



Report for the Period January 2016 – September 2017

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Director's Overview



I am delighted to be presenting the first report on the work of CARPE. A verbal rather than written report on activities during the first ten months of the centre's existence was presented to the Advisory Board in October 2016. This report covers some of that material and spans the period January 2016 until September 2017.

Being appointed Director of a new centre is challenging but incredibly exciting and invigorating also. It was my good fortune that Dr. Darina Scully took up her position as a post-doctoral researcher at CARPE in March of 2016 and Anastasios Karakolidis joined as a full time doctoral student in August of that year. Over the past eighteen months or so, our small team has initiated and progressed a significant programme of research and research related activity that mark CARPE out as a significant force within the Irish educational landscape and beyond. I am incredibly proud of the fact that we have:

- published five peer reviewed articles and presented at six peer reviewed conferences;
- delivered eleven research reports to Prometric;
- launched six major research projects in Education – (Animations in Assessments, Survey on Standardised Testing in Primary Schools, Assessment of Learning about Wellbeing at Second Level, Assessment of Critical Thinking at DCU, Review of Learning Portfolios in Higher Education, and Assessment of Bullying in the Workplace);
- initiated two new empirical projects using Prometric data;
- organised the appointment of two adjunct professors;
- collaborated with six staff members from four DCU faculties in new CARPE research projects;
- overseen the work of two international doctoral students during a two-month summer internship programme (supported by Boston College);
- established links with two DCU research centres and one international assessment centre
- organised the CARPE launch, first annual lecture and four CARPE seminars;
- supervised two doctoral students to completion (plus one in year 2 and one in year 4);
- secured an additional fully funded Prometric PhD (to be filled shortly);
- overseen the recruitment of three additional doctoral students (one with partial funding from CARPE).

Getting off to a good start is important for any new venture, but real success requires a plan for the longer term. I have thought a lot about what can realistically be achieved at CARPE over the next three years and tried to visualize the way in which the centre might grow and thrive. In doing so, my mind's eye has created a picture of a vibrant and internationally recognised centre delivering on its mission to shape assessment policy and practice across all levels of the educational system and across the professions. It has sufficient funding to support a full time Director and Deputy Director, as well as two full time postdoctoral researchers, two full-time and two part-time doctoral candidates. Another four part-time PhDs are also being supervised by staff at the centre. At least twelve staff members at DCU are directly involved in CARPE related research and teaching

activities. In addition, the work of the centre is supported by at least four adjunct professors and the regular contributions of up to four international interns and four visiting scholars. CARPE staff members are engaged in at least two significant international research projects in cooperation with researchers based in other universities and/or research centres and the centre has established a growing reputation for research and development in “difficult to assess” areas such as wellbeing, critical thinking, tacit knowledge and other 21st century skills. In Ireland, CARPE is at the forefront in research and policy formation around reform in assessment within the Irish second level system. The centre is the “go to” location for those wishing to develop high level expertise in assessment and measurement and up to ten individuals are engaged in professional development in the area (through short courses and/or postgraduate work in Ireland and partner institutions abroad). In addition, CARPE staff members are actively involved in undergraduate and postgraduate teaching with a focus on classroom assessment and measurement.

I believe that this vision is achievable with hard work, a clear focus on activities that support CARPE's mission and, above all, a team of brilliant people dedicated to improving assessment in all its guises. I look forward to what we can achieve together in the years to come.

Before signing off I would like to express my gratitude to the members of the Advisory Board for agreeing to be such an important part of CARPE and for their encouragement and support over the past year. I am also indebted to Linda Waters and Steve Williams for their invaluable assistance with the programme of research undertaken on behalf of the Prometric. In presenting this first report, I am conscious that CARPE would not exist were it not for Professor Brian McCraith's deep interest in assessment and former Prometric CEO Michael Brannick's decision to support his idea for a new assessment centre at DCU. Recently, I have had the pleasure of meeting new Prometric CEO, Charles Kernan and I would like to take this opportunity to wish him well in his new role. Finally, I would like to acknowledge all those colleagues at the Institute of Education who have been so incredibly kind to me during my recovery from various eye surgeries over the past two years.

A handwritten signature in purple ink that reads "Michael O'Leary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Prof. Michael O'Leary
Prometric Chair in Assessment
Director – CARPE

Research Programme

An extensive research programme aiming to address several challenges posed by both existing and new conceptions of assessment is underway at CARPE. The programme can be broadly divided into (i) research focusing on assessment in education and (ii) research focusing on assessment for credentialing and licensure in the workplace. There is, however, a notable overlap between these contexts in terms of key measurement and validity issues, and in many cases, it can be expected that outcomes arising from research in one context may inform and guide certain elements of the other.

CARPE's research on assessment in education has spanned various levels of the educational system, and has involved collaborations with partners both within and outside of DCU, and internationally. In the field of credentialing and licensure, we have completed a series of reports on a range of topics pertinent to the test development industry, as identified by our funders, Prometric. These bespoke reports review up-to-date literature, provide recommendations for best practices, and finally, identify topics of interest for future research – some of which we are now exploring through a series of follow-up empirical studies.

* * *

Research on Assessment in Education

(i) Exploring the Use of Standardised Assessments in Irish Primary Schools

Project Directors: Michael O'Leary (CARPE) & Deirbhile NicCraith (INTO)

Since the publication of the Assessment Guidelines for Primary Schools in 2007, there has been a stronger focus on assessment in schools. There are many forms of assessment, of which standardised testing is one. Standardised tests have gained in importance since 2012 when schools became obliged to forward the results of these tests to the Department of Education and Skills.

The purpose of this research was to explore the use of standardised tests in literacy and numeracy in primary schools in Ireland (ROI). Issues addressed included teachers' understanding of standardised tests, how standardised tests are used formatively and diagnostically and the experiences of schools in reporting on the results of standardised tests. Data on teachers' professional development needs with respect to standardised testing were also gathered.

Following a year-long development and piloting process, a questionnaire was distributed in hard copy and online to a random sample of 5,000 teachers in May 2017. The first set of findings from the survey will be published in the spring of 2018, and it is intended that these findings will inform both policy and practice regarding standardised testing in Irish primary schools.

(ii) Assessment of Critical Thinking in Dublin City University (ACT@DCU)

Project Director: Michael O’Leary

ACT@DCU is a pilot study investigating the extent to which an online test developed by the Educational Testing Service (ETS) in the United States to assess critical thinking (CT) in higher education is suitable for use in DCU. The study has two major aims. First, data from the administration of the test to 225 First Year students in 2017 and 225 Final Year students in 2018 will be used to validate the test in a non-US context, *e.g.* comparing the DCU item statistics and factor structure to the international item statistics and factor structure. The data will also provide a basis for comparisons between DCU and other institutions internationally.

In addition, this study seeks to determine if the test can measure growth in CT from First Year to Final Year in DCU. In the pilot, this will be achieved with current First Years and Fourth Years. Leaving Certificate points will be used as a control variable to account for the fact that we are measuring two different groups. The intention is that if the psychometric properties of test hold up in the DCU context, the First Year cohort will be tested again in 2021 when they are in Final Year.

Over time, we hope that data from the test will help to facilitate conversations among staff regarding pedagogy, curricula and educational interventions to improve teaching and learning of CT; be integrated with other non-cognitive and co-curricular indicators of student success at DCU (*e.g.* Loop Reflect); and provide evidence of institutional and programme-level learning outcomes in CT.

(iii) Review on the Use of Learning Portfolios in Higher Education

Project Directors: Darina Scully, Michael O’Leary (CARPE) & Mark Brown (NIDL)

In recent years, portfolios (and ePortfolios) have come to be used as pedagogical and evaluative tools in a wide variety of disciplines, and across all levels of the education system. Artefacts that may be presented in a learner’s portfolio include samples of their writing, photographs or videos documenting their accomplishments, and teachers’ evaluations of their performance in a given area. Learning portfolios are a specific type of portfolio that may also include drafts and ‘unpolished work’, with the focus on both the process of compiling the portfolio as well as the finished product. Reflective pieces, ongoing formative assessment and feedback are key elements of learning portfolios, and the overall goal is to facilitate and document learning over time.

It has been hypothesized that learning portfolios may be especially suited to the development and assessment of integrated, cross-curricular knowledge and generic skills/attributes (*e.g.* critical thinking, creativity, communication, emotional intelligence), as opposed to disciplinary knowledge in individual subject areas. This is of particular interest in higher education contexts, as universities and other parts of the sector face growing demands to bridge a perceived gap between what students learn, and what is valued by employers.

In conjunction with the NIDL, CARPE is in conducting a comprehensive review examining the state of the field regarding learning portfolio use in higher education. Specifically, the review aims to (i) evaluate the extent to which there is sufficient empirical support for the effectiveness of these tools, (ii) highlight potential challenges associated with their implementation on a university-wide basis, (iii) form recommendations with respect to ‘future-proofing’ the practice and (iv) identify gaps in the field that may guide the development of future pilot studies and investigations regarding learning portfolios across various faculties within DCU. The review is due to be published in February 2018.

(iv) Development of an Instrument to Measure Learning about Wellbeing in Secondary Education

Project Directors: Catherine Maunsell (Institute of Education), Michael O’Leary (CARPE), Larry Ludlow (Boston College) & Gulsah Gurkan (Boston College)

The significance of wellbeing with respect to developmental and educational outcomes for children and young people is unequivocal. The objective measurement of wellbeing is a relatively recent and growing academic pursuit and this particular study seeks to examine a heretofore understudied area namely, the potential use of scenarios/vignettes to measure young peoples’ experience of wellbeing as a consequence of their engagement with efforts to enhance it within second-level schooling.

