Integrating Evidence Based Management & Data Analytics in Executive MBA & Post-Experience Masters Programmes

Claire Gubbins

SUPPORTING EVIDENCE-BASED MANAGEMENT EDUCATORS

Table of Contents

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This chapter discusses various strategies and methods used to integrate evidence-based management to various post-experience Masters programmes (including Masters in Strategic Learning & Development, Masters in Work & Organisational Psychology, Graduate Certificate in Strategic Leadership, Masters in Human Resource Management) and Executive MBA's. The depth at which evidence-based management content is covered varies across the programmes but the strategies and methods used and discussed here are broadly similar in all cases aside from the amount of time allocated to each element depending on the programme. I provide evidence why and how our strategies are appropriate or effective. To share my experiences, I include examples of course content, assessments, assessment topics, links to material to include in course content and a pre/post-test for module/programme evaluation. In doing so, I also discuss the key challenges encountered by students in developing their evidence-based practice skills and provide illustrative feedback on module/programme content from students, external evaluators and external examiners.

Bringing Evidence Based Management Education to Dublin City University Business School

Dublin City University (DCU) Ireland's strategic objectives include to "*Provide a transformative student experience", "optimising the employability of our graduates*" and *"DCU is a University of Enterprise- industry engagement with be a hallmark of our activities"*. My *EBM*

approach in teaching post-experience students aligns with these objectives. My EBM teaching journey began after I was asked to be the Director of DCU Business School's Executive MBA programme in 2014 and assigned a module entitled Managing People and Organisations. The DCU Executive MBA attracts post-experience participants typically in mid to senior management positions, with on average 7+ years management experience, who possess an honours degree, usually in a technical area, some with Masters qualifications, and seeking to progress to senior levels. I conducted some research and an evaluation of the existing programme and combined this with AMBA (Association of MBA's accreditation body) feedback, which highlighted opportunities to further develop the programme. I identified three key challenges.

Three Challenges

1. The first challenge pertains to engaging students in reading scientific articles and extracting and recognising the value of science to their practice. Many students find reading scientific articles difficult and furthermore see it as an exercise required for university assignments beyond which it will not be required again. This issue is well recognised given calls to improve the readability of scientific articles (Gubbins & Rousseau, 2015) through using words familiar to practitioners (Bartunek & Rynes, 2010) and translating the results of research into a language that makes implementation possible. An MBA programme review identified that a module on research methods and a dissertation assignment did previously exist on the Executive MBA programme but it was removed as students did not like or see its relevance to management practice. This points to an opportunity to better communicate and develop understanding of and ability to use scientific research for practice.
2. A second challenge identified was critique of the Managing People and Organisations module by Executive MBA's as being too related to human resource management (HRM)- the remit of HR professionals and not general managers. As a HR and Organisational Behaviour Professor, aware of the scientific research illustrating the importance of various people management practices for individual, team and organisational performance, it was not surprising but it was disappointing to hear that general managers did not always see the value, as part of their roles, in attending to HR activities. This pointed to the possibility that improving leaders knowledge about scientific research illustrating how HR practices in fact enable organisational goals may develop their interest in engaging in HR activities.
3. A third challenge was to recognize that these students are already well-educated, with years of work experience. Executive MBAs appreciate their professional experience being recognised, discussed and applied to MBA programme content. They expect to hear from their peers regarding their own professional experience, stakeholder

perspectives, and organisational concerns. As such their professional experience and that of their organisational stakeholders must be recognised and included as part of their learning experience on any educational programme.

These three challenges underpin my drive to bring evidence-based management teaching to the DCU Executive MBA and DCU Business School. Evidence based management (EBM), which originated in evidence-based medicine, is the systematic, evidence-informed practice of management decision-making, paying attention to the quality of evidence available from science, organisational data, stakeholders and practitioner experience (Barends & Rousseau, 2018). As such EBM's focus on scientific evidence responded to the first evaluation insight about the DCU Executive MBA ie engaging students in reading and seeing the relevance of scientific research for practice. EBM's focus on practitioner and stakeholder experience permitted respect for and recognition of Executive MBA's vast professional experience. EBM's requirement to source organisational data was appropriate for Executive MBA's whose roles are data driven and who constantly focus on organisational performance metrics. As such a focus on data was both a language they understood, and they were likely in positions to review data relevant to organisational problems.

