bridge21 and the Trinity Access Programme (TAP) and also increases the involvement of both the School of Education and School of Computer Science and Statistics. The project, in which 11 disadvantaged schools are involved, is funded by Google and involves the longitudinal tracking of over 1,000 students and 100 teachers as they engage in a suite of Bridge21 related activities for students and teachers

### Project achievements

- In 2015-2016, over 1,300 students took part in workshops, including 360 girls that participated in the CodePlus programme.
- 500 teachers engaged in Bridge21 activities. This included 140 trainee teachers that are completing Trinity’s Professional Masters in Education and 82 teachers that completed the Postgraduate Certificate in 21st Century Teaching and Learning.
- In January 2016, as part of Accenture’s Girls in STEM day in the National Convention Centre, 500 transition year students took part in a Bridge21 *Dummy Dive* active maths challenge
- A pilot *School of Distinction Award* was launched, which aims to recognize schools who are innovating in their practices of 21st Century Teaching and Learning and enhancing social capital in students, so those who traditionally have not gone on to Third Level education, not only give it serious consideration, but more importantly are equipped with the skills to gain entry and thrive once admitted.
- **Global promotion, engagement and collaboration**  
Bridge 21, as lead partner for the Erasmus+ Teaching for Tomorrow project, are engaged in

promoting the research from the Bridge21 methodology in schools across Europe in Germany, Ireland and Sweden.

The second Erasmus+ project, EuroSole, focuses on Self Organised Learning Environments as championed by Sugata Mitra from Newcastle University. The partners include Newcastle University (lead partner), Lathi University (Finland), Success4All Community Interest Company (S4A), George Stephenson High School (GSHS) and cvo Toekomstonderwijs (TKO Hoboken), Belgium.

Some of the Bridge21 team visited NGOs and made exploratory visits to the TATA Trust in India and Pepy in Cambodia, to teach and talk about elements of Bridge21's learning model.

- **Research output**

The team presented at major events including the British Educational Research Association Conference and The Institute of Electrical and Electronic Engineers (IEEE) Frontiers in Education International Conference. In all, 10 papers were published in international journals and conference proceedings

## Technology infrastructure and devices

A range of technologies are used including:

- Windows Movie Maker to create and edit movies using pictures and video with sound, captions, credits and special effects.
- Audacity to record and edit sound files.
- Google Drive to create, share and update documents with team.
- Scratch to write computer programmes and to create animations and games.

Bridge21 continues to strengthen its partnerships with corporate supporters and had volunteer mentors from a number of technology companies including Workday, Google and Altify, where employees volunteered as mentors on the Coding Workshops. They ran a week long Transition Year workshop for Infineon's *Chip@School - Design and Delivery* Programme involving 16 students. The programme was run in conjunction with the AMBER SFI Centre in Trinity. Bridge21 partnered with Google in the design and delivery of their TY Programme *OneWeek@Google: Design and Delivery of 2 workshops Future Technology Workshop and Getting Started with Computer Systems with the Raspberry Pi*. Each workshop involved 50 students. At the Accenture Girls in STEM event in the national Convention Centre 500 secondary school girls took part in a *Dummy Dive* problem solving activity. Bridge 21 also ran a 1-day coding activity in Salesforce which involved the design, delivery and recruitment of 20 students to participate in a *Game Design with Scratch* workshop.



**Bridge 21 sponsors and partners**

## Digital pedagogy

The Bridge 21 project is a collaborative inquiry-based learning experience where technology is embedded within the overall experience. For example, the **Transition Year (TA) programme** offers students opportunities to use technology in a creative way and get a taste of college life at Trinity College Dublin. Once they have all completed an initial 'core' week, many students are invited back to take part in workshops focusing on a range of advanced topics. Now in its 10<sup>th</sup> year, the programme continues to be a cornerstone of the Bridge21 student activities. Two hundred and thirty TY students from 11 schools take part in 17 weeks of activities. Students work in teams of 4 or 5 and take on different challenges each day. To successfully complete their daily projects, the students have to generate ideas; assign roles amongst themselves; plan and schedule; meet deadlines; and present their work.

