

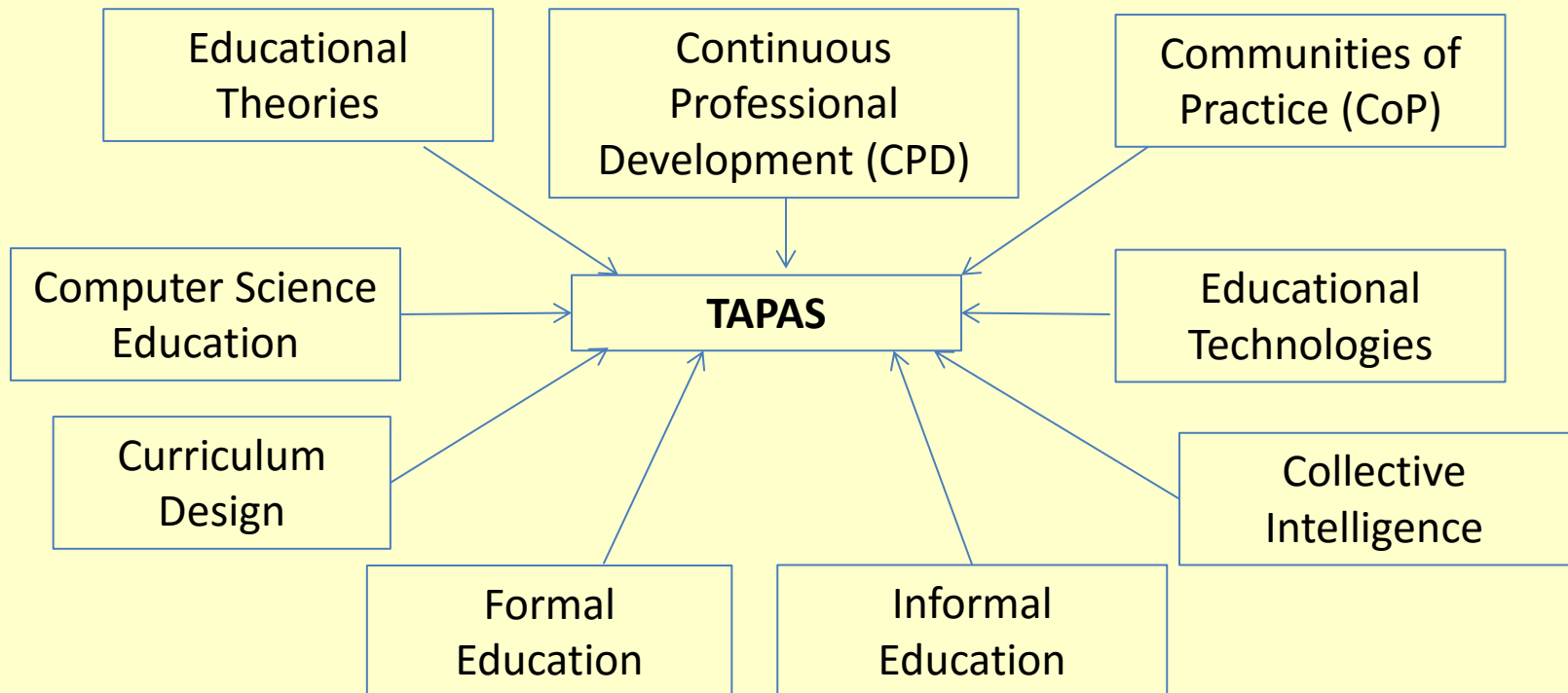
Helping Teachers to Teach Coding

- TAPAS
 - Teaching APpInventor to All at School
- Background
- Why
 - Motivation behind project
- Objectives
 - 3 of them
- What
 - Shrink-wrap App Inventor
- How –
 - Team and resources
- Evaluation
- How to get involved