The impetus for this study can be found in recent curricular reforms within the Irish second level (high-school) education context. Of particular relevance is the new subject area of Wellbeing within the reformed Junior Cycle programme. Following stakeholder consultation, the National Council for Curriculum and Assessment (NCCA) has published the Guidelines for Wellbeing in Junior Cycle 2017. In highlighting the use of a wide variety of assessment approaches such as projects, presentations, self and peer assessment, the guidelines point towards more class-based assessment of students’ learning. As a consequence, the development of objective assessment tools that will aid student and teacher judgement making warrants serious academic attention.

(v) Development of an Instrument to Measure Bullying in the Workplace

Project Directors: James O’Higgins Norman (Anti Bullying Centre), Michael O’Leary (CARPE), Larry Ludlow (Boston College) & Sebastian Moncaleano (Boston College)

Bullying research has gained a substantial amount of interest in recent years because of the impact on the emotional and social development of children, adolescents and adults. Assessment measures have generally focused on school bullying and interactions between peers. The most widely used assessment is the Olweus Bullying Questionnaire (OBQ) which characterises peer bullying behaviour as involving at least one of the following: physical harassment, verbal abuse, relational or exclusion bullying and cyberbullying. This tool and others of its kind are advantageous to research but still pose certain issues in terms of providing absolute measures of bullying behaviour.

One recent meta-analysis conducted by the Anti-Bullying Research Centre (DCU) showed that a range of methodological issues influenced the rates of bullying in studies across Ireland, even if the same assessment scale was used. These included: the use or lack of a definition of bullying, the timeframe participants were referred to (*i.e.*, ‘ever’ to ‘one month ago’) and even how answers were categorised (‘frequent’ to ‘occasional’). While the OBQ has been validated in several large scale and international studies among school children, there is no equivalent for adult or workplace bullying. This research will draw on a literature review on current approaches to the assessment of workplace bullying to develop a Rasch measurement scale using scenarios/vignettes that can be trialled with a small sample of Irish adults.

(vi) Animated Video-Based vs. Text-Based Assessment of Practical Intelligence (PhD Project)

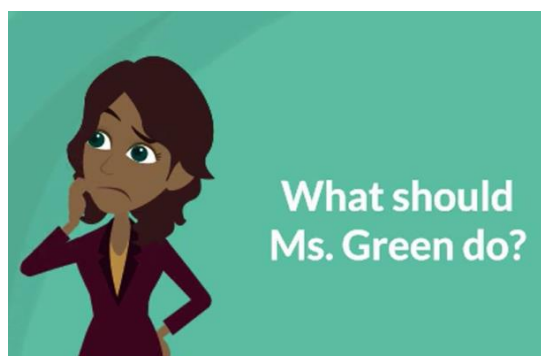
PhD Candidate: Anastasios Karakolidis

Project Supervisors: Michael O'Leary & Darina Scully

Although technology provides a great range of opportunities for facilitating assessment, text is usually the main – if not the only – means used to explain the context, present the information, and communicate the question in a testing process. Written language is often a good fit for measuring simple knowledge-based constructs that can be clearly communicated via text (such as historical events), nevertheless, when assessments provide test takers with large amounts of sophisticated information in order to measure complex constructs, text may not be suitable for facilitating this process. Animations may be a pioneering way of presenting complex information that cannot be easily communicated by written language. To date, however, research literature on the use of animations in assessment is currently scarce.



This PhD project is focused on (a) the development and validation of an animated situational judgement test to assess teachers' practical intelligence, (b) the investigation of test-takers' views about this instrument and (c) the examination of the extent to which this animated test provides a more valid assessment of test-takers' knowledge, skills and abilities, compared to a parallel text-based version of the test.



Research on Assessment for Credentialing & Licensure in the Workplace Reports

(i) “Some Recommendations for Item Development”

Author: Darina Scully | Submitted to Prometric: 20/05/16

This report provides an overall synopsis of the literature pertaining to the development of multiple-choice (MC) items. It draws on various systematic reviews that have culminated what are now regarded as general “rules” for MC item-writing, but notes the excessive role that has been played by expert opinion – as opposed to empirical evidence – in the formation of these guidelines. With this in mind, this report also pays close attention to recent experimental studies that have explored item performance indicators associated with various characteristics, and on this basis, provides an up-to-date and empirically-informed series of recommendations for MC item development.

(ii) “Constructing Multiple-Choice Items at Higher Levels of Cognitive Complexity”

Author: Darina Scully | Submitted to Prometric: 13/07/16

MC items are frequently used by educators and test developers due to their objective and cost-efficient nature. However, they are often criticized for their perceived inability to assess higher-order thinking process (*e.g.* application, analysis and synthesis), given that the correct answer is provided amongst the response options. This is concerning, given the increasingly recognized importance of higher-order thinking in educational discourse, and the centrality of these types of skills in many professional environments.

This report provides a comprehensive review of the literature investigating the capacity of MC items to measure higher-order thinking. On the basis of the literature, it is argued that it is indeed possible to construct MC items measuring such processes, provided certain strategies are followed. Finally, these strategies are outlined and explained, using practical examples.

(iii) “Awarding Partial Credit in Multiple-Choice Testing”

Author: Darina Scully | Submitted to Prometric: 01/09/16

MC test developers have typically shown a strong preference for the single-best answer response format and number-correct scoring. Despite this, some measurement experts have expressed dissatisfaction with these methods, as they assume a sharp dichotomy between knowledge and lack of knowledge, and information regarding test-takers’ partial knowledge on an item-by-item basis may contribute significantly to the estimation of true proficiency levels.

In response to this criticism, a number of alternative testing models that facilitate the allocation of partial credit have been proposed. This report discusses and critiques three such approaches; namely: option-weighted scoring, confidence-weighted responding, and the liberal multiple-choice item format. To date, findings regarding the application of these approaches have been complex and equivocal, with no one method emerging as uniformly superior. Ultimately, whether or not it is worth pursuing these strategies depends on a combination of multiple factors, such as the overall purpose of the assessment, the overall difficulty of the test, the cognitive complexity of the items, and the particular psychometric properties that are most valued by the test developer.

(iv) “Simulations: Fidelity and the Uncanny Valley”

Author: Anastasios Karakolidis | Submitted to Prometric: 04/10/16

The use of animated simulations is becoming increasingly popular in the field of assessment, as a means of providing more realistic contexts in which test-takers can demonstrate their knowledge and skills. The development of these virtual environments can be a complex and expensive process, however, and there are many aspects which require careful consideration. One of the most important aspects is fidelity; *i.e.* the degree to which a simulation accurately presents a situation.

Intuitively, it is often assumed that higher fidelity is preferable; however, there are some instances in which this may not be the case. In 1970, Masahiro Mori developed the “*Uncanny Valley*” hypothesis, which posits that making robots or animated characters more humanlike tends to increase perceivers’ affinity with the characters to a point, but that once that point is exceeded, animated characters become too realistic and may evoke a feeling of ‘eeriness’ in perceivers.

This report discusses the advantages of using animations and simulations in assessment, presents an up-to-date review of Mori’s “*Uncanny Valley*”, and provides practical implications for the development of animations and simulations, with a specific focus on animated characters.

(v) “Competency-Based Assessment”

Author: Darina Scully | Submitted to Prometric: 24/10/16

In recent years, the terms ‘competency’ and ‘competencies’ have gradually infiltrated the discourse surrounding assessment of all types. One of the biggest challenges facing the competency paradigm; however, is the plethora of different interpretations of this term within the literature. This report unpacks the concept of ‘competencies’, and considers how they differ from traditional KSA (knowledge, skills and abilities) statements. Among the issues considered in this report are:

- whether or not competencies can be considered to be directly observable
- whether competencies encompass personal attributes in addition to skills and abilities
- whether competency statements describe superior or effective performance/achievement
- whether competencies are best ‘atomistic’ or ‘holistic’ in nature

(vi) “Situational Judgement Tests”

Author: Darina Scully | Submitted to Prometric: 15/11/16

Originating in and most commonly associated with personnel selection, Situational Judgement Tests (SJTs) can be loosely defined as assessment instruments comprised of items that present a job-related situation, and require respondents to select an appropriate behavioural response to that situation. Traditionally, SJTs are assumed to measure tacit, as opposed to declarative knowledge; but debate about the precise nature of the construct(s) underlying SJTs persists.

In recent years, the use of SJTs - and consequently, research into their development and implementation - has become increasingly prevalent. This report provides an overview of what is currently known about SJTs on the basis of this research. For example, they are favoured for their moderate to good predictive validity across a variety of job roles and their potential to add value over other known predictors of performance, and it has been demonstrated that they have less adverse impact on certain subgroups, when compared with cognitive ability tests.

(vi) “Providing Effective Feedback in the Context of Certification and Licensure Testing”

Authors: Michael O’Leary & Darina Scully | Submitted to Prometric: 14/02/17

In recent years, there is increasing pressure on test developers to provide diagnostic information that can help unsuccessful test-takers improve future performance and assist academic and training institutions in evaluating the success of their programmes and identifying areas that may need to be modified. This growing demand for diagnostic feedback is also evident in the Standards for Educational and Psychological Testing, which states that “candidates who fail may profit from information about the areas in which their performance was especially weak” (AERA, APA & NCME, 2014, p. 176). Test developers face a substantial challenge in attempting to meet this demand, whilst simultaneously upholding their ethical responsibility to ensure that any test data that are reported and shared with stakeholders, or used to make educational, certification or licensure decisions are accurate, reliable and valid. This report investigates the issues involved in reporting test sub-scores, and outlines a number of approaches (e.g. scale anchoring, level descriptors and graphical methods) that could be taken when reporting in large scale testing contexts.

