Report for the Period October 2019 – September 2020

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Director's Overview

The world of assessment and testing, like so many other worlds, has been seriously disrupted this year. Three years ago, CARPE produced an industry report for Prometric on the use of online proctoring which contained a conclusion that read: "at this moment in time, the opportunities to design research projects that address significant questions about online proctoring are myriad despite the likelihood that online proctoring will be focused initially on tests with low stakes while onsite proctoring will continue to dominate in high-stakes environments." Little did we know what was just around the corner and what an impact COVID-19 would have on Prometric's global programme of work across the credentialing industry. The impact in Ireland has been no less significant. For example, all teaching and assessment at DCU moved online following the lockdown in March. Moreover, the high stakes Leaving Certificate Examination that had been in place for Irish secondary school students since 1924 was abandoned in favour of a system of calculated grades. The pandemic had a major impact on work at CARPE also and while many of its activities were disrupted, new opportunities to extend its influence nationally and internationally have arisen.

In the immediate aftermath of the lockdown CARPE personnel were centrally involved in preparing guidance documents and videos for use by colleagues in DCU who needed to make alternative arrangements for the assessment of their students due to the cancellation of on-site exams. In May, Paula Lehane led a data gathering initiative on the impact of online teaching and learning on the DCU student body.

A major programme of research is now underway at CARPE to update the literature on remote proctoring and to address issues pertaining to the comparability of in-centre and live remote proctored testing.

In June, I received an invitation from the Minister for Education to be a member of an Independent Steering Committee set up to provide assurance about the quality and integrity of the outcomes of the calculated grades system following the national standardisation process. It is anticipated that this work will extend well into the Autumn until the appeals process is completed.

While Covid19 has meant that all CARPE personnel now work predominantly from home, significant time has been spent progressing various research papers and projects. These include:

- Papers on teachers' conceptions of assessment, computer based assessment, attitudes to standardised testing, models of alignment for credentialing exams, and the assessment of critical thinking in higher education are among those that have either been published since October 2019 or are in press. It is especially pleasing that

the research on critical thinking has connected researchers at CARPE with researchers at one of the world's biggest and most influential testing organisations - the Educational Testing Service (ETS).

- Four papers are currently being peer reviewed: the use of interviews for selection to initial teacher education, artificial intelligence in assessment, the use of animations in assessment and the impact of standardised testing on teaching.
- Three papers are being prepared for submission to peer reviewed journals: data use in schools, teacher attitudes to standardised testing, and non-cognitive factors in achievement.
- Three reports on the assessment of transversal skills in STEM (an Erasmus+ funded project) were launched in March: *Digital Formative Assessment in STEM*, *Virtual Learning Environments and Digital Tools for Implementing Formative Assessment of Transversal Skills in STEM*, and Towards *a Conceptual Framework for ATS-STEM*
- Fourteen papers submitted by CARPE personnel were accepted for presentation at peer reviewed conferences in 2020.

Looking beyond the remote proctoring research being done with Prometric, the next twelve months will see a number of other studies come to fruition. For example, an application for ethical clearance to undertake a study of teachers' experiences with the calculated grades has been submitted to the Ethics Committee at DCU. Another study in collaboration with members of DCU's Anti Bullying Centre (ABC) is focusing on the development of a scale to measure understanding of bullying in the workplace is in train. Data collection involving circa 1000 respondents from Ireland and the UK will take place before the end of the year. It is hoped the scale will be used by organisations to generate data that will help in developing bespoke educational programmes focused on the issue of workplace bullying. Through the good offices of Marguerite Clarke, the first steps have been taken recently towards a research collaboration between CARPE and the World Bank in 2021.

Turning now to some highlights with respect to CARPE researchers: following a worldwide search and a very competitive selection process, I am delighted to welcome Gemma Cherry (PhD, Queen's University Belfast) as the new Prometric post-doctoral researcher at CARPE. Gemma is already busy working on the remote proctoring research projects. Vasiliki Pitsia successfully defended her doctoral research on September 28th. Her research explored issues around the relatively small percentage of Irish students at the upper levels of achievement in international studies such as PISA. Her dissertation was described by her examiners (Eugenio Gonzalez of ETS and Maurice O'Reilly DCU) as a *tour de force*. Vasiliki will be graduating as CARPE's second PhD in the Spring. IRC scholar, Paula Lehane, successfully completed her transfer viva taking her from the doctoral track to the doctoral register at DCU. Data gathering in schools for her research on the use of static and interactive items in computer-based testing, which was due to take place in April and May and had to be postponed, is currently underway. Over the coming year, Prometric PhD

candidate, Conor Scully, will work with staff at DCU's School of Nursing to explore issues related to Objective Structures Clinical Examinations (OSCE). This research is highly relevant for Prometric as the company has many medical clients interested in the psychometric properties of OSCEs. Conor is investigating how they are deployed internationally and how technology can be leveraged to address some of the measurement issues that arise when OSCEs are used. Prometric-supported, part-time PhD candidate, Deirdre Dennehy, has completed the first chapter of her thesis investigating how an assessment of emotional intelligence could be incorporated into an assessment of collaborative problem solving. She is currently writing her literature review. Former Prometric PhD Anastasios Karakolidis has had great success with his doctoral research winning the *DCU President's Award for innovation* last June. In addition, he presented on his work to an international audience as part of the requirements for being shortlisted (one of four projects) for the international *eAssessment Award*. Former Prometric post-doctoral researcher and now fulltime professor at DCU, Darina Scully, is in the process of writing a literature review paper on the assessment of creativity for CARPE. Darina is also involved in Prometric's remote proctoring work.

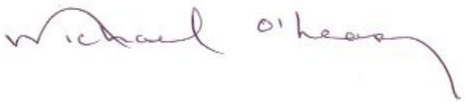
A student from Boston College's Measurement Evaluation Statistics and Assessment (MESA) programme was selected to participate in CARPE's two-month long Research Experience Programme (REP) during the summer of 2020. However, travel restrictions meant that the programme could not take place. My hope is that the REP will be able resume next year. I know that the chair of the MESA programme, Larry Ludlow, is an enthusiastic supporter of the project.

While the pandemic prevented CARPE staff from engaging in our summer professional programme, we were fortunate to have spent a thought-provoking day last February with John Gardner exploring the theme of *'Assessment in 2030'.* We also learned a great deal from Matthias von Davier's excellent presentation on the use of process data for the CARPE 2019 public lecture. Gerry Shiel's very insightful response to the lecture must also be acknowledged.

In July, Daire Keogh succeeded Brian MacCraith as President of DCU. I would like to take this opportunity to wish them both well. Brian's time at the helm was an outstanding success and establishing an assessment centre at DCU was just one of his many great achievements. I was delighted that Daire had the opportunity to meet with Prometric CEO Roy Simrell at the company's offices in Baltimore in March. We are all incredibly grateful for Prometric's continuing commitment to CARPE and DCU. Linda Waters, Li Ann Kuan and Garrett Sherry are my main points of contact at Prometric and it is a privilege to work with such supportive and knowledgeable colleagues.

My sincere thanks to each and every one of the members of CARPE's Advisory Board for taking the time to respond to my many requests through the past year. In particular, I want to pay tribute to Zita Lysaght who sits on the CARPE Advisory Board and attends all of the monthly CARPE Advisory Panel meetings (with Linda and Li-Ann). In addition, Zita supervises three CARPE PhDs, plays a leading role in three of its research projects and has been a member of all interview panels for the recent PhD and post-doctoral research positions.

I am grateful to IOE Executive Dean, Anne Looney, School of Policy and Practice Head of School, Elaine McDonald and DCU Trust Director of Philanthropy Claire Whelehan for their constant encouragement and support. A final word of thanks must go to Paula Lehane for all the work she has done over the past year to update CARPE's website, maintain its social media profile and keep minutes of its meetings. She is also responsible for collating and formatting all the information in this report.



Michael O'Leary, Prometric Chair in Assessment/Director of 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/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. Current members of the Board are:

- Dr. Marguerite Clarke, World Bank, Washington
- Professor John Gardner, University of Stirling
- Professor Larry Ludlow, Boston College
- Dr. Zita Lysaght, Dublin City University
- Mr. Garrett Sherry, Prometric
- Professor Gerry Shiel, Educational Research Centre
- Professor Matthias von Davier, Boston College

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.

A standing committee of the advisory board, the CARPE Advisory Panel (CAP), meet three to four times a year using online or face-to face sessions to review and plan individual projects related to Prometric's needs and interests. The members of CAP are:

- Professor Michael O'Leary
- Dr. Zita Lysaght
- Dr. Linda Waters (Prometric)
- Dr. Li-Ann Kuan (Prometric)

Staff

Prof. Michael O'Leary Prometric Chair in Assessment

Michael holds the Prometric Chair in Assessment and is the Director of CARPE. He is a graduate of the B.Ed. Programme at St Patrick's College and holds an M.Ed. from Trinity College, Dublin. He gained his Ph.D. in Educational Research and Measurement at Boston College in 1999. 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 as well as the examining and supervision of doctoral students

Gemma Cherry Prometric Post-Doctoral Researcher

Gemma is the Prometric Postdoctoral Researcher at CARPE. Gemma holds a B.A. in Sociology and a MRes in Social Research Methods from Queen's University, Belfast. She intends to take her Viva for her PhD in Education, in November 2020. Prior to joining CARPE, Gemma worked full-time as an affiliated lecturer at the University of Cambridge, specialising in quantitative research methods. At Cambridge, Gemma also coordinated the Masters in Educational Research programme and supervised the research projects of postgraduate students in the Faculty of Education. At the University of Cambridge, Gemma was in involved in research that assessed the economic value of literacy and numeracy skills across OECD countries. Previously, Gemma held various positions in the School of Social Sciences, Education and Social Work at Queen's University. Her work included undergraduate and postgraduate teaching, focusing on social research methods. At Queen's University, Gemma's research focused on educational inequalities and her PhD examined inequalities in primary and post-primary pupils' educational attainment outcomes across urban and rural locations of Northern Ireland. Gemma contributes to the full programme of research at CARPE.