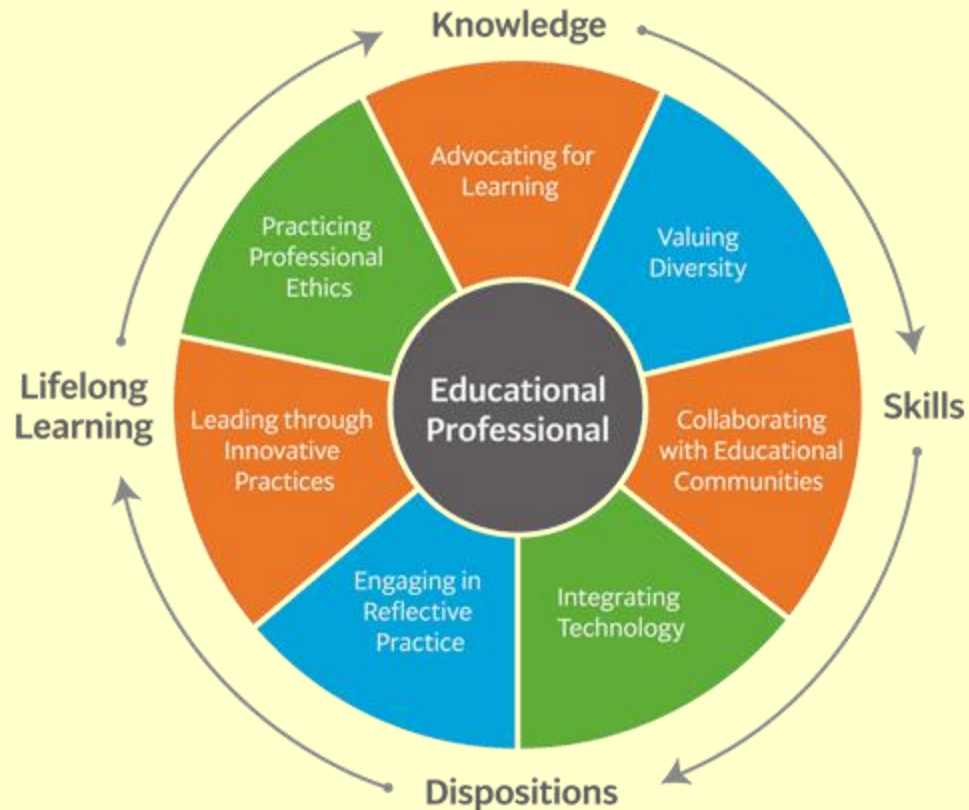


Helping Teachers to Teach Coding

- Background
 - Broad theoretical framework
 - Bricoleur (Levi-Strauss, 1968, Maxwell 2012)