Trial Teaching EBM

On the basis of the above my first step was to trial teach EBM in my module on Managing People and Organisations. The focus here was on teaching EBM as applied to the topics on managing people and organisations and was a light version of strategies and methods discussed in more detail below. This initial trial involved:

- Pre-reading, discussion or use of scientific empirical articles and meta-analyses on managing people topics e.g HRM and Organisational Performance, Performance Management, Performance Feedback and HR Practices, to extract the question, the results, its usefulness to practice and to critically appraise the methodology.
- Use of the Carnegie Mellon University and CEBMa "Evidence-based Management Certified Online Course Modules" in this book) combined with in-class workshops on key content from these modules.
- Module participants were directed towards content on data analysis such as in statistical analysis textbooks (Field, 2024), verified youtube material (e.g. by Mark Saunders https://www.youtube.com/@MarkSaundersOnResearchMethods) and beyond that they engaged in self-directed learning on data analysis.
- Scaffolded assignments (as discussed in more detail below) requiring use of evidence-based management practices to complete a Managing People topic assignment.

Programme Decisions

As a result of positive evaluations of the module, evidence-based HR content and EBM skills development, I approached the Executive MBA programme board, with a proposal to elevate EBM teaching and content on the MBA programme overall. A decision was also taken to promote the DCU Executive MBA programme's unique selling point (USP) as being both an evidence-based MBA and developing evidence-based practice skills in participants, thus providing a sustainable transformative education to our MBA participants.

The next sections discuss various adaptable strategies and methods used to teach EBM which began and developed from module level and programme level EBM teaching on the DCU Executive MBA programme and were then subsequently rolled out and adapted for other programmes.

Key Strategies Used to Teach Evidence Based Management

As a teacher, four principles are central to my overarching teaching philosophy and are the foundation on which I teach EBM.

1. I adopt the role of learning facilitator guiding the students through the evidence-based management steps and facilitating them in learning how to understand and apply those steps.
2. I use a scaffolding approach to teaching and assessment where necessary and possible. In the case of teaching EB practice skills this involves some small in-class activities and small assignments that gradually require application of EB practice skills such as writing an answerable question, acquiring and appraising scientific evidence, including its usefulness for practice.
3. I provide feedback on in-class activities and small assignments to develop students' knowledge and skills as they progress through the various steps. I also hold regular 1-to-1 and team-based meetings with students to provide verbal feedback on work-in progress (e.g, discussing their question and its connection to their PICOC, reviewing their organisational data in relation to their question and their data quality).
4. The connection between research and practice and between university and industry is reinforced at all opportunities. This includes how science can inform practice, how practice can inform the direction of science, how and why science requires organisational engagement, why organisations need university engagement for research, how university- industry engagement is mutually beneficial.

Table 1 and the subsequent sections outline the timelines, strategies, and methods used in teaching EBM. Column 1: Timeline proposes when in the module/programme the proposed strategy/method is best introduced. Column 2: Strategy outlines the contextual justification or reason for using the methods proposed. Column 3: identifies the methods used to teach evidence-based management- further detail on which is provided in the subsequent sections.

Table 1. Timeline, Justification of Strategies and Methods for Teaching EBM

TIMELINE	STRATEGY JUSTIFICATION	METHOD
MOTIVATING ACCEPTANCE OF EBM		
Induction &/or Week 1	Changing Mindsets by Diagnosing Participants Knowledge & Its Trustworthiness	• Quiz • Discussion • Scientific Articles
	A Meta-Competency to Learn how to Learn Beyond the Programme	• Student & Facilitator led identification of organisational contextual factors impacting decision making • Discussion of the impact of those contextual factors on making trustworthy decisions • Discussion of the relevance of the meta-competency of learning how to learn in this context • Illustrating how the steps of EBM develop learning how to learn meta-competency
	The Basis for a Sustainable Education	• Differentiating Education & Training • Discussion of the role of University • Defining sustainable learning and development • Illustrating how EB practice skills develop learning how to learn meta-competency & provide a sustainable education

TIMELINE	STRATEGY JUSTIFICATION	METHOD
MOTIVATING ACCEPTANCE OF EBM		
	A Decision-Making Tool to Reduce Bias	• Exercises to demonstrate bias • Discussion of various biases that impact decision making • Reference to bias reading material • Illustrating how EBM is a decision-making tool to reduce bias • Compare EBM as a decision-making tool to other systematic decision-making tools in use
DEVELOPING EVIDENCE BASED MANAGEMENT SKILLS		
Weeks 1-4	Develop Core Knowledge on EBM	• Carnegie Mellon University online modules on EBM • CEBMa content
Weeks 1-4	Ask an Answerable Question	• In-class critique of possible questions • Provision of trigger questions needing refinement & definition • Submit proposed question & PICOC for approval • Consultations on proposed question & PICOC
Induction	Acquire Scientific Evidence	• Workshop with University Librarian CEBMa content
Ongoing	Engage with Scientific Evidence	• Scientific Articles • In-Class Discussions on > The question addressed in article > Trustworthiness of evidence in article > Usefulness to practice
Weeks 2-6	Acquire, Appraise, Apply, Scientific Evidence	To be used as pre-work, in-class activity, or assignment • Acquire & Appraise Scientific Articles sourced with respect to an answerable question • Apply Scientific Articles to Practice by identifying its usefulness & limitations for Practitioners • Apply Scientific Evidence in the CAT Project