Doctoral Students

Conor Scully is the current **Prometric PhD candidate** at CARPE (20192021). He holds a BA in philosophy, political science, economics, and sociology from Trinity College Dublin and an MSc in sociology from the University of Amsterdam. His Master's thesis research was on the presentation of heterosexuality in Irish secondary school aged boys. His research interests include emotional intelligence, gender, sexuality, education, and their intersection.

PhD Working Title: Inter-Rater reliability in Objective Structured Clinical Examinations for Nurses

Supervisors: Dr Mary Kelly, Dr Zita Lysaght, Prof. Michael O'Leary **Progress:** 2nd year

Vasiliki Pitsia is a PhD candidate working at Carpe. She was funded in her first year by Prometric and then through an Irish Research Council scholarship. She holds a B.Sc. 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. Vasiliki has worked on various research projects in Greece and Ireland and previously received funding from the Geary Institute to work on the 'Preparing for life' data. She was a member of the research team responsible for developing the Greek national report for the Programme for International Student Assessment (PISA) 2015. Alongside her studies, Vasiliki is a part-time lecturer in research methodology and advanced statistical techniques, as part of the University of Patras and National and Kapodistrian University of Athens online MSc programme 'Interdisciplinary Approach to STEM in Education'. Vasiliki is also responsible for designing and teaching a series of professional development workshops on using SPSS software for academic staff. Her broader research interests include research methods, statistical analysis and educational assessment, with a focus on large-scale international and national studies.

PhD title: Investigating high achievement in Mathematics and Science in Ireland: An indepth analysis of national and international assessment data

Supervisors: Dr. Zita Lysaght **,** Prof. Michael O'Leary, Prof. Gerry Shiel

Progress: Completed (September 2020)

Paula Lehane was previously the 2018 Prometric PhD candidate at CARPE. Her research is currently being funded by the Irish Research Council (2019-2021). She graduated from Mary Immaculate College (University of Limerick) with a first class honours degree in Education and Psychology in 2011. She completed her Postgraduate Diploma in Special Educational Needs (SEN) at University College Dublin (UCD) in 2015 and then completed a part-time Master's in Education there in 2016. She was previously the SEN and IT Co-Ordinator of a large urban primary school and has taught all class levels within the primary sector. Alongside her studies and work as a teacher, Paula has been employed as a research supervisor and guest lecturer in UCD, delivering inputs on topics including collaborative instruction, response to intervention and the use of statistics and digital tools in schools. Her research interests include SEN, school-based assessment practices and technology-based assessments.

PhD Working Title: Multimedia Items in Technology-Based Assessments (TBAs)
Supervisors: Prof. Michael O'Leary, Dr. Darina Scully, Prof. Mark Brown **Progress:** 3rd Year

Sylvia Denner is a part-time PhD candidate at CARPE. She holds an M.Soc.Sc. from University College Dublin and a Higher Diploma in statistics from Trinity College Dublin. Sylvia works in the Educational Research Centre, where she is currently working on PISA 2018. She was also one of the authors on the PISA 2015 report.

PhD Working Title: What is the impact on student performance in reading, mathematics and science in PISA when students in age-based samples are tested at different times of the year (*i.e. a*utumn vs. spring testing), and what variables can explain the impact?
Supervisors: Prof. Michael O'Leary, Prof. Gerry Shiel **Progress:** 3rd Year

Deirdre Dennehy is a part-time PhD student at CARPE. She holds a Bachelor of Education in Education and Psychology and a Masters of Education from Mary Immaculate College (University of Limerick). Her research interests include the assessment of well-being, standardised testing and the use of digital assessment tools. Deirdre works as a primary school teacher and has taught a range of classes across the primary sector.

PhD Working Title: Embedding the Assessment of Emotional Intelligence within Collaborative Problem Solving Tasks: An Exploratory Study
Supervisors: Dr Zita Lysaght, Prof. Michael O'Leary, **Progress:** 2nd Year

Adjunct Professors

Prof. John Gardner, University of Stirling

John Gardner is a professor of Education at the University of Stirling and is the former Senior Deputy Vice-Chancellor of the university. In 2012 he completed a four-year term as President and Vice-President of the British Educational Research Association. He has been a visiting professor at the University of Oxford, Department of Education (2009/17) and is currently a visiting professor at Queen's University Belfast and Dublin City University. He was elected to fellowship of the UK Academy of Social Sciences in 2007, the British Computer Society in 2004 and the Chartered Institute of Educational Assessors in 2007. Since 2018, he has been chair of the Welsh Government's Teacher Recruitment and Retention Advisory Board.

Prof. Gerry Shiel, Educational Research Centre

Professor 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. Most recently, alongside Associate Professor Damian Murchan (Trinity College), he published an important textbook on assessment for pre-service and practising teachers internationally. *Understanding and Applying Assessment in Education* (2017) is the first textbook of its kind with Irish authors.

Research Associates

The CARPE team collaborate with a number of individuals from other centres within the IoE, other faculties within DCU, and indeed other institutions globally on various projects. Bios of these Research Associates are provided below. Further details of the projects in which each person is involved are provided in the section on 'Ongoing Projects' (see p.19-35).

Prof. Lisa Abrams, Virginia Commonwealth University

Lisa is an Associate Professor of Research and Evaluation in the School of Education at Virginia Commonwealth University (VCU), where she teaches graduate courses in assessment, measurement, programme evaluation and educational research design. She is a graduate of Boston College, with a doctoral degree in Educational Research, Measurement and Evaluation. She specializes in test-based accountability policy, assessment design and date-use practice. Lisa spent three months of her sabbatical as a Visiting Professor at CARPE from May to July 2018, during which time she worked on a number of projects in the areas of test development and assessment literacy & professional development. Lisa continues to collaborate with the Centre and returned in the autumn of 2018 to co-deliver the Annual CARPE Lecture.

Dr. Sarahjane Belton (ACT@DCU 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 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 from 2006 - 2007, and has lectured in Physical Education in the School of Health and Human Performance at DCU from 2007 to present.

Prof. Mark Brown (Critical Review of Learning Portfolios)

Mark 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.

Prof. Deirdre Butler (Assessment of Transversal Skills in STEM; Minecraft in Irish Schools)

Deirdre works in DCU's Institute of Education and is internationally known as a leading scholar and creative practitioner of methods supporting teachers' professional development and students' learning. She has a particular expertise in developing sustainable, scalable models of teacher professional learning and has managed projects and school based initiatives which focus on creative uses of digital technologies. She advises ministries of education around the globe on redesigning education systems for the challenges that face the world now and in the future. She has worked across a broad range of stakeholders in education, technology, government, corporate and non-profit sectors. She played a key role in developing the recently launched Digital Strategy for Schools (2015) and the 21CLD MOOC, the first Irish-designed MOOC for teacher professional learning. She also established flagship Lego Education Innovation Studio within DCU's Institute of Education along with a purpose-built Minecraft Studio.

Dr. Eamonn Costello (ATS-STEM)

Eamonn is currently chair of DCU's online BSc. in Information Technology and BSc. in Management of Information Technology and Information Systems. Eamon holds a BA (Hons) in English Literature and History from Trinity College Dublin, a higher Diploma in Computer Science from University College Dublin, an MSc in Software and Information Systems from National University of Ireland Galway and a Doctorate in Education from Trinity College Dublin. His Doctoral study analysed the implications of massively distributed collaborative development processes for education and educational technology and focused on the community of the Open Source VLE Moodle.

Gulsah Gurkan (Assessment of Well-Being)

Gulsah is a doctoral student at the Department of Measurement, Evaluation, Statistics and Assessment (MESA) at the Lynch School of Education, Boston College. She holds a B.S. and an M.S. degree in Teaching Physics from Bogazici University, Istanbul. Prior to beginning her doctoral studies, she worked as a measurement and evaluation specialist at the Educational Volunteers Foundation of Turkey (TEGV) in Istanbul for three years, where she led many research and evaluation studies to foster the development of evidence-based programs implemented across the country. Her current research interests mainly focus on psychometrics, item response theory, large-scale data analysis, quasi-experimental research, and education policy.

Dr. Anastasios Karakolidis (Various Projects)

Anastasios was the first Prometric PhD candidate at CARPE (2016-2019).

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 delivers lectures on research methodology and advanced statistical techniques (e.g. multilevel modelling) to Master's students in Greece and Ireland. His research interests include research methodology, statistical analysis, measurement, assessment, testing and large-scale international studies. He currently works with the Educational Research Centre.

Dr. Li-Ann Kuan (Various Projects)

Li-Ann is an educational psychologist with over 20 years of experience in the testing industry, engaging both in content development and psychometrics. Over the course of her career, Dr. Kuan has managed the development and delivery of large-scale educational and professional assessments both in the United States and in developing countries such as Pakistan, Namibia, and Zambia. Dr. Kuan received her Bachelor of Science in Psychology from Brown University, and a Master of Arts and a Doctor of Philosophy in Psychological Studies in Education from the University of California, Los Angeles.

Dr. Francesca Lorenzi (Assessment for Learning Audit Instrument Project)

Francesca is a lecturer at DCU. Her teaching is primarily in the areas of Intercultural Education, Ethics and Values Education, Philosophy of Education and Curriculum Implementation; Assessment and Feedback. She obtained a PhD in Education from the National University of Ireland, Maynooth with a thesis focusing on the role of dialogue in assessment and the democratisation of practices in education. Her specific research interests include but are not limited to dialogue in education, democratic and inclusive approaches to educational assessment, creativity in education, ethics in the classroom, values and identity in relation to education for sustainable development.