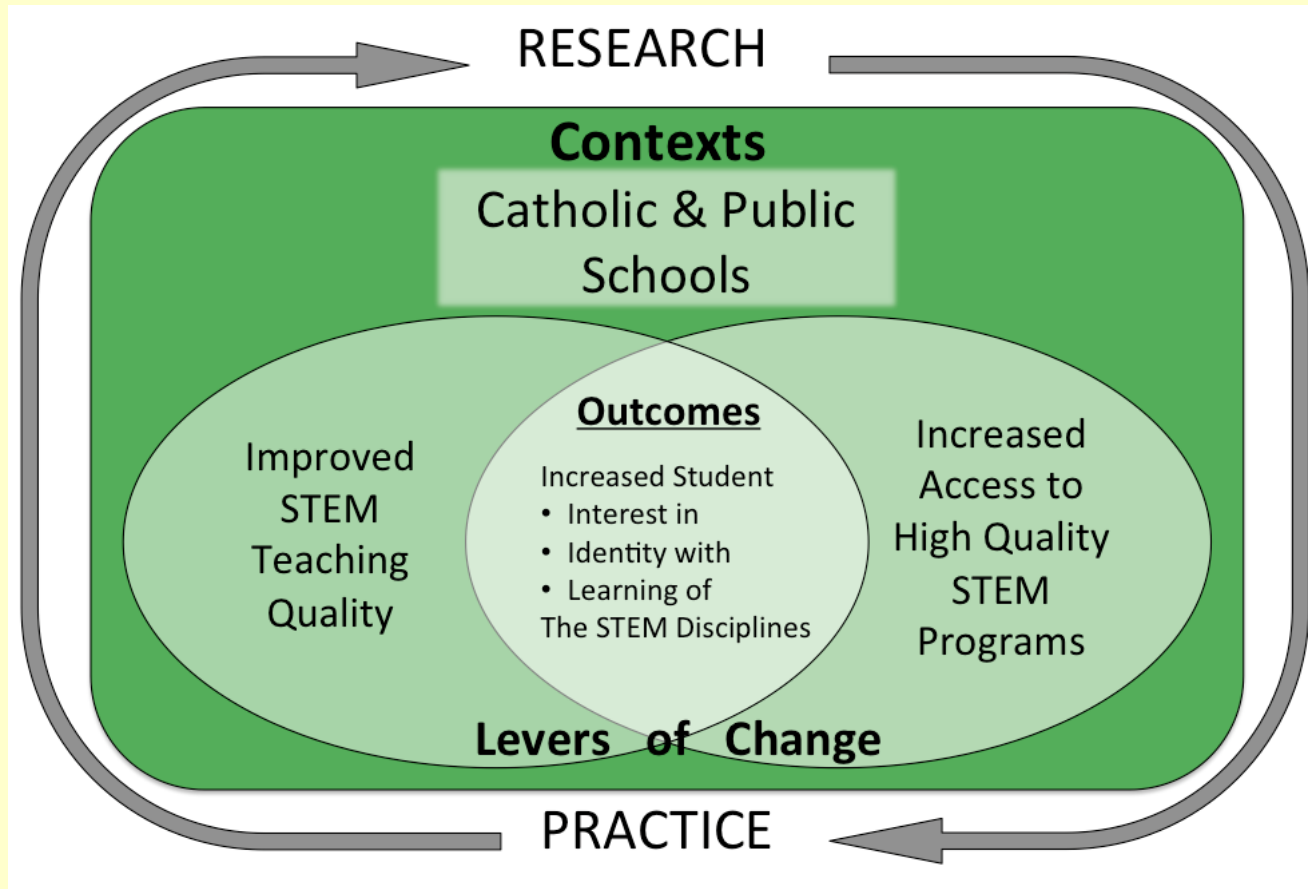
Helping Teachers to Teach Coding



University of Phoenix: - Education Conceptual Framework

http://www.phoenix.edu/colleges_divisions/education/conceptual_framework.html

Helping Teachers to Teach Coding



University of Notre Dame – STEM Education:

<https://stemeducation.nd.edu/about/conceptual-framework>

Helping Teachers to Teach Coding

- Why - Motivation

- Increase awareness and understanding of computing

- Not just word processing
 - Not just using social media
 - Digital Strategy for Schools 2015-20
 - ICT: Upper Second level education