(vii) “The Development and Provision of Practice Tests”

Authors: Anastasios Karakolidis, Michael O’Leary & Darina Scully | Submitted to Prometric: 28/02/17

This report presents key findings arising from the literature regarding the efficacy of practice tests. On the basis of the findings, a series of recommendations for best practice regarding the development and provision of practice tests are made, and potential directions for future research outlined.

(ix) “Situational Judgement Tests (Part II)”

Author: Darina Scully | Submitted to Prometric: 15/06/17

This report is a follow-up to the initial report on the topic of Situational Judgement Tests (SJTs) submitted in November 2016. Drawing on the most recent literature in the field, it considers and critiques various approaches to the development, keying and scoring of SJT items, and offers practical advice on each of these aspects to SJT developers. In addition, it considers which types and formats of SJTs will best facilitate the provision of diagnostic feedback. Finally, it explains how SJTs can assess higher levels of cognitive complexity.

(x) “Reducing Gender Bias in Tests and Test Items”

Author: Darina Scully | Submitted to Prometric: 17/07/17

This report considers the issues of fairness, bias and construct-irrelevant variance in testing, with specific reference to gender. It discusses the various ways in which gender bias may inadvertently be introduced during item and test development, and also considers empirical approaches to the detection of gender bias (e.g. differential bundle functioning). Possible sources of bias in terms of wording, content, cognitive processes and item types are discussed. Drawing on the most up-to-date literature and guidelines, practical advice on how to reduce gender bias is offered.

(xi) “Remote Proctoring: Current Knowledge of an Emerging Practice”

Authors: Anastasios Karakolidis, Michael O’Leary & Darina Scully | Submitted to Prometric: 11/09/17

In recent years, technology has facilitated the emergence of new phenomena – many of which have the potential to transform the testing industry – but perhaps none more so than online proctoring. This report gives an overview of the concept of online proctoring (terminology and various formats, how it is currently used), and emphasizes the exponential growth that is expected to occur in this market over the next 10 years. Empirical research focusing on (i) stakeholders’ perceptions of the online proctoring process and (ii) comparisons of online-proctored vs. onsite-proctored exams is then reviewed. Finally, the technological, ethical and legal challenges associated with online proctoring are considered.

Empirical Studies arising from Reports

(i) A comparison of 3 vs. 4 option MCQs

Project Directors: Darina Scully & Michael O’Leary

A strong body of research spanning 30+ years suggests that the optimal number of response options for an MC item is three (one key and two distractors). Three-option MC items require considerably less time to construct and administer than their four- or five-option counterparts. Furthermore, they facilitate broader content coverage and greater reliability through the inclusion of additional items. Curiously; however, the overwhelming majority of test developers have paid little heed to these factors. Indeed, it is estimated that <1% of contemporary high-stakes assessments contain three-option items. This phenomenon has often been commented on, but not yet satisfactorily explained.

In collaboration with Prometric, CARPE have conducted a study comparing item performance indices and distractor functioning (based on responses from more than 1,000 test candidates) across 20 stem-equivalent three-and four-option items from a high-stakes certification assessment. Findings from the study – which support the practice of constructing 3-option items – have been disseminated at two international conferences (ATP, March 2017 and E-ATP, September 2017). It is hoped that these findings will help guide future decisions regarding item development, and add to the current body of literature on this topic by exploring the issue specifically within a certification and licensure context.

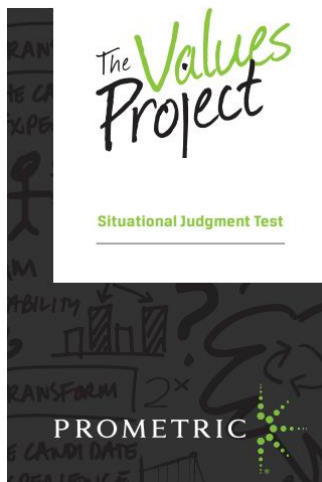


Darina Scully presents findings from the 3 vs 4 option MCQ project at the E-ATP Annual Conference in Noordwijk, The Netherlands.

(ii) Exploring various methods of scoring SJTs

Project Directors: Darina Scully, Michael O'Leary, Anastasios Karakolidis

SJTs are often discussed as though they were a discrete entity, but in reality, there are many variations in terms of how these instruments are developed, keyed and scored, each of which may have important consequences for the validity of any subsequent judgements based on their use. In terms of development, SJT items are often derived from *critical incidents*, whereby subject matter experts gather anecdotes about situations typically encountered in a particular job role. As this method typically gives little consideration to the underlying construct(s) assessed, it often results in poor psychometric properties, and consequently, a limited ability to justify and defend the use of the test. Furthermore, as SJT items do not have demonstrably 'correct' answers, decision criteria for both keying and scoring are – to some extent – subjective.



In an effort to explore some of these issues, CARPE administered a 16-item critical-incident SJT (adapted from a training and development initiative at Prometric called the *Values Project*) to a sample of 153 Prometric employees. Construct, criterion and face validity evidence was examined across two different keying methods and five different scoring methods. Preliminary findings were presented at *E-ATP* in September 2017.

Overall, these findings were in line with previous research suggesting that SJTs are associated with high face validity. In addition, they underlined the complexity of the constructs measured by SJTs, and suggested that the critical incident development method applied to a company-specific test may yield a measure of organizational culture as opposed to a measure of behavioural effectiveness. Finally, some support arose for the idea that scoring systems placing greater emphasis on knowing what *not* do (as opposed to more traditional systems rewarding 'knowing what do to') may be associated with the highest predictive validity.

Research Outputs

Peer-Reviewed Journal Articles

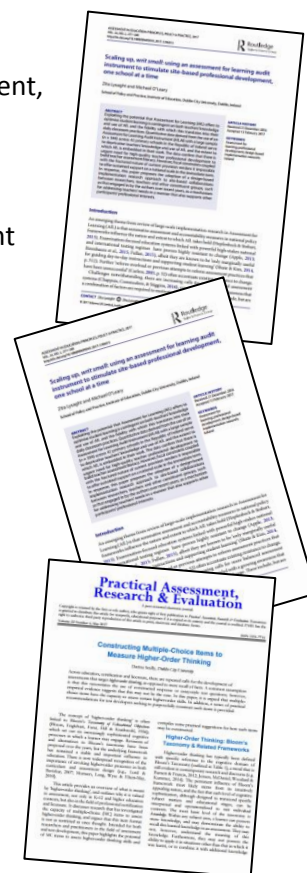
Lysaght, Z., & O'Leary M. (2017). Scaling up, writ small: using an assessment for learning audit instrument to stimulate site-based professional development, one school at a time. *Assessment in Education: Principles, Policy and Practice*, (24)2, 271-289

Karakolidis, A. Pitsia, V. & Emvalotis, A. (2016). Examining students' achievement in mathematics: A multilevel analysis of the Programme for International Student Assessment (PISA) 2012 data for Greece. *International Journal of Educational Research*, 79, 106-115

Karakolidis, A., O'Leary, M. & Scully, D. (2017). Practice tests: do they work? Can they work better? *CLEAR Exam Review*, 27 (1), 12-16

Pitsia, V., Biggart, A. & Karakolidis, A. (2017). The role of students' self-beliefs, motivation and attitudes in predicting mathematics achievement: A multilevel analysis of the Programme for International Student Assessment data. *Learning and Individual Differences*, 55, 163-173.

Scully, D. (2017). Constructing Multiple-Choice Items to Measure Higher-Order Thinking. *Practical Assessment, Research & Evaluation*, 22 (4). Available online: <http://pareonline.net/getvn.asp?v=22&n=4>



Conference Presentations

Karakolidis, A., Scully, D. & O'Leary, M. (2017, March 6). *Simulations in Assessment and the Uncanny Valley: Too true to be good?* Paper presented at the International Technology Education and Development Conference (INTED), Valencia.

Lysaght, Z., & O'Leary, M. (2016, August 26). *Developing Assessment Capacity in Norway and Ireland Using the Assessment for Learning Audit Instrument (AfLAI)*. Paper presented at the Annual Meeting of the European Conference for Education Research (ECER), Dublin

O'Leary, M., & Lysaght, Z. (2016, April 11). *Using the Assessment for Learning Audit Instrument to inform Data-driven Professional Development*. Paper presented at the Annual Meeting of the American Educational Research Association (AERA), Washington.

Scully, D., Karakolidis, A. & O'Leary, M. (2017, September 27). *Challenging a Tenet of Multiple Choice Testing: Are Four Response Options Really Necessary?* Paper presented at the European Association of Test Publishers (E-ATP) Conference, Noordwijk.

Scully, D., Karakolidis, A. & O'Leary, M. (2017, September 28). *Refining Situational Judgement Tests for Certification and Licensure*. Paper presented at the European Association of Test Publishers Conference, Noordwijk.

Scully, D. & Waters, L. (2017, March). *Driving Program Decisions Through Research: Applying Best Practices*. Paper presented at the Association of Test Publishers Innovations in Testing Conference, Scottsdale, AZ.

Unpublished Literature Reviews & Reports

Karakolidis, A. (2016). Simulations: Fidelity and the Uncanny Valley. Unpublished manuscript, Centre for Assessment Research, Policy & Practice in Education, Dublin City University

Karakolidis, A., O'Leary, M. & Scully, D. (2017). The development and provision of practice tests: A research brief outlining key findings and recommendations for best practice. Unpublished manuscript, Centre for Assessment Research, Policy & Practice in Education, Dublin City University.

