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Attaining 21st Century Skills Online: A Programmatic Approach

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Abstract: This case study reports on the practical use of technology to support a programmatic approach to achieving learning outcomes. This is achieved through the provision of appropriate opportunities for online distance learning (ODL) students to achieve the range of 21st century skills needed to manage the complexity of future problems and continue to be critical consumers and producers of knowledge throughout their lives. A programme-focused assessment strategy is utilised on an ODL Humanities programme with a distributed, modular provision model, in order to satisfy related learning outcomes. This strategy allows for the deployment of a range of assessment types, many of which are only possible through the current affordances of online learning, for example, wiki-building in groups and debates using discussion forums. Both the students and the majority of the academic staff are off-campus, with technology providing the means for interaction and communication relating to assessment of learning outcome achievement. Technology is also the medium through which the off-campus subject experts who develop assessments receive appropriate, professional development such that they understand the pedagogical approaches and technological solutions available for assessment and feedback design and development. This paper will present the model through which this professional development takes place, and the way in which a team-based approach is used to ensure the appropriate design and development of assessments and related feedback mechanisms.

Keywords: 21st century skills; higher education; assessment strategy; learning outcomes; professional development

1. Introduction

This case study reports on the learning journey that the Humanities Programme Team (DCU Connected), in Dublin City University, have undertaken in the practical use of technology to provide appropriate opportunities for ODL students to achieve a range of 21st century skills. These are the skills students need in order to manage the complexity of future problems and continue to be critical consumers and producers of knowledge throughout their lives. DCU Connected has responsibility for ODL programmes in the National Institute of Digital Learning (NIDL), Dublin City University, and more specifically this case study relates to an undergraduate Humanities Programme which includes three DCU Connected qualifications: the Bachelor of Arts (Hons) in Humanities; the Bachelor of Arts (Hons) in English and History; and the Bachelor of Arts (Hons) in Humanities (Psychology Major).

2. Teaching and learning model

The teaching and learning model in use on the Humanities Programmes is underpinned by well-defined staff role delineation similar to other ODL models (Sangra, 2002). Team members can be both geographically distributed and functionally disaggregated in terms of their roles. A core, full-time team works with a larger part-time staff network from a variety of industry and academic backgrounds. With the full-time team members executing a wide range of roles and functions, centred on the coordination and management of the teaching and learning process, the part-time team members have very distinct and specific roles and responsibilities. The part-time team members consist of subject experts who execute a diverse range of quality assurance, learning, and teaching functions. Through their work they provide: academic leadership, design and develop academic learning resources, design and develop assessments; teach and support students through asynchronous and synchronous means, mark student assessments and provide detailed, timely feedback; and also review the quality of that marking and feedback.

3. Learning outcomes and a programme-focused assessment strategy

Appropriate design and development of assessments is important to a positive student experience, and poorly designed assessments can have a negative impact, which can diffuse into students’ wider lives (Race, Brown and Smith, 2005). An assessment should have a structured design, be clearly written, unambiguous, and comprehensive (Nicol and Macfarlane-Dick, 2006). Rossiter (2013) highlights the importance of assessment design that: ensures an assignment has broad-based coverage of learning outcomes and/or related accreditation requirements, graduate attributes, etc.; challenges students to excel though high but appropriate expectations, with penalties for unprofessional practices; and facilitates transition by mandating regular

engagement, with related support and feedback. Instructions for assignments need to provide students with guidance on the assignment task, how to complete the task(s), and the evaluation criteria for that assessment (Speck, 1998). This level of detail can be especially useful to those students who are new to, or have no recent experience of, higher education and off-campus students who need to study without access the cues and tacit information of the physical lecture-hall. Well-constructed and appropriate criteria for assessment evaluation allow students to inform their studies and also facilitate the organised provision of tutor feedback (Carless, 2006). Where students have been provided with the evaluation criteria along with the assessment instructions this can enhance the relevance of feedback received, which is useful as students often seek “better feedback, more frequently, and more quickly” (Nicol and Macfarlane-Dick, 2006; Whitelock, 2008, p.2), and feedback received has a powerful impact on student learning (Evans, 2013; Hattie and Timperely, 2007). However, feedback practices vary widely in Irish higher education (O’Regan et al., 2015), perhaps due to, as Nicol (2009) found in Scotland, there being little or no support for those marking student assessments.