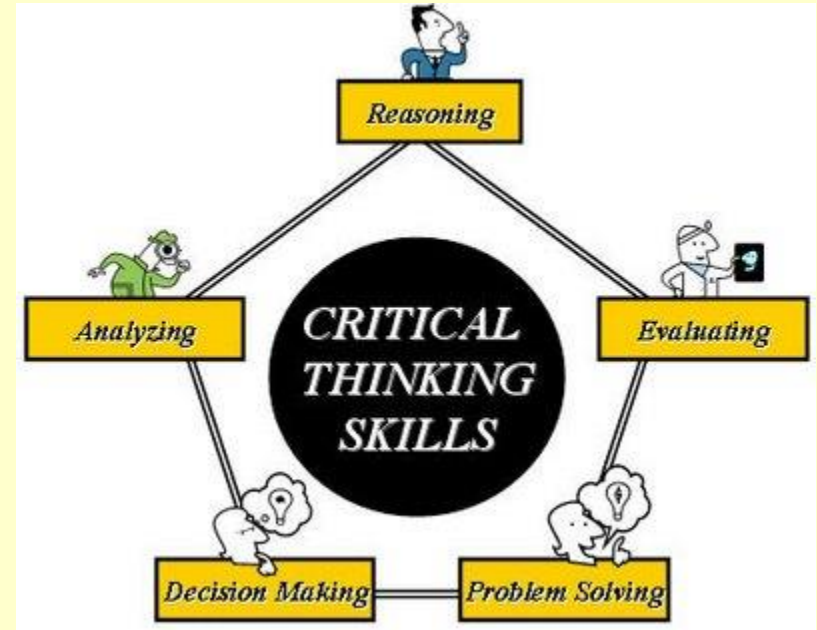
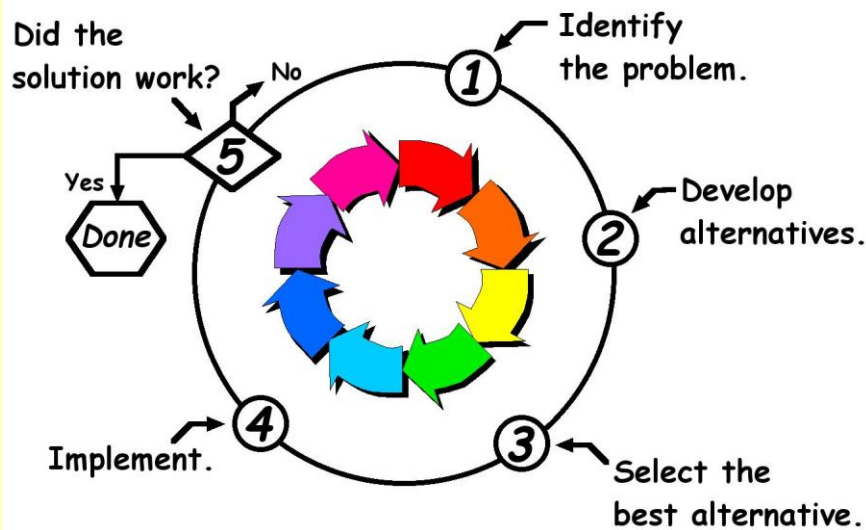
- Not just for future

- computer scientists, programmers, software engineers, data analysts, business analysts, information technology managers

- Buzz words:

- Critical Thinking, Problem Solving, Computation Thinking

Steps to solve a problem...



“Computational Thinking is the new literacy of the 21st century.”

JEANNETTE WING



Helping Teachers to Teach Coding

- Why - Motivation
 - Good resources already exist
 - Google App Inventor, MIT, DCU ComputeTY
 - AppInventor is useful (Morelli et al., 2011)
 - No need to re-invent the wheel (green computing)
 - Make them available to schools, teachers and students
 - In a format that they can actually use
 - In a way that suits them
 - Increase teachers' confidence
 - Provide scaffolding

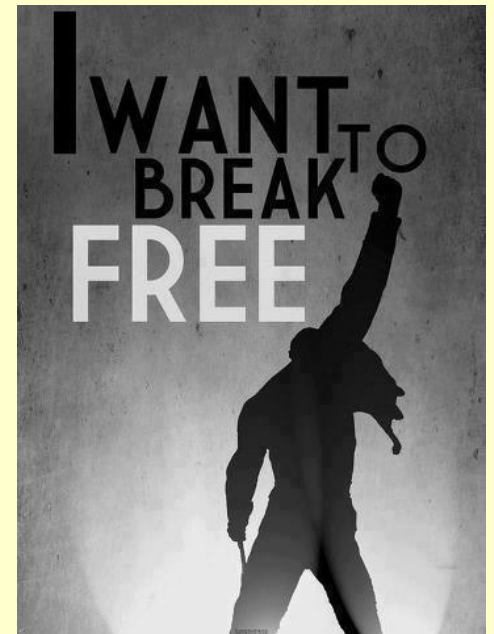
Helping Teachers to Teach Coding

- Why – Motivation
 - DCU is (not) the centre of the universe!
 - Best teachers and schools don't exist where they're needed most (Sugata Mitra, educational scientist)



Helping Teachers to Teach Coding

- Why – Motivation
 - “I want to break free”
 - Get computer science resources out of the universities and into the schools
 - Institutional adoption and implementation of blended learning (Graham et al., 2011)
 - Awareness/exploration
 - Adoption/early implementation
 - Mature implementation/growth



Helping Teachers to Teach Coding

- Objectives
 - to deliver a **computer programming** module
 - **suitable** for schools
 - each **individual** school – own way
 - to **train teachers**
 - **comfortable, competent and confident** with delivering the module in their own school
 - to **disseminate** our ApplInventor resources to **schools across Ireland**

This project is being funded by Google under the CS4HS (Computer Science for High School) initiative.