Karakolidis, A., O'Leary, M. & Scully, D. (2017). Online Proctoring: A research brief outlining current knowledge of an emerging practice. Unpublished manuscript, Centre for Assessment Research, Policy & Practice in Education, Dublin City University

O'Leary, M. & Scully, D. (2017). Providing effective feedback in the context of certification and licensure testing with particular reference to non-successful candidates. Unpublished manuscript, Centre for Assessment Research, Policy & Practice in Education, Dublin City University

Scully, D. (2016). Some Recommendations for Item Development. Unpublished manuscript, Centre for Assessment Research, Policy & Practice in Education, Dublin City University.

Scully, D. (2016). Constructing MC items at higher levels of cognitive complexity for certification and licensure tests. Unpublished manuscript, Centre for Assessment Research Policy & Practice in Education, Dublin City University.

Scully, D. (2016). Awarding Partial Credit in Multiple-Choice Testing. Unpublished manuscript, Centre for Assessment Research Policy & Practice in Education, Dublin City University.

Scully, D. (2016). Organizing certification or licensure tests by competency statements: a review of the literature and recommendations for practice. Unpublished manuscript, Centre for Assessment Research Policy & Practice in Education, Dublin City University.

Scully, D. (2016). A review of empirical research and theory on the use of situational judgement items and recommendations for best practice. Unpublished manuscript, Centre for Assessment Research Policy & Practice in Education, Dublin City University

Scully, D. (2017). Reducing Gender Bias in Tests and Test Items. Unpublished manuscript, Centre for Assessment Research, Policy & Practice in Education, Dublin City University.

Research Projects Coming on Stream in 2017/2018

(i) State of the Art Review in ICT-based Assessment

Project Directors: Janet Looney (European Institute of Education & Social Policy), Michael O’Leary, Darina Scully & Anastasios Karakolidis (CARPE)

CARPE has been invited to contribute to an upcoming special issue of the European Journal of Education, a peer-reviewed journal covering a broad spectrum of topics in education. This issue will be focused on the extent to which assessments are fit for their intended purpose(s), and is due to be published in June 2018. Specifically, CARPE is contributing to the authorship of an article on the state of the art in ICT-based assessment, including recent developments in ICT-based large-scale standardised assessments, alternative assessments including simulations, and machine scoring of open-ended responses.

(ii) International Collaborative for Performance Assessment of Learning in Higher Education: Research and Development project (iPAL: R&D)

Project Directors: Richard Shavelson, Guillermo Solano-Flores, (Stanford University), Olga Troitschanskaia (University of Mainz) & Julian Marino (University of the Andes), Henry Braun (Boston College)

CARPE is a partner in the International Collaborative for Performance Assessment of Learning in Higher Education: Research and Development project (iPAL: R&D). iPAL: R&D is an international consortium of higher-education researchers, measurement specialists, administrators and faculty that has been established in response to the growing global demand to measure the outcomes of higher education. Specifically, its focus is on the measurement of learning of so-called “21st century skills”, including critical thinking, analytical reasoning, problem solving, perspective taking and communication. By drawing together the best existing perspectives from various projects and initiatives across Europe, the Americas and Asia; iPAL: R&D ultimately aims to develop reliable and valid performance assessments that can be used by higher-education institutions both nationally and cross-nationally. Importantly, it is envisaged that these assessments will facilitate formative (fostering the development of generic skills) as well as summative (accounting for skills learned) activities.

CARPE Events

CARPE Launch

The official launch of CARPE took place on Tuesday, 26th April 2016 in the Séamus Heaney Lecture Theatre, Cregan Library, DCU St. Patrick's Campus. Speakers at this event were Professor Brian MacCraith (President of DCU), Professor Daire Keogh (President of St. Patrick's College) and Mr. Michael Brannick (President and CEO, Prometric).

The welcome address was given by Professor Michael O'Leary (Prometric Chair in Assessment) and CARPE was launched by Dr. Therese N. Hopfenbeck (Director of the Oxford University Centre for Educational Assessment). The text of Michael's address is provided in Appendix A.



*Brian MacCraith, Daire Keogh, Therese Hopfenbeck, Michael Brannick
and Michael O' Leary, pictured at the CARPE Launch*

CARPE Annual Lecture

CARPE was honoured to welcome Jannette Elwood, Professor of Education at Queen's University Belfast, to deliver our inaugural public lecture on Monday, 17th October 2016. The event opened with an introductory address from CARPE Director, Prof. Michael O'Leary and Prometric CEO, Michael Brannick. Prof. Elwood then delivered a stimulating presentation of her findings from a series of interviews with teachers and students all across Ireland on their experiences of 'predictability' in the Leaving Certificate examinations. This study was part of a larger investigation conducted by Prof. Elwood and various others at the Oxford University Centre for Educational Assessment (OUCEA), funded by the State Examinations Commission.



Prof. Jannette Elwood delivers the inaugural CARPE lecture

Following Prof. Elwood's presentation, Prof. Emer Smyth of the Economic and Social Research Institute provided an insightful response, drawing on her own findings from a longitudinal study on students' perspectives on secondary education. Both speakers highlighted similar themes, most notably the importance of including the student voice in any discussions concerning the Leaving Cert.

An engaging debate ensued. The attendees, comprising various stakeholders in education, discussed a number of issues, such as whether a gap exists between the skills assessed at Leaving Cert. and those valued in tertiary education, the conflict that may exist for teachers between fostering a love of the subject in their students and preparing them for high-stakes assessment, the potential for modularization or reducing the breadth of subjects to be studied, the challenges faced by those tasked with designing examination questions, and the respective influences of parents and teacher educators on student and teacher behaviours surrounding assessment.

CARPE Seminars

Throughout the 2016/17 academic year a series of four seminars was held to introduce and share the work of CARPE and its staff to people within and outside the university. The seminars were also intended to provide others with an opportunity to share their interests in assessment and in CARPE.

All seminars began with an overview of how CARPE is organised and funded and what the centre was set up to achieve. There followed a brief outline on research projects underway at the centre. Participants were then encouraged to discuss the research work and/or to contribute ideas for research collaborations. Three projects grew out of these seminars: the assessment of learning about well-being, the assessment of bullying in the workplace and the assessment of critical thinking in higher education.

Additional seminars are being planned for 2017/18.

CARPE Research Experience Programme

In the Spring of 2017 students from the Measurement Evaluation Statistics and Assessment (MESA) doctoral programme at Boston College were invited to apply for a two month long Research Experience Programme (REP) at CARPE. Three students were interviewed and two were selected – Gulsah Gurkan and Sebastian Moncaleano. The REP was supported fully by a grant from Boston College which covered the students' flights, accommodation and living expenses in Dublin. DCU covered the costs of providing the office space and all other expenses. As part of its summer visiting student programme, Boston College Ireland provided the students with orientation over the weekend they arrived and with other supports throughout their stay. The two students began their programme on June 6, 2017. During their time at CARPE the students worked on following research projects:



CARPE REP students Gulsah Gurkan and Sebastian Moncaleano, pictured with IoE & CARPE staff during their time in Dublin

- The assessment of learning about wellbeing in secondary school (Gulsah)
- The assessment of workplace bullying (Sebastian).

The projects were supervised by Dr. Catherine Maunsell (wellbeing), and Dr. James O'Higgins Norman and Dr. Mairead Foody (bullying). At the end of the two months the students submitted a 5,000 word literature review on their topics. Both students are currently working with the supervisors in getting these drafts ready for peer review. Over the next year both students plan to extend the work by developing and trialling scenarios/vignettes as a means of measuring learning about wellbeing and bullying in the workplace.

CARPE Visiting Scholar Programme

In July 2017 an email was circulated internationally inviting academics to some of their sabbatical time at CARPE. The first person to take up the offer is Dr. Lisa Abrams, Virginia Commonwealth University. Lisa will be arriving at CARPE in the spring of 2018.



Dr. Lisa Abrams

CARPE in the Media

Is our education system fit for purpose in the 21st-century? Irish Times, 17 April 2017

<https://www.irishtimes.com/news/education/is-our-education-system-fit-for-purpose-in-the-21st-century-1.3051073>

Are Irish classrooms innovative enough? Irish Times, 23rd March 2017

<https://www.irishtimes.com/sponsored/are-irish-classrooms-innovative-enough-1.3013304>

Are junior cycle reforms on the right track? Irish Times, 3rd January 2017

<https://www.irishtimes.com/news/education/are-junior-cycle-reforms-on-the-right-track-1.2923506>

The changing face of how we assess our students. Irish Independent, 11th May 2016

<http://www.independent.ie/irish-news/education/going-to-college/the-changing-face-of-how-we-assess-our-students-34703319.html?platform=hootsuite>

Centre will focus on better ways to assess students. Irish Independent, 27th April 2016

<http://www.independent.ie/irish-news/education/centre-will-focus-on-better-ways-to-assess-students-34663193.html?platform=hootsuite>

Almost €1m for DCU Research. Irish Independent, 11th April 2015

<http://www.independent.ie/regionals/argus/news/almost-1m-for-dcu-research-31123840.html>

Staff contributions to the IOE

Michael O'Leary was appointed as Director of CARPE in November 2015. Between that and the end of January 2016 he was responsible for the B.Ed.4 Classroom Assessment module. Over 400 students were enrolled in that module. Michael was also acting auxiliary supervisor and/or panel member for three doctoral candidates conducting research in early childhood education (2) and arts education. Two of these candidates have successfully defended their dissertations and will be graduating in November 2017; the other candidate is expected to graduate in 2018. In July 2016, Michael delivered a 30 hour module on research methods (with Dr. Lysaght) to the incoming Ed.D. cohort. From November 2015 to June 2016, Michael acted as advisor to the new Ed.D. programme Chairs and retained his membership of various academic committees set up to facilitate the DCU incorporation programme.