Dr. Zita Lysaght (Various Projects)

Zita is an Assistant Professor in the School of Policy and Practice at the Institute of Education (St. Patrick's Campus), DCU; she lectures in assessment and research methodology on undergraduate, masters and doctoral programmes and coordinates the final year BEd4 and PME2

research projects. She is Director of the Assessment for Teaching and Learning (ALT) Project, a member of the Advisory Board of the Centre for Assessment Research and Policy in Education (CARPE) and a former Chair of Post-Graduate Studies by Research and Co-chair of the EdD programme. As part of her current role, Zita 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. Zita has twice received the President's Award for Excellence in Teaching and Learning.

Dr. Kay Maunsell (Assessment of Well-Being)

Kay is a 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.

Dr. Angela Mazzone (Assessment of Workplace Bullying)

Angela is a Postdoctoral Researcher at the National Anti-Bullying Research and Resource Centre (ABC), Dublin City University. She is involved in a large-scale national study on workplace bullying which is funded by the Health Service Executive (HSE). Her main research interests are workplace-bullying, school bullying, bullying towards immigrant youth, peer relations and socio-moral development

Dr. John McKenna (ACT@DCU Project)

John 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. 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. Prior to lecturing, he worked as a design engineer in electronics and telecommunications in the London area and as a communications consultant in Seoul, Korea.

Sebastian Moncaleano (Assessment of Workplace Bullying)
Sebastian is a doctoral student at the Department of Measurement, Evaluation, Statistics and Assessment (MESA) at the Lynch School of Education, Boston College. He majored in mathematics with a minor in education at Universidad de los Andes in Bogota, Columbia. Following this, he worked for two years as a maths teacher at an international high school in Bogota. His current research interests include the use of technology-enhanced items in large-scale assessments, the development of measurement scales, and the impact of career related events on the teaching quality of higher education faculty.

Prof. Mark Morgan (Assessment of Non-Cognitive Constructs)
Mark was the first Cregan Professor appointed in St. Patrick's College, Drumcondra (now DCU's Institute of Education). His scholarship can be categorized under four broad headings: motivation and job satisfaction, substance misuse and prevention, literacy and educational disadvantage. These are derived from his training and experience as both a primary teacher and social psychologist. Mark co-delivered the annual CARPE lecture in October 2018.

Prof. Damian Murchan (Assessment in the Primary School) Damian has collaborated with CARPE staff on their recent discussion paper for the NCCA on assessment in the re-developed primary school curriculum. He also acted as a reviewer for the CARPE/INTO Standardised Testing Project. Damian is Head of the School of Education in Trinity College Dublin where he leads a school with extensive national and international engagement with teaching, research and policy. A former teacher and school principal, Damian's research interests include educational reform, assessment methods, elearning and assessment, incorporation of key skills into the curriculum, and teacher professional development. He co-chairs a consortium established by Trinity and the Educational Research Centre Drumcondra that was intended to host the Annual Meeting of the Association for Educational Assessment - Europe in Dublin in November 2020.

Dr. Deirbhile Nic Craith (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.

Dr. James O'Higgins Norman (Assessment of Bullying in the Workplace)
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 postprimary school.

Naoimh O'Reilly (ACT@DCU 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. Katherine Reynolds (Assessment of Critical Thinking at DCU; Shortened Assessments: MoC & Micro-Credentialling)
Katherine received her doctorate from the Department of Measurement, Evaluation, Statistics, and Assessment at the Lynch School of Education, Boston College. She holds a B.A. in History and an M.S. Educational Policy Studies and Evaluation, both from the University of Kentucky. While at Boston College, she has worked as a graduate assistant at the TIMSS and PIRLS International Study Center. Prior to graduate studies, she taught 7th and 8th grade science in Charlotte, North Carolina. Katherine's research interests include scale development and university student-faculty interaction.

Dr. Darina Scully (Various Projects)
Darina is an Assistant Professor in Child/Adolescent Learning & Development, Wellbeing and SPHE in the School of Human Development in DCU. She holds a B.A. (Mod.) and a Ph.D in psychology from Trinity College, Dublin. Darina has extensive research experience in education

and the social sciences, particularly in quantitative methods and statistical analysis. From 2016 to 2019, she held the post of Prometric Postdoctoral Researcher in the Centre for Assessment Research, Policy & Practice in Education (CARPE), where her work focused on various issues in assessment and test development in educational and workplace settings. Prior to this, she worked as a Research Assistant in the Educational Research Centre, where she was involved in a number of high profile national and international research projects, including TIMSS (Trends in International Maths and Science Study), and the evaluation of the School Support Programme under DEIS (Delivering Equality of Opportunity in Schools).

Associate Prof. Steven Stemler (SJTs)

Steven is an Associate Professor of Psychology at in the Psychology Department, Wesleyean 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.

Olivia Szendey (Assessment of Transversal skills in STEM)

Olivia works on the Assessment of Transversal Skills in STEM project for CARPE. Olivia is a doctoral student studying Measurement, Evaluation, Statistics, and Assessment in the Lynch School of Education and Human Development at Boston College. She holds a B.S. in psychology from James Madison University. At Boston College Olivia works as a graduate assistant at the office of Institutional Research, Planning, and Assessment. She is also a research assistant for Dr. Larry Ludlow and is working with him and others to develop a scale measuring "leading a life of meaning and purpose".

Dr. Linda Waters (Various Projects)

Linda began her career in testing at the Educational Testing Service in Princeton, New Jersey, working as part of the team to transition the first large-scale United States-based licensure examination program from paper-and-pencil testing to computer-based testing. Dr. Waters joined Prometric in 2004 and is a member of the Global Business Development team. She has previously held faculty positions at the University of South Carolina and the University of Delaware. Dr. Waters is a registered nurse and a graduate of the University of Delaware with a Ph.D. in Educational Measurement and Statistics. She is also Prometric's representative on CARPE's advisory panel.

International Research Advisors

Dr. Marguerite Clarke is a Senior Education Specialist in the Human Development Network of the World Bank. She holds a PhD 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 work has focused on the impact of citizen-led assessments in India and elsewhere.

Dr. Eugenio Gonzalez has a vast and varied experience in the field of large-scale assessments in education. He is a Strategic Advisor at ETS (Educational Testing Service) and the Director of the IEA-ETS Research Institute. His previous positions include Head of the IEA's (International Association for the Evaluation of Educational Achievement) Research & Analysis Unit, and Director of Quality Control and Field Operations at the US National Assessment of Educational Progress (NAEP). While working on his doctorate at Boston College, he oversaw the development and implementation of TIMSS (The Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study).

Prof. Therese Hopfenbeck is a 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*.

Prof. Larry Ludlow 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.

Prof. Laura O'Dwyer 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.

Dr. Matthias von Davier is a Distinguished Research Scientist at the National Board of Medical Examiners (NBME), in Philadelphia. Previously he was a Senior Research Director in the Research & Development Division at Educational Testing Service (ETS), and co-director of the Center for Global Assessment at ETS, where he led psychometric research and operational analysis for assessments such as PISA, PIAAC, TIMSS and PIRLS. He earned his Ph.D. in psychology from University of Kiel, Germany, in 1996, specializing in psychometrics. His areas of expertise include item response theory, latent class analysis, diagnostic classification models (distribution models, computational statistics, person-fit, item-fit etc.,) and the analytical methodologies used in large scale educational surveys. His current work is concerned with extending, implementing and applying multidimensional IRT, IRTree, and latent response models, as well as speed/accuracy models to process data research using log-file and timing data using data from large scale tests e.g. PISA, PIAAC.

Linked Centres

CARPE and the Anti Bullying Centre (ABC) at DCU are now linked through the Assessment of Bullying in the Workplace Project. See: http://www4.dcu.ie/abc/index.shtml

CARPE is linked to the National Institute for Digital Learning (NIDL) through its research on learning portfolios and the assessment of transversal skill in STEM funded by an Erasmus+ grant. NIDL Director, Professor Mark Brown was co-author with Darina Scully and Michael O'Leary on the Review on the Use of Learning Portfolios in Higher Education, published in February 2018. See: http://www.dcu.ie/nidl/index.shtml

The current director of the Oxford University Centre for Educational Assessment (OUCEA), Professor Therese Hopfenbeck, plays an important advisory role in CARPE. Prof. Hopfenbeck was the external examiner for Anastasios Karakolidis's doctoral thesis. See: http://oucea.education.ox.ac.uk/

CASTeL is Ireland's largest research centre in Science, Technology, Engineering, and Mathematics (STEM) education. CASTeL and CARPE are collaborating on the ATS-STEM s project funded by ERASMUS+. See: http://castel.ie/

Research

In 2019, CARPE completed a number of high profile projects (as outlined in last year's report here).The joint CARPE/INTO survey on Irish primary school teachers' views on standardised assessment was released in May 2019. This was the first study of its kind in Ireland and generated a significant amount of discussion on the role of standardised tests in Irish primary schools. Members of CARPE also collaborated with policy-makers on a number of issues and authored reports for the National Council of Curriculum and Assessment (NCCA) on how to best align curriculum standards with assessment practices and what steps should be undertaken when devising the first computer-based exam for the Leaving Certificate.

CARPE continues to pursue an extensive research programme in assessment, spanning topics relevant to all levels of the education system and across the professions. Some of our projects focus on Irish educational assessment, whilst others address more global issues such as the assessment of "hard to measure" skills, technology-based assessment, and issues in the field of certification and licensure assessment. An overview of all of our projects and the progress made with each in the past twelve months is provided below.