Helping Teachers to Teach Coding

- What - Shrink-wrap DCU's ComputeTY App Inventor
 - Shrink-wrap
 - Package up or put a wrapper around
 - Raspberry Pi-ify App Inventor
 - Raspberry Pi – great little educational computer
 - Loads of good resources online
 - Info for teachers
 - Overview, what the students will learn, curriculum links, what you will need, lessons
 - Info for students



SENSING THE WEATHER



OVERVIEW

Over the course of this scheme of work, students will consider the importance of collecting weather data and how this can be done. They will connect some simple sensors, be introduced to the Python programming language, and learn some techniques to gather sensor data.

Raspberry Pi
Teaching

Helping Teachers to Teach Coding

- What
 - DCU + ComputeTY
 - DCU course for Transition Year students
 - Running successfully for 10 years
 - 1 week course
 - Prizes for best projects
 - Courses
 - Web Design, Java, App Inventor (very popular, over subscribed)



Helping Teachers to Teach Coding

- What
 - AppInventor
 - Block programming tool
 - Open source web application
 - Create apps for (Android) operating system



Helping Teachers to Teach Coding

- How
 - Team
 - School of Computing (DCU)
 - Professional Development Service for Teachers (PDST)
 - International Centre for Innovation and Workplace Learning (ICIWL)
 - National Centre for Digital Learning (NIDL)
 - Teaching Enhancement Unit, DCU
 - Secondary Schools
 - Not an island
 - Institute of Education
 - Primary Schools
 - NCCA
 - Other projects in the same 'space'

Helping Teachers to Teach Coding

- How
 - Resources made available
 - Overview
 - What the students will learn
 - Curriculum links
 - What you will need
 - Lesson
 - Student Worksheet
 - What could go wrong (and what to do)
 - Extra challenges
 - Interesting diversions
 - Quizzes
 -

Helping Teachers to Teach Coding

- How
 - Face-to-face course
 - Important the teachers get to ACTUALLY use AppInventor themselves
 - Better to work in a group with others
 - Intensive 2-day(?) workshop
 - Mini-MOOC
 - Teachers can work through the mini-MOOC together
 - Available in asynchronous mode also
 - Can't attend or refresher
 - Community of Practice (CoP)
 - Support from other teachers
 - Give TAPAS legs



Helping Teachers to Teach Coding

- Evaluation
 - Critical
 - Want to learn what works and what does not
 - Several cohorts
 - Secondary school teachers
 - Let me know if you are interested
 - PDST internal team
 - Masters in Education and Training (eLearning) students
 - Mixed methods
 - Pre- and post-questionnaires
 - Interviews
 - Mini-MOOC learner analytics

Helping Teachers to Teach Coding

- How to get involved
 - Please do
 - Contact: Monica Ward
monica.ward@dcu.ie
01 700 8719
 - “Plan”
 - Pilot 1: mid-Sept 2016
 - Pilot 2: end-Oct 2016
 - Mini-MOOC initial version: Jan 2017
 - Pilot 3: mid-Feb 2017
 - TAPAS Launch: May 2017

References

- Department of Education and Skills, 2015. *Digital Strategy for Schools 2015-2020: enhancing Teaching, Learning and Assessment*.
- Graham, C.R., Woodfield, W. and Harrison, J.B., 2013. A framework for institutional adoption and implementation of blended learning in higher education. *The internet and higher education*, 18, pp.4-14.
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- Maxwell, J.A., 2012. *Qualitative research design: An interactive approach: An interactive approach*. Sage.
- Morelli, R., De Lanerolle, T., Lake, P., Limardo, N., Tamotsu, E. and Uche, C., 2011, March. Can android app inventor bring computational thinking to k-12. In *Proc. 42nd ACM technical symposium on Computer science education (SIGCSE'11)* (pp. 1-6).