Postgraduate Certificate in 21st Century Teaching and Learning

School of Education in association with
School of Computer Science & Statistics (SCSS), Centre for Research in IT in Education (CRITE) and Trinity Access Programme (TAP)

Course Handbook 2014/15
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Postgraduate Certificate in Education (21\textsuperscript{st} Century STEM/CS Teaching and Learning)

1. Introduction

In May 2013 Trinity College announced a major collaboration with Google on developing a targeted intervention to support Computer Science (CS) and STEM (Science, Technology, Engineering and Mathematics) teaching and learning in schools, with specific attention to disadvantaged schools. This three-year partnership with Google is aimed at transforming the teaching and learning of computer science in Irish schools. Google is undertaking the partnership to mark 10 years in Ireland and has provided substantial part funding to support this project. As Ireland strives to emerge as the Silicon Valley of Europe, this initiative is aimed at producing the next generation of computer scientists who will help to make this vision a reality. Computer Science education is acknowledged as being central to the development of 21st-century innovation. Every year, there is a 15% growth in the number of people and machines, and within the next two decades almost everyone on the planet could be on the Internet. Dublin is known as the digital capital of Europe, and in order to maintain that position, computer science skills will become even more critical as companies create new business models through the cloud and the web.

The partnership aims to affect a significant long-term change through a range of innovative educational interventions focused on the second level education system. Under the project, teachers will have the opportunity to undertake a certified course in 21st century computer science teaching and learning skills, developed by the Trinity Access 21 network and the School of Education. Providing teachers with access to a certified professional development course will assist second level schools to increase the number of students involved in and interested in computer science.

The project also includes targeted efforts to improve computer science and STEM capacity within designated disadvantaged (DEIS) schools, and specific supports have been developed by TAP and the School of Education in order to drive educational and social change through these schools. The focus on creative, active and technology based teaching and learning links in with the reforming agenda of the Department of Education and Skills. In addition, to enhance engagement with computer science and coding, over 1,000 Raspberry Pi’s will be provided to participating students and teachers so they can start to learn programming in a practical and enjoyable way. The Raspberry Pi is a credit card sized computer that plugs into a TV or a keyboard and is used to help children and teachers learn programming skills.

This proposed certificate course is designed to focus on a depth of engagement with selected TAP/Bridge 21 schools in order to change the school culture in a significant way through building school capacity at multiple levels – school leadership, teachers and students. The course will contribute to fostering a strong school culture with engaged students developing their full educational potential and teachers who have the capacity and scope to develop new teaching and learning approaches, leveraging technology and aligning with the new Junior Cycle. Particular emphasis is placed on the teaching of STEM subjects (including computing).

The proposed certificate aims to achieve a significant impact within Irish education by offering approximately 300 CPD opportunities for teachers, part-funded by Google. The
proposed suite of modules aims to boost the expertise of the teaching cohort in 21C teaching and learning skills with a particular emphasis on STEM/CS pedagogy and in building leadership and change management capacity within schools to help address educational disadvantage.

The proposed suite of modules arises from collaboration across the 'Trinity Access 21' network in College, which includes the Trinity Access Programmes (TAP) and Bridge21 and the expertise of the Schools of Education and Computer Science & Statistics. The current proposal is situated within the School of Education’s existing Division of Continuing Professional Development (CPD), and will draw on the School’s significant experience in offering courses of this nature to teachers. The School of Education is one of the largest professional schools in College and organises its activities around teaching, learning and research. The School addresses educational issues at a number of levels: in initial teacher education, postgraduate teacher education, Continuing Professional Development (CPD), and through engagement in high quality research. There is a long tradition in the School of Education of educating high quality teachers to cover the full range of educational provision in Ireland, and of further supporting them during their career through the provision of targeted and specialised in-career and postgraduate programmes ranging from diploma to doctoral level. The Certificate course is a core part of the School’s strategic planning in relation to the provision of the continuum of lifelong learning for teachers. TAP has a long track record of developing innovative educational projects, courses and entry routes for students from socio-economically disadvantaged backgrounds. Bridge21 has a strong recent presence in this area, challenging conventional models of teaching so that students are empowered to teach and learn through technology and teamwork, where the teacher adopts the roles of ‘facilitator’ and ‘leader’.

2. **Course Rationale**

2.1. **Purpose**

The course modules reflect a number of intersecting concerns on the current landscape of Irish education, particularly reform of curriculum and pedagogy in the Junior Cycle of education; development of enhanced leadership capacity within schools and across the system generally; development of STEM/CS capacity within schools; and enhanced support for students from disadvantaged backgrounds. Thus the award in Postgraduate Certificate in 21st century Teaching and Learning provides post-primary teachers with the opportunity to up-skill in relation to areas of their professional knowledge and practice, which are currently the subject of system level review and attention at national level.

2.2. **Course Aims**

The certificate aims to support the development of an innovative learning culture within schools, through working with participant teachers to develop a teaching and learning environment that is team-based, technology mediated, project-focused and cross-curricular. Modules in the certificate reflect an additional focus on leading and managing change and building an understanding of the major current policy challenges within which the post-primary education system is operating.

The modules aim to enhance the expertise of the teaching cohort in new models of teaching and learning with particular emphasis on STEM/CS. Furthermore the modules
aim to address complex challenges related to developing an inclusive educational environment and preparing all school students for higher academic aspiration and progression, through a focus on whole school culture, leadership and change. It is intended that participant teachers will understand how to develop and lead a ‘cultural change process’ within the classroom and the wider school environment, and they will have the opportunity to implement and reflect on such a process within the context of the proposed course.

In summary, the certificate course aims are to:

- inform and support teachers through major national educational reform initiatives – such as the new Junior Cycle and the increased relevance of technology in the classroom;
- further develop the capacity and confidence of participating teachers to lead and manage innovation and change within their educational environment;
- ensure that the opportunities presented by educational reforms are fully harnessed by schools across the socio-economic spectrum – including those closely linked to Trinity College in low income communities near the University; and
- involve participant teachers and schools in a learning and research programme that will enable professional development as well as the development of exemplar schools in the context of 21C learning environments.

2.3. Course Learning Outcomes

On successful completion of the Certificate in Education (21st Century STEM/CS Teaching and Learning) students should be able to:

- analyse the theory and practice underpinning a 21C learning environment;
- develop and research/evaluate a 21C learning environment;
- employ computer programming and STEM knowledge and skills in their professional practice;
- relate educational theory in inclusive education, leadership and change management to the development of educational policy and provision;
- apply appropriate theories and practices related to leadership and change management within their own learning environments;
- develop reflective practice in collaborative teaching and learning contexts.

3. Academic and Administrative Staff

This certificate course will be coordinated by Dr Joseph Roche in the School of Education.

The course will be administered by Megan Kuster, mekuster@tcd.ie, 01 896 3345. Megan is based in the TA21 office in Oriel House.

A list of course academic staff is provided below.
<table>
<thead>
<tr>
<th>Module Coordinators</th>
<th>Modules</th>
<th>Teaching Staff and Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-1: Digital Media Literacy and 21st Century Learning</td>
<td>Dr Jake Byrne (B21); Brendan Tangney (CRITE and B21); Dr Keith Johnston (Education and CRITE); Ciarán Bauer (B21)</td>
</tr>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-2: Problem Solving in the 21st Century</td>
<td>Dr Jake Byrne (B21); Brendan Tangney (SCSS, CRITE and B21); Ciarán Bauer (B21)</td>
</tr>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-3: Introduction to Programming through Animation</td>
<td>Dr Jake Byrne (B21); Brendan Tangney (CRITE and B21); Ciarán Bauer (B21)</td>
</tr>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-4: Intermediate Programming through Game Design</td>
<td>Dr. Jake Byrne (B21); Brendan Tangney (CRITE and B21); Ciarán Bauer (B21)</td>
</tr>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-5: Intermediate Programming: Exploring Computer Systems</td>
<td>Dr Jake Byrne (B21); Brendan Tangney (CRITE and B21); Ciarán Bauer (B21)</td>
</tr>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-6: Advance Programming</td>
<td>Dr Jake Byrne (B21); Brendan Tangney (CRITE and B21); Ciarán Bauer (B21)</td>
</tr>
<tr>
<td>Brendan Tangney</td>
<td>TA21-Mod-7: Contextualised Mathematics</td>
<td>Brendan Tangney (CRITE and B21); Aibhín Bray</td>
</tr>
<tr>
<td>Dr Colette Murphy</td>
<td>TA21-Mod-8: Science, Technology, Engineering &amp; Maths (STEM) Pedagogy</td>
<td>Dr Colette Murphy (Education) and Dr Joseph Roche (Education)</td>
</tr>
<tr>
<td>Dr Andrew Loxley</td>
<td>TA21-Mod-9: Bridge21 Advanced Methodology &amp; Teacher as Co-Researcher</td>
<td>Dr Andrew Loxley (Education); Cliona Hannon (TAP); Dr Keith Johnston (Education and CRITE); Dr Jake Byrne (B21)</td>
</tr>
</tbody>
</table>
4. Admissions

The initial cohort of participants will be drawn from selected TAP/CRITE partner schools. It is expected that up to six teachers per partner school will participate in the CPD programme focused on CS/STEM in practice (using the Bridge 21 model), leadership, cultural change management and educational inequality with a view to building a strong college-going culture within these participant schools.