Current Projects

(i) Assessment of Transversal Skills in STEM

Project Directors: CARPE, CASTeL (Centre for the Advancement of STEM Teaching and Learning) and NIDL (National Institute for Digital Learning)

Prof. Michael O'Leary (CARPE) speaking at the ATS-STEM Launch

Science, Technology, Engineering and Mathematics (STEM) has infiltrated every sector of today's world. It is essential that the future workforce continues to be equipped with the knowledge, skills and abilities necessary to further develop and secure our globally connected economy. To achieve this, STEM education needs significant support and investment in school systems worldwide. In particular, the creation of classroom-based digital tasks and activities that can cultivate STEM literacy must now be prioritised. In December 2018, an ambitious research project that aims to address this shortcoming received €2.34 million in funding from the Erasmus+ Programme. In March 2019, the President of DCU welcomed partner organisations from 8 EU countries (Ireland, Austria, Cyprus, Belgium, Slovenia, Spain, Finland and Sweden) to the Institute of Education to officially begin this DCU-led project titled 'Assessment of Transversal Skills in STEM'. The project is led by three DCU Research

Centres: The National Institute for Digital Learning (NIDL), The Centre for Assessment Research Policy and Practice in Education (CARPE) and the Centre for the Advancement of STEM Teaching and Learning (CASTeL). Working with 120 schools across Europe, the partners have begun to devise, test and scale new digital assessments for STEM education that engage and enhance students' transversal skills such as teamwork, communication and discipline-specific critical thinking. At the time of writing, CARPE has been involved in writing three reports to assist in these endeavours:

Report #3: Digital Formative Assessment of Transversal Skills in STEM: A Review of Underlying Principles and Best Practice. Katherine Reynolds, Michael O'Leary, Mark Brown and Eamon Costello.

Report #3 reviewed the key components and principles surrounding the theory of formative assessment. Focusing on the underlying principles and practices involved in implementing digital formative assessment technologies, this report is based on findings from two of the ATS STEM project's work packages: *Review of digital assessment approaches* (WP1.4) and, *Formative assessment design* (WP2.1). Evidence suggests that the use of formative assessment and feedback can be beneficial in the STEM fields, however, it is also associated with an array of challenges that need to be considered. The report presents several frameworks and models that can be used to guide thinking about how digital formative assessments can be used to enhance learning and achievement in STEM. The report also highlights the importance of adequate teacher training, professional development and support in the implementation of digital formative assessment systems.

Report #4: Visual Learning Environments and Digital Tools for Implementing Formative Assessment of Transversal Skills in STEM. Olivia Szendey, Michael O'Leary, Conor Scully, Mark Brown and Eamon Costello.

Report #4 examined the potential of various digital tools and architectures that may be beneficial to supporting assessment for learning in STEM. By conducting a targeted review of the literature, nine key features of digital assessment tools were outlined and discussed in terms of their educational affordances. The report also highlighted that in order for the potential of these tools to be realised, further empirical research is required to support their implementation. The report emphasises the need to develop an understanding of how various learning contexts may impact on how these tools are utilised in practice.

Report #5: Towards the ATS STEM Conceptual Framework. Deirdre Butler, Eilish McLoughlin, Michael O'Leary, Sila Kaya, Mark Brown and Eamon Costello.

Report #5 in the series, draws upon key findings from the previous reports to provide a policy and research informed conceptual framework detailing the relationship between and the practical integration of the 4 STEM disciplines, while also simultaneously considering the role

of assessment. The ATS STEM conceptual framework contains 4 main components that underpin a common understanding of what integrated STEM is and how it can be assessed using a range of digital tools. These components are: Core STEM Competences; STEM Learning Design Principles; Key features of Formative Assessment STEM Tasks and; Key features of Digital Assessment Tools. It is perceived that this framework will be useful for educators by enabling the design and development of an integrated STEM curriculum with appropriate teaching, learning and assessment tools. This visual model of Integrated STEM education provides a common language and shared understanding of the concept. At present, the conceptual framework is provisional in nature and further research will be carried out with the aim of testing and validating it in schools.

(ii) Assessment of Critical Thinking at 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* skills in higher education is suitable for use in DCU. It is an inter-disciplinary collaboration between CARPE and researchers from DCU's Schools of Business, Computing, and Health & Human Performance. A pilot study of the HEIghten CT test involving 214 First Year and 264 Fourth Year DCU students was conducted between September 2017 and May 2018 and provides reasonable validity evidence to support its use in an Irish context. A paper detailing the background to the study and the findings has been accepted for publication in the *Journal of Higher Education Theory and Practice.*

The proposal now is to continue using the HEIghten CT test in DCU with two major goals in mind: (1) to provide evidence of institutional and program-level learning outcomes in CT (including growth in DCU students' critical thinking skills as they progress through their university programmes); (2) to facilitate conversations among staff regarding pedagogy, curricula and educational interventions pertinent to developing CT skills.

(Iii) Human Capital Initiative (DCU)

Project Director: A DCU-wide funding application. Michael O'Leary represents CARPE.

Future Jobs Ireland 2019 states that, "…by 2025, our workers and enterprises will be operating in a changed economy. Technology continues to herald new ways of doing business and new economic opportunities". Central to this are objectives to enhance skills, develop and attract talent to Ireland. Transversal skills along with core competencies in numeracy, literacy and digital technologies are critical for work in all sectors. The Human Capital Initiative (HCI) will increase capacity in higher education in focused programmes designed to meet these priority skills needed for enterprise.

In 2020, CARPE supported DCU's application for a HCI grant that would allow DCU to develop courses of study that would enhance the transversal skills and competences of

postgraduate students. The outcome of the application is due to be announced in the Autumn of 2020

(iv) Assessment of Bullying in the Workplace

Project Directors: Michael O'Leary, Conor Scully, Zita Lysaght, James O'Higgins Norman & Angela Mazzone (Anti-Bullying Centre), Larry Ludlow (Boston College)

One of the greatest tools in combatting bullying behaviours in schools and workplaces is ensuring that people have a good knowledge of *what* bullying behaviour actually looks like so that they can then implement appropriate procedures.

As part of the 2017 CARPE Research Experience Programme, Sebastian Moncaleano, a PhD student from Boston College, conducted a literature review on current approaches to the assessment of workplace bullying. Drawing on this review, and on skills learned during the Professional Development week in the summer of 2018 and 2019, the CARPE team, in collaboration with subject matter experts from the IoE's Anti-Bullying Centre, have developed a number of scenarios that can be used to measure people's awareness of bullying behaviours in workplace settings. These items will be piloted in Autumn 2020.

(v) Remote Proctoring in Credentialing and Licensure Tests

Project Directors: Michael O'Leary, Darina Scully, Anastasios Karakolidis, Gemma Cherry, Paula Lehane, Vasiliki Pitsia & Conor Scully

Remote proctoring (RP) has the potential to transform the testing industry by providing testtakers the option to take an examination remotely, instead of at a face-to-face testing environment. RP refers to a range of technological processes implemented to monitor testtakers during examinations, performing functions similar to those of human proctors including the minimisation of cheating, via an online system. There is increasing interest in RP and it has been estimated to be a $10 billon market by 2026. In particular, the onset of the COVID-19 pandemic in February 2020 has meant that many higher education institutions and professional regulatory bodies are now rapidly exploring the use of RP services.

In 2017, a research brief was submitted to Prometric which outlined the benefits and main concerns associated with online proctoring. In 2020, researchers at CARPE updated this research through two memos. Memo one reviewed research conducted since 2015 and examined the psychometric properties of RP examinations, including issues of reliability and validity. Test-taker experience is discussed in terms of the advantages and disadvantages of taking a RP test as opposed to an in-person test. A discussion for the potential of candidates to cheat is also included in Memo one. Various recommendations are provided for how Prometric can develop and administer RP assessments in line with best practice. Memo two

focused on the policies, procedures and security concerns associated with RP. The report addressed key administration and security issues including fraud prevention, privacy, data protection and test content safekeeping. Memo two highlights how addressing these concerns can increase candidate trust in the use of RP and also give greater confidence in the RP process. Both memos highlight that empirical research in this area is limited, especially in relation to licensure and certification assessments. As new published work becomes available, it is imperative that Prometric keeps up to date with these developments. It seems likely that the demand for RP options will continue to increase over the next decade and as such, it is critical that we increase our understanding of this practice through empirical evidence.

(vi) Development of an Assessment for Learning Audit Instrument for Secondary Schools (AfLAi)

Project Directors: Zita Lysaght, Michael O'Leary, Larry Ludlow, Dr. Francesca Lorenzi

This project has its roots in assessment challenges identified from research conducted in the Irish context. This research highlighted: (a) the dearth of assessment instruments nationally and internationally to capture changes in children's learning arising from exposure to, and engagement with, Assessment *for* Learning (AfL) pedagogy; (b) the nature and extent of the professional challenges that teachers face when trying to implement AfL with fidelity and; (c) the urgent need for a programme of continuous professional development to be designed to support teachers to learn about AfL and integrate it into their practice.

Since the initiation of this project, significant progress has been made in all three areas: An Assessment for Learning Audit instrument (AfLAi) developed by Zita and Michael has been used across a range of Irish primary schools and in educational systems in Australia, Netherlands, Norway, Malaysia, Chile and South Africa. In addition, data from almost 600 Irish primary teachers have been used to develop a research-focused Assessment for Learning Measurement instrument (AfLMi). In 2018 an audit instrument for use in secondary schools was developed (the AfLAi2) and data gathering using this instrument continued in 2019 with 147 audits completed by teachers across five schools. Finally, programmes of professional development in assessment continue to be implemented in undergraduate and post-graduate teacher education programmes and as part of site based in-service teacher education.

(vii) Irish students' performance at the upper levels of achievement in mathematics and science across national and international assessments (PhD Thesis)

PhD Candidate: Vasiliki Pitsia

Project Supervisors: Zita Lysaght, Michael O'Leary, Gerry Shiel,

Students in Ireland have often performed well on national and international assessments of mathematics and science, however, there is a notable absence of students scoring at the highest proficiency levels. Additionally, the scores of high achievers in Ireland (i.e. those performing at the national 90th percentile in these subjects) have tended to be lower than their counterparts in other countries. A pattern of declining performance among high achievers have been also detected in the Irish state examinations. Reports of low performance among students in Ireland on national and international assessments have not yet been given sufficient attention. Taking into account Ireland's overall performance in science and mathematics and the large proportion of high achievers in reading literacy, it seems that more Irish students have the potential to perform at the highest levels.