Darina Scully took up the position of Prometric Postdoctoral Researcher at CARPE in March 2016. In her first year at the IoE, Darina contributed as a guest lecturer on the research methods component of the Ed.D. programme. She now also lectures on the topic of standardised assessment as part of the *Mathematics, Assessment and Digital Learning* module for B.Ed.4 students, and is involved in the development and delivery of the *Applying Quantitative Research Methods* module as part of the IoE's Graduate Training Elements. Darina also contributes to supervision within the IoE: she co-supervises the Prometric PhD candidate (with Prof. O'Leary), she is involved in the supervision of several PME final year action research projects, and she will also act as a panel member for an incoming doctoral candidate this academic year.

Anastasios Karakolidis has just entered the second year of his Ph.D. at CARPE. Alongside his doctoral work and contributions to Prometric research projects, he is also involved in the supervision of PME final year action research projects.

Staff External Engagement

Michael O'Leary acts as External Examiner for the Structured Ph.D. Programme at Mary Immaculate College, University of Limerick and is a review for a number of Irish and international research journals .

Darina Scully has acted as a peer reviewer for *Irish Educational Studies*.

Anastasios Karakolidis was a member of the research team responsible for the Programme for International Student Assessment (PISA) 2015 for Greece. He also lectures on research methodology and statistics on the M.Sc. in STEM Education at the University of Patras, Greece.

Research Visits

Charles Kernan

On the 24th of August 2017, recently appointed Prometric CEO, Charles Kernan visited the St Patrick's Campus. He was accompanied by Mr. Garret Sherry, Prometric VP. Michael provided an update on all CARPE related work and activities, and key findings and implications from each of the 11 reports that have been submitted to Prometric were discussed in detail.



Prometric CEO Charles Kernan & Vice President Garrett Sherry are welcomed to Belvedere House by Nathalie Walker (DCU Educational Trust), Brian MacCraith & Michael O'Leary

Henry Braun



Boisi Professor of Education and Public Policy and Director of the Center for the Study of Testing, Evaluation and Education Policy (CSTEPP) at Boston College, Professor Henry Braun visited CARPE on 14th September 2017. Michael and Anastasios provided Prof. Braun with an overview of the major research projects underway at CARPE. Prof. Braun briefed Michael on progress on the iPAL: R&D project as well as on the "Tracking Development Toward Living a Life of Meaning and Purpose: Addressing the Challenges to Measurement" conference that takes place November 14-16, 2017 on the Boston College campus.

Claire Wyatt Smith

Claire Wyatt-Smith is a Professor of Educational Assessment and Literacy and Institute Director of the Learning Sciences Institute Australia. On September 25th 2017 Darina and Anastasios spent the morning with Prof Wyatt-Smith reviewing the key CARPE projects, including the 15 draft animations being developed to measure teachers' tacit knowledge. Michael joined the group in the afternoon for a wide ranging discussion on assessment policy and practice changes within the Irish and Queensland educational systems.



Darina Scully and Anastasios Karakolidis discuss projects with Claire Wyatt-Smith during her visit to CARPE

The Centre

Governance

As a research centre within the Institute of Education, CARPE is managed by the Research Centres & Groups Committee (an Education Faculty Committee) comprising the Chairs/Directors of Research Centres and chaired by rotation. The Associate Dean for Research is an ex officio member of the committee and the committee chair represents all DCU's Research Centres on the Faculty Research Committee. In addition, CARPE has an Advisory Board which meets annually. The function of the Board is to:

- provide ongoing advice to the Director on academic and research aspects of the Centre;
- assist in the development of strong collaborative links (national and international) with other assessment organisations and research centres;
- help to maintain the Centre's visibility and reputation in research;
- review the Centre's annual report and provide feedback of a strategic nature;
- attest to the quality of the research outputs from the Centre;
- evaluate the Centre's operational functioning and processes.

Membership of the Board (comprising five external representatives from academia, a representative from Prometric and a representative from the Institute of Education) is by invitation of the Director and is for three years. The current members of the Advisory Board are:

- Professor Jo-Ann Baird Oxford University
- Professor Jannette Elwood, Queen's University Belfast
- Professor John Gardner, University of Stirling
- Professor Patrick Griffin, University of Melbourne, Australia
- Professor Larry Ludlow, Boston College
- Dr. Zita Lysaght, Dublin City University
- Mr. Garrett Sherry, Prometric



The Board meets at least once a year. All proceedings and decisions are minuted and circulated for comment to the Board members and to those in attendance. The draft minutes are circulated prior to the subsequent meeting and are approved and signed at that meeting.

Advisory Board members, pictured with representatives from CARPE, Prometric & DCU Institute of Education

Staff



Prof. Michael O'Leary

Prometric Chair in Assessment

Michael holds the Prometric Chair in Assessment and is the Director of CARPE. A former primary teacher, he holds an M.Ed. from Trinity College, Dublin and a Ph.D. in Educational Research and Measurement from Boston College. He has acted as Ireland's representative on the OECD's Network A (student outcomes) and sat on the Board of Participating Countries of PISA during its first cycle. He was a member of the NCCA working group that developed the guidelines on assessment for Irish primary schools. He was also a member of the Child Development and Education Panel of the National Longitudinal Study of Children in Ireland during its planning phase. Michael has provided statistical analysis of data for the national surveys of reading and mathematics achievement in Ireland and collaborated over many years with colleagues on a variety of research projects ranging from the introduction of calculators at Junior Cycle to teaching for social justice. Between 2007 and 2015 he was director of postgraduate studies in education at St Patrick's College. He now leads an extensive programme of research at CARPE focused on assessment and measurement at all levels of the educational system and in the workplace. He also contributes to teaching of modules in classroom assessment and quantitative research methods.



Dr. Darina Scully

Prometric Post-Doctoral Researcher

Darina is the Prometric Postdoctoral Researcher at CARPE. She holds a B.A. (Mod) and a Ph.D. in Psychology from Trinity College, Dublin. Prior to joining CARPE, Darina worked full-time as a Research Assistant at the Educational Research Centre (ERC), Drumcondra and part-time as a Tutor in Research Methods and Psychology at the National Institute of Digital Learning (NIDL), DCU. At the ERC, Darina was involved in the development of a suite of computer-based tests of literacy, numeracy and reasoning for primary and post-primary school children, and in extensive piloting of a platform to support the delivery of these tests, the *Drumcondra Online Testing System (DOTS)*. She also worked on national and international research projects such as the evaluation of the DEIS (Delivering Equality of Opportunity in Schools) programme, and the implementation of TIMSS (Trends in International Maths and Science Study) in Ireland. Darina contributes to the full programme of research at CARPE. She also teaches within the IoE on modules in standardised assessment and quantitative research methods at both undergraduate and postgraduate level.



Anastasios Karakolidis

Prometric Doctoral Candidate

Anastasios is the Prometric Doctoral Candidate at CARPE. He holds a B.A. in Primary Education from the University of Ioannina, Greece, and an M.Sc. in Quantitative Methods and Statistical Analysis in Education from Queen's University. See p.29 for Anastasios' full bio and details of his project.

Adjunct Professors



**Prof. John Gardner,
University of Stirling**

Memo supporting the Appointment of Professor John Gardner as Adjunct Professor:
Prof. Gardner's Background and Experience

Professor Gardner has over 120 academic publications to his name and has authored or co-authored seven books, the most recent being: *Assessment and Learning* (2012, Sage), *Developing Teacher Assessment* (2010, McGraw-Hill/Open University) and *The Classroom X-Factor* (2011, Routledge). He has presented numerous international keynote addresses and been principal investigator for research projects exceeding £2.5million in total funding. From 1994 until 2010, he was a member of the globally influential Assessment Reform Group (ARG) and is currently a visiting professor at the University of Oxford's Centre for Educational Assessment.

Prof. Gardner is a fellow of the British Computer Society, a fellow of the Chartered Institute of Educational Assessors, and an Academician of the Academy of Social Sciences. He is currently a member of the steering committee of the Economic and Social Research Council's Technology Enhanced Learning (TEL) programme and a member of the ESRC's Peer Review College. In 2011, he completed a two year term of office as President of the British Educational Research Association. From 2004 to 2008 he was a member of the UK RAE Education panel and he is a current member of the Research Excellence Framework (REF) Panel 25 (Education).

How CARPE/DCU will benefit in having Prof. Gardner as an Adjunct Professor

A perusal of Professor John Gardner's CV will make it clear that he brings a global reputation as an academic, teacher and expert in educational assessment. As a member of the UK's Assessment Reform Group and author/editor of the very influential *Assessment and Learning* (2012) book, he has been at the centre of efforts to reform assessment worldwide. Over the past few years when I was Director of Postgraduate Studies in SPD, I have come to know John very well in his capacity as external examiner for the Assessment strand of the Ed.D. He has already given unstintingly of his time and expertise and his honest and insightful feedback has enhanced the programme considerably. If appointed Adjunct Professor, I believe he has the potential to make an even greater contribution to DCU and the Institute of Education in particular. It should be noted that beyond his involvement in our doctoral programmes, John has demonstrated his on-going support and enthusiasm for what we are trying to achieve at DCU. I was particularly delighted when he accepted my invitation to sit on the Advisory Board of CARPE. Over the past year he has been a wise counsellor in helping me to negotiate my first year as director. I am also delighted that he will be delivering the second CARPE lecture on the topic of the public's understanding of assessment in October 2017.

John has indicated that he will be retiring from his position of Deputy Principal at the University of Stirling in March 2017 and is very keen to become involved as an Adjunct Professor at the Institute of Education. He is especially interested in becoming involved in assessment related work with colleagues at the School of Policy and Practice. As Director of CARPE, I believe his presence will enhance not just the reputation of the centre but the day-to-day capacity of the School of Policy and practice to conduct the highest quality research. I cannot recommend him highly enough to you.