Gaining admission to the programme will be competitive and schools will be required to demonstrate sustained commitment over the duration of the initiative. The project will initially focus on 10 schools over a two year period, engaging teachers in each school to begin to create a critical mass of practice locally.

Each applicant to the Postgraduate Certificate in 21st Century Teaching and Learning must meet the following academic and professional criteria:

   Academic:
   
   • Possess qualifications and competencies recognised at Level 8 of the National Framework of Qualifications (for example, a higher diploma or an honours degree).

   Professional:

   • Be registered with the Teaching Council of Ireland; and
   • Have a minimum of one year’s teaching experience in schools.

Applications to this course will be made through the SITS Direct Entry Application
system. Selection will be made on the basis of:

- applicants’ academic and professional qualifications;
- written commitment from the school management team to support the applicant in attending the course, and to facilitate the implementation of the new methodologies in the school setting.

5. Course Structure

5.1. Overview

The Postgraduate Certificate in Education (21st Century STEM/CS Teaching and Learning) is a part-time course which runs over one academic year. Students must select 6 modules from an available suite of 12 (see table above), each of which will require students to carry out practical application of the theory and concepts studied, attend workshops and lectures, and follow any course materials provided online. All students must take the first compulsory module, Digital Media Literacy and 21st Century Learning. In accordance with the Bologna requirements this Certificate is allocated 30 ECTS.

<table>
<thead>
<tr>
<th>Core Module: 5 ECTS Credits</th>
<th>Student effort hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent Hours</td>
<td>100</td>
</tr>
<tr>
<td>Workload: Contact Time (hours)</td>
<td></td>
</tr>
<tr>
<td>Lectures</td>
<td>2</td>
</tr>
<tr>
<td>Seminars</td>
<td>2</td>
</tr>
<tr>
<td>Workshops/Presentations</td>
<td>4</td>
</tr>
<tr>
<td>Workload: Personal Study</td>
<td></td>
</tr>
<tr>
<td>Pre-module reading/preparation</td>
<td>6</td>
</tr>
<tr>
<td>In-course reading</td>
<td>6</td>
</tr>
<tr>
<td>Practice elements within the classroom and school setting. Reflection, analysis and evaluation of approaches and theories in practice</td>
<td>40</td>
</tr>
<tr>
<td>Assignments</td>
<td>40</td>
</tr>
<tr>
<td>Total Student Effort Hours per Module</td>
<td>100</td>
</tr>
</tbody>
</table>

Face-to-face contact time for each 5 ECTS module will be 8 hours. Peer to peer and collaborative group learning will be a strong feature of the course. It is recognised that much of the shared learning will be the practice element of the modules where participants will reflect on, implement and evaluate learning from the modules within their teaching duties. A significant part of its practice element has been designed to overlap with participants’ regular teaching and learning duties and participants will be
encouraged to reflect on how best to incorporate the frameworks and models, principles or strategies experienced and discussed in the workshops and seminars into their teaching. They will also be encouraged to evaluate any interventions and approaches they embed in their teaching preparation and/or practice. Some directed reading will be required in advance of the classes ensuring that the main focus of the classes will be on contextualisation, critical discussion and enabling the application of theory into practice within the classroom and school setting. Thus, a large proportion of the workload will focus on self-directed and collaborative learning, with the workshops acting as a 'scaffold' to guide and support this approach.

5.2. Schedule of Module Delivery within the Academic Year 14/15

The following timetables are intended to be as accurate as possible, some amendments may be necessary over the course of the year; however this is likely to be minimal.

Core Modules

Students should attend both the Friday and Saturday sessions for each of the 4 modules.

<table>
<thead>
<tr>
<th>Leadership and Change Management</th>
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</thead>
<tbody>
<tr>
<td>26/9/2014     6-9pm</td>
</tr>
<tr>
<td>27/9/2014     9.30am-5pm</td>
</tr>
<tr>
<td>TCD; Lloyd Building, LB.01</td>
</tr>
<tr>
<td>Google Foundry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Digital Media Literacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/10/2014    9.30am-5pm</td>
</tr>
<tr>
<td>17/10/2014    6-9pm</td>
</tr>
<tr>
<td>Google Foundry</td>
</tr>
<tr>
<td>TCD; Arts Bldg, Synge Theatre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inclusive Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>28/11/2014    6-9pm</td>
</tr>
<tr>
<td>29/11/2014    9.30am-5pm</td>
</tr>
<tr>
<td>TCD; Arts Bldg, Synge Theatre</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teacher as Co-Researcher</th>
</tr>
</thead>
<tbody>
<tr>
<td>27/2/2015     6-9pm</td>
</tr>
<tr>
<td>28/2/2015     9.30am-5pm</td>
</tr>
<tr>
<td>Google Foundry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Showcase</th>
</tr>
</thead>
<tbody>
<tr>
<td>23/5/2014     9.30am-5pm</td>
</tr>
<tr>
<td>Google Foundry</td>
</tr>
</tbody>
</table>
**Option Modules**

Certificate students should attend one workshop day and one assignment support day for each of the two optional modules they are taking.

The location for all option modules is the Bridge 21 learning space in Oriel House, on the corner of Fenian St and Westland Row.

<table>
<thead>
<tr>
<th>Module Title</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving in the 21st Century (CompuThink)</td>
<td>18/10/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Problem Solving in the 21st Century (CompuThink) assignment support</strong></td>
<td>24/10/2014</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Intro to Animation through Game Design (Scratch 1)</td>
<td>29/10/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td>Intermediate Programming through Game Design (Scratch 2)</td>
<td>30/10/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td>Intro to Animation through Game Design (Scratch 1)</td>
<td>8/11/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Intro to Animation through Game Design (Scratch 1) assignment support</strong></td>
<td>14/11/2014</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Intermediate Programming through Game Design (Scratch 2)</td>
<td>15/11/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Intermediate Programming through Game Design (Scratch 2) assignment support</strong></td>
<td>21/11/2014</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Advanced Programming with Python</td>
<td>22/11/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Advanced Programming with Python assignment support</strong></td>
<td>5/12/2014</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Exploring Computer Systems (Raspberry Pi)</td>
<td>6/12/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Exploring Computer Systems (Raspberry Pi) assignment support</strong></td>
<td>12/12/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Contextual Maths</td>
<td>13/12/2014</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Contextual Maths assignment support</strong></td>
<td>19/12/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Problem Solving in the 21st Century (CompuThink)</td>
<td>17/1/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td>Event</td>
<td>Date</td>
<td>Time</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>-----------</td>
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</tr>
<tr>
<td>Information Literacy though Contextualised Inquiry</td>
<td>24/1/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td>Intro to Animation through Game Design (Scratch 1)</td>
<td>31/1/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Information Literacy though Contextualised Inquiry assignment support</strong></td>
<td>6/2/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Intermediate Programming through Game Design (Scratch 2)</td>
<td>7/2/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Problem Solving in the 21st Century (CompuThink) assignment support</strong></td>
<td>13/2/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Intro to Animation through Game Design (Scratch 1)</td>
<td>18/02/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td>Intermediate Programming through Game Design (Scratch 2)</td>
<td>19/02/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Intro to Animation through Game Design (Scratch 1) assignment support</strong></td>
<td>20/02/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Advanced Programming with Python</td>
<td>21/02/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Intermediate Programming through Game Design (Scratch 2) assignment support</strong></td>
<td>6/3/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Exploring Computer Systems (Raspberry Pi)</td>
<td>7/3/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Advanced Programming with Python assignment support</strong></td>
<td>13/03/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td><strong>Exploring Computer Systems (Raspberry Pi) assignment support</strong></td>
<td>20/03/2015</td>
<td>6-9pm</td>
</tr>
<tr>
<td>Contextual Maths</td>
<td>21/03/2015</td>
<td>9.30am-5pm</td>
</tr>
<tr>
<td><strong>Contextual Maths assignment support</strong></td>
<td>27/03/2015</td>
<td>6-9pm</td>
</tr>
</tbody>
</table>

To be confirmed: STEM Pedagogy
5.3 Attendance

It is expected that students will attend and participate fully in all six modules. A student who attends for less than 70% may be returned as ‘Non-Satisfactory’. In order to be eligible for the award of the Postgraduate Certificate a student must obtain credit for the academic year by satisfactory attendance at lectures/wrkshops and by carrying out the required course-work or other designated assignments. A student who is absent from attendance at prescribed courses due to illness may be required to submit a medical certificate to the course office within one week of the absence occurring.

6. Assessment

Each module on the Certificate course is individually assessed and a student must complete all course work prescribed. As the course is focused on teachers’ continuous professional development, evidence-based assessment is the preferred assessment method. There will be a mixture of formative (un-assessed) and summative assessment that will focus not only on knowledge but on reflection and application of skills and competencies. There will be a focus on ‘process’ assessment and there will be no written examinations.

The specific mode of assessment is provided in each individual module description in Appendix 1 below.

- All modules are graded on a Distinction/Pass/Fail basis.
- There is no compensation across modules.
- A 50% pass mark is required for each of the modules. Within modules, assessment components are weighted equally.
- In cases where students fail to achieve a minimum of 50% in a module, a resubmission will be permitted once. A maximum of two modules may be resubmitted.
- All modules are equally weighted.
- The Postgraduate Certificate may be awarded a mark of Distinction. The award of Distinction will require an overall credit-weighted average mark of at least 70% across all modules.

6.1. Assessment Criteria

In the interests of consistency and comparability the following criteria are considered in the assessment of module assignments.