TIMELINE	JUSTIFICATION STRATEGY	METHOD
DEVELOPING EVIDENCE BASED MANAGEMENT SKILLS		
Weeks 2-6	Engage with Organisational Evidence via Data Analytics	• Data Analytics modules • Data Analytics tutorials • Data Analytics consultations • Referencing to other reading or online resources
Weeks 6-10	Acquire Organisational Evidence: Various Strategies	• Use pre-existing or publicly available case studies or datasets • Use own organisational dataset • Collect stakeholder or professional experience insights
Weeks 6-12	Analyse, Appraise, Apply Organisational Evidence	• Analyse Organisational Evidence using Data Analysis Tools • Appraise Organisational Evidence • Apply Organisational Evidence in the CAT Project
VISUALISING EVIDENCE BASED MANAGEMENT IN ACTION		
	The CAT Project	• Presentation • Dragons Den
	Discuss Cases	• Solicit Students Cases • From published articles • Corporate Research Forum • Chapters in this Book

Changing Mindsets by Diagnosing Participants Knowledge and its Trustworthiness: My first strategy is to illustrate EBM's value to decision making and it begins with a quiz based on these articles (Rynes et al., 2002; Sanders et al., 2008; Tenhiälä et al., 2016) and these books (Pearce, J.L. (2021) *Organizational Behaviour: Real Research for Real Managers,* California, Mervin & Leigh Publishers; Locke, E. (2009) *Handbook of Principles of Organizational Behaviour: Indispensable Knowledge for Evidence Based Management*, Wiley). Executive MBA's, HR professionals or general managers are tasked with answering quiz questions taken directly from these articles and books and then subsequently presented with the answers. From

here the answers and the scientific sources behind those answers are presented and discussed. This exercise serves to highlight what knowledge students do possess and the scientific research behind that knowledge. It also highlights which knowledge and practices they believe to be effective are not based on scientific evidence. This quiz results in students posing questions about other areas of their knowledge or practices to identify if scientific research is available. These discussions raise their curiosity, engage their interest in evidence-based practice, helping to illuminate that there are also areas of management practice for which there is no or insufficient scientific research from which to inform decisions.

This approach, and others outlined below, help to influence student mindsets and attitudes regarding an evidence-based approach to decision making. Per the theory of planned behaviour (Ajzen, 1991) and related research, attitudes guide the adoption of new practices (Barends et al., 2017). So, beginning EBM teaching by influencing attitudes is a key leverage point for influencing practice. It was found that launching straight into teaching evidence-based management was sometimes met with resistance and a lack of clarity or reasons to adopt it. However, this quiz-based approach went some way towards opening minds.

A Meta-Competency: Learning to Learn Beyond the Programme: After some time, teaching EBM on modules and programmes, I identified that while I passionately believed in the importance of the meta-competency of learning how to learn and how fundamentally valuable evidence-based practice (EBP) is in developing this meta-competency, not all students shared my understanding, belief or enthusiasm. One obvious reason is of course everyone believes they already know how to learn. Another reason from post-experience students is that they are equipped already with educational qualifications, training and years of experience. They registered on these programmes to gain new qualifications, training and to get up-to-date knowledge in topic areas. However, it needs to be highlighted that what is taught on a programme is only sufficient for a moment in time, does not cover all possible topics and thus students would need to keep learning. It is, in tandem necessary, to take care to highlight both the value of the programmes and illuminate how participants meta-competencies on learning how to learn are developed alongside completing programme content. Two strategies were used to get this message across.

First, was discussing stable and unstable contextual factors which participants encounter in managing and leading in their organisations and how these factors make decision making challenging. The most obvious recent example is the COVID-19 Pandemic. The objective of these discussions was to highlight that despite all the knowledge gained on post-experience programmes, constantly developing and newly emerging contextual factors means that not everything participants need to be prepared for can be or is covered on such programmes. As such, they need meta-competencies to learn how to learn and be adaptable to change. In class,

participants identified contextual factors impeding or challenging their decision making or which required decisions to made in a vacuum or ever-changing circumstances. Other contextual factors discussed in this article (Harney & Gubbins, 2024) were also used to centre these discussions. Further still, discussions on technological developments most especially regarding the role of AI in information sourcing and decision making indicate how much easier it is to access information to inform decisions. However, it is equally now more difficult to know if that information can be trusted. Discussions on crisis situations highlight how decisions need to be made in the absence of scientific research and consequently illuminate the value of the best available organisational data which could be used in those circumstances.

