Curriculum Vitae

Jake Rowan Byrne Ph.D. M.Sc. B.Eng.

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Research Focus

My current research focus explores the development and delivery of 21st century learning experiences for both teachers and their students at post-primary level. My particular focus is in Computer Science areas such as programming and embedded systems, but the approaches are more generalizable and have been used for teaching other subjects such as English, Maths, History and Science.

I have also been involved with a pilot module in Transdisciplinary Design for undergraduate students from multiple disciplines across Trinity College Dublin's campus. This research was looking at how mixing disciplines can help foster solutions to "Wicked Problems" and broaden the student's experiences such that they can demonstrate a number of the Graduate attributes that Trinity aspires too.

As part of my aspirations to seek career development I am looking to secure future IRC and ERC funding to developing theory, practice and technologies to describe, model and support Transdisciplinary Team Dynamics. Such approaches would be used to tackle "Wicked Problems" in Educational, Social, Creative, Industrial and Academic contexts.

Areas of interest: 21st Century Teaching & Learning, Transdisciplinarity, Human-Computer Interaction, Research Skills, CSCL, CSCW, User Centred Design/Design Thinking, Internet of Things, Maker Culture

Current Role

Research Fellow and Computer Science and STEM Programme Manager at Bridge 21, Trinity College Dublin

September 2013 – Present (Full-time)

Responsible for the development and delivery of 6 computer science and digital media themed modules on Trinity College's School of Education Postgraduate Certificate in 21st Century Teaching and Learning, targeted at second level teachers. This involved the marketing, registration and administration elements associated with running the module over the last three academic years. During this time, I also developed an activity model, using Design Thinking that is now used to design activities in second level classrooms.

Publications

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Book Chapter:

Byrne, J. R., Fisher, L., & Tangney, B. (2016). *A 21st Century Teaching and Learning Approach to Computer Science Education: Teacher Reactions.* CSEDU 2015, CCIS 583, pp. 523-540, Springer

Byrne, J. R. & B. Tangney (2012). *CAWriter: A Computer Supported Collaborative Tool to Support Doctoral Candidates Academic Writing – A Pedagogical and Human-Computer Interaction Perspective* Collaborative and Distributed E-Research: Innovations in Technologies, Strategies and Applications: Innovations in Technologies, Strategies and Applications, pp. 181-205. IGI

Peer Reviewed Journals:

Byrne, J. R., O'Sullivan, K., & Sullivan, K. (2017). *An IoT and Wearable Technology Hackathon for Promoting Careers in Computer Science*. IEEE Transactions on Education. , vol. 60, no. 1, pp. 50-58.

Conference/Meeting Proceedings:

Byrne, J. R., Fisher, L., & Tangney, B. (2015). *Empowering teachers to teach CS—Exploring a social constructivist approach for CS CPD, using the Bridge21 model.* In Frontiers in Education Conference (FIE), 2015. pp. 1-9. IEEE

Sullivan, K., Byrne, J. R., Bresnihan, N., O'Sullivan, K., & Tangney, B. (2015). *CodePlus—Designing an after school computing programme for girls.* In Frontiers in Education Conference (FIE), 2015. pp. 1-5. IEEE

Fisher, L., J. R. Byrne, & B. Tangney (2015). *Exploring Teacher Reactions towards a 21St Century Teaching and Learning Approach to Continuing Professional Development Programme in Computer Science.* In 7th International Conference on Computer Supported Education (CSEDU-2015). pp. 353-362.

Byrne, J. R., L. Fisher, & B. Tangney (2015). *Computer science teacher reactions towards raspberry Pi Continuing Professional Development (CPD) workshops using the Bridge21 model.* Computer Science Education (ICCSE), 2015 10th International Conference on. pp. 267-272.