With all of the above in mind, this study aimed to undertake an in-depth investigation of the trends and nature of high achievement in mathematics and science in Ireland, by combining national and international large-scale assessment data. The overarching aims are to inform policy and practice, to provide country-specific recommendations, and to advance the development of exceptional skills needed to succeed in a modern, competitive society.

Vasiliki successfully defended her doctoral thesis in September 2020, passing with minor revisions. After making the changes that the examiners required, she is ready to graduate in Spring 2021. This research was funded by the Irish Research Council under the prestigious government of Ireland Postgraduate Programme.

(viii) Multimedia Items in Technology-Based Assessments (PhD Thesis)

PhD Candidate: Paula Lehane

Project Supervisors: Michael O'Leary, Mark Brown, Darina Scully

The use of digital devices and technology to conduct assessments in educational settings has become more and more prevalent in recent times. While paper-based assessments are largely restricted to traditional item types such as multiple choice or short answer questions, the possibilities for items in TBAs are more extensive (e.g. drag-and-drop items, simulations) and continue to expand as technology develops. However, the impact of these item types and their interaction with multimedia stimuli on test-taker performance and behaviour in *assessment* situations has yet to be fully clarified. Failure to address this shortcoming in research could lead to poorly designed digital assessments that could impact on the accuracy of interpretations being made from such tests.

Paula's PhD project aims to examine the influence of multimedia items and different item types on test-taker performance in TBAs by investigating the following research questions using performance data (in the form of test scores) and process data (in the form of eye movement data):

- How do test-takers allocate attention in TBAs that include multimedia stimuli and involve different item types (e.g. multiple-choice questions, drag-and-drop items)?
- What is the impact of (i) multimedia stimuli and (ii) item types on test-taker performance in TBAs?
- Is there a difference in test-taker performance and attentional allocation behaviours in TBAs involving different types of multimedia items?

In April 2020, Paula completed her viva to transfer from the PhD track to the PhD register. Paula hopes to submit her thesis in 2021. This research is funded by the Irish Research Council under the prestigious government of Ireland Postgraduate Programme.

(ix) Inter-Rater reliability in Objective Structured Clinical Examinations for Nurses (PhD thesis)

PhD Candidate: Conor Scully

Project Supervisors: Mary Kelly (School of Nursing), Zita Lysaght and Michael O'Leary

Objective Structured Clinical Examinations (OSCEs) are an assessment format common in medicine and nursing. In an OSCE, a student moves through a series of stations at which they have to complete a specific task e.g. recording patient history. They are judged on their performance at each station by a trained examiner, using a scoring rubric specific to that station. Compared to previous examination methods in medicine and nursing, the OSCE is generally considered to produce reliable scores, but score reliability is often at a less than acceptable level.

Assessor cognition is a field of research that seeks to understand how exactly assessors in examinations make decisions about student performances. It is increasingly accepted that because assessors are all unique, they are likely to judge students in idiosyncratic ways. This study will employ a mixed methods approach to understand how nursing OSCE assessors make decisions about students, and whether the cognitive processes through which assessors go have an impact on score reliability. Additionally, it will be investigated the extent to which score reliability can be improved if there is increased alignment between the scoring rubrics and assessors' cognitive processes. Conor has recently completed his PGR2 submission and as such has begun the second year of his doctoral work.

(x) Use of technology for teaching in response to COVID-19 in post-primary schools
Project Directors: Darina Scully, Paula Lehane and Conor Scully

As the Covid-19 pandemic continues to jeopardise public health and cause economic chaos, it is essential that the global education community find ways to attend to the educational needs of children and young people. In the Republic of Ireland, policy makers have strongly recommended the use of technology to ensure continuity of learning for post-primary students (Department of Education and Skills, 2020). However, previous research suggests that Irish schools' use of such tools is heavily influenced by a number of factors. These include teacher digital competence (as conceptualised by Redecker's (2017) framework), school context, internet infrastructure and student access to devices (e.g. Eivers, 2019). To examine how Irish post-primary schools used technology-based strategies to minimise disruption to their students' learning during the Covid-19 pandemic, a digital survey was carried out with a random sample of 70 school leaders. The results of this survey will be published in the *Journal of Technology, Pedagogy and Education* in Autumn 2020.

(x) Minecraft in the Classroom
Project Directors: Paula Lehane and Prof. Deirdre Butler (IoE)

With over 176 million copies sold (Microsoft, 2019), *Minecraft* is one of the most popular digital games ever among children and teenagers. Originally designed as a commercial game for private users, the recent launch of *Minecraft Education Edition*, (a version of the game optimised for classroom use), can now give educators the opportunity to introduce digital game-based learning (GBL) to their classrooms using a game that can capitalise on their learners' interests. CARPE and the IoE have worked together on a report outlining the potential of *Minecraft* and GBL to support teaching, learning and assessment in schools. This report was originally scheduled for publication in March 2020 but has been delayed.

Suspended Projects

(i) Assessment of Learning about Well-Being
Project Directors: Kay Maunsell, Gulsah Gurkan

The significance of wellbeing with respect to developmental and educational outcomes for children and young people is unequivocal. However, the objective measurement of wellbeing is a relatively recent academic pursuit. In light of the introduction of wellbeing as a subject area within the reformed Junior Cycle programme in Ireland, the development of objective assessment tools in this area is likely to warrant serious academic attention in the coming years. This study seeks to examine the potential use of scenarios/vignettes to measure young people's experience of wellbeing as a consequence of their engagement with efforts to enhance it within second-level schooling.

Research Outputs Oct 2019-Sept 2020

Peer-Reviewed Articles

Darmody, M., Lysaght, Z. & O'Leary, M. (2020). Irish post-primary teachers' conceptions of assessment at a time of curriculum and assessment reform. *Assessment in Education: Principles, Policy & Practice.* https://doi.org/10.1080/0969594X.2020.1761290

Lehane, P. (2019). What Makes a Difference for Candidates Taking Computer-based Tests? Issues Surrounding Device Comparability and User Interface Modifications. *CLEAR Exam Review*. https://www.clearhq.org/page-1721345#winter19

Scully, D., Pitsia, V. & Karakolidis, A. (2019). Exploring the interpersonal dimension of teaching in an Irish post-primary context. *Irish Educational Studies.* https://doi.org/10.1080/03323315.2019.1697947

Reports

Butler, D., McLoughlin, E., O'Leary, M., Kaya, S., Costello, E., & Brown, M. (2020). *Towards the ATS STEM Conceptual Framework*. ATS STEM Report #5. Dublin: Dublin City University.

Reynolds, K., O'Leary, M., Brown, M. & Costello, E. (2020). *Digital Formative Assessment of Transversal Skills in STEM: A Review of Underlying Principles and Best Practice*. ATS STEM Report #3. Dublin: Dublin City University.

Szendey, O., O'Leary, M., Scully, C., Brown, M., & Costello, E. (2020). *Virtual Learning Environments and Digital Tools for Implementing Formative Assessment of Transversal Skills in STEM.* ATS STEM Report #4. Dublin: Dublin City University

Industry Reports

Scully, C. & Lehane P. (2020). *Remote Proctoring: Memo 1 – Considerations for policies, procedures, and regulations when using remote proctoring for online licensure and certification exams.* Unpublished manuscript, Centre for Assessment Research Policy & Practice in Education (CARPE), Dublin City University.

Lehane, P. & Scully, C. (2020). *Remote Proctoring: Memo 2 – Considerations for policies, procedures, and regulations when using remote proctoring for online licensure and certification exams.* Unpublished manuscript, Centre for Assessment Research Policy & Practice in Education (CARPE), Dublin City University.

Accepted, Peer-Reviewed Conference Papers

Kuan, L., O'Leary, M. & Brunner, B. (2020). *Is the Psychometric Quality of Situational Judgment Items Affected by the Type of Task Analysis Performed?* Paper accepted for presentation at the Association of Test Publishers (ATP) Conference, San Diego, United States. (Conference cancelled).

Lehane, P., Lysaght, Z. & O'Leary, M. (September, 2020) *The Interview as a Selection Mechanism for Entry into Initial Teacher Education: A Review of the Literature and Recommendations for Practice*. Paper presented at the Educational Studies Association of Ireland, Dublin, Ireland.

Lehane, P., Pitsia, V., & Karakolidis, A. (2020). *Identifying factors predicting teachers' use of assessment data: Findings from a national large-scale survey of primary teachers in Ireland.* Paper accepted for presentation at the European Conference on Educational Research 2020, Glasgow, UK. (Conference cancelled).

Lehane, P., Pitsia, V., & Karakolidis, A. (2020). *Exploring primary school teachers' use of assessment data in an Irish context*. Paper submitted for publication at the 21st Annual Meeting of the Association for Educational Assessment (AEA) – Europe, Dublin, Ireland (Conference Postponed).

Ling, G., O'Leary, M. et al. (2020). Assessment of Competencies as a Result of College Learning: Explorations in Europe and Beyond. Symposium accepted by Division 9 (Assessment, Evaluation, Testing and Measurement) of the European Conference on Educational Research 2020, Glasgow, UK. (Conference cancelled).

O'Leary, M., Lysaght, Z., NicCraith, D. & Scully D. (2020). *Teacher Perspectives on Standardised Testing of Achievement in Ireland*. Paper accepted for presentation at the Annual Meeting of the American Educational Research Association (AERA), San Francisco, United States. (Conference cancelled).

O'Leary, M. & Reynolds, K. (2020). *Critical Thinking Test Validity in International Contexts: Evaluating the ETS HEIghten Test for Irish Use.* Paper accepted for presentation at the Annual Meeting of the American Educational Research Association (AERA), San Francisco, United States. (Conference cancelled).

Pitsia, V. (2020). *Using PISA data to examine high-achieving students' characteristics.* Paper submitted for publication at the 21st Annual Meeting of the Association for Educational Assessment (AEA) – Europe, Dublin, Ireland (Conference Postponed).