Second, was outlining the core steps of evidence-based practice and how by engaging in EBP, the meta-competency of learning how to learn is developed. Evidence based practice is about making decisions in a conscientious, explicit, judicious and systematic way through the six steps of asking, acquiring, appraising, aggregating, applying and assessing.

TextBox 1. 6 Steps of Evidence Based Practice

1. **Asking**: translating a practical issue or problem into an answerable question
2. **Acquiring**: systematically searching for and retrieving the evidence
3. **Appraising**: critically judging the trustworthiness and relevance of the evidence
4. **Aggregating**: weighing and pulling together the evidence
5. **Applying**: incorporating the evidence into the decision-making process
6. **Assessing**: evaluating the outcome of the decision taken

Barends, E., Rousseau, D.M., & Briner, R.B. (2014). Evidence-Based Management: The Basic Principles: Amsterdam: Center for Evidence-Based Management.

I explain how EBP equips participants to pose questions on anything that arises during their working lives and systematically source and critically evaluate evidence pertaining to that question. This enables them to make an informed decision or reach an informed answer. As such in an ever-changing world of work, their education extends beyond the walls of the university, their time in university and the content of specific educational programmes and provides them with the meta-competencies required to address questions and challenges not covered on programme curricula at one point in time.

The Basis for a Sustainable Education: At the outset of programmes and modules, as mentioned above, I would always discuss with programme participants how EBP develops a key meta-competency on learning how to learn and thus provides a more sustainable education. However, in more recent years, I have identified that this argument needed to be deeper and reinforced more often. In a world where people expect fast information, fast answers, quick solutions and instant, there was increasing pressure for learning in the form of training, soundbites, skills development, a demand for tell me how rather than teach me how to learn for myself. In an environment where Professors, Programmes, Schools and Universities try to:

- respond to student expectations and increase student satisfaction
- respond to industry narratives that universities produce graduates whom know much but can do little
- increase student numbers, justify their existence and funding,

there can be increased pressure to provide what students want rather than what they need and provide training rather than an education. As such it has become increasingly important to discuss the difference between education and training, the role of universities and why education and a sustainable education is valuable beyond quick soundbites and skills training which can be sourced from a vast array of training providers.

A recently coined term *'sustainable learning and education'* (Hays & Reinder, 2020) provides a nice definition from which to launch such discussions. While I did not have this available to me when I originally started making this argument, it is certainly useful now. It defines sustainability *of* learning as learning that is continuous, enduring and proactive. Such learning focuses less on the amassing of knowledge or technical skills and more on learning to learn and optimising learning from experience. The need for sustainable learning and education reflects the fact that every organisation needs to be concerned with the ability of its people to continuously and effectively adapt to rapid and radical change, learn to deal with new and different challenges, and create and innovate better and faster than its competitors; and, sometimes, not to compete at all, but to collaborate (Trilling and Fadel 2009). Hays (2015) identifies how these skills and dispositions are in high demand but in short supply. There are arguments that more sustainable learning and education needs to be developed including through strategies and mechanisms to better promote and support learning to learn (Evans 2017; Smith 2016) at individual, team and organisational levels.

One such strategy towards providing sustainable learning and education is evidence-based practice (EBP). It teaches how to frame a question (Ask), it teaches students how to source the evidence they need to address any question they face now or in the future (Acquire). It teaches students how, in a world full of fast information, fast facts and fake news, to critically appraise the evidence they source to make decisions only on trustworthy evidence (Appraise). By equipping students with these skills and a decision-making toolset they develop the meta-competency of learning how to learn in a systematic explicit manner.