- Organisation and structure of the text.
- Range and understanding of literature/source material for investigating the topic.
- Analysis, presentation and interpretation of literature.
- Application to educational theory/practice and related reflection.
- Quality of conclusions/outcomes-recommendations/implications for future action.
- Structure and presentation: general layout, observations of academic conventions, quality of language, sentence construction, syntax and paragraphing.
6.2. Submission of Coursework

Module assignments must be submitted in ‘hard copy’ format (to the Course Administrator Megan Kuster in the TA21 Office in Oriel House) accompanied by a signed cover sheet and a title sheet (see Appendix 2) and also electronically via turnitin (http://turnitin.com/) before close of business on or before the due date specified. A submission is only considered valid when submitted both electronically and in hard copy and when accompanied by the signed cover sheet. Assignments are normally submitted five weeks after the module has been delivered, to the deadlines specified below. It is important that you do not hand in your work to the module co-ordinator. In the unlikely event that an assignment gets mislaid, students are required to keep a copy of all work submitted. Comments are sent to a student after the work has been assessed; the actual work is not returned to the student.

All written work should be word processed and all additional materials for example, images on CD, need to be clearly marked with your name and student number and attached to the main assignment.

Where appropriate, students can use relevant examples from professional school experience in order to provide illustration for their argument and to demonstrate their ability to link theory with practice. However, all personal details concerning a school or work setting referred to should not be identifiable. Statements made in an assignment should be backed up by references to an author and an appropriate source (see Appendix 3 for referencing conventions) in order to avoid loose generalisations and plagiarism.

Feedback on assignments and guidance on how academic performance may be improved is provided in the form of written comments on a standard report sheet (see Appendix 4). Where possible, we aim for a turnaround time of 4-6 weeks from the initial submission of assignments to receiving written feedback and a provisional grade. All provisional grades are subject to final approval at the annual Court of Examiners.

6.3. Deadlines for Submissions

Deadlines for submission are normally 5 weeks post the module delivery date, as follows.

Leadership and Change Management 31st October 2014
Digital Media Literacy 21st November 2014
Inclusive Education 9th January 2015
Teacher as Co-Researcher 3rd April 2015

Submission dates for the optional modules will be advised by the module leader and as per above will be set 5 weeks post the module delivery date.
6.4. Request for extension to submit coursework

Where there are prescribed dates for submission of coursework, a student must meet these dates, unless prior approval has been given for an extension. An extension can only be granted by the Course Co-ordinator. Requests for an extension must be made in writing (email) and may be granted on medical grounds (with medical certificate required for submission) or in respect of ad misericordiam situations.

6.5. Late submission and word limits

Work submitted outside of the prescribed deadline may not be accepted, unless prior permission has been sought and granted from the Programme Co-ordinator.

A tolerance of 10% is permitted in respect of the word count for assignments. A student who submits a piece of work which exceeds the permitted tolerance may not be accepted.

6.6. Marking scheme for module assignments: grade descriptions

All modular assessments are graded as distinction, pass or fail. The examining lecturer assigns a provisional grade to a piece of work. Coursework and assignments are graded in accordance with the following conventions. These grade descriptions are intended to provide guidelines for the marking of coursework and assignments; they are not rigid prescriptions, but general indications of the qualities that are looked for at each level of classification. Please note that all grades are provisional until agreed by the Court of Examiners.

<table>
<thead>
<tr>
<th>Distinction (70%+)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure/Organisation</strong>&lt;br&gt;(organisation and structure of the text; logic)</td>
<td>Text and argument systematically and explicitly organised; without any significant lacunae or repetition. Identifies and discusses pertinent issues in depth.</td>
</tr>
<tr>
<td><strong>Analysis/Reflection</strong>&lt;br&gt;(coherence of argument; reflection, distillation, criticality)</td>
<td>Critical review and synthesis of ideas; coherent, realistic and well-supported argument; perceptive appraisal of implications.</td>
</tr>
<tr>
<td><strong>Support</strong>&lt;br&gt;(range and understanding of sources)</td>
<td>Critical coverage of all major sources; systematic, analytical use of these sources.</td>
</tr>
<tr>
<td><strong>Presentation</strong>&lt;br&gt;(length, use of presentation conventions, referencing, spelling, grammar, language)</td>
<td>Competent control of length; appropriate presentation and use of referencing conventions; accurate grammar, spelling and use of language.</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td>Work of outstanding quality, showing perceptive and critical insight</td>
</tr>
<tr>
<td><strong>Pass (50%+)</strong></td>
<td></td>
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</tbody>
</table>
| **Structure/Organisation**  
(organisation and structure of the text; logic) | Text and argument structured in a sustained way; all major structural elements present. |
| **Analysis/Reflection**  
(coherence of argument; reflection, distillation, criticality) | Ideas organised and grouped into a coherent, realistic and well-supported argument; incorporating some critical analysis and relevant/appropriate use of supporting sources. |
| **Support (range and understanding of sources)** | Use of a range of sources in the literature, though there may be some minor gaps all major relevant sources should be covered; systematic, analytical use of these sources |
| **Presentation (length, use of presentation conventions, referencing, spelling, grammar, language)** | Length requirements observed; appropriate presentation and use of referencing conventions; grammar and spelling accurate in the main. Satisfactory use of language. |
| **Overall** | Work of good quality, showing knowledge and understanding |

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<thead>
<tr>
<th><strong>Fail (49% or below)</strong></th>
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</table>
| **Structure/Organisation**  
(organisation and structure of the text; logic) | Poor or weak organisation/structure. Significant gaps or repetition in the argument/text. |
| **Analysis/Reflection**  
(coherence of argument; reflection, distillation, criticality) | Some evidence of understanding of ideas although mainly descriptive with limited critical analysis and support. |
| **Support (range and understanding of sources)** | Evidence of some reading in the field but largely descriptive. Little or no analysis or understanding evident. |
| **Presentation (length, use of presentation conventions, referencing, spelling, grammar, language)** | Basic command of presentation conventions and referencing, presentation occasionally marred by language/spelling errors affecting comprehensibility. |
| **Overall** | The work does not achieve the standards required at honours level |
6.7. Processing of module assignments

Feedback and a provisional grade/mark are returned to students using the assignment report form (Appendix 4) normally within 4/6 weeks of the coursework submission.

A Court of Examiners meets once a year in early July to formally process students’ module assignments. All grades/marks are provisional until approved by the Court of Examiners. The Court of Examiners will consist of all academics involved in teaching and assessment on the programme as well as an External Examiner.

6.8. Compensation and Supplemental Coursework

Candidates are not permitted to pass by compensation across or within modules.

A candidate may submit supplemental coursework for a maximum of two failed modules, capped at the pass mark (50%). Failure of three or more modules will result in the candidate being excluded from the programme. Supplemental assignments may vary in nature from the original coursework assignments. In a module which is assessed via multiple components only the failed components need to be resubmitted.

Where one or more forms of assessment apply within an individual module, a student must achieve a pass in each component in order to pass that module overall. In such cases of multiple assessments within a module, normally a distinction can only be achieved where a student achieves a distinction in each graded component.

7. College Facilities

Postgraduate Certificate students have access to the College’s Library and IT facilities including tcd email.

Students who would like to use the Sports Centre regularly can avail of the public membership rates in the TCD Sports Centre.

Students who would like to purchase guest passes may do so, at a rate of €8 per visit, which includes full access to the pool and gym.
APPENDIX 1 Module Outlines
1. Title of Module
Digital Media Literacy and 21st Century Learning

2. Module Code
TA21-Mod-1 Compulsory

3. Entry Requirements (if applicable)
None

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry-based activities. 100 hours of total student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims

Rationale
New digital media can be very effective when utilised within an overarching 21st century learning paradigm which emphasises communication, creativity and problem solving. In particular, a 21st century pedagogical approach is strongly encouraged by the new Junior Cycle programme, as is the development of digital media skills. This module adheres to a principal of learning by doing in which the students develop their digital media skills by participating in a 21st century learning experience. The participants are then required to create, deliver and critically reflect upon a media rich learning experience for a group of learners of their choice.

Aims
- Introduce students to the key components of 21st century learning models using the Bridge21 methodology as a concrete example.
- Develop students’ skills and capabilities in using current and emerging digital media technologies for teaching & learning.

8. Learning Outcomes

On successful completion of this module, the student should be able to
1. Create learning materials in a variety of digital formats.
2. Plan learning activities according to the Bridge21 model of 21C learning.
3. Incorporate digital media material into Bridge21 learning activities.
4. Evaluate the educational merits of using a variety of media in different learning contexts.
5. Critically reflect upon the planned learning experience.

9. Course Content and Syllabus
Digital Media Literacy:
• Theoretical background to Digital Media Literacy.
• Digital Media Literacy skills and competencies (access, manage, integrate, evaluate and create).
• Practical approaches for implementing Digital Media Literacy activities.

21st Century Learning:
• Frameworks for 21C Learning.
• 21C Learning skills and competencies.
• The Bridge21 model of 21C Learning.
• Reflection as an essential component of 21C learning

10. Teaching and Learning Methods
A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.

Students will be encouraged to participate in a community of practice with their peers which will be supported by College’s VLE platform.

College guidelines on universal accessibility will be followed.

11. Required Equipment and Resources (if applicable)
Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools.

12. Methods of Assessment (for example, essay, seminar paper, examination, presentation)
Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of a media-rich, 21C learning experience with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

*The EBA will comprise of the following items:*
1. Description of the planned learning experience and its theoretical underpinnings.
2. A media presentation on an aspect of the delivery of the learning experience.
3. A structured reflection on the experience.