Pitsia, V. (2020). *Characteristics of high achievers: A multilevel logistic regression analysis of PISA mathematics and science data.* Paper accepted for presentation at the American Educational Research Association (AERA) 2020 Annual Meeting, San Francisco, United States. (Conference cancelled).

Pitsia, V., O'Leary, M., & Shiel, G. (2020). *A multilevel binary logistic regression analysis of mathematics and science achievement in TIMSS 2015 in an Irish post-primary context.* Paper accepted for presentation at the European Conference on Educational Research 2020, Glasgow, UK. (Conference cancelled).

Pitsia, V., Lysaght, Z., Shiel, G., & O'Leary, M. (September, 2020). *Are we meeting the needs of high achievers? A closer look at PISA, TIMSS and PIRLS data for Ireland.* Paper accepted for presentation at the Educational Studies Association of Ireland Conference 2020, Dublin, Ireland.

Pitsia, V., O'Leary, M., Shiel, G., & Lysaght, Z. (November, 2019). *What do international large-scale assessments tell us about high achievement in mathematics and science, with specific reference to Ireland and some comparison countries?* Paper presented at the 20th Annual Meeting of the Association for Educational Assessment (AEA) – Europe, Lisbon, Portugal.

Reynolds, K., Abrams, L. & O'Leary, M. (2020). *Applying the Webb Alignment Model to Professional Testing.* Paper accepted for presentation at the Association of Test Publishers (ATP) Conference, San Diego, United States. (Conference cancelled).

Scully, C. (September, 2020). *Inter-rater reliability and validity in the Objective Structured Clinical Examination.* Paper accepted for presentation at the Educational Studies Association of Ireland, Dublin, Ireland.

Other outputs by members of CARPE

Peer-Reviewed Journal Articles

Karakolidis, A., Pitsia, V., & Emvalotis, A. (2019). The case of high motivation and low achievement in science: What is the role of students' epistemic beliefs? *International Journal of Science Education, 41*(11), 1457-1474. https://doi.org/10.1080/09500693.2019.1612121

Mazzone, A., & Pitsia, V. (2020). Individual and contextual factors associated with bullying victimisation: A cross-national comparison of Irish and Lithuanian students. *Paper submitted for publication.*

Nigam, Y., Humphries, I. & Lehane, P. (2020). Could Maggot Therapy be taught in Primary Schools? *Journal of Biological Education.* https://doi.org/10.1080/00219266.2020.1748686

Papers in press or currently under review

Members of CARPE currently have a number of papers under peer review since early 2020. However, significant delays are present in the peer review process as a result of COVID-19. Papers in press and under review include:

- Digital learning, leadership and the response to the COVID-19 pandemic in Irish secondary schools (in press)
- Measuring critical thinking in Higher Education (in press)
- Webb's model of alignment for supporting score interpretation and use claims in credentialing examinations (in press)
- Irish primary teachers' beliefs about and attitudes to standardised tests of English Reading and Mathematics (in press)
- The use of interviews for selection to initial teacher education (in review)
- Artificial intelligence in educational assessment (in review)
- The use of animations in assessment (in review)

Papers in preparation

- Non-cognitive factors in achievement
- Assessment data use in schools
- Towards a framework to support the implementation of digital formative assessment in Higher Education

CARPE Events

CARPE Public Lecture 2019

(L-R) Prof. Michael O'Leary (CARPE), Dr. Mathias von Davier and Garrett Sherry (Prometric)

On Monday, 21st October 2019, CARPE hosted its fourth annual public lecture. This year's topic was '*Process Data: What you wanted to know but were too afraid to ask*', and we were pleased to host the highly accomplished Dr. Mathias von Davier to deliver the lecture. This video is available to be viewed under the 'Lecture Resources' section of our website.

Mathias holds the Distinguished Research Scientist position at the National Board of Medical Examiners (NBME), in Philadelphia since January 2017. Prior to this appointment, he was a Senior Research Director in the Research & Development Division at Educational Testing Service (ETS), and co-director of the center for Global Assessment at ETS. He helped to lead the psychometric research and operational analysis of the center in relation to a range of large-scale assessments such as PISA, PIAAC, TIMSS and PIRLS. He is currently the editor of Psychometrika and has written extensively in the fields of education, research methodology and psychometrics.

In his lecture, Mathias provided the audience with an overview of process data, explaining it as those actions (such as time spent on task or number of mouse-clicks) that are automatically recorded by a computer in their system logs as coded and time-stamped strings of data. These strings can be used for instant feedback to students, or for diagnostic and scoring purposes at a later time. Mathias noted that process data has the potential to enrich psychometric methods and can allow us to gain a greater understanding of test-takers' knowledge, skills and abilities. Mathias provided some compelling case studies that highlighted the value of process data for teachers and learners. For example, he discussed how educationalists

Professor Matthias von Davier

working with vocational students in third-level institutes in the Netherlands used process data to better understand what strategies car mechanic apprentices use when trying to diagnose car problems. This then informed the design of their future lectures and courses.

The audience offered some thoughtful comments and questions. Prof. Gerry Shiel from the Educational Research Centre (ERC) began the responses to Mathias' lecture, noting the relevance of this topic to research currently being conducted within the Irish context. In particular, Gerry highlighted how current research by the ERC aims to use process data to better understand Irish performance in PISA. However, he cautioned that there was a significant need for investment in the field in order to ensure that researchers have the capacity to work with such data. Other members of the audience noted that it may take several years before we make any substantial moves forward in integrating process data into standard analysis practices. The team at CARPE are extremely grateful to all those who attended the event. We would also like to thank Mathias for all his work in preparing this engaging lecture, Gerry Shiel for his insightful response to some of the issues raised by Mathias, and Paul Murphy, who captured the photographs and video on the day.

Prof. Gerry Shiel responding to issues raised by Mathias

Teaching Council Webinar on Assessment

The Teaching Council hosted a joint webinar with the Junior Cycle for Teachers (JCT) and National Council for Curriculum and Assessment (NCCA) on 6 November 2019 in which the theme of Exploring Perspectives on Assessment: Learning from Research and Practice was discussed, chaired by the Teaching Council's Director Tomás Ó Ruairc. The Director of CARPE, Professor Michael O'Leary was one of the contributors, alongside Gráinne Macken (Regional Leader for Northwest Whole School Support and CPD, Junior Cycle for Teachers), Ben Murray (Director with the National Council for Curriculum and Assessment) and Elaine Daly (Post-Primary student at Coláiste Treasa, Kanturk, Co. Cork).

An Chomhairle Mhúinteoireachta
The Teaching Council

The role of high stakes assessments in primary education, teacher-student relationships in assessment contexts and teacher autonomy were some of the topics discussed. This webinar is available to view on the Teaching Council website here.

Graduation 2019

On November 6th 2019, our first Prometric PhD Scholar was conferred as Dr. Anastasios Karakolidis. It was a momentous day for both CARPE and Anastasios' family.

Dr. Karakolidis with his family and supervisors on his graduation day

John Coolahan Research Framework Award

The John Coolahan Research Support Framework marks the immense contribution of Professor John Coolahan to the field of education at home and abroad. The framework seeks to support teachers in using existing research to inform their practice, or in carrying out new research, either in collaboration with others or independently. It emphasises research activities that strengthen the links between research, policy and practice, and on collaboration among teachers, and between teachers and other educational researchers.

Zita Lysaght (DCU), Deirbhile Nic Craith (INTO Director of Education & Research), Siobhan Lynskey (INTO Education Committee Chair and principal of St Colmans NS, Tuam, Co. Galway) and Michael O'Leary (Centre for Assessment Research, Policy and Practice in Education, DCU) were awarded the John Coolahan bursary award for their project entitled '*Developing Innovative, Research-Informed Professional Learning Materials to Guide Primary Teachers' Individual and Collaborative use of Standardised Testing in Support of Pupils' Learning*' in an event chaired by Seán MacMahon, former INTO President. The joint research publication on which this project is based, was also supported by Anastasios Karakolidis, Paula Lehane, Maeve McCafferty and Vasiliki Pitsia.

Siobhán Lynskey (INTO Education Chair), Deirbhile Nic Craith (INTO Director of Education and Research), Zita Lysaght (DCU) & Michael O'Leary (CARPE)

Visiting Scholar Seminars

Prof. John Gardner is an Adjunct Professor within the School of Policy and Practice at DCU, and works primarily within CARPE as part of this role. He is also a member of the CARPE Advisory Board. In February 2020, Prof.
Gardner encouraged the team at CARPE to reflect on key issues in assessment in order to focus their attention on how to engage with their future research projects and goals. It was a thoroughly enjoyable and engaging seminar and it even involved some arts and crafts!

Visually depicting how hard it is to balance the demands of measurement science with the desires of stakeholders

Launch of the Conceptual Framework for STEM Education

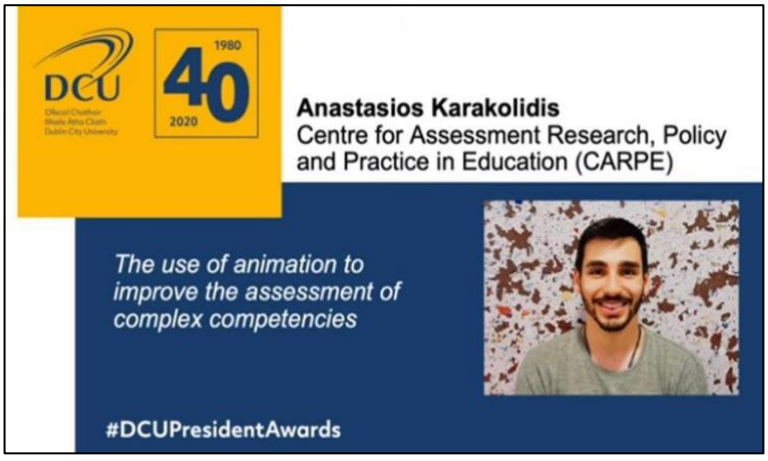
In March 2020, a series of reports concerning STEM education across Europe was released by DCU President Prof. Brían MacCraith. The research was jointly conducted by the National Institute for Digital Learning (NIDL), CARPE and the Centre for Advancement of STEM Teaching and Learning (CASTeL) in DCU as part of an Irish partnership involving H2 Learning Limited, Kildare Education Centre and under the auspices of the Department of Education and Skills to coordinate a major European funded research project. The project comprises a wider partnership working together in 13 institutions across 8 European countries.