**Prof. Gerry Shiel,
Educational Research Centre**

Memo supporting the Appointment of Dr Gerry Shiel as Adjunct Professor:
Dr Shiel's Background and Experience

Gerry Shiel is a Research Fellow at the Educational Research Centre, St Patrick's Campus. He has overall responsibility for the centre's standardised test development programme in reading, mathematics and science for primary and secondary schools. Over the past 25 years, Gerry has developed high level expertise in the teaching and assessment of reading literacy and has been centrally involved in multiple cycles of large scale testing programmes including the national assessments of English reading and mathematics and the TIMSS, PISA and PIRLS international studies. He has extensive experience of test development and item writing, scoring of student responses, scaling and analysis of data, report writing and communicating findings across a range of media. He has worked at the highest level of decision making on the OECD's testing programme having been a member of its PISA Board of Participating Countries for many years. Gerry has had a multitude of peer reviewed articles and reports published and has presented on his research all over the world. This year sees the publication for an international audience of his important textbook on assessment for pre-service and practising teachers. *Understanding and Applying Assessment in Education* is the first textbook of its kind with Irish authors (with D. Murchan).

How DCU will benefit in having Dr Shiel as an Adjunct Professor

I have known and/or worked with Gerry for almost forty years. Within the field of education he has a rare combination of professional experience – a former classroom teacher who worked with children experiencing difficulties with literacy and numeracy, who went on to establish a world-wide reputation as a researcher of the highest rank. Throughout his career (including all my work with him on the national and international assessments as well as projects on pupil profiling and the use of calculators in the Junior Cycle) he has maintained standards that now mark him out as the leading expert in Ireland on the assessment of reading literacy as well as the conduct of national and international assessments. It should also be noted that he has made a significant teaching and supervision contribution to a variety of DCU's masters, Ed.D. and Ph.D. programmes and has delivered courses on assessment for the World Bank in a number of developing countries.

Gerry has indicated to me that he will be retiring from his position as Research Fellow at the ERC within the near future and is keen to become involved as an Adjunct Professor at the Institute of Education. Given his background as a former classroom teacher and as a researcher with deep expertise in assessment, he has the potential to make a major contribution to teaching, supervision and research within the School of Policy and Practice. As Director of CARPE, I believe his presence will enhance not just the reputation of the centre but the day-to-day capacity of the School of Policy and practice to conduct the highest quality research. I cannot recommend him highly enough to you.

Doctoral Students



Marie Darmody is a secondary teacher completing an Ed.D. (part time) at the Institute of Education. Her doctoral work is focused on secondary school teacher's conceptions of assessment. In 2015 Marie was awarded a bursary from the National Council for Curriculum and Assessment (NCCA) to support her research.

PhD Title: Irish Post-Primary Teachers' Conceptions of Assessment

Supervisors: Dr Zita Lysaght & Professor Michael O'Leary

Abstract: The purpose of this research was to elicit baseline data about Irish post-primary teachers' conceptions of assessment. Post-primary education in the Republic of Ireland is currently in the midst of significant curriculum and assessment reform at Junior Cycle, the first three years of the secondary school system. Central to this change is the positioning of the teacher at the heart of the assessment process. The successful implementation of the new assessment practices will not only require a high level of teacher assessment literacy, but will also depend upon the extent to which teachers' conceptions of assessment align with the philosophical underpinnings of the reform. Research has indicated that teachers' beliefs serve to filter information entering the cognitive domain, to frame particular educational situations or problems and to guide teachers' intentions and actions (Fives & Buehl, 2012). In light of this evidence, the introduction of new assessment initiatives should take account of how teachers conceive of the nature and purpose of assessment. Adopting a non-experimental cross-sectional design, this study surveyed a large sample (n=489) of post-primary teachers using the abridged version of Brown's (2006) Teachers' Conceptions of Assessment Inventory (TCOA-IIIa). This 27-item self-report instrument is designed to elicit teachers' level of agreement with four intercorrelated assessment factors (i.e., school accountability, student accountability, improvement and irrelevance). Quantitative data derived from the survey were analysed using a mixture of descriptive statistics, exploratory factor analysis, independent samples t-tests and one-way analysis of variance. Maximum likelihood exploratory factor analysis resulted in a 5-factor solution for the Irish data which differed somewhat from Brown's (2006) original model. Implications of the results for the conceptualisation of assessment in the Irish post-primary context are considered.

Conference papers/presentations:

Darmody, M. (2014, November). *Athmhúnlú ar an bhfoghlaim san aonú haois is fiche: Measúnú chun foghlama*. Cur i láthair ag an Tionól Teagaisc, Coláiste Pádraig, Baile Átha Cliath.

Darmody, M. (2015, May). *Junior Cycle Reform in the 21st Century: Towards a reconceptualisation of Learning?* Paper presented at the Fifth Annual Post-Graduate Conference in Humanities and Education, Dublin City University.

Darmody, M. (2016, September). *Post-Primary Teachers' Conceptions of Assessment*. Paper presented at the NCCA Assessment Research Showcase, Dublin.

Ann Marie Gurhy is a primary teacher completing an Ed.D. (part-time) at the Institute of Education. Her doctoral research explores the interplay between a Teacher Learning Community, Japanese Lesson Study, CPD in Assessment for Learning and Mathematics teaching and learning in an all-girls Primary School in Ireland.

PhD Title: Using Assessment for Learning to Enhance the Teaching and Learning of Mathematics in one Primary School. A Lesson Study Approach

Supervisors: Dr Zita Lysaght & Professor Michael O’Leary

Abstract: In recent decades the merits of assessment for learning (AfL) have been particularly lauded, nationally and internationally. Scholars have linked effective use of AfL with improved student learning and achievement, increased student motivation and self-esteem, enhanced self-regulation and metacognition, improved teacher professional and organisational learning and better student-teacher relationships. In the Irish context, while government policy emphasises the centrality of AfL in teaching and learning few teachers have received assessment-related continuing professional development (CPD). The Department of Education and Skills (DES, 2011a) has highlighted that AfL is not used sufficiently widely in our schools and concerns have also been raised about teacher assessment literacy. Regarding mathematics, data from the 2009 National Assessments of Mathematics and English Reading (DES, 2010b), school inspections (DES, 2010a), international reports (PISA, 2009), and the Literacy and Numeracy Strategy (DES, 2011a) have suggested Irish students are underperforming.

This practitioner action research case study aimed to address these issues. Operating within the pragmatic paradigm, it utilised a convergent parallel mixed methods design. Over the course of one academic year, it investigated the impact of AfL practices on the teaching and learning of mathematics at fourth-class level in one primary school. Specifically, it explored how the use of AfL principles, strategies and techniques affected students’ attainment on standardised mathematics tests and their dispositions towards mathematics. Additionally, the research investigated the potential of lesson study (LS) as a vehicle of collaborative professional learning in AfL and considered the impact engaging in LS had on teachers’ skills, knowledge, and use of AfL, and their beliefs towards AfL as a form of assessment. This study also provided unique insights into learners’ perspectives of using AfL in mathematics, both teachers and students. Findings revealed significant effect size gains in children’s confidence, motivation and attitudes regarding mathematics, although there was no appreciable difference in students standardised mathematics scores when compared to the comparison group. Additionally, indications are that teachers found LS to be a very effective model of CPD in AfL. Finally, implications for conducting further research are discussed.

Conference papers/presentations:

Gurhy, A. M. (2015, Feb). Assessment and mathematics learning: The learner’s perspective. Paper presented to the joint conference of the British Society for Research into Learning Mathematics, and Mathematics Education International, St. Patrick’s College, Dublin.

Gurhy, A. M. (2015, Apr). Assessment for learning and mathematics: Learners’ perspectives. Paper presented at the Annual Conference of the Educational Studies Association of Ireland conference, Maynooth.

Gurhy, A. M. (2015, May). Japanese lesson study and assessment for learning in mathematics: Learners' perspectives. Paper presented at the fifth Annual Postgraduate Research Conference in Humanities and Education, Dublin City University, Dublin.

Gurhy, A. M. (2017, February). Using assessment for learning to enhance mathematics education in the primary school: Irish students' perspectives. 10th Congress of European Research in Mathematics Education (CERME 10), Croke Park, Dublin. Available at https://keynote.conference-services.net/resources/444/5118/pdf/CERME10_0279.pdf

Gurhy, A. M. (2017, April). Using Assessment for Learning to Enhance Mathematics Education in the Primary School. A Lesson Study Approach. Paper presented at the Annual Conference of the Educational Studies Association of Ireland, University College Cork.



Lorcan Coyle is a primary teacher completing an Ed.D. at the Institute of Education. His doctoral research seeks to capture the chronological narrative of Assessment for Learning (AfL) implementation in an Irish primary school.

PhD working title: A critically reflective chronological narrative of formative assessment implementation in an Irish primary school

Supervisor (s): Dr Zita Lysaght & Prof Michael O'Leary

Progress on the thesis: 4th year

Conference papers/presentations:

Coyle, L. (2014, April). An analysis of the Irish Department of Education and Skills' Literacy and Numeracy Strategy, "Learning for Life" (2011) from the perspective of Kingdon's Agenda-setting Model. Paper presented at the Fourth Annual Post Graduate Conference in Humanities and Education, St. Patrick's College, Dublin .

Coyle, L. (2015, May). Policy Rhetoric versus Classroom Reality: The Irish Department of Education and Skills' Literacy and Numeracy Strategy, "Learning for Life" (2011) and its Challenges to Formative Assessment in the Irish Primary Sector. Paper presented at the Fifth Annual Post Graduate Conference in Humanities and Education, Dublin City University, Dublin.