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

*The assessment criteria are:*
Demonstrating an understanding of how to create and deliver a 21C learning experience.
Demonstrating technical competence in a number of digital formats.
The depth and richness of the reflection provided.
Each of the above criteria are weighted equally.

*Formative Assessment:*
Informal feedback will be provided to students on their initial draft of the planned learning experience.
Informal feedback will be provided to students on their initial reflections.
Peer (and tutor) feedback and support will be provided through the on-line community.

13. Pass Requirement and assessment components to be listed in SITS
14. 50% overall and 50% in each of the 3 components, weighted equally

15. Method of Supplemental Assessment
16. Recommended Reading Materials / Indicative Resources

21C Learning:


The Bridge21 Model:


Lawlor J., Marshall K., Tangney B., Bridge21 – Exploring the potential to foster intrinsic student motivation through a team-based, technology mediated learning model, Technology, Pedagogy and Education, in press.

Digital Media Literacy:


17. Evaluation
An on-line module survey will be administered at the end of the module and this will be considered by the course team.

18. Module Coordinator
Brendan Tangney

19. Module Teaching Team
Dr Jake Byrne; Brendan Tangney; Dr Keith Johnston; Claire Conneely; Ciarán Bauer; Kevin Sullivan; others
Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. **Title of Module**
   Problem Solving in the 21st Century

2. **Module Code**
   TA21-Mod-2 Optional

3. **Entry Requirements (if applicable)**
   TA21-Mod-1

4. **Level (JF, SF, JS, SS, Postgraduate)**
   Postgraduate

5. **Module Size (hours and number of weeks)**
   Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. **ECTS Value**
   5 ECTS

7. **Rationale and Aims**
   **Rationale**
   Creative and practical problem solving are essential skills for working in the 21st century. As there has been a recent focus on developing these skills within formal education, a number of strategies and approaches have been developed to hone these skills. These approaches largely involve hands on, practical learning experiences. This module introduces a number of such activities that provide practical introductory examples to help students solve problems, with a focus on logical issues that have relevancy to coding and programming, but do not involve using a computer. This computer orientated approach to problem solving is commonly known as computational thinking.

   This module adheres to a principal of learning by doing in which the students develop their skills by participating in a 21st century learning experience. The participants are required to create, deliver and critically reflect upon a problem based learning experience for a group of learners of their choice.

   **Aims**
   - Introduce students to the relevancy of various practical problem solving strategies as they relate to coding and programming, without needing to use a computer.
   - Introduce students to the concepts of algorithms and algorithmic thinking.
   - To build foundational knowledge for students before they move on to programming activities.
   - Develop students’ skills and capabilities in using and developing problem based activities for use with a group of learners of their choice.

8. **Learning Outcomes**
   **On successful completion of this module, the student should be able to**
   1. Identify and describe some problem solving strategies.
   2. Describe and explain some algorithms and algorithmic thinking.
   3. Solve problems which have more than one possible solution.
   4. Plan a 21C learning experience which incorporates algorithmic thinking & problem solving activities.
5. Critically reflect upon and evaluate the planned learning experience.

9. **Course Content and Syllabus**

<table>
<thead>
<tr>
<th>Problem Solving and Computational thinking:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving strategies.</td>
</tr>
<tr>
<td>Algorithms.</td>
</tr>
<tr>
<td>Problem solving and computational thinking skills and competencies</td>
</tr>
<tr>
<td>Practical approaches for implementing computational thinking and problem based activities.</td>
</tr>
</tbody>
</table>

10. **Teaching and Learning Methods**

| A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology. |
| Students will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform. |
| College guidelines on universal accessibility will be followed. |

11. **Required Equipment and Resources (if applicable)**

| Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools. |

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**

| Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of a computational thinking 21C learning experience with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners. |

*The EBA will comprise of the following items:*
1. Description of the planned learning experience and its theoretical underpinnings.
2. A media presentation on an aspect of the delivery of the learning experience.
3. A structured reflection on the experience.

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

*The assessment criteria are:*
Demonstrating their understanding of computational thinking and problem based learning.
Demonstrating an understanding of how to create and deliver a 21C learning experience involving computational thinking.
The depth and richness of the reflection provided.

Each of the above criteria are weighted equally.

*Formative assessment*
Informal feedback will be provided to students on their initial draft of the planned learning experience. Informal feedback will be provided to students on their initial reflections. Peer (and tutor) feedback and support will be provided through the on-line community.

13. **Pass Requirement and assessment components to be listed in SITS**

50% overall and 50% in each of the three components (weighted equally).

14. **Method of Supplemental Assessment**
Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

15. Recommended Reading Materials / Indicative Resources


16. Evaluation

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

17. Module Coordinator

Brendan Tangney

18. Module Teaching Team

Dr Jake Byrne; Brendan Tangney; Claire Conneely; Ciarán Bauer; others
Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Introduction to Programming through Animation

2. Module Code
TA21-Mod-3 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims
Rationale
This module provides an introduction to programming for beginners through the use of a number of technologies that provide novice programmers the opportunity to explore basic programming skills and knowledge, without the issues associated with debugging syntax and spelling.

This module adheres to a principal of learning by doing in which the students develop their programming skills in the context of a 21st century learning experience. The participants are required to create, deliver and critically reflect upon an introductory programming learning experience for the cohort of their choice.

Aims
- Introduce students to basic programming concepts.
- To build a practical and foundational knowledge for students before they move on to more advanced programming concepts.
- Develop students’ skills and capabilities in using tools and approaches designed to aid in the learning of basic programming skills.
- To apply programming knowledge in other teaching & learning contexts.

8. Learning Outcomes
On successful completion of this module, the student should be able to
1. Plan and implement introductory programming learning activities according to the Bridge21 model of 21C learning.
2. Identify and illustrate ways in which programming will enliven and enrich their classroom teaching.
3. Illustrate an understanding of basic programming concepts such as loops and initialisation.
4. Relate basic programming concepts to basic animation actions.
5. Critically reflect upon the planned learning experience.

9. Course Content and Syllabus
Areas to be covered include:
• Basic programming concepts (loops and initialisations).
• Practical introductory technical skills, including basic proficiency with tools such as Scratch for animation.
• Practical approaches for implementing an introductory programming-based learning activity.

10. Teaching and Learning Methods
A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.

Students will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform.

College guidelines on universal accessibility will be followed.

11. Required Equipment and Resources (if applicable)
Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools.

12. Methods of Assessment (for example, essay, seminar paper, examination, presentation)
Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of programming-based 21C learning experience with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

The EBA will comprise of the following items:
1. Description of the design of the learning experience and its theoretical underpinnings.
2. A media presentation of some aspect of the delivery of the learning experience.
3. A structured reflection on the experience.

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

The assessment criteria are:
Demonstrating their technical competence using an introductory programming interface or piece of software.
Demonstrating an understanding of basic programming concepts and of how to create and deliver a 21st century learning experience to introduce programming.
The depth and richness of the reflection provided.

Each of the above criteria are weighted equally.

Formative assessment
Informal feedback will be provided to students on their initial draft of the planned learning experience. Informal feedback will be provided to students on their initial reflections. Peer (and tutor) feedback and support will be provided through the on-line community.

13. Pass Requirement and assessment components to be listed in SITS
50% overall and 50% in each of the 3 components, weighted equally

14. Method of Supplemental Assessment
Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

15. Recommended Reading Materials / Indicative Resources


16. Evaluation

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

17. Module Coordinator

Brendan Tangney

18. Module Teaching Team

Dr Jake Byrne; Brendan Tangney; Claire Conneely; Ciaran Bauer; others
MODULE SPECIFICATION

Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Intermediate Programming through Game Design

2. Module Code
TA21-Mod-4 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims

Rationale
This module provides an intermediate level introduction to programming for those who already understand basic programming concepts such as initialisation, loops and how to decipher what an algorithm might do. This module will build on the introduction to programming module with the use of a number of technologies that provide novice programmers the opportunity to explore basic programming skills and knowledge, without the issues associated with debugging syntax and spelling.

This module adheres to a principal of learning by doing in which the students develop their programming skills in the context of a 21st century learning experience. The students are required to create, deliver and critically reflect upon a learning experience based on game design for a group of learners of their choice.

Aims
- Introduce students to intermediate programming concepts.
- To progress students' knowledge in preparation for more advanced programming concepts.
- Develop students' skills and capabilities in using tools and approaches designed to aid in the learning of intermediate programming skills.
- To apply programming knowledge in other teaching and learning contexts.

8. Learning Outcomes

On successful completion of this module, the student should be able to
1. Plan and implement game design learning activities according to the Bridge21 model of 21C learning.
2. Identify and illustrate ways in which programming will enliven and enrich their classroom teaching.
3. Create a technical artefact that demonstrates the use of intermediate programming concepts such as variables, events and concurrency.
4. Relate intermediate programming concepts to basic game design elements.
5. Critically reflect upon the planned learning experience.

9. Course Content and Syllabus

**Areas to be covered include:**
- Intermediate programming concepts (variables, events, concurrency, inputs).
- Technical skills, including intermediate proficiency with tools such as Scratch.
- Practical approaches for implementing a learning activity based on game design.

10. Teaching and Learning Methods

A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.

Students will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform.

College guidelines on universal accessibility will be followed.

11. Required Equipment and Resources (if applicable)

Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools.