Prof. Michael O'Leary (CARPE), Prof. Deirdre Butler (DCU), Prof. Brían MacCraith (DCU President), Associate Professor Eilish McLaughlin (CasTeL) and Associate Professor Eamonn Costello (NIDL)

Of the five reports launched, the first two deal with research pertaining to STEM Education in schools and with national policies for STEM in various European countries. The third report discusses the key ideas and principles underlying STEM digital formative assessment theory. The fourth examines the potential of various technology-enhanced tools and architectures that are used to support assessment for learning. Drawing on all four of these, the fifth report presents a pathway towards and integrated conceptual framework for the assessment of transversal skills in STEM that will be validated and further developed by the 12 project partner institution across eight European countries.

The research underpinning this first iteration of the ATS STEM Conceptual Framework presented provides a conceptual tool to help European educators reach a common understanding of what integrated STEM education is and how it can be assessed using a range of digital tools in schools.

2020 President's Award for Engagement and Innovation and the 2020 eAssessment Awards



Virtual announcement of Anastasios' award success

In a time when good news was very hard to come by, CARPE did have cause to celebrate this in May 2020 thanks to our most recent graduate, Dr. Anastasios Karakolidis, the previous Prometric PhD scholar at CARPE (2016-2019). Anastasios won the postgraduate student category in the 2020 DCU President's Award for Engagement and Innovation, which took place on May 27th 2020. His dissertation explored the use of animations to improve the assessment of complex competencies in teaching e.g. managing interpersonal conflict. Anastasios' research has many applications in the field of assessment and the materials he created for his research may offer significant value to the field of teacher education. The rigorous and high-quality work that Anastasios conducted for his doctoral research has made a tangible contribution to the field and everyone in CARPE is delighted that Anastasios' outstanding work has been acknowledged by everyone at DCU.

Anastasios's doctoral work was also recognised in the 2020 eAssessment awards in June 2020, where he was one of the four finalists in the Innovation in Assessment' category. CARPE is honoured to have supported Anastasios' work during his doctoral studies and look forward to his future successes.

CARPE in the media

Over the past 12 months, CARPE has tried to increase its engagement with the wider public on issues related to assessment.


Leaving Cert marking 'rushed, unfair and lacks precision'

State Examinations Commission paper illuminates process of grade consistency

Tue, Jan 14, 2020, 01:00

Carl O'Brien Education Editor

In January 2020, the Irish Times viewed an unpublished report from the State Examinations Commission (SEC). In Carl O'Brien's article summarising the report, it was revealed that many within the SEC considered the marking process for the Leaving Certificate (LC) exams as rushed, unfair and risks compromising the accuracy of students' grades. The process currently used by the commission was considered to be very unusual compared to other international counterparts and was thought to "distort" the marking by changing the weighting attached to individual questions, rendering the marking scheme "less valid".


Faults with State exams marking need to be corrected

Convoluted process of altering marking schemes may disadvantage some students

Thu, Jan 16, 2020, 01:00

Michael O'Leary

Sorting and despatching Leaving Cert exam scripts. An internal research report shows it is possible some exam candidates candidates are disadvantaged during the marking process. Photograph: Alan Betson

Professor Michael O'Leary wrote an opinion piece in the Irish Times in response. In it, Michael acknowledged that the SEC deserves great credit for the efficient way in which the high stakes LC examination process is managed each year where 'mistakes of any kind are rare'. However, he also noted that the current approach used to mark LC scripts may unfairly disadvantage some candidates once marking schemes are revised. At the end of the piece, Michael recommended the use of a mathematical transformation of the marks derived from the original marking scheme to scaled scores, once all marking is complete.

Both articles generated a large amount of interest on Twitter and in the Letters to the Editor section of the paper. Some quotes cause particular debates among the general public which allowed for an interesting discussion regarding what is meant by 'fairness' in assessment and whether or not mathematical models are appropriate for subjects where the awarding of marks is somewhat subjective e.g. Art, English.

> "In an effort to mitigate the effect of a relatively hard paper, the marking scheme is altered and some of the more difficult questions are awarded less marks

The Minister for Education and Skills, Joe McHugh TD, pronounced in May 2020 that the Leaving Certificate 2020 examinations were to be cancelled for 60,000 LC students. Instead, a Calculated Grades model was to be put into place.

When this was first announced, there was quite a lot of confusion as to what would be involved in this. Would class teachers assign grades? Would performance on previous state exams be taken into consideration? Would gender be considered?

Once again, Michael wrote an opinion piece in the Irish Times discussing the advantages and disadvantages of a Calculated Grades model based solely on teacher grades. In particular, the value of trusting teacher judgements while being aware of certain biases as well as the possibility of consulting with students about their grades was discussed. This idea in particular caused significant debate on Twitter!

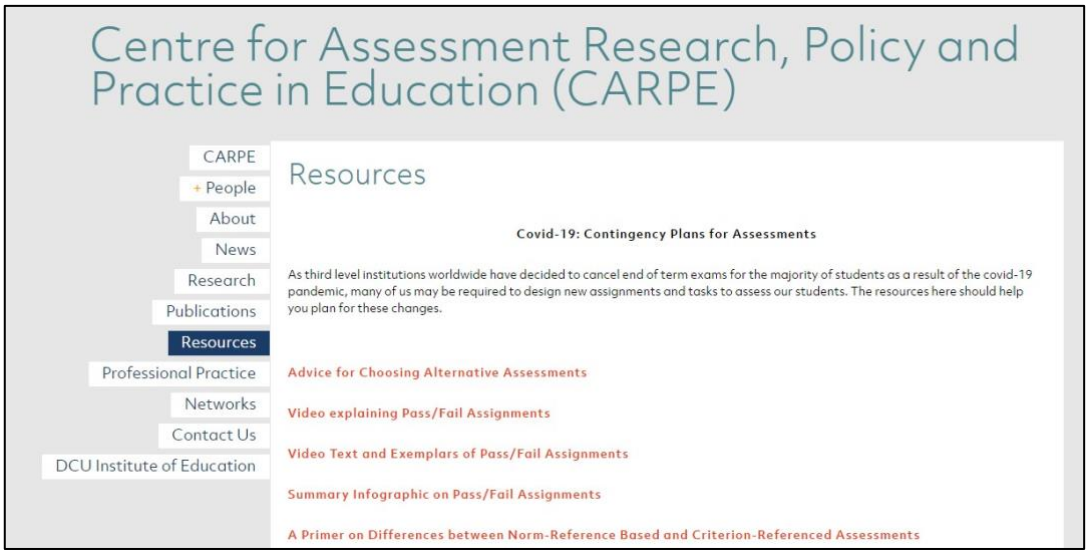
Literature to support Michael's points were referenced and a full reference list is available to read in the appendix on page 43 and on the CARPE website here.

CARPE and COVID-19

Support for Third-Level Institutions

The extended closure, in March 2020, of educational institutions in 107 countries worldwide due to the COVID-19 pandemic, created an unprecedented situation leading to drastic and abrupt changes to the nature of everyday teaching, learning and assessment. Many thirdlevel institutions like Dublin City University decided to cancel end of term exams for the majority of their students. Lecturers were then required at very short notice to design new assignments and tasks to assess their students.

Led by Prof. Michael O'Leary, CARPE created a number of resources to help those in third level institutions to choose appropriate alternative assessments. Guidance on pass/fail assignments and the design of effective rubrics were all included in this resources. These were all uploaded to our website and are available to view here.



Leaving Certificate 2020 – Calculated Grades Model

The Minister for Education and Skills announced in May 2020 that the Leaving Certificate 2020 examinations were to be postponed. The Minister established the Calculated Grades model in order to allow 60,000 Leaving Certificate students to receive State certification for their learning achievements and to progress to third-level education or to the world of work in Autumn 2020.

The design of the Calculated Grades model was informed by advice from a Technical Working Group comprising experts drawn from the State Examinations Commission, the Inspectorate of the Department of Education and Skills, the Educational Research Centre, and international external consultants. An Independent Steering Committee (ISC) was established to oversee the process, headed by Dr. Áine Lawlor, former Chief Executive of the Teaching Council. Prof. Michael O'Leary, Professor of Assessment at DCU and Director of CARPE was appointed by the Minister for Education and Skills to this 6-member

committee in June 2020. The ISC's first report to the Minister is available to read here. A report on the appeals process will be delivered in November 2020.

CARPE Contributions to the IoE

(i) Research Consultancy Hours

CARPE welcomes all requests for research design and/or data analysis support from IoE staff and students. Since summer 2018, a set of formal guidelines have been put in place to ensure this support can be provided in an adequate and timely manner. Specifically, proforma has been put in place on CARPE's website (dcu.ie/carpe), whereby all requests for support can be made to the Director. Once the nature and extent of the support required has been identified, a member of the CARPE research team is officially appointed to the job. This researcher can spend up to a maximum of two consultation hours per project during the normal working day, but additional consultations that take place outside of working hours are also possible. This service has been well received, and the CARPE team have already received many requests through these channels.

(ii) SPSS Workshops

CARPE are pleased to be able to offer a series of workshops on using SPSS to analyse data from questionnaires. These workshops are aimed at those who are new to SPSS, and cover topics such as data entry and cleaning and running both descriptive inferential statistics. The workshops are led by Vasiliki Pitsia, (assisted by other CARPE staff and students), and typically take the form of three two-hour sessions, held regularly throughout the academic year. Two such series were held over the past year, and feedback from workshop attendees has been overwhelmingly positive.