In 2012 an initiative that was to be the first step in the design of a programme-focused assessment strategy began. This was to constructively align programme learning outcomes with assessments across the programmes, in addition to the pre-existing alignment between module learning outcomes and assessments. Programme-focused assessment is defined here as an assessment design that explicitly provides students with opportunities to achieve all module and programme learning outcomes as they progress through their programme (Brunton et al., 2016; PASS, 2012). Programme learning outcomes were examined in order to identify assessment types that could be utilised to provide appropriate opportunities for students to achieve a specific learning outcome. These assessment types were compared to assessments in use, with deficiencies being identified, for instance a need to bring in more reflections, presentations, and group-work in order to provide opportunities to achieve learning outcomes relating to communication, collaboration, reflection, etc. This initiative is in line with Boud and Falchikov’s (2006) comment that those designing and managing academic programmes need to look at the assessment practices they utilise and ask whether they are “able to adequately address a wider set of needs. Can they and do they equip students for a lifetime of learning?” (p.401). This initiative, and the programme-focused assessment strategy that followed, was underpinned by the idea that, as Goodyear (2015) describes,

“careful forethought, imagination, empathy and planning will often tilt the balance towards success. As many experienced teachers will know, when it comes to planning educational activities, the devil is often in the details: small oversights can have disproportionate effects on how a learning activity unfolds” (p.31).

This process allowed us to further realise many of the benefits identified in the literature of having programmatic constructive alignment (Biggs; 1996; Biggs; 1999; Biggs and Tany, 2007; Conole, 2013; Sharpe et al., 2010; Moule, 2007; Palloff and Pratt, 2009; Salmon, 2004). Specifically, we sought to promote both self-directed and collaborative learning in order to support stronger learning communities (O’Shea, Stone, Delahunty, 2015).

The implementation of the assessment matrix enhanced the variety of assessment types in use. Table 1 below shows the development of assessment use in Sociology modules, between 2017-2018 compared with 2012-2013. As can be seen the Assessment matrix facilitated a shift away from an over reliance on essays towards a range of different assessment types, while maintaining a strong focus on academic writing. These facilitated students in achieving a wider variety of learning outcomes relating to the development of knowledge, skills, and competencies.

Table 1: Assessment types in Sociology modules 2012-2013 and 2017-2018

Module	2012-2013	2017-2018
Sociology Foundation	Essay Online Discussion Essay Essay Examination	Study skills activity Information gathering task Writing task Essay
The Changing Social Environment	Essay Essay Essay Examination	Essay Online debate Essay Examination
Power, Social Order, Crime, Deviance, Work and Employment	Essay Essay Essay Examination	Reflective learning portfolio Literature review Online debate Case study project

Social inequality and Intergroup Relations	Essay Essay Essay Examination	Online debate Social policy task Essay Examination
Language, Culture and Society	Essay Essay Online Discussion Essay Examination	Essay Online discussion Case study and reflective eportfolio Examination
Research Methods and Project	Quantitative Research Methods Exercises Research School Examination Research Project	Draft Literature review Statistics Exercises Research School Report Research School Test Online contributions Weekly reports Journal Poster Presentation Dissertation

4. The Assessment Matrix

The assessment matrix facilitates the explicit linking of each assessment in a module to associated learning outcomes as well as the university's defined set of graduate attributes, which are a formal part of programme structures. Table 2 gives an example of this, where one of the assessments for a sociology module, 'The Changing Social Environment', is linked to graduate attributes and learning outcomes.