12. Methods of Assessment (for example, essay, seminar paper, examination, presentation)

Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of a 21C learning experience based on game design with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

*The EBA will comprise of the following items:*
1. Description of the design of the learning experience and its theoretical underpinnings.
2. A media presentation of some aspect of the delivery of the learning experience.
3. A structured reflection on the experience.

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

*The assessment criteria are:*
Demonstrating their technical competence using an intermediate programming interface or piece of software for game design and understanding of intermediate programming concepts.
Demonstrating an understanding of how to create and deliver a 21C learning experience involving programming for game design.
The depth and richness of the reflection provided.

Each of the above criteria are weighted equally.

*Formative assessment*
Informal feedback will be provided to students on their initial draft of the planned learning experience. Informal feedback will be provided to students on their initial reflections. Peer (and tutor) feedback and support will be provided through the on-line community.

13. Pass Requirement and assessment components to be listed in SITS

14. 50% overall and 50% in each of the 3 components, weighted equally
### 15. Method of Supplemental Assessment

Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

### 16. Recommended Reading Materials / Indicative Resources

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Title</th>
<th>Journal/Media</th>
<th>Pages</th>
</tr>
</thead>
</table>

### 17. Evaluation

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

### 18. Module Coordinator

Brendan Tangney

### 19. Module Teaching Team

Dr Jake Byrne; Brendan Tangney; Claire Conneely; Ciarán Bauer; others
## MODULE SPECIFICATION

### Programme(s) to which Module applies

| Certificate in Education (21st Century STEM/CS Teaching and Learning) |

### 1. Title of Module

| Intermediate Programming: Exploring Computer Systems |

### 2. Module Code

| TA21-Mod-5 Optional |

### 3. Entry Requirements (if applicable)

| TA21-Mod-1 |

### 4. Level (JF, SF, JS, SS, Postgraduate)

| Postgraduate |

### 5. Module Size (hours and number of weeks)

| Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort. |

### 6. ECTS Value

| 5 ECTS |

### 7. Rationale and Aims

**Rationale**

Embedded computing technologies, such as smart phones and wearable technology, are becoming ubiquitous, readily available, cheap and easily modified for a variety of applications. This module introduces a number of such technologies that provide practical introductory examples to assist students in exploring this emerging area of 21C technological development.

The module adheres to a principal of learning by doing in which the students develop their skills with embedded systems in the context of they themselves participating in a 21st century learning experience. The participants are required to create, deliver and critically reflect upon an embedded system learning experience for the cohort of their choice.

**Aims**

- To introduce students to the relevancy of inputs and outputs as they relate to computing and computers that are becoming pervasive in everyday life.
- To build a practical and foundational knowledge in relation to embedded systems.
- To develop students’ skills and capabilities in using current and emerging embedded systems for teaching and learning.

### 8. Learning Outcomes

*On successful completion of this module, the student should be able to*

1. Plan and implement an embedded systems learning activity according to the Bridge21 model of 21C learning.
2. Construct basic electronics circuits and code to interface with electronic components.
3. Relate their use of embedded systems to real world applications.
4. Identify the set up and support requirements of an embedded systems 21C learning activity.
5. Critically reflect upon the planned learning experience.

### 9. Course Content and Syllabus
Computers and Computing:
• Computing in everyday life, with a focus on inputs and outputs
• Intermediate embedded system skills and competencies (electronics and programming).
• Practical approaches for implementing learning activities involving embedded systems.

10. **Teaching and Learning Methods**

A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.

Students will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform.

College guidelines on universal accessibility will be followed.

11. **Required Equipment and Resources (if applicable)**

Flexible learning space with access to computers, spare monitors, keyboards, mice, cameras, digital projector, assortment of embedded systems (including the Raspberry Pi) and accessories.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**

Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of an embedded systems 21C learning experience with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

*The EBA will comprise of the following items:
1. Description of the design of the learning experience and its theoretical underpinnings.
2. A media presentation of some aspect of the delivery of the learning experience.
3. A structured reflection on the experience.*

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

*The assessment criteria are:* 
Demonstrating their technical competence in using an embedded system of their choice. 
Demonstrating an understanding of how to plan and implement a 21C learning experience involving embedded systems. 
The depth and richness of the reflection provided.

Each of the above criteria are weighted equally.

*Formative assessment* 
Informal feedback will be provided to students on their initial draft of the planned learning experience. 
Informal feedback will be provided to students on their initial reflections. 
Peer (and tutor) feedback and support will be provided through the on-line community.

13. **Pass Requirement and assessment components to be listed in SITS**

14. 50% overall and 50% in each of the 3 components, weighted equally

15. **Method of Supplemental Assessment**

Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

16. **Recommended Reading Materials / Indicative Resources**


17. **Evaluation**

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

18. **Module Coordinator**

Brendan Tangney

19. **Module Teaching Team**

Dr Jake Byrne; Brendan Tangney; Claire Conneely; Ciarán Bauer; others
## MODULE SPECIFICATION

### Programme(s) to which Module applies

| Certificate in Education (21st Century STEM/CS Teaching and Learning) |

### 1. Title of Module

Advanced Programming

### 2. Module Code

TA21-Mod-6 Optional

### 3. Entry Requirements (if applicable)

TA21-Mod-1

### 4. Level (JF, SF, JS, SS, Postgraduate)

Postgraduate

### 5. Module Size (hours and number of weeks)

Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

### 6. ECTS Value

5 ECTS

### 7. Rationale and Aims

**Rationale**

This is an advanced programming module for those who already understand basic and intermediate programming concepts such as initialisation, loops, how to decipher what an algorithm might do, variables, events and concurrency. This module will introduce students to a syntax specific, text-based programming language, building on their knowledge and experience using graphical interfaces or block based languages encountered in previous modules (if applicable).

The module adheres to a principal of learning by doing in which the students develop their programming skills in the context of a 21C learning experience. The participants are required to create, deliver and critically reflect upon a learning experience using a text-based programming language for the group of learners of their choice.

**Aims**

- To introduce students to text based programming languages.
- To introduce students to the relevancy of text based programming languages and their use in everyday computing tasks.
- To develop students' skills and capabilities in using tools and approaches designed to aid in the learning of text based programming languages.
- To apply advanced programming knowledge in other teaching & learning contexts.

### 8. Learning Outcomes

*On successful completion of this module, the student should be able to do the following.*

1. Plan and implement a learning activity using a text based programming language in the context of the Bridge21 model of 21C learning.
2. Identify and illustrate ways in which programming will enliven and enrich their classroom teaching.
3. Create a technical artefact that demonstrates proficiency in the use of a text based programming language.
4. Relate programming tasks to real world applications.
5. Critically reflect upon the planned learning experience.

9. **Course Content and Syllabus**

   * **Areas to be covered include:**
     - Advanced Programming concepts (including syntax and debugging).
     - Advanced technical skills, including proficiency with programming languages such as Python.
     - Practical approaches and best practice for implementing a learning activity using a text based programming language.

10. **Teaching and Learning Methods**

    A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.

    Students will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform.

    College guidelines on universal accessibility will be followed.

11. **Required Equipment and Resources (if applicable)**

    Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**

    Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of an advanced programming 21C learning experience with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

    *The EBA will comprise of the following items:*
    1. Description of the design of the learning activity and its theoretical underpinnings.
    2. A media presentation of some aspect of the delivery of the learning experience.
    3. A structured reflection on the experience.

    Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

    *The assessment criteria are:*
    - Demonstrating their competence to program using a text based language.
    - Demonstrating an understanding of how to create and deliver a 21C learning experience involving an advanced (text-based) programming language.
    - The depth and richness of the reflection provided.

    Each of the above criteria are weighted equally.

    *Formative assessment*
    - Informal feedback will be provided to students on their initial draft of the planned learning experience.
    - Informal feedback will be provided to students on their initial reflections.
    - Peer (and tutor) feedback and support will be provided through the on-line community.

13. **Pass Requirement and assessment components to be listed in SITS**

    50% overall and 50% in each of the 3 components, weighted equally

15. **Method of Supplemental Assessment**

35
Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

16. **Recommended Reading Materials / Indicative Resources**


17. **Evaluation**

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

18. **Module Coordinator**

Brendan Tangney

19. **Module Teaching Team**

Dr Jake Byrne; Brendan Tangney; Claire Conneely; Ciarán Bauer; others
MODULAR SPECIFICATION

Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Contextualised Mathematics

2. Module Code
TA21-Mod-7 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims

Rationale
A major trend in mathematics education is towards contextualised learning in which the real world properties and relevance of mathematics are to the fore. This is very much the philosophy behind the new Project Maths syllabus for secondary schools. This approach is in turn an instance of the broader trend towards 21st century teaching and learning which emphasises key skills such as problem solving and managing information. However, in practice many so called real world maths problem based learning activities are actually classic textbook, decontextualised, problems with a thin veneer wrapped around them.

There is also a movement towards the use of technology in maths education but teachers are faced with a myriad of tools without a clear pedagogical basis for their use.

Models of 21C teaching and learning offer a pedagogical framework within which a contextualised approach to maths education sits more naturally. Equally such a framework is more suitable for the exploitation of the potential of technology to enhance the learning process.

Aims
- Introduce students to the wide variety of ICT tools for teaching mathematics and to provide them with a conceptual framework for understanding the nature of technology-enhanced learning interventions.
- Provide students with a set of guidelines for developing innovative maths learning activities.
- Introduce students to how innovative contextualised maths education activities can be devised for a 21C learning scenario.
- Provide students with the skills necessary in order to design and deliver such activities.