A Decision-Making Tool to Reduce Bias: The previous strategies discussed illustrating the reasons to engage in evidence-based practice might influence mindsets and attitudes, but they may fall short of influencing practice. While these strategies may help practitioners to see the value in EBM, some are still concerned with the lack of time they have available to engage in EBP. As such another strategy used is to conduct some exercises on and discuss bias in decision making and how systematic approaches to decision making reduce the influence of bias. The book "Judgment in Managerial Decision Making" by Bazerman and Moore (2018) is used as the basis for much of this content. Specifically, a number of common biases influencing decision making identified in this book are discussed. First, students are presented with exercises to help expose how decision making is influenced by various biases and then these biases are discussed. This then leads to introduction to and discussion about System 1 and System 2 thinking. System 1 thinking refers to our intuitive system, which is typically fast, automatic, effortless, implicit, and emotional. We make most decisions in life using System 1 thinking. For instance, we usually decide how to interpret verbal language or visual information automatically and unconsciously. By contrast, System 2 thinking refers to reasoning that is slower, conscious, effortful, explicit, and logical (Kahneman, 2003). In most situations, our System 1 thinking is quite sufficient, but System 2 thinking should preferably influence our most important decisions. The time poor nature of managerial life suggests that executives often rely on System 1 thinking (Chugh, 2004) but as biases are much more likely to occur in System 1 thinking than in System 2 thinking, practicing managers should engage in System 2 thinking for important decisions. System 2 thinking requires the use of more systematic decision-making tools, such as evidence-based practice.

It is helpful to remind practitioners that they do use systematic approaches to decision making in other areas of their organisation or their work and as such this is another such decision-making tool in their toolbox. Gubbins and Rousseau (2015) identify that reframing ideas as similar to something already accepted by practitioners helps them see its use.

Developing Evidence Based Management Skills

Develop Core Knowledge on Evidence Based Management - To develop students' core evidence-based management knowledge and skills, they were directed to materials provided by the Centre for Evidence Based Management (https://cebma.org/). In the majority of cases students were required to complete some or all of the Carnegie Mellon University https://oli.cmu.edu/courses/evidence-based-management-o-f/ and CEBMa online-learning evidence based management modules or courses https://cebma.org/resources/professional-development-online-course-new/.

To supplement this, each class session took some time to repeat and reinforce specific EBM content which would be necessary for students in completing their assignments. These

are discussed in the following sections and organised according to key steps of EBM ie.: Ask, Acquire, Appraise, Apply and in relation to two key sources of evidence ie Scientific Evidence and Organisational Evidence.

Ask, Acquire, Appraise, Apply Scientific Evidence - A scaffolding approach was used to develop students' evidence-based practice skills specifically regarding ask, acquire, appraise and apply scientific evidence. The design components of this approach are illustrated in Table 1. The key components were:

Ask an Answerable Question - A challenge identified by practitioners and academics is around framing a problem or question and then answering that precise question. Practitioners identify how many meetings or organisational projects are based on improperly defined questions or on concepts with multiple definitions leading to a lack of clarity as to what the focus of the question, problem or project is. This then leads to dissatisfaction about the solutions if they don't address everyones 'understanding' of what the problem/project was focused on in the first instance. Equally, academics experience frustration in reading student projects and assignments when they do not focus on and answer the question asked.

Being clear about the question and the definition of concepts contained within the question is the first step in evidence-based management practice ie Ask- translating a practical issue or problem into an answerable question. To facilitate students' skills in developing an answerable question, the following approaches were used:

- Students were given some broad questions in class to critique and improve e.g teamworking improves team performance. Students were required to firstly complete this task alone without guidance. Ultimately, the discussion required them to define "improves" and evaluate how it is measured. They were asked to consider multiple definitions of teamworking and team performance. They could also identify what boundary conditions to put on their questions e.g specific country, industry, organisational unit, level in hierarchy etc.
- Students were given some sample broad questions to trigger their thinking on what topics to focus on for both the minor and major CAT projects (see Appendix 1 Assignment details). They were required to refine those questions and define the concepts within.
- All students were required to submit their proposed CAT project answerable questions to the module lecturer for development and approval. Despite appearing like a simple step in the process, this step required more iterations than perhaps students expected.
- Students were required to develop a PICOC for their answerable question for the CAT project. The PICOC approach to helping frame answerable questions was generally valued by students for the purposes of the immediate project and identified as something useful in their evidence-based management practice in their organisations. This was also subject to feedback and approval.

Acquire Scientific Evidence - All programmes include, during programme Induction, a workshop with a University librarian introducing them to the library databases and how to conduct searches. The university library also has a number of online resources illustrating how to search for scientific articles. Further still, the Business School has a dedicated university librarian available to post-experience students for individual consultations. Students on a number of programmes were also directed to the Centre for Evidence Based Management resources on conducting library searches (https://cebma.org/resources/tools/cebmas-methodological-search-filters/).