Table 2: Example of an assessment with related DCU graduate attributes and learning outcomes

Module	Sociology 2: The Changing Social Environment
Assessment Type	Online Debate
Assessment Question	Write a series of posts debating the following topic: <i>"Involvement of the State into the private domestic sphere has brought more harm than good for Irish family." vs. "Involvement of the State into the private domestic sphere has brought more good than harm for Irish family"</i> Chose and submit 6 posts to the online learning environment, Loop.
Module Learning Outcome	Reflect on the domestic context of social life and the factors that have impacted on its constituent concepts of family, household and home
Programme Learning Outcomes	<ul style="list-style-type: none"> • Utilise physical and/or electronic resources and tools in the preparation and presentation of academic work. • Participate constructively in group based activities • Employ individual, interpersonal, and team working skills to successfully complete a range of academic and practical tasks

DCU Graduate Attributes	<ul style="list-style-type: none"> • Effective Communicators “DCU motivates students to appreciate the importance of communication in all its dimensions. DCU graduates will be able to draw on appropriate skills to negotiate effectively, to collaborate, and to influence others.” (DCU Graduate Attributes, 2018) • Solution-Oriented “DCU emphasises the use of evidence and understanding as guides to action. DCU graduates will be adept at applying knowledge to issues encountered in the workplace and in society.” (DCU Graduate Attributes, 2018)
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A challenge in developing the assessment matrix was that it was necessary to spread assessment types across the programmes due to the flexible progression routes in this type of modular, continuous programme. While some restrictions are in place, the flexibility of module selection is a defining element of these programmes. Where programmes share a module the assessment types developed must work effectively for both qualifications. The matrix provides an overview of assessments to enable effective curriculum design work. This approach mitigates against over and under reliance on certain assessment methods. It enriches the feedback types for students and ensures a mix of assessment types across the students learning journey through the humanities programmes. Learning, and its design including the design of assessments, is too often decontextualized, where different aspects of a programme can be seen as distinct entities “apart from the bodies of knowledge and practices from which they are generated and on which they focus” (Boud and Falchikov, 2006, p.405). Nichol (2009), when discussing first year assessment, cautions against only making changes in assessments in some modules, which may “reduce the coherence of the first-year experience and send mixed messages about assessment and feedback requirements and expectations” (p.10). The assessment matrix details: assessment type; number of assessments; assessment weightings; marking rubrics; and the feedback format for every module. See table 3 below for an example of the assessment information relating to two modules on the Philosophy subject stream. A team-based approach, bringing together “content, pedagogical and technical expertise” (Burrell et al., 2015, p.1) is taken to the creation and iterative review of the matrix.

Table 3: Assessment Matrix for two philosophy modules.

Module	Assignment 1	Assignment 2	Assignment 3	Assignment 4	Exam
PH100	study skills activity Weighting 15%	information gathering task Weighting 20%	writing task Weighting 30%	Essay Weighting 35%	N/A
Phil2	Essay Weighting 10%	Online Discussion and Blog Weighting 20%	Extended Essay Weighting 20%	N/A	Weighting 50%

The assessment matrix is a key part of the Humanities Programmes’ quality assurance processes. The matrix is reviewed at annual subject review meetings. These discussions are also impacted by student feedback. The assessment matrix is approved by the Humanities Programme Board, and then by the Open Education Unit’s Teaching and Learning Committee. In this way the programme-focused assessment strategy is developed systematically by: the Humanities Programme Team who make sure constructive alignment of assessments to learning outcomes; subject teams, especially Subject Leaders, who make sure appropriate assessments are placed across modules; and Assessment Developers who develop the assessments themselves. The Humanities Programme Board and Open Education Unit’s Teaching and Learning Committee maintain an overview of the process, which demonstrates, to any internal or external stakeholders (Ascough, 2011), that this approach to assessment development is rigorous and transparent.