8. Learning Outcomes

On successful completion of this module, the student should be able to
1. Identify suitable ICT tools for use in the teaching of mathematics.
2. Design, plan and deliver innovative mathematical learning activities using the Bridge21 model of 21C teaching and learning.
3. Critically reflect upon the planned and implemented technology mediated mathematics learning experiences.

9. **Course Content and Syllabus**
- Issues in maths education.
- Contextualised math pedagogy.
- Acceptance models for technology enhanced learning interventions.
- Classification of math learning tools.
- Bridge21 and maths education.
- Design principles for 21C math learning activities.

10. **Teaching and Learning Methods**
- A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.
- Learners will be encouraged to participate in a community of practice with their peers which will be supported by College’s VLE platform.
- College guidelines on universal accessibility will be followed.

11. **Required Equipment and Resources (if applicable)**
- Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools.
- Maths learning tools including GeoGebra and Woofram Alpha.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**
- Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of a number of contextualised mathematical learning activities with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

**The following items need to be submitted for grading.**
1. Description of the design of the learning experience and its theoretical underpinnings.
2. A media presentation on some aspect of the delivery of the learning experience.
3. A structured reflection on the experience.

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

**The assessment criteria are:**
- Demonstrating an understanding of how to create and deliver a 21C mathematics learning experience.
- The depth and richness of the reflection provided.

Each of the above criteria are weighted equally.

**Formative Assessment**
- Informal feedback will be provided to students on their initial draft of the planned learning experience.
- Informal feedback will be provided to students on their initial reflections.
- Peer (and tutor) feedback and support will be provided through the on-line community.

13. **Pass Requirement and assessment components to be listed in SITS**
- 50% overall and 50% in each of the 3 components, weighted equally
14. **Method of Supplemental Assessment**

Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

15. **Recommended Reading Materials / Indicative Resources**


Lawlor J., Marshall K., Tangney B., Bridge21 – Exploring the potential to foster intrinsic student motivation through a team-based, technology mediated learning model, Technology, Pedagogy and Education, in press.


16. **Evaluation**

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

17. **Module Coordinator**

Brendan Tangney

18. **Module Teaching Team**

Brendan Tangney; Aibhín Bray
1. **Title of Module**
Science, Technology, Engineering & Maths (STEM) Pedagogy

2. **Module Code**
TA21-Mod-8 Optional

3. **Entry Requirements (if applicable)**
TA21-Mod-1

4. **Level (JF, SF, JS, SS, Postgraduate)**
Postgraduate

5. **Module Size (hours and number of weeks)**
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. **ECTS Value**
5 ECTS

7. **Rationale and Aims**

   **Rationale**
   STEM teaching and learning in post-primary education, particularly the subjects of Science and Mathematics, has undergone major development in recent years. Furthermore, the new programme for Junior Cycle requires a 21st century pedagogical approach, with implications for both the theory and practice of STEM education. Teachers are now required to create learning opportunities for students to develop key skills, such as cooperative and collaborative learning, creativity and problem-solving. Other new developments in STEM pedagogy include the Nature of Science; constructivist and socio-cultural approaches; Project Maths and assessment for learning (AfL) in Science and Mathematics.

   **Aims**
   - Familiarise students with new developments in the area of STEM teaching and learning, including nature of science, introduction of problem-based, cooperative learning strategies, etc.
   - Support students to acquire and develop practical skills and capabilities to use emerging approaches in their day-to-day teaching.
   - Facilitate students to collaborate with their peers to develop their pedagogical skills, for example: planning and running practical and inquiry-based STEM lessons; questioning; assessment (including assessment for learning (AfL) techniques).
   - Encourage students to collaborate with one another in their practices (e.g. in co-teaching, lesson study), and to develop their awareness of continuous professional development.
   - Support students to develop a range of strategies to teach STEM as both creative and rigorous subjects.

8. **Learning Outcomes**

   On successful completion of this module the student should be able to:
   1. Explain the key tenets of social constructivist views of students’ learning in science.
2. Differentiate between forms of pedagogical practice, and use of creative, discursive, practical and problem-based activities, as a means of developing students’ literacy and numeracy skills.
3. Develop a research-informed approach to teaching and learning which can be implemented through the science curriculum.
4. Evaluate the application of inclusive education principles in the science classroom, and discuss how to promote an inclusive learning and teaching environment, showing awareness of and facilitating individual pupil needs.
5. Develop a self-reflective approach to their own teaching, reflecting on and improving their practice, and taking responsibility for identifying and meeting their developing professional and academic needs.

9. **Course Content and Syllabus**
- New approaches to teaching the theoretical and practical aspects of science courses in second level schools in Ireland, particularly at junior cycle level.
- Innovations in practical work and ICT in science teaching and learning.
- Theories of teaching and learning in science.
- Student attitudes to science in school.
- Fun activities in the science classroom which encourage learning and foster engagement.
- Focus on questioning to develop student learning in science.
- Formative (AfL) & summative assessment & grading.
- Numeracy and literacy in the context of science.
- Developing learning communities in the science classroom.
- Methods of collaboration in learning and teaching science.

10. **Teaching and Learning Methods**
Seminars and practical workshops will be delivered using the Bridge21 methodology, to include teamwork, problem-based, cooperative learning, collaborative learning and whole class teacher input and discussion. This will offer learners a flexible approach to teaching and learning.

Peer teaching, with special reference to practical science.

Learners will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform.

College guidelines on universal accessibility will be followed.

11. **Required Equipment and Resources (if applicable)**
Flexible learning space with ready-at-hand access to computers, with internet access.
Presentation facilities.
Science laboratory.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**
Online Portfolio, structured as follows:
1. Design and implement a series of lessons based on a chosen teaching and learning theory or approach relevant to improving science learning, and provide a description of how to implement the theory or approach.
2. Critically evaluate their implementation of the theory or approach using Video Stimulated Recall, to demonstrate what occurred during the lessons and whether the lesson objectives were met, and to reflect on the approach within this specific classroom and a self-reflection on the impact of the exercise on their own teaching practices.

Students will be encouraged to commence work on their online portfolio when they start the module. Regular discussion of portfolio entries with tutors will assist in their formative assessment throughout the duration of the module.
### 13. Pass Requirement and assessment components to be listed in SITS

| On line portfolio 50% |

### 14. Method of Supplemental Assessment

| Re-submission of assignment |

### 15. Recommended Reading Materials / Indicative Resources

| Black, P. and Harrison, C. (1990) Science inside the Black Box. King’s College London. (booklet) |
Journal articles and web references will be supplied during sessions.

16. **Evaluation**
An on-line module survey will be administered at the end of the module and this will be considered by the course team.

17. **Module Coordinator**
Colette Murphy

18. **Module Teaching Team**
Colette Murphy and the School of Education new post holders in Maths education and in STEM
MODULE SPECIFICATION

Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Bridge21 Advanced Methodology & Teacher as Co-Researcher

2. Module Code
TA21-Mod-9 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims

Rationale
This module builds on the introductory module on 21C learning using the Bridge21 methodology, with increased emphasis on the role of the teacher in critically monitoring and researching their own professional practice in the context of a learning community involving other teachers and researchers.

This module will provide students with a critical grounding in the principles and practices that underpin the generation of research-based evidence, with a specific focus on its affect on policy and practice in the domain of education. The development of educational practitioners’ abilities to critically reflect on and deconstruct secondary research has been a core set of competencies in the area of continuing professional development since the late 1960s. In developing this tradition, it is intended in this module to provide students with the capacity to undertake their own research, but to do so from a theoretically and methodologically informed perspective. It is also essential that this is situated with the reflective and reflexive practitioner tradition, to provide a meaningful link between theory, research and practice of implementing Bridge21other 21st century learning methodologies and effecting evidence-based change within the post-primary school context.

Aims
- To develop students' critical understanding of 21st century learning models, using the Bridge21 model as a concrete example.
- To provide students with a critical grounding in the key debates around research-based evidence both within and outside of education (e.g. medicine, social work, nursing).
- To introduce students to the range of research methodologies and research tools applied by research-based evidence practitioners.
- To develop students’ critical understanding of the reflexive dimensions associated with research-based evidence.
- To develop students understanding of the analytical techniques applied in the context of evidence-based research.
8. **Learning Outcomes**

*On successful completion of this module students should be able to:*

1. Identify and describe critically the range of methodological approaches that can be applied in the domain of educational research, with an emphasis on practitioner inquiry; action research and case study.
2. Apply the research process to investigate either instance of a 21C teaching and learning intervention or any out-of-classroom ‘school culture’ issue;
   Be able to distinguish between appropriate research methods and/or approaches for specific research questions.
3. Articulate the ground from which the analysis proceeds and from which arguments, evidence, explanations, and logic are assessed
   Use analytic skills in writing.
4. Write in a clear style and adhere to conventional academic practice with regards citations, footnotes, and referencing.
5. Demonstrate the independent learning ability required to advance his or her knowledge and understanding as part of their on-going professional development.

9. **Course Content and Syllabus**

Deconstructing the underpinning principles of research-based policy and practice.
Critically exploring the tools & techniques of data generation.
Fabricating evidence? The role of analysis and data representation and dissemination within research-based evidence policy and practice.
Design, development, implementation, evaluation and reporting of a technology enhanced project.
Overview of the research process & its key principles.
Research methods.
Data Collection Instruments.
Data analysis.