Similarly, **Invent Week** focusses on the practical benefits of technology and offers students a chance to explore, have fun and be creative. In June 2016, 20 students from the CS-TY and CodePlus Programs returned for an advanced workshop which built on their prior CodePlus and CS-TY experiences by focusing on future technological trends such as Wearable Technology, Internet of Things (IoT), Robotics and Home Automation. The students took part in a four day 'hackathon' where each team had to prototype and develop a marketing strategy for a 'product' by lunchtime on day four. Using a range of technologies, each team built full or partial models, including software, for their ideas, which included a smart shoe that shouted encouragement/abuse to motivate you to run faster (Personal Trainer), a surveillance drone disguised as a crow (Crone), a smart tennis racquet that suggested what shots to take (Smacquet), an automatic voice translator (KACI translator) and a device to locate lost items (Locatonator). They also created a marketing campaign and the workshop culminated with each team making a 'Dragon's Den' pitch to 'sell' their idea to a panel of professionals working in the technology sector.

## Teacher confidence and use of technology

The Postgraduate Certificate in 21st Century Teaching and Learning, which is a key component of the TA21 (Trinity Access 21) project, is proving most effective in helping teachers change their classroom practice, making innovative use of technology and teaching coding skills.

## Teacher Professional Development

Working with teachers is key to promoting and scaling the Bridge21 teaching and learning methods. Bridge21 continues to work with 20 partner schools facilitating in-school teacher workshops and promoting in-class active learning. Now in its 2nd year, 82 teachers have completed the Postgraduate Certificate in 21st Century Teaching and Learning course. In this course they received formal training in the Bridge21 methodology as it applies to STEM/CS education and educational disadvantage. With some modules delivered in Google's offices in Dublin, it gave the participating teachers first-hand experience of a high tech working environment. Graduating teachers also have the option to progress onto the existing M.Ed. in the School of Education at TCD.

The Computer Science and STEM modules from the certificate are available to teachers and educators for free on a not-for-credit basis. In 2015/16, 104 teachers attended these workshops. Both the Cert and non-accredited workshops cover the content that teachers require to teach the two new Digital Media and Coding short courses for post-primary schools.

Each of the 11 core schools participating in TA21 were offered a series of three workshops to support their 21st century teaching practices within the school and over 174 teachers participated. 140 trainee teachers on the School of Education's Postgraduate Masters in Education (formally the H.Dip.) completed the core ICT module in Bridge21.

### Technology use across the curriculum

- **Transition Year (TA) Programme**

This year, aside from five Computer Science weeks, there were advanced weeks on Physics, History, *Seachtain na Gaeilge*, German, Media and Peer Education. Students also took part in Trinity Access Programme's Primary School Programme with Bridge21 TY students acting as mentors to Primary School students.

- **Computer Science Workshops**

The Computer Science Transition Year (CS-TY) Programme is now in its 8th year and given the increased interest in coding as a possible school subject is a key Bridge21 activity. The workshops cover computational thinking, programming with Scratch for animation & game design and an introduction to Python and the Raspberry Pi. Of the 120 students that took part in the 4 day workshops this year, 71 were girls.

- **CodePlus**

The gender gap in computer science remains an international problem. CodePlus is a customised version of the CS-TY Programme aimed at secondary school girls and delivered in all-girl secondary schools. It is now in its 2nd year and is supported by the ICS Foundation. In 2014, 90 second-level students took part and this has risen to 350 participants in 2015/16.

CodePlus aims to introduce teenage girls to coding, problem solving, computational thinking, and developing an understanding of how technology influences the world around us now, and where it might lead in the future. The workshops were offered in a variety of formats; in school during the normal day, after school or in Bridge21. In all cases, the girls spent at least 20 hours on the CodePlus Programme.

- **Foreign Language Learning**

In February 2016, students from Gauß Gymnasium Gelsenkirchen in Germany and students from St. Joseph's School, Rush, collaborated face to face in a week long language learning workshop based in the Bridge21 learning spaces in Oriel House. The students had been in contact with each other via video chat during the year to focus on native speaker interactions when learning a second language.

- **Primary School Programme**

Fifth and sixth class students from 11 primary schools around Dublin joined Bridge 21 for a full day of creativity and technology. The teams were supported by Transition Year mentors over the three weeks of activities. The primary school programme is not only a fun day out where students can make movies, Bridge21-style, but is also an important welcome for the young students to Trinity College, planting seeds around their learning into the future.