Engage with Scientific Evidence - To encourage engagement with scientific evidence and to develop skills in reading, appraising and applying scientific evidence, modules focused on programme content e.g Managing People and Organisations, Practising Organisational Psychology, Strategic Learning and Development, Organisational Behaviour, were delivered using the evidence-based management lens. For each topic covered within each module, the focus was on discussing the best available scientific evidence on that topic. Students were required to engage in a number of ways:

1. Scientific articles were assigned in advance for pre-reading and then used to facilitate in-class discussions about the questions posed by the articles and the results.
2. The best available scientific evidence was presented in class focusing on the topic in question, the evidence available and then interrogating its quality.
3. In both scenarios above every session required extracting insights for practice from the scientific evidence and how these insights could inform the design of organisational interventions. The aim was to constantly facilitate conversations to bridge the research- practice gap.
4. Contemporary topics for which there is no or limited scientific research were also covered with discussions centred on what organisational data students could use to inform their decision making in these areas.

Acquire, Appraise, Apply Scientific Evidence - Modules which teach specific topics through an evidence-based management lens provided small incremental activities or projects to students to gradually develop their evidence-based practice skills ultimately culminating in a major project in the format of a CAT (critically appraised topic) which required use of all the previously developed skills.

1. To develop students' skills in acquiring, appraising and applying scientific evidence, activities or projects such as those in TEXTBOX 2 and 3 were completed. These required students to Ask a question and acquire scientific evidence which would provide

answers to that question. On completing these projects or presentations, students were given verbal and/or written feedback to illustrate the strengths of their report and the areas for development. This feedback could be then applied to the CAT project. The first activity/project focuses on acquiring and appraising scientific evidence. Students were encouraged to use the CEBMa content to evaluate and critically appraise scientific articles (https://cebma.org/resources/tools/critical-appraisal-questionnaires/) .

TextBox 2. Group Presentation Assignment Part (a)

Identify if scientific evidence exists for the effectiveness of a popular people management practice. You will be allocated a topic or you can identify your own (e.g. 360 Degree Feedback, Performance Goal Setting, Talent Management, Selection Interviews, Classroom V Online Training, Employee Engagement, Training, Face-to-Face V Virtual Project Teams).

- Specify precisely the question you are asking
- Use Academic Search Complete and Business Source Complete Databases (See Centre for Evidence Based Management for tips on how to search databases or contact DCU Library).
- Find at least 3 papers related to the practice
- Present on the following detail:
  - > How you searched
  - > The articles you found
  - > What conclusion you draw from your findings
    - Your conclusion MUST answer "is there scientific evidence that the practice or model is likely to be effective or useful?"
  - > How did you arrive at this conclusion
  - > Any concerns you have with your conclusion
  - > Any issues you identified in the articles which may suggest they are not the 'best scientific evidence'

2. The second activity/project focuses on applying scientific evidence to practice. Interestingly, a trend emerged across nearly all modules and programmes in relation to the second activity/project. Despite the fact that post-experience students are practitioners, when completing project 2, they focused more on appraising the scientific articles through a scientific lens as per activity/project 1 rather than a practice lens ie. identifying if the sample was relevant to practice or how the results of the studies could inform organisational interventions.

TextBox 3. Group Presentation Assignment Part (b)

On the same topic as Part (a) and using the same 3 academic articles.

> Identify the pro's and con's of each study's usefulness to HR practice

> Identify your choice for which is the most useful TO PRACTICE and the reasons why

> Present on the following detail:

- Pro's and why
- Con's and why
- Most useful to practice article and why

Other insights from implementing these activities/projects included:

- students sometimes extracted their insights from the theories presented in the scientific articles rather than the results of the studies/meta-analyses themselves.
- in answering the project 2 question pertaining to which article were most useful for practice, sometimes students would source excellent scientific studies and meta-analyses alongside a more readable, brief paper in a publication which may not be peer-reviewed or scientific and they would identify that paper as being 'more useful to practice'. This had more to do with readability than content. This, in itself, provided a valuable learning opportunity around appraising the sources and quality of scientific evidence.

Acquire, Appraise, Apply Organisational Evidence - To teach evidence-based management skills on acquiring, appraising and applying organisational evidence, the CAT project (see Appendix 1) was used. Guidelines on how to conduct a critically appraised topic (CAT) were shared: https://cebma.org/resources/guidelines-reas-and-cats/. The CAT project draws on

Kolb's learning theory and meta-analytic evidence that practice based methods combined with information is a most effective delivery methodology (Lacerenza et al., 2017). It also draws on recognition that programme material that is representative of the real world encourages more sustainable learning and practice (Ashford-Rowe et al. 2014; Hays & Reinders, 2020). The format of the CAT project varied depending on:

- the programme
- how much time was available to engage in evidence-based management content and
- the weighting of the assignments.