10. **Teaching and Learning Methods**

A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.
Learners will be encouraged to participate in a community of practice with their peers which will be supported by college’s VLE platform.
College guidelines on universal accessibility will be followed.

11. **Required Equipment and Resources (if applicable)**

Flexible learning space with access to computers, the Internet, digital projector.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**

Students will be required to undertake a small piece of research in their own school, as practical application of the foundational concepts and methodologies covered in the module.
Successful completion of the research will involve constructing a research proposal, conducting a research intervention which will allow them to collect and analyse data in order to present results and findings and producing a written report of 2,500 words.
The report will include a critical evaluation and self-reflection on the impact of the research exercise on their own professional practice. The assessment will be based on the written report of 2500 words.

13. **Pass Requirement and assessment components to be listed in SITS**

50%
14. Method of Supplemental Assessment

Resubmission of assignment

15. Recommended Reading Materials / Indicative Resources

<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Publisher/Location</th>
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**Relevant Websites**
- http://www.soc.surrey.ac.uk/sru/Sru.html
- http://www.nova.edu/ssss/QR/index.html
- http://www.uwm.edu:80/People/brodg/quals.htm
- http://www.essex.ac.uk/info/dataresources/
- http://sosig.ac.uk/
- http://www.bera.ac.uk/
- http://www.britsoc.co.uk/
- http://sjmc.cla.umn.edu/faculty/schwartz/ivsa/
- http://www.aera.net/

**Online relevant journals accessible via TCD library**
Students are strongly encouraged to use some of the following journals as part of their time on the module, which they should also use during their thesis work.
- *Journal of Mixed Methods Research*
- *Survey Research Methods*
- *Forum, qualitative social research*
- *Harvard Educational Review*
- *International Journal of Qualitative Studies in Education*
- *Qualitative Inquiry*
- *Qualitative Research*

16. Evaluation

An on-line module survey will be administered at the end of the module and this will be considered by the course team.

17. Module Coordinator

Dr Andrew Loxley

18. Module Teaching Team

Dr Andrew Loxley; Claire Conneely; Keith Johnston; Brendan Tangney; others
MODULE SPECIFICATION

Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Inclusive Education: issues related to equality, diversity and (dis)advantage in educational settings

2. Module Code
TA21-Mod-10 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims

*Rationale*
This module explores the socio-cultural factors that impact on the distribution of educational access, participation and advantage/disadvantage within the compulsory context. More specifically it will critically explore the socio-cultural and economic influences on equity and equality which are examined through discourses around inclusion that are related to issues pertinent to contemporary professional practice.

*Aims*
- To engage with policy and provision matters within education for students who are experiencing/have experienced or are at risk of marginalisation within educational environments.
- To explore the range of policy responses and modes of practice, nationally and internationally, which attempt to address issues relating to educational access, widening participation, ‘fair access’ and disadvantage.
- To examine theoretical understandings of ‘power’ and ‘empowerment’ as they relate to differential access, participation and outcomes in education contexts.

8. Learning Outcomes

*On successful completion of this module, the student should be able to:*
1. Identify and critically describe key issues related to educational (dis)advantage, including socioeconomic influences, ‘diversity and difference’, additional needs, access, marginalising factors.
2. Evaluate and apply educational theory to an analysis of educational access, participation, advantage and disadvantage and marginalisation in the Irish context.
3. Reflect on the relevance of sociological perspectives and concepts interrogated through the module, as they relate to students’ experiences of school and society with the intention of developing critical engagement and analyses of their daily school life.
9. **Course Content and Syllabus**
The course content is set within the Irish legislative framework and national/international literature examining the emergence and impact of Inclusion as an ideology and practice. It also explores socio-cultural theories and approaches significant to widening participation and fair access.

10. **Teaching and Learning Methods**
The teaching strategy is a mixture of seminars and workshops structured around pre-session readings.

11. **Required Equipment and Resources (if applicable)**
Flexible learning space with ready-at-hand access to computers, the internet, digital projector.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**
Students will be required to submit an evidence-based assignment (EBA) in ‘portfolio’ or essay format which will facilitate the opportunity to draw on any multi-media tools and techniques, demonstrating reflection-in-action. A choice of topics for this assignment will focus on issues relating to educational inclusion, educational access and/or participation.

The portfolio will provide a number of presentation options which will include: an essay; or a combination of media in light of the underlying aims of the entire programme, e.g. the use of digital technology; and/or the possibility of drawing from critical engagement with creative methodologies, e.g. visual, audio etc.

13. **Pass Requirement and assessment components to be listed in SITS**
Portfolio 50%

14. **Method of Supplemental Assessment**
Re-submission of assignment

15. **Recommended Reading Materials / Indicative Resources**

*Core Readings*


Supplementary Reading List


Websites
http://www.esri.ie (Economic and Social Research Council)

16. Evaluation
An on-line module survey will be administered at the end of the module and this will be considered by the course team.
17. **Module Coordinator(s)**  
Dr Paula Flynn; Cliona Hannon

18. **Module Teaching Team**  
Dr Paula Flynn; Dr. Lisa Keane; Cliona Hannon; others
MODULE SPECIFICATION

Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Leadership and Change Management in Education

2. Module Code
TA21-Mod-11 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims
   Rationale
   This module helps students to critically examine the role that leadership has in promoting change in schools and reflect on their own part in this process.

   Aims
   • To develop an understanding of leadership as a social and ethical practice with profound implications for learning, school and society.
   • To introduce students to the theory, research, policy and practice of leadership and change management with specific reference to the field of education.
   • To explore values and ideologies which underpin the current wave of structural reform and change in education; and their implications for school-level leadership and management.

8. Learning Outcomes
   On successful completion of this module, the student should be able to:
   1. Identify and critically discuss key issues related to educational leadership including influences of policy and governance, and change management at school level.
   2. Taking context into account, reflect critically on change theories and their implementation in practice
   3. Evaluate their conceptualisation of leadership within the context of their own schools.

9. Course Content and Syllabus
   This will be set within the context of national and international literature on educational leadership and management and will provide an opportunity to consider the school/community/teaching profession/society as a social system.

10. Teaching and Learning Methods
The teaching strategy is a mixture of seminars and workshops structured around pre-session readings.

11. **Required Equipment and Resources (if applicable)**

    Flexible learning space with ready-at-hand access to computers, the Internet, digital projector.

12. **Methods of Assessment (for example, essay, seminar paper, examination, presentation)**

    Students will be required to submit an evidence-based assignment (EBA) in ‘portfolio’ form, drawing on any multi-media tools and techniques, demonstrating reflection-in-action. The assignment will explore a school/student focused strategy within the context of leadership and change management.

    The portfolio will provide a number of presentation options which will include: an essay; or a combination of media in light of the underlying aims of the entire programme, e.g. the use of digital technology; and/or the possibility of drawing from critical engagement with creative methodologies, e.g. visual, audio etc.

13. **Pass Requirement and assessment components to be listed in SITS**

    Portfolio 50%

14. **Method of Supplemental Assessment**

    Re-submission of the assignment.

15. **Recommended Reading Materials / Indicative Resources**


16. **Evaluation**
An on-line module survey will be administered at the end of the module and this will be considered by the course team.

17. **Module Coordinator**
Dr Maija Salokangas; Clíona Hannon

18. **Module Teaching Team**
Dr Maija Salokangas; Dr Lisa Keane; Clíona Hannon; others
MODULE SPECIFICATION

Programme(s) to which Module applies
Certificate in Education (21st Century STEM/CS Teaching and Learning)

1. Title of Module
Information Literacy though Contextualised Inquiry

2. Module Code
TA21-Mod-12 Optional

3. Entry Requirements (if applicable)
TA21-Mod-1

4. Level (JF, SF, JS, SS, Postgraduate)
Postgraduate

5. Module Size (hours and number of weeks)
Eight student contact hours which will combine both workshops and seminars based around readings and tasks which encompass inquiry based activities. 100 hours of student effort.

6. ECTS Value
5 ECTS

7. Rationale and Aims
Rationale
The main means by which students at post-primary and third level seek out information is via Internet searching. Many post-primary and third-level students consider themselves to have good ICT skills, but these skills do not naturally equate to good information literacy. This module will encourage students to reflect upon and develop their own information literacy skills while engaging in genuine, contextualised inquiry. As such, the core principles of inquiry-based learning will also be outlined and demonstrated in practice. Grounded in the Bridge21 model, this course will require students to critically reflect on processes for finding and assessing information. In doing so they will learn about how they learn, and gain an understanding of how they think about knowledge. Emerging from this process, students will then be required to design and deliver their own inquiry-based scenario that promotes the development of information literacy rooted in their own discipline. The module will examine how an ‘information skills rich’ inquiry can be used in tandem with plenary and whole class discussion to create dynamic learning experiences.

Aims
- To introduce the 6 core concepts of information literacy.
- To introduce Inquiry Based Learning and empower students to design their own discipline specific inquiries.
- To encourage students to reflect upon and develop their own research skills.

8. Learning Outcomes
On successful completion of this module, the student should be able to.
1. Use the internet effectively as a research resource.
2. Design their own contextualised inquiry.
3. Plan and implement strategies to teach inquiry skills in the classroom context.
4. Reflect upon their own learning.