5. Professional development for Assessment Developers

The model of assessment development in use on the Humanities Programmes follows from a tutor-centered tradition of Open and Distance Learning (ODL) provision, which has evolved with the affordances of online learning (Sangrà, 2002; Simpson, 2013). The process of designing, developing and implementing assessments, as directed by the assessment matrix, is a disaggregated and distributed activity with the part-time academic staff involved being geographically spread throughout the Republic of Ireland. With much current discussion about unbundling of education we present our practice as one example of the opportunities and challenges inherent in a relatively high degree of division of labour in an ODL mode of academic work. The role of the Assessment

Developer is central to this mode of academic work. Assessment Developers design and develop assessments within a team-based context as they work collaboratively with the full-time team members and Subject Leader, communicating and working together through email, shared online documents, online meetings, and occasionally face to face meetings. The work is also carried out in line with existing templates, which include: detailed instructions for students; marking guidelines for the markers of the assessment; and rubrics, grading schemes and/or rubrics. An underpinning principle of this provision of pedagogical and practical guides to the Assessment Developers is an aim to ensure a consistent experience for students as they progress. Many Assessment Developers have been in that role for many years, with accumulated expertise relating to development of assessments for ODL students. Assessment Developers are often also Tutors, and so have additional experience of ODL teaching and learning.

Within the parameters of the requirements given to them as directed by the assessment matrix, the Assessment Developers are free to design and develop assessments. Developed assessments are reviewed to ensure consistency within and across assessment documents, and to ensure that due dates are spaced out appropriately, in order to manage student workload and support effective provision of feedback. Assessments are internally moderated by the Subject Leader. If there are any issues to be addressed the Subject Leader and team work collaboratively with the Assessment Developer to further develop the assessment(s), such that they are ready for release to students on the first day of the academic year.

In the iterative development of the assessment matrix difficulties can arise. Assessment Developers may not have previously engaged in this work in the context of a programme-focused strategy. Academics from particular disciplinary backgrounds may show resistance to, or ignorance of, those pedagogical approaches and practices that are beyond their existing practice (Burrell et al., 2015). Assessment Developers and/or students may be unfamiliar with, or hold pre-existing negative views of, particular assessment types, for example group work assessments (Donelan and Kear, 2018). These difficulties can be mitigated against through: providing information to, and engaging in discussions with, students and subject teams; the development of an asynchronous online course for Assessment Developers; and the provision of synchronous training for new Assessment Developers. Such challenges need to be overcome in order to ensure that the assessment matrix can be an effective part of the Programme's teaching and learning processes.

Assessment Developers may be more accustomed to scenarios where the design and development of assessments lay within their remit, and not where an Assessment Matrix indicates the necessary assessment types to be developed. For some, designing and developing 'non-traditional' assessment types requires a culture change, with negotiation required to gain acceptance of the new processes and different assessment types. For some the new processes were seen as encroaching on academic freedom (Fuller, Henderson and Bustamante, 2015; Haviland, Hi-Shin, and Turley, 2010). This resistance is consistent with research carried out by Haviland, Hi-Shin, Turley (2010, p.263) which found that "faculty members perceive accountability-driven assessment as at odds with their culture, priorities, and practices". Yang and Cornelious (2005) discuss other, similar changes in role for academic staff members, who may be more familiar with traditional modes of instruction, when becoming 'virtual instructors'. In developing 'non-traditional' assessments some may demonstrate "compliance without understanding" (Fuller et al., 2015, p.346), as they over-rely on templates supplied resulting in, for example, rubrics that did not appropriately reflect the assessment. Initial and ongoing discussion and negotiation is necessary as some Assessment Developers need more support in creating further iterations of assessments.

In order to support Assessment Developers there is a related online course within the university's Virtual Learning Environment (VLE), Loop, which is a customised version of Moodle. This course provided flexible professional development opportunities of the type recommended by Forsyth (2002). To adapt a point Yang and Cornelious (2005) make regarding online instruction, Assessment Developers must adjust their attitudes to creating assessments for ODL students, understand what qualifications are needed, and know what they can do to ensure the quality of those assessments. With the introduction of a number of assessment types to the assessment strategy, the main development work undertaken was in the expansion of the resources available to developers relating to different assessment tools and strategies. These resources detail: the benefits and pitfalls of each assessment type; the structure of assignment documentation for students (i.e. sources to be used, aims and objectives, which module/programme learning outcome is being assessed, detailed guidelines, assessment weightings, evaluation criteria, format for submission, and specific instructions relating to any digital technologies used); provide guidance on how to create assignment marking guidelines for Tutors; and supply sample assessment grading scheme/marking scheme/feedback grids.