Fisher, L., Oldham, E., Tangney, B., & Byrne, J. (2014). *Preparing teachers for teaching computer programming.* Paper presented at the 4th Conference of the Association of Ubiquitous and Collaborative Educators International, Dublin, Ireland

Fisher, L., Tangney, B., & Byrne, J. (2014). *Evaluating use of the Bridge21 Model for Teacher Continuous Professional Development (CPD) in Computer Science (CS).* Paper to be presented at the 11th European Evaluation Society Biennial Conference Dublin, Ireland pp. 44-45

Byrne, J. R., & Tangney, B. (2010). *CAWriter: a CSCW/CSCL tool to support research students' academic writing.* In Proceedings of the 24th BCS Interaction Specialist Group Conference. pp. 458-462. British Computer Society.

Additional Experience

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Commissioned to write the new Computer Science Specification for Leaving Certificate – National Council for Curriculum and Assessment

February 2017 – June 2017 (Part-time)

Activities: creative input and leading the writing of the draft specification (curriculum) and liaise with the NCCA and development group to finalise the draft to present to the minister of Education & Skills and send out for consultation with the public and other stakeholders.

Managing Director and Design Consultant at MetaTech Ltd. - Human Systems Design

December 2012 - Present (Part-time)

Activities: Project Management, Human Factors, Design Thinking, User Experience, Web Design, User Interface Design, Human Computer Interaction, Prototyping, Mechatronic Engineering, Workshop and Makerspace design.

Creative Technology Curator at dlr LexIcon Lab Dun Laoghaire Rathdown Central Library

June 2015 – Present (MetaTech Ltd. Consultancy) (Part-time)

Responsible for the development and curation of workshops in 3D printing, Electronics, programming and hardware development with Arduino and Raspberry Pi. This involved personal delivery and sourcing of additional personnel for workshop delivery, equipping the LexIcon lab and strategizing the future directions.

STEM Enterprise Camp Lead with dlr LexIcon and dlr Local Enterprise Board

September 2016 – Present (MetaTech Ltd. Consultancy) (Part-time)

Four initial training workshops are student-centered with an active learning pedagogy marrying theory and practice. Student teams will then use Design Thinking to develop and apply their learning in order to develop a working prototype and then pitch the business case for their idea.

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Computer Science Transition Year Workshop Co-Coordinator at Bridge 21

March 2012 - Present (Part-time)

Helped coordinated the running of computer science workshops with transition year students (approx. 16 years of age).

The workshops also emphasise a team work model, where students work together, brainstorming ideas, setting tasks, negotiating responsibilities and presentation of their work. These skills are often considered lacking in the standard education system and are often desired by industry.

Computer Science Mentor at Bridge 21

December 2009 - March 2012 (Part-time)

Similar in nature to the volunteer work I did with Bridge 21 learning (see below) but the focus was to facilitate students to program computers through the Bridge 21 model.

Supervision of Masters level dissertations as part of the Master in Technology and Learning at Trinity College Dublin

September 2009 - 2014 (Part-time)

"meta-project" thesis for 1st year Technology and Learning Masters Students and Masters Thesis Technology and Learning

Hardware and Software Consultant at Monford Ag Ltd

April 2011 - June 2013 (MetaTech Ltd. Consultancy) (Part-time)

Co-inventor of the GrassOmeter prototype (see full patent below). Involved the development of a proof of concept embedded systems device that farmers wear and use in combination with a mobile device to measure and track grass growth on dairy farms as they walk their farm.

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PhD Candidate at Trinity College Dublin

   October 2008 - 2013 (Full-time)

Based in the Centre for Research in IT in Education (CRITE).

Looking at supporting Academic Writing with creative and tightly integrated web services.

Title: "CAWriter: using an Activity System perspective to inform the design of tools to support early career Ph.D. candidates"

General Skills: Research Skills, Higher Education, Educational/Learning Technologies, Human Computer Interaction (HCI), Web Development, User Centered Design, Research/Academic Writing, Interface Design, Transdisciplinarity

Technical Skills: JavaScript/jQuery, MySQL, PHP, CSS, HTML/HTML5, LAMP server admin, SPSS

Lab Demonstrator at Trinity College Dublin

   October 2008 - April 2013 (Part-time)

I have worked on a number of modules teaching freshman undergraduates.