(iii) Teaching and Supervision

All members of the CARPE team are actively involved in teaching and/or supervision at both undergraduate and postgraduate level within the Institute of Education.

Michael supervises six doctoral students and contributes occasional lectures on the EdD Programme

Paula contributes to the B.Ed programme helping the School of STEM Education, Innovation and Global Studies to deliver workshops for 1st and 4th Year students on the use of digital tools (e.g. Scratch, Minecraft) in primary schools. Paula has also been a Writing Tutor within the DCU Writing Centre since September 2018. This initiative was set up to offer free writing help to any student, undergraduate or postgraduate, regardless of course, degree or level. As part of her work with the Writing Centre, Paula works with students on a one-to-one basis as well as providing online and group writing support. She also facilitates

academic writing workshops and creates resources on this topic. Conor will also work with the Writing Centre from September 2020.

Vasiliki has been involved in facilitating SPSS Workshops for staff. They have also contributed to the *Write to Read* research project, co-ordinated by Dr Eithne Kennedy and Prof. Gerry Shiel.

CARPE External Engagement

Michael acted as peer reviewer for *Assessment in Education: Principles. Policy and Practice* and *Irish Educational Studies.* He was also a member of the Independent Monitoring Committee for the Leaving Certificate 2020 Calculated Grades Model. In preparation for his contribution to a webinar by the Teaching Council entitled *Exploring Perspectives on Assessment - Learning from Research and Practice,* he wrote a piece on reconceptualising assessment for an edition of organisation's *eZine* newsletter. In June he prepared a short video presentation on assessment for the Professional Development Service for Teachers (PDST).

Vasiliki lectures on research methodology and statistical techniques, as part of the University of Patras and National and Kapodistrian University of Athens online MSc programme 'STEM in Education'. She also delivers hands-on statistics workshops to academic staff. Vasiliki is a co-investigator in a research project funded by the Children's Research Network Prevention and Early Intervention Research Initiative. In addition, she is a short-term consultant at the World Bank Group and member of the PISA research team in Greece. Vasiliki has acted as a peer-reviewer for the European Journal of Educational Research.

Paula delivers guest lectures on the topics of co-teaching, assessment and individualised planning to practising teachers on the Postgraduate Diploma in Special Educational Needs in UCD (University College Dublin). She is also a research supervisor for students completing their Professional Masters in Education (PME; post-primary) qualification in UCD. Paula acted as a peer reviewer for the *Journal of Technology, Pedagogy and Education* this year.

Appendix 1

A Commentary on the use of Calculated Grades for the Leaving Certificate

Michael O'Leary

CARPE/DCU

May 13, 2020

Note: Apart from the inclusion of reference list below, this article is the same as the one that was published in the Irish Times
https://www.irishtimes.com/news/education/wouldleaving-cert-students-estimates-of-their-own-grades-help-teachers-1.4252424

The cancellation of Leaving Certificate (LC) exams was a difficult decision for all involved. Up until Friday May 8, Minister Joe McHugh and his officials at the Department of Education and Skills (DES) were between a rock and a hard place. They knew that planning to go ahead with the Leaving Cert exams over the summer was risky given the health threat; logistically challenging, given the requirement for social distancing in exam centres; and open to criticism, given the range of challenges being experienced by students with poor internet access and/or with high levels of anxiety. But they were also aware of the difficulties involved in conceiving of an implementable alternative to Leaving Certificate exams, with the legislative constraints of the State Examinations Commission being involved in any alternative arrangements being a major one. For the teacher unions, the cancellation of the exams meant crossing a red line by agreeing that teachers could be involved in a process of assessing their own students for certification purposes. For representatives of student, parent and management bodies it meant advocating for positions that were not universally supported by members.

So what now? Well why not begin by placing our trust in the professional judgement and expertise of teachers in the way we have done with our medical practitioners? It's true that Irish research evidence on the accuracy of teacher-predicted grades is lacking and that research conducted with teachers in the UK has been presented as evidence in arguments made against the practice. However, contextual issues in the research have been missed in some reporting and should be noted.

Predicted grades are used by the CAO equivalent in the UK, UCAS, to make *provisional* university place offers to students, a situation that is very different to where we in Ireland now find ourselves. The 16% accuracy rate reported in a UK study (Wyness, 2016) and quoted in some media reports relates to predictions involving a combination of three A level subjects, not one. In addition, what hasn't been explained clearly enough is that about 75% of the predictions were *over*-predictions (when compared to the actual results) as a consequence of many teachers using the process to motivate their students in the period before exams taking place. Interestingly, over-prediction was as likely occur to with the majority of disadvantaged students as it was with their non-disadvantaged counterparts. However, the fact that very high-achieving students in disadvantaged schools were likely to be under-predicted (about 3,000 students over three years) should be noted.

The findings from individual studies conducted over the past ten years in the UK, New Zealand and from a meta-analysis of 75 studies from the United States and various European countries suggest that the correlation between teachers' judgments of students' academic achievement and students' actual test performance is positive and fairly high (e.g. Sudkamp et al., 2012). The correlation coefficient is around 0.6 - a finding that, in essence, indicates that there is a similarity between how teachers and tests rank-order students, but the rankings are not always the same. This arises from the reality that teacher judgements and standardised exams/tests are different assessments. Importantly, we must not assume that the exam/test ranking is the correct one - I will return to this issue. There is also evidence in the literature indicating that we need to pay particular attention to the accuracy of teacher judgements about students from low socio-economic backgrounds and/or with low achievement levels (e.g. Meissel et al., 2017; Murphy & Wyness, 2020). Overall, it is important to note that much of the research is based on individual teacher expectations about *future* performance and does not necessarily relate directly to the accuracy of judgements arrived at when teachers apply clear criteria and work with colleagues and their school leaders to arrive at a decision about *current* achievement. With that in mind, the change of terminology from *predicted grades* to *calculated grades* is useful in so far as it helps to remind us that the focus now should be less on trying to replicate a LC result and more on how informed teacher judgements can be used to arrive at the best possible measure of student achievement.

While the LC examination system has many strengths, we should be careful about holding it up as a paragon of accuracy and fairness. There are very good reasons why efforts to reform it are underway. The reality is that there is no ultimate truth in a LC result (or the outcomes from any assessment for that matter) because each exam cannot measure all elements of a subject area. As a consequence, every educational assessment contains what is called *measurement error* (which also accounts for some of the variation in rankings). It is analogous to the idea of the *margin of error* (e.g. $\pm$3%) in opinion polls that involve a sample rather than all possible respondents. There are also the myriad factors that affect student performance on the day of an exam, e.g. misreading a question, not feeling well etc. The LC is fair in so far as everyone takes the same test and under the same conditions that include anonymous marking. The public has confidence in the system and that is important. However, students do not arrive at the testing centres with nothing but ability and a track record of diligent study separating them. Some had better teachers than others and some were able to avail of the benefits that economic advantage bestows e.g. grinds. Indeed, so many of the problems faced by students over the past while in terms of having access to technology, having a quiet space at home to study and so on, have been relevant to the LC fairness issue long before the arrival of Covid-19.

Needless to say, the guidance provided by the DES to teachers and schools will be crucial in helping them make the best possible decisions about student marks and class rankings as well as how to handle conflicts of interest. At the very least, the collaborative nature of the work should mitigate the danger of individual teacher biases coming into play. What to do in situations where prior information for individual students is inadequate and/or where students study a subject outside of school remains problematic. Both issues prompt me to wonder if the addition of estimated grades (or marks) submitted by all students for the subjects they were planning to take, along with a justification for each using a DES approved *pro-forma* would have helped the decision making process in schools. I acknowledge that the idea of students predicting their own grades is unusual and that research tells us that students

are prone to overestimate their grades (e.g. Attwood et al., 2013). However, the idea is democratic and, as well as providing additional information for teachers, would have indicated that we trust our young adults to be responsibly involved in a process that will have a major impact on their futures. It might also have been a way of guarding against the possibility of canvassing by students and their parents/guardians.

In the guidance provided to teachers and principals it would be important to include the conclusions from the research on teacher judgements, especially those that speak to fairness for disadvantaged students. Two other points are also worth highlighting. Over the years a number of studies linking Junior and Leaving Certificate data have been conducted at the Educational Research Centre, (e.g. Millar and Kelly, 1999) and, assuming issues of data protection can be addressed, a new study undertaken in the very short term would provide robust data for teachers to use. We also need to remember that, over the past number of years, many teachers have worked with colleagues during *Subject Learning and Assessment Review* (SLAR) meetings to assess student work as part of Junior Cycle reform. This experience is likely to be very useful now as they go about the process of calculating their students' marks/grades.

So let's row in behind this plan and give it every chance to succeed. While every student deserves to be treated fairly, so does every teacher. Students have the right to appeal and, if unhappy with the outcome, can take an exam at a later stage. I'm also confident that further and higher education institutions will make every effort to enhance access schemes if required. Teachers, like their medical counterparts, have the right to make professional judgements without fear or favour, but I worry that headlines that appeared in British newspapers in April will begin appearing here (e.g. *Parents and pupils overwhelm schools with pleas for good grades* – The Guardian, 19/4/20).

All of this is not to suggest we should not leave our critical faculties behind. Far from it. I understand the need to review grades submitted by schools and to apply statistical procedures in some cases to ensure "common national standards." However, we should remember that there is no objective truth to be found in distributions of grades from previous LC years either and that conclusions drawn from aggregated data (as opposed to student level data) can be problematic (see Gilleece, 2014 for more detail). This will be especially important to bear in mind when schools are making strong cases for awarding individual grades/marks that may not fit an established pattern. Moreover, planning for a programme of research should begin immediately to evaluate the extent to which this pandemic has forced us down a path that may or may not prove useful in reforming what we do at the end of secondary education in Ireland.

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