Anastasios Karakolidis is the Prometric PhD candidate at CARPE. He holds a B.A. in Primary Education Teaching from the University of Ioannina, Greece, and an M.Sc. in Quantitative Methods and Statistical Analysis in Education from Queen's University, Belfast. He was a member of the research team responsible for the Programme for International Student Assessment (PISA) 2015 report for Greece. Anastasios has given series of lectures on research methodology and advanced statistical techniques (e.g. multilevel modelling) to Master's students. His research interests include research methodology, statistical analysis, measurement, assessment, testing and large-scale international studies.

PhD working title: The use of animations to assess *Practical Intelligence*

Supervisors: Prof. Michael O'Leary, Dr. Darina Scully

Progress on the thesis: 2nd year

Publications in peer-reviewed academic journals:

Pitsia, V., Biggart, A., & Karakolidis, A. (2017). The role of students' self-beliefs, motivation and attitudes in predicting mathematics achievement: A multilevel analysis of the Programme for International Student Assessment data. *Learning and Individual Differences*, 55, 163–173.
<https://doi.org/10.1016/j.lindif.2017.03.014>

Karakolidis, A., Pitsia, V., & Emvalotis, A. (2016). Examining students' achievement in mathematics: A multilevel analysis of the Programme for International Student Assessment (PISA) 2012 data for Greece. *International Journal of Educational Research*, 79, 106–115.
<https://doi.org/10.1016/j.ijer.2016.05.013>

Karakolidis, A., Pitsia, V., & Emvalotis, A. (2016). Mathematics low achievement in Greece: A multilevel analysis of the Programme for International Student Assessment (PISA) 2012. *Themes in Science and Technology Education*, 9(1), 3–24.

Pitsia, V., Karakolidis, A., & Emvalotis, A. (2016). Attempting interdisciplinary approaches in education by using Google Earth (in Greek). *Education Sciences*, (3), 177-186.

Conference papers/presentations:

Karakolidis, A., Scully, D., & O'Leary, M. (2017). Simulations in assessment and the Uncanny Valley: Too true to be good? In *11th annual International Technology, Education and Development Conference* (pp. 3572–3581). Valencia, Spain. <https://doi.org/10.21125/inted.2017.0883>

Pitsia, V., Karakolidis, A., Emvalotis, A., & Sofianopoulou, C. (2017). Analysing performance in mathematics: The case of Immigrant Students. In *11th annual International Technology, Education and Development Conference* (pp. 4829–4835). Valencia, Spain.
<https://doi.org/10.21125/inted.2017.1127>

Research Associates

Dr. Sarahjane Belton (Critical Thinking Project)

Sarahjane graduated with a degree in Physical Education and Maths from the University of Limerick in 2001. She taught physical education for a year in second level education (2001 - 2002) before completing a Ph.D. in Physical Activity Measurement at the University of Limerick in 2006. Sarahjane lectured in Physical Education in St. Patrick's College Drumcondra from 2006 - 2007, and has lectured in Physical Education (physical education and sport pedagogy, curriculum development and evaluation) in the School of Health and Human Performance at Dublin City University from 2007 to present.

Professor Mark Browne (Learning Portfolios Project)

Professor Mark Brown is Ireland's first Chair in Digital Learning and Director of the National Institute for Digital Learning (NIDL). He is currently Chair of the Innovation in Teaching and Learning Steering Committee for the European Consortium of Innovative Universities (ECIU) and is both an EDEN Fellow and member of the Executive Committee of European Distance and e-Learning Network (EDEN). He also serves on the Supervisory Board of the European Association of Distance Teaching Universities (EADTU) and co-leads the Empower Online Learning Leadership Academy (EOLLA) for new and emerging institutional leaders in European universities. In 2016, Mark was appointed as a representative of the Irish Universities Association on the Board of the National Forum for the Enhancement of Teaching and Learning in Higher Education. Professor Brown's main research interests are in the areas of digital learning, blended learning, online learning including MOOCs, learning design, effective pedagogy, academic development, higher education, quality enhancement, the nature of the student learning experience, and educational policy and leadership.

Dr. Zita Lysaght (Assessment for Learning and Teaching ALT Project)

Zita is a member of the School of Policy and Practice at the Institute of Education, DCU. She is Chair of Post-Graduate Studies by Research, Co-chair of the Ed.D. programme, Director of the Assessment for Teaching and Learning (ALT) Project and coordinates the final year BEd4 and PME2 research projects. She provides professional development nationally and internationally in assessment (particularly formative assessment as it relates to teaching and learning), mixed methods research design and theoretical and conceptual frameworks. Her work has been published in Ireland, Europe and the US.

Dr. John McKenna (Critical Thinking Project)

Dr. John McKenna has been a Lecturer in the School of Computing at Dublin City University since September 2000. He graduated with the degree of B.Eng. in Electronic Engineering in 1988 from NIHE, Limerick (now University of Limerick). He obtained the degrees of M.Sc. in Speech and Language Processing and Ph.D. (titled "Kalman Filtering Towards Automatic Speaker Characterisation") from the University of Edinburgh in 1996 and 2004 respectively. More recently (2012) he received a Postgraduate Diploma in Technology and Learning from Trinity College, Dublin. From 1988-1995, he worked as a design engineer in electronics and telecommunications in the London area and as a communications consultant in Seoul, Korea. He spent a year (1992/3) in voluntary teaching at QingHai University in the People's Republic of China.

Dr. Catherine Maunsell (Learning about Wellbeing Project)

Dr. Catherine Maunsell is Senior Lecturer in Psychology at the School of Human Development at the Institute of Education, Dublin City University. Catherine lectures primarily in the area of developmental and educational psychology and since 2010 is the Subject Co-ordinator of Developmental and Educational Psychology on the B.Sc. Psychology programme offered through the School of Nursing and Human Sciences at DCU. She has been engaged as Irish Co-ordinator on a range of large-scale EU research projects, in the broad areas of education, lifelong learning and social justice. Most recently, she has been pursuing particular research interests in the rights of children and young people and those most marginalised, and their rights to relationships and sexuality education from a developmental perspective.

Dr. James O'Higgins Norman (Bullying in the Workplace Project)

Dr. James O'Higgins Norman is Associate Professor in Sociology and Director of the National Anti-Bullying Research and Resource Centre (ABC). He is best known for his research on homophobic bullying in second-level schools in Ireland which has drawn international media attention and was referenced in parliamentary proceedings in Ireland and at the EU Commission when these bodies were debating the implementation of policy and laws on bullying in schools. Other research interests include gender and cyberbullying, and diversity and bullying in schools. He also taught professional ethics at University College Dublin and was a teacher in a post-primary school.

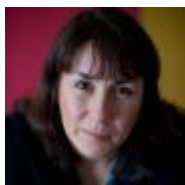
Ms. Naoimh O'Reilly (Critical Thinking Project)

Naoimh is a lecturer at the School of Business at DCU. She holds a B.A. (hons) in International Marketing & Languages and an MBS in Strategic International Marketing, both from Dublin City University. Her teaching interests lie in digital marketing and she is currently pursuing her Ph.D. in Technology Enhanced Learning at Lancaster University.

Dr. Deirbhile Nic Craith (Survey of Standardised Testing Project)

Deirbhile is Director of Education & Research and secretary to the Irish National Teachers Organisation (INTO) Education Committee. Her remit includes education issues and policy, including curriculum and assessment, special education, social inclusion, early childhood education and Gaeilge. She represents the INTO on many external education bodies including the Council of the NCCA, An Chomhairle um Oideachas Gaeltachta & Gaelscolaíochta, and the Standing Committee of Heads of Education and Teacher Unions. Deirbhile holds Masters' and Ph.D. degrees in education from University College Dublin.

International Research Advisors and Associates



Professor Jo-Anne Baird

Jo-Anne is Director of the Department of Education, University of Oxford. Her research interests are in educational assessment, including system-wide structures and processes, examination standards, marking and assessment design. Her current research projects include Setting and Maintaining Standards in national examinations, Examination reform: the impact of modular and linear examinations at GCSE, Assessment for Learning in Africa (AFLA), intelligent accountability and the Progress in International Reading Literacy Study England national centre.



Dr. Marguerite Clarke

Marguerite is a Senior Education Specialist in the Human Development Network of the World Bank. She holds a Ph.D. in educational measurement and program evaluation from Boston College. A former primary and secondary school teacher, she now leads the Bank's work program on learning assessment. Currently based in India, her recent blog has focused on the impact of citizen-led assessments (CLAs) in that country and elsewhere. See <http://blogs.worldbank.org/education/are-citizen-led-assessments-raising-learning-levels>.



Professor Jannette Elwood

Janette is Professor of Education at the School of Social Sciences, Education and Social Work, Queens University Belfast. Her main research interests are in the social constructions and consequences of tests, examinations and assessment practices. She is a founding member of the Association for Educational Assessment-Europe and was the association's Vice-President (2004-6), an executive council member (2001-2006) and Chair of the Annual Conference Committee (2011). She is executive editor of the journal *Assessment in Education* (published by Taylor and Francis) and a visiting senior research fellow at University of Oxford Centre for Educational Assessment.



Associate Professor Therese Hopfenbeck

Therese is an Associate Professor of Educational Assessment at Oxford and Director of the Oxford University Centre for Educational Assessment. Originally a secondary school teacher with many years' experience, Therese has worked as school district supervisor and as a consultant on national examinations for the Norwegian Directorate for Education. Therese has been published widely in her native Norway, in the UK and across the English speaking world. Her book *From Political Decisions to Change in the Classroom: Successful Implementation of Education Policy* was published in 2014. With colleagues at Oxford, her influential *State of the Field Review: Assessment and Learning* was published in 2014. She is the current editor of the prestigious journal: *Assessment in Education*.