CS1013 (2010) - Programming Project (Aim: build a game using Processing.org - Java variant)

2E9/2E10 (2010-2013) - Design Project (Aim: Use an XBee module to wirelessly control a number of buggies around a track, modeling an automated light rail system)

General Skills: Mentoring/facilitating student learning by doing, delivered material on specific elements during lectures to 100+ students, Marking and assessment of students work, Problem solving (hardware failure, software bugs etc.), Verbal Communication

Technical Skills: Processing, Java, C#, BASIC, Arduino, Serial communications, Hardware Design, Sensor integration.

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Volunteer Work

Volunteer at Bridge 21 - October 2007 - June 2011

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

Volunteer work involved : Guiding teams while they work in their learning "pods", Supporting young people through creative team projects.

Skills & Expertise

Educational Research, Educational Technology, 21st Century Teaching and Learning, Design Thinking, Transdisciplinary Research, Participatory/ User-centered Design, Iterative Design, Interface Design, Human Computer Interaction, Higher Education, Creative Problem Solving, Team Work, Proof of Concept, Innovation, Web Development, Mechatronics, Computer Science, Arduino, Raspberry Pi, ESP2866, Intel Galileo, Scratch/Snap, Python, PicAxe, PHP, MySQL, JavaScript, CSS, HTML, jQuery, C++, HTML,

Honors and Awards

- Co-Founder Transdisciplinary Innovation Network – Trinity Teaching Innovation Grant
- Nominated for the 2015/2016 Trinity Provost Teaching Award
- US Embassy Conference 2014 - Smart People for a Smart Economy: Education, Technology and Closing the Skills Gap – panel curator and chair
- EdTech Ireland U.S. tour cultural exchange recipient – Awarded by U.S. Embassy Dublin, January 2014
- John Holland Undergraduate Scholarship 2007 - awarded by RINCE @ DCU

Patents

SYSTEM AND METHOD FOR MEASURING PARAMETERS RELATING TO AGRICULTURE

Patent PCT/EP2012/068565 Issued September 20, 2012

Inventors: Jake Byrne, David Guerin, Steven Lock, Jerrold C. Manock

The invention provides a system and method system for measuring agricultural parameters, for example the quantity of an agricultural product such as grass. The system comprising means for triggering a measurement of data and repeating the measurement at a plurality of locations

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over an area; means for communicating the measurement data to a processing means; and means for calculating the quantity of agricultural product for the area using the processing means. The invention solves a problem of how to effectively and simply measure an agricultural product, such as grass, and provides a benefit by allowing the farmer to quickly and accurately measure their grass in a particular field or area.

Education

Trinity College Dublin, PhD, 2008-2013

Human-Computer Interaction, Participatory/User-Centered Design, Third Level Education, Computer Science, Pedagogy, Creativity, Philosophy.

"CAWriter: using an Activity System perspective to inform the design of tools to support early career Ph.D. candidates." - My thesis explored early Ph.D. processes as a creative design problem. An Activity Systems perspective was used as an overarching framework with which creative phases and research skills could be integrated with novel tools to supports novice academics.

Trinity College Dublin M.Sc., Technology and Learning, 2006 - 2008

"Experiences with a multi-user virtual environment for knowledge building"

Dublin City University B.Eng., Mechatronics, 2002 - 2006

Activities and Societies: Chairman of PhysEng Society (Physics and Engineering Society) 2004

Additional Courses

Middleware for Distributed Systems, School of Computer Science and Statistics (10 ECTS)

Visions of Ubiquitous Computing, School of Computer Science and Statistics (5 ECTS)

Creative Thinking & Innovation with the Innovation Academy (10 ECTS)

Opportunity Generation and Recognition with the Innovation Academy (5 ECTS)