Periodic professional development workshops are held to bring together the Assessment Developers to discuss the programme-focussed approach to assessment, and the assessment design and development process. These workshops often take place online using the Adobe Connect live, online classrooms. Workshops focus on developing the competencies and skills of Assessment Developers to enable them to create and design new forms of assessment and new approaches to feedback (Haviland, Hi-Shin, Turley, 2010). It is important to focus on student learning through the use of effective assessment technique, rather than just focus on assessment types (Fuller et al., 2015). More importantly workshops facilitate discussion with and between Assessment Developers, allowed time for the voicing of concerns, and for proposing ideas on how different forms of assessment and related approaches to feedback can be developed. Workshops allow assessment writing communities to form within subject areas, which make discussions around approaches to assessment and feedback more cohesive. Overall, workshops provide an opportunity to model the type of participatory pedagogies we wished to enact with students amongst ourselves as an ODL teaching team.

This is an ongoing iterative process that must produce a variety of assessment types that also satisfy subject teams' preferences for assessments in their subject area. Specific educational practices, which Schulman (2005) has termed signature pedagogies, can play longstanding and important roles within different disciplines of study. A study is currently underway to examine the experience of Assessment Developers in the processes described above.

6. Technology Enhanced Assessment Methods

Following the identification of the different assessment types needed to provide appropriate opportunities to achieve learning outcomes, these assessments then need to be designed and developed for the online distance learning context. Technological solutions were needed to facilitate the achievement of the pedagogical goals bound up with the use of these varied assessment types. Table 4 below provides an overview of the technologies in use for the variety of assessment types in use:

Table 4: Technology Enhanced Assessment Approaches

Assessment	Tool(s)
Online presentation	Adobe Connect
Online debate	Moodle discussion forum
Wiki	Moodle Wiki
Reflection on learning	Mahara eportfolio
Peer review	Moodle Workshop
Student created video presentations	Screencasting software, webcam or mobile phone, Youtube
Group project	Google docs, Google Hangouts
Reflective journal	Moodle journal
Formative assessments	Moodle quiz, moodle lesson
Online assignment submission	Moodle assignment, Urkund text matching

The institutional VLE was the primary enabler of technology enhanced assessment. Each module on the Humanities programmes has a Moodle course where the students engage with tutors, fellow students, learning resources and assessments. Students engage with tutors and students via the module discussion forums and in the Adobe Connect live, online classroom. Students engage with assessments on the module's Moodle course that contain the assessment information and links to the necessary technological tools such as Moodle Wiki, Moodle Quiz, a Mahara eportfolio, etc.

7. Communication

Due to the distributed and disaggregated nature of our online distance teaching and learning model, the majority of students and academic staff are off-campus (Sangra, 2002). Technology is fundamental to communication and interaction between ODL staff and students. The formal communication tools which are available in our institution to facilitate interaction are Moodle discussion forums, email (Google Apps for Education) and Adobe Connect live online classrooms. Informal communication tools adopted by the student community are Whatsapp groups and social media such as Facebook groups. The formal and informal communities of staff and students enabled by communications technology are essential sources of support, encouragement and human connection in the context of an online distance learning programme (O'Shea, Stone, Delahunty 2015; Andrews and Tynan 2012). A research study is currently being planned to investigate the role of formal and informal communication methods in an online distance learning context.

8. Summary

This paper provides a case study of how a framework can be implemented in an online distance learning context whereby the practical use of technology, led by appropriate pedagogy, can provide appropriate opportunities for the achievement of 21st century skills. The development over time of a programme-focused assessment strategy has facilitated the deployment of a variety of assessment types linked to learning outcomes. A team-based approach is utilised at each level of this work: the iterative, annual review and development of the assessment matrix; the design and development of assessments; and the choice of appropriate technological solutions in the assessment design and development process. It is within this team-based approach that assessment

developers receive professional development such that they understand the technological solutions available for assessment and feedback design and development. Such professional development is necessary to avoid, minimise, and counteract the resistance to, or ignorance of, pedagogical approaches and technological solutions for assessment and feedback design and development.

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