Professor Patrick Griffin

Patrick is Professor Emeritus at the Melbourne Graduate School of Education, where, until recently, he held the Chair of Education (Assessment) and was Director of the Assessment Research Centre. He is widely published on assessment and evaluation topics, with his research focusing on links between assessment and teaching in the fields of problem solving and higher order competency assessment and performance. He has led national and international studies of problem solving, literacy and numeracy and was Executive Director of the Assessment and Teaching of 21st Century Skills Project with an impact on national and international assessments including the 2015 PISA study. His work has also had an important impact on the work of teachers and school leaders in Australia and elsewhere.



Professor Larry Ludlow

Larry is Professor and Chair of the Department of Measurement, Evaluation, Statistics, and Assessment (MESA) in the Lynch School of Education at Boston College. He teaches courses in research methods, statistics, and psychometrics. His research interests include development of: a) Rasch-based scenario scales, b) longitudinal models for understanding and predicting faculty teaching evaluations, and c) longitudinal teacher retention and attrition prediction models.



Professor Laura O'Dwyer

Laura is a member of the Department of Educational Research, Measurement, and Evaluation in the Lynch School of Education at Boston College. She teaches courses in applied data analysis (basic to advanced topics), quantitative research methods, survey construction, and experimental design. O'Dwyer's research focuses on examining the impact of technology-based interventions on student and teacher outcomes, and on international comparative studies in education. She has conducted several studies that employ randomized experimental designs to examine educational interventions including the effects of online professional development on teaching practices and learning outcomes.



Associate Professor Steven Stemler

Steven is an Associate Professor of Psychology at in the Psychology Department, Wesleyan University, Connecticut. He has spent nearly two decades systematically studying the purposes of school (elementary through post-secondary) and how those purposes get measured via testing. He and his colleagues have developed a number of innovative new ways of measuring broad constructs such as creativity, cultural competence, practical intelligence, and ethical reasoning. Dr. Stemler has published more than 40 peer-reviewed articles, books, and chapters.

Linked Centres

CARPE and the Anti Bullying Centre (ABC) at DCU are now linked through the Assessment of Bullying in the Workplace Project. Further details about the Centre and its director James O'Higgins Norman are available at:

<http://www4.dcu.ie/abc/index.shtml>



CARPE is also linked to the National Institute for Digital Learning (NIDL) through a project focused on learning portfolios. NIDL Director, Professor Mark Brown is co-author with Darina Scully and Michael O'Leary of the upcoming Review on the Use of Learning Portfolios in Higher Education due to be published in early

2018. See: <http://www.dcu.ie/nidl/index.shtml>

The former and current directors of the Oxford University Centre for Educational Assessment (OUCEA), Jo-Anne Baird and Therese Hopfenbeck respectively, play important advisory roles in CARPE and the intention is that the two centres will be involved in collaborative research projects in the future. See:

<http://oucea.education.ox.ac.uk/>



Appendix

Professor Michael O’Leary’s address, CARPE Launch, April 2016

I am truly honoured to be addressing you this afternoon as Prometric Chair in Assessment at DCU. My sincere thanks to so many friends and colleagues from St Pat’s, DCU, Mater Dei, CICE and from across the Irish university system for taking the time to be here for this launch. I am delighted to see former colleagues (in various stages of retirement) who have been wonderful mentors to me in this College stretching all the way back to 1975. It’s also good to see so many others I’ve worked with over the years - school principals, teachers, staff of the Educational Research Centre, the NCCA, teacher unions, CJ Fallon, the Education Centres and the Junior Cycle support service. I’m delighted too that a number of current and former graduate students could be here. I would like to extend a very warm welcome to Garrett Sherry and Ian Clifford from Prometric’s offices here in Dublin and in Dundalk. I am especially pleased that two very important ladies in my life are here today-my wife Deirdre and my mother Noreen.

We are here today because assessment matters. It matters to the hundreds of millions of people who take or conduct assessments in classrooms and workplaces all over the world every year. It matters to the tens of thousands of professionals who work as assessment specialists, researchers, test developers or psychometricians. Assessment matters to educationalists, economists, politicians and policy makers. It matters in Ireland and in every OECD country. In more recent times, assessment has become an important focus for poorer countries seeking to improve the education and welfare of their citizens. Indeed, it is no exaggeration to say that assessment is a global matter and a global concern.

This is because assessment policy and practice impacts profoundly on people's life chances. The assessments used to support a five year old who is learning to read, For example, are crucial to the future well-being of that child. We know that end of secondary education assessments act as important gatekeepers for those seeking entry to college. Examinations as well as credentialing and licensure assessments are important milestones on the way to most vocational and professional careers.

Assessment matters too because it exerts a powerful influence on what happens in our schools, universities and other learning environments. What you assess is what you get is a well-known epithet... and one we know to be true. The impact of assessment on teaching and learning has not always been positive and it is good to see that slowly but surely, assessments that have encouraged rote learning and recall are being replaced by a range of assessments within more balanced systems that are designed to promote deep understanding, life-long learning, self-regulation, adaptive and critical thinking, collaborative problem solving and high quality communication – skills that were once required of a chosen few, but are now at the heart of modern life and work for so many in this generation.

And, of course, how we assess matters. The world of assessment in the guise of summative paper-and-pencil tests, while still relevant, is being revolutionised by new conceptions of assessment and by the use of digital technology. There is now an increased emphasis on how assessment can be used to support learning not just measure it, while computer-based assessment is expanding the horizon of what we thought possible in assessment.

At this moment in time, given all that is happening in assessment here in Ireland and internationally with, for example, PISA, TIMSS and PIRLS, the field of assessment is an exciting and challenging place to work. And into this context, comes a new Centre for Assessment Research, Policy and Practice in Education at DCU. With the financial support of Prometric, the Centre, located within the Institute of Education, is being established to enhance the practice of assessment across all levels of the educational system (from early childhood to fourth level) and across the professions (from job entry

to career advancement). The acronym we are using for the centre is CARPE, as in *carpe diem* - seize the day. Our intention is to make the most of each day at the centre with specific reference to four broad domains of work.

The first is through assessment research. I recently had the pleasure of visiting Prometric's headquarters in Baltimore, Maryland and met with President and CEO, Michael Brannick, and his test development and psychometric teams with a view to identifying a research agenda relevant to them. Many of the problems they identified such as the equivalence of test outcomes across paper-and-pencil and digital modes of delivery, the use of animations to expand the repertoire of skills that can be assessed, effective ways of providing feedback are relevant to both assessment in the workplace and in education. Work on a number of these important projects is now underway at CARPE where Prometric has also provided funding for a post-doctoral researcher (Dr. Darina Scully) and a Ph.D. student (Anastasios Karakolidis).

I am also delighted to announce today a significant research project being undertaken at CARPE in collaboration with the INTO and its Director of Education, Dr. Deirbhile NicCraith. This project will focus on how standardised tests of literacy and numeracy are understood and used in Irish primary schools. The research findings will be used to inform both policy and practice regarding standardised testing.

Professor Mark Brown, at the National Institute for Digital Learning, and I are also in the early stages of planning a programme of research focused on the assessment of DCU's Generation 21 graduate attributes. This work will link with similar projects around the world on what is now referred to as 3rd generation assessment and will be of interest across educational and workplace settings.

This is an ambitious programme of research for a new centre, and, with a view to ensuring the best possible outcomes, a second element of the Carpe agenda is to establish strong assessment research networks around the world. I am delighted to be able to announce that five internationally recognised assessment experts have agreed to sit on the advisory board for CARPE.

- Professor Jo-Anne Baird, University of Oxford
- Professor Jannette Elwood, Queens University Belfast
- Professor John Gardner, University of Stirling and University of Oxford
- Professor Patrick Griffin, University of Melbourne
- Professor Larry Ludlow, Boston College

They will be joined on the Board by Dr Zita Lysaght an assessment expert working on this campus and by Garrett Sherry of Prometric Ireland.

As well as an advisory board I have established an international research associate facility to support the work of the centre. Dr Laura O' Dwyer a measurement expert from Boston College and Dr Marguerite Clarke an Assessment specialist in The Human Development Network of the World Bank in Washington have come on board in that capacity. Further announcements about other research associates joining the team will be made through the CARPE website and social media in the months ahead.

My ambition is that in time CARPE will be linked to all the major assessment research centres globally. I am delighted to name the Oxford University Centre for Educational Assessment as the first linked centre. You will be hearing from its Director Dr Therese Hopfenbeck shortly. My sincere thanks to you, Therese, for agreeing to launch CARPE today. What you have achieved at your centre over the past eight years is an inspiration to me.

A third element of the work at CARPE will be focused on Policy Development. The intention is that CARPE will be a place where ideas about assessment, traditional and innovative, can be presented and discussed in a way that is respectful yet open to challenge by all those either interested or impacted by assessment. As a first step in achieving this goal, I have invited Professor Jannette Elwood to deliver the first public lecture on assessment in the Autumn. Her topic will be focused on her recent research study investigating the predictability of the Irish Leaving Certificate Examination.

Last but not least, and in acceptance of the fact that there is a dearth of assessment and measurement expertise within the Irish system, the intention is that a suite of accredited and non-accredited programmes in assessment will be developed at CARPE and offered through the university. In that way I believe something truly long lasting can be achieved to compliment the research agendas outlined earlier. My aim is to ensure that DCU President Brian McCraith's vision in establishing the Chair in Assessment and Prometric's gift to the university in support of it will bear fruit for decades to come.

I want to finish now by expressing my gratitude to Brian McCraith, to Michael Brannick and the Prometric organisation for putting their faith in me to lead this important initiative. I am excited about what we can achieve together in the coming years.

Go raibh mile maith agaibh.