Engage with Organisational Evidence via Data Analytics - Given that evidence-based management specifies that one source of evidence is organisational data, the Executive MBA programme was redesigned to introduce a module on data analytics. In other programmes, subsequently, this module was also added and variously labelled as, for example, HR analytics, People analytics, Data analytics and Storytelling. These modules aimed to introduce students to foundational statistical concepts, teach skills on basic data management, data analysis, how to interpret statistical results and how to present statistical results. The types of software used in these modules varied with student and programme needs and lecturer preferences e.g Excel, SPSS, Jamovi and R.

These modules presented both opportunities and challenges. For example, students with a level of knowledge and skills with statistics and data were comfortable whereas those with no statistical knowledge or skills found it more difficult to apply the learning outside the modules themselves. For those students, extra supports provided included: lecturers being available for more individualised or team-based sessions, regular question and answer opportunities and being referred to freely available online YouTube material on specific statistical techniques.

There was and still is debate as to which software should be taught with the debate circling around what software students are more likely to use, have access to, is most user friendly and what level of sophistication in data analytic techniques students should be required to develop. From an evidence-based management perspective and for the purposes of the majority of post-experience programmes in DCU Business School, it is agreed that a basic knowledge of statistical concepts, an ability to conduct basic data analysis and a foundational understanding of statistical results so as to be able to interpret results to inform decisions is sufficient. It is suggested that where students require more sophisticated knowledge and skills that they should refer to data scientists in their organisations or develop their own skills further through other programmes or training. However, it was also identified from students that despite the narrative around organisations engaging more with big data and data analytics, the prevalence of data scientists in organisations has not kept pace (Almgerbi et al., 2021).

Acquire Organisational Evidence: Various Strategies

1. *Using Pre-existing Case Information and Organisational Data*

   For programmes or modules where the time available to teach and/or assess evidence-based management is limited or where students do not have access to organisational data, I have used two approaches:

   - **Option 1**: case studies and/or datasets I have generated myself from research/ consulting.

     My own anonymised case studies and datasets are based on real-life management problems. These may have been collated for research or consulting purposes and have permissions to use once anonymised. These are often of interest to practitioners encountering the same or similar problems. Students sift the datasets to identify a question which they wish to answer which the variables in the dataset can answer. They are tasked with producing a consulting report outlining the scientific and organisational evidence-based answer to the question.

   - **Option 2**: publicly available datasets e.g national, government or publicly available datasets from national/international research consortia.

     Publicly available datasets were provided to the students. These came from the central statistics office or ongoing national/international research projects which generate datasets and make them publicly available. Students identify a question they wish to answer for which there are data points in the dataset available to answer that question. They are then tasked with producing a consulting report outlining the scientific and organisational evidence-based answer to the question posed.

2. *Using Own Organisational Question and Organisational Data*

   For students with identifiable organisational questions/problems for which they need an answer and for which they have access to internal organisational data, they are tasked with:

   - identifying an organisational question/problem which requires an answer
   - sourcing the best available relevant organisational data
   - This approach has been applied in three different ways across and within various programmes to meet student needs.

   - **Option 1**: Team Based Project focusing on One Organisation

     Students can complete this project in teams with one organisation volunteering to be the focal organisation and providing the required question/problem and dataset.

- **Option 2**: Individual Project focusing on Own Organisation

  Students can complete this project as individuals which is sometimes requested to protect the confidentiality of the organisation, the dataset and the results.

- **Option 3**: Class Based Project focused on One Organisation

  On one programme where all students were from the same organisation, the class opted to generate a survey collaboratively as a collective, distribute it as a class with representatives from the class targeting specific areas of the organisation, clean and aggregate the data generated and generate one dataset which was used to address various questions/problems chosen by teams within the class.

3. *Using Another of the Three Sources of Organisational Evidence*

   An alternative option which I have used with pre-experience Masters students is to focus on and acquire and appraise organisational data in the format of stakeholder experiences and professional experience. This approach is also illustrated in Chapter "Capstone Projects Integrating Multiple Sources of Evidence" by Ann Smith and Alessandra Capezio in this book.