9. Course Content and Syllabus
Information Literacy:
The emerging standards for Information Literacy
The core skills attendant to meeting these standards
The application of these standards through problem and inquiry based learning

Inquiry Based Learning:
The process of inquiry design, resourcing and implementation
Discerning the balance between inquiry and content, situating the inquiry in learning
The design, delivery and critical assessment of a contextualised inquiry

10. Teaching and Learning Methods
A flipped classroom approach will be followed and the face to face student contact sessions will be delivered according to the Bridge21 methodology.
Learners will be encouraged to participate in a community of practice with their peers which will be supported by College’s VLE platform.
College guidelines on universal accessibility will be followed.

11. Required Equipment and Resources (if applicable)
Flexible learning space with ready-at-hand access to computers, the Internet, cameras (video and still), digital projector, sound recording, media editing and presentation tools.

12. Methods of Assessment (for example, essay, seminar paper, examination, presentation)
Students will be required to submit an evidence-based assignment (EBA) based on the creation and delivery of an inquiry based-learning experience with a group of learners of their choice. They will be required to reflect upon the lessons learned from the experience both for themselves as practitioners and for the target group of learners.

The EBA will comprise of the following items:
1. Description of the planned learning experience and its theoretical underpinnings.
2. A media presentation on an aspect of the delivery of the learning experience.
3. A structured reflection on the experience.

Students are free to use whatever digital media they wish for their submission but the written component should not exceed 2,500 words.

The assessment criteria are:
Demonstrating an understanding of information literacy and inquiry-based learning principles
Demonstrating an understanding of how to plan and implement a 21stC inquiry based learning experience
The depth and richness of the reflection provided.

Each of the above criteria are weighted equally.

Formative Assessment
Informal feedback will be provided to students on their initial draft of the planned learning experience.
Informal feedback will be provided to students on their initial reflections.
Peer (and tutor) feedback and support will be provided through the on-line community.

13. Pass Requirement and assessment components to be listed in SITS
14. 50% overall and 50% in each of the 3 components, weighted equally

15. Method of Supplemental Assessment
Failure in one component requires it to be resubmitted. Failure in 2 or more requires all 3 to be resubmitted.

16. **Recommended Reading Materials / Indicative Resources**

21st Century Learning


Lawlor J., Marshall K., Tangney B., Bridge21 – Exploring the potential to foster intrinsic student motivation through a team-based, technology mediated learning model, Technology, Pedagogy and Education, in press.


Information Literacy


Asselin, M. (2002) “I wish someone had taught me”: Information literacy in a teacher education programme, Teacher Librarian 30(2), 10-17


Enquiry Based Learning

Markham, T., (2013) Inquiry Learning Vs. Standardised Content: Can they Coexist?
17. **Evaluation**
An on-line module survey will be administered at the end of the module and this will be considered by the course team.

18. **Module Coordinator**
Dr. Danielle O'Donovan

19. **Module Teaching Team**
Dr. Danielle O'Donovan; Brendan Tangney; Keith Johnston; Kevin Sullivan; others
APPENDIX 2 Assignment Cover Sheet & Title Sheet

TRINITY COLLEGE

School of Education in association with School of Computer Science & Statistics (SCSS), Centre for Research in IT in Education (CRITE) and Trinity Access Programme (TAP)

Cover Page for Postgraduate Certificate in 21st Century Teaching and Learning Assignment Submission

Please ensure that this completed form accompanies your assignment.

SURNAME: ____________________________________________

FIRST NAME: __________________________________________

STUDENT NUMBER: ____________________________________

MODULE TITLE: _________________________________________

TITLE OF ASSIGNMENT: _________________________________

MODULE TUTOR: ________________________________________

DATE SUBMITTED: _____________________________________

WORD COUNT: _________________________________________

I hereby declare that the work in this assignment is entirely my own and that the content has not been substantially, or is concurrently being used to meet the requirements for another module on this programme or for the award of another academic qualification. It includes the published and unpublished work of others, which is duly acknowledged in the text wherever relevant.

SIGNED: _______________________________________________
Title page for each assignment

University of Dublin

Trinity College

[Module Title]

[Assignment Title]

by

John Murphy

01234567

A paper submitted to the School of Education, Trinity College Dublin, in partial fulfilment of the requirements for the award of the Postgraduate Certificate in 21st Century Teaching and Learning, January 2014
APPENDIX 3 Referencing Conventions

Introduction

In light of the increase in use of citation and referencing software such as EndNote or RefWorks, the School of Education has amended its citation and referencing conventions to accommodate the use of such software. The conventions adopted are those of the American Psychological Association (APA) and when using EndNote or other citation software, you should format all entries as “APA 6th”. The following indicates how cited work should be included in both the text of your thesis and the list of references at the end whether using software or not.

[The School of Education acknowledges the contribution of the State University of Sacramento in the preparation of this document]

IN TEXT

Throughout the body of your paper, note the author and date of research that you mention.

Author and Date Cited in Text (no parenthetical citation necessary)
In a 1989 article, Gould explores some of Darwin’s most effective metaphors.

Author Not Cited in Text
As metaphors for the workings of nature, Darwin used the tangled bank, the tree of life, and the face of nature (Gould, 1989).

Author Cited in Text
Gould (1989) attributes Darwin’s success to his gift for making the appropriate metaphor.

Direct Quotation with Name of Author
Gould (1989) explains that Darwin used the metaphor of the tree of life “to express the other form of interconnectedness—genealogical rather than ecological—and to illustrate both success and failure in the history of life” (p. 14).

Direct Quotation without Name of Author
Darwin used the metaphor of the tree of life "to express the other form of interconnectedness—genealogical rather than ecological" (Gould, 1989, p. 14).

For each of the samples above the correct "References" APA style format would be:


Quoting references that cite other works

To cite secondary sources, refer to both sources in the text, but include in the References list only the source that you actually used. For instance, suppose you read Feist (1998) and would like to paraphrase a sentence from Bandura (1989) within that book:
In this case, your in-text citation would be: Bandura (Bandura, 1989, as cited in Feist, 1998) defined self-efficacy as "people's beliefs about their capabilities to exercise control over events that affect their lives" (p. 1175).

Feist (1998) would be fully referenced within the list of References. Bandura (1989) would not be listed.

LIST OF REFERENCES

Begin your list of references on a new page, headed with the word “References” centred at the top.

Use “Reference” if there is only one.

Alphabetize the list by author’s last name. If there is no author given, start with the first significant word in the title.

For article titles, capitalize only the first word of the title and subtitle, and proper names.

Periodical titles should be written in full with both capital and lower case letters.

References are to be in a hanging indent format, meaning that the first line of each reference is set flush left and subsequent lines are indented (In Microsoft Office: Word 2007, choose Line spacing> Line spacing options> Indentation> Special> Hanging). Double space the entire list.

PRINT SOURCES: JOURNAL ARTICLES


One Author


Two to Seven Authors


Eight or More Authors

Note: Include all authors up to and including seven. For eight or more, include the first six, then an ellipsis, followed by the last author’s name.


Magazine Article

**Review of a Book**


**Daily Newspaper Article, No Author**

**Note:** Use *p* or *pp* before page number. If the article had more than one page but not continuous then the citation would be "pp. A12, A14."


**Letter to the Editor, Newspaper Article**


**Entire Issue of a Journal**


**PRINT SOURCE: BOOKS AND REPORTS**

Format: Author, A.A. (year). Title of work. Location: Publisher.

**Book**


**A Book by More than One Author**


**Edited Book**


**Corporate Author as Publisher**

    Washington, DC: Author.

**Anonymous Author**


**Chapter in a Book**


**ERIC Document**


**Government Report**


    Dublin: Stationary Office.

**ELECTRONIC (BROADCAST, ONLINE and WEB SITES)**

Many scholarly publishers have been assigning unique identifiers to each published article. The **DOI (Digital Object Identifier)** is an alpha-numeric code registered to each scholarly article in order to assign a persistent link to the article. The DOI has replaced the database name and URL in the list of references. Because the link is to the final version, do not include a retrieval date. Since DOI numbers are complex, copy and paste DOI into the reference. APA recommends that the DOI be included for print and online citations.

Citing electronic sources is similar to citing print sources; citations direct readers to the source or as close as possible.


**Full-Text Article with DOI assigned**


**Full-Text Articles without a DOI**

If no DOI has been assigned, provide the home page URL of the journal, book or report publisher. If you are accessing through a database, you may need to do a web search to locate the URL. It is not necessary to include the name of the database. There is no full-stop at the end of a reference citation ending with a URL.


**Online Newspaper Article**


**Research or Technical Report from a Web Site**


**Article from Web Site or E-journal**


**Webpage**


Note: Use (n.d.) if no date is given.
Television Broadcast

Electronic Book from Web Site

Electronic Book from Database

Wiki

Data set

Blog post

Audio podcast
APPENDIX 4 Assignment Report Form

University of Dublin
Trinity College

Assignment Report Form for Postgraduate Certificate in 21st Century Teaching and Learning. Modules

1. Student Name: 
2. Module Title
3. Assignment Title:
4. Date of Submission:
5. Length (adequate/inadequate):

<table>
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<th>Borderline</th>
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<th>Very Good</th>
<th>Excellent</th>
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<td>Illustration/incorporation of examples related to practice</td>
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Comments:

Strengths
Weaknesses
Areas for improvement

Provisional grade and mark awarded: (SUBJECT TO THE AGREEMENT OF THE COURT OF EXAMINERS)

Grade: Distinction [ ] Pass [ ] Fail [ ]

Mark (%): ______________

Signed: .................................................. Date: ..................................