Analyse, Appraise and Apply Organisational Evidence - The data analysis tools and techniques suggested and CEBMa content are the basis on which students then analyse and appraise the data sourced and analysed. This content is then used in the CAT Project. This appraisal can include evaluation of:

- The method used to collect the data
- The credibility of the source of the data
- Any biases that may be present
- The reliability and validity of the measures used to collect the data
- The sample and its relevance to the question posed
- Sample size
- The trustworthiness of the data
- The quality of data analysis
- How the results can and cannot inform the question posed

Visualising Evidence Based Practice in Action

The CAT Project - This CAT project can culminate in a Dragon's Den style presentation of the CAT case to class colleagues and a panel of judges- either senior practitioners or world-renowned academics or both as is suitable for the design or audience. In early versions of as-

signed CAT projects, there was no presentation component. However, overtime the calibre of the top scoring CAT projects was such that it represented a missed learning opportunity to not illustrate them to all programme participants as a) examples of quality CAT's b) live examples of evidence-based practice in action, from which they could learn so as to further develop their EBM skills. This concluding presentation also serves to put students in a situation of having to both verbalise and answer questions about their question/problem and the associated evidence used to arrive at an answer which parallels practice scenarios where they have to defend their decisions to boards of management or employees.

Discussing Cases - Some student feedback requested case examples of evidence-based practice in use in organisations. There are strengths and limitations with providing case examples. A limitation is that on seeing a case example, participants may simply aim to replicate what they see rather than apply evidence-based practice to their organisation in a more customised way. Equally, participants may limit themselves to the standard presented in that case rather than pushing the boundaries further and implementing evidence-based practice more completely. However, on the opportunity side it enables students to "see one, do one" and provides a comparable organisation that they can relate to. Four suggestions for sourcing cases are these:

1. After programme participants are clear on what evidence-based management is and during discussion of the steps of evidence-based practice, module facilitators can request:
    - examples from participants of these individual EBP steps in action in their organisations based on their experience
    - examples of evidence-based management in action in their organisations
    - examples of where decisions were made without sourcing trustworthy evidence and where the steps of evidence-based practice would have been beneficial. This as a discussion point usually results in many examples and very lively and engaged discussions of faulty decision-making practices and biased evidence.
    - See the TextBox 4 exercise/project which could be adapted and used as the basis for a case discussion or a case project.
2. Use material provided in published articles using case studies as a basis for discussion. For example, a study exploring case organisations implementation of HR analytics (Belizón, M. J., & Kieran, S. (2022). Human resources analytics: A legitimacy process. Human Resource Management Journal, 32(3), 603–630). https://doi.org/10.1111/1748-8583.12417.)

3. The Corporate Research Forum is currently and iteratively engaged in research producing reports detailing how and to what extent evidence-based management is applied in member organisations. https://www.crforum.co.uk/research-and-resources/case-studies-ebhr-a-new-paradigm/
4. See Chapters in this book by Blake Jelley & Tina Saksida, Tatiana Andreeva and Denise M. Rousseau which include cases for use in teaching EBM.

TextBox 4. Project Exercise

Scientific Evidence

1a. Identify a Organisational Psychology Topic of Interest to you
TOPIC: _____
1b. Frame it as a question: What is the Scientific Evidence for the Impact of ___ on ____?
Question: _____
1c. Source 1 Scientific Article that answers this question & using that article state what the article identifies as the answer to the question and how it came to that conclusion.
Reference & URL: _____
Answer: _____
1d. Any quality/trustworthiness/reliability/validity/bias concerns you have with using this article to inform an Organisational Decision on this Topic.

_____

Organisational Data

Select an Organisational Decision (same topic) that was made in relation to this topic & question
2a. Details on the organisational decision:

_____
2b. The Decision that was taken

_____
2c. What Organisational Data and/or Other Evidence was used to justify this decision

_____
2d. Was it the correct Decision & how did you come to that conclusion?

_____

Teaching Evidence Based Management: The Key Challenges Experienced by Students

Acquire Scientific Evidence - In engaging in CAT projects a challenge which emerged despite students developing an answerable question, was where students sourced scientific or organisational evidence which did not directly answer the question posed. For example:

- studies or data which focused on a different outcome to that posed in the question
- focused on a different level of analysis ie individual, team or organisation
- focused on a different independent variable to that posed in the question
- became distracted by the results presented in scientific articles and discussed these broadly rather than focusing tightly on the result(s) which were directly relevant to the question posed.

These mistakes were valuable learning opportunities in helping students identify that despite having prepared a precise defined question, they still need to constantly remind themselves of what their focus was, what the question was when interrogating various sources of evidence and not get distracted by all the other information surrounding the answer they sought.

Appraise Scientific Evidence - Once provided with the tools for appraising scientific evidence, most post-experience students engaged in this process systematically and with a degree of comfort. Most often they recognised, for example, the sample sizes, the populations, the relevance of the sample or population for their organisational context. A lesser number of students, for example, differentiated between cross-sectional and longitudinal methodologies, called out meta-analyses and recognised the strength of regression coefficients thus these elements needed to be reinforced to ensure a complete appraisal of the trustworthiness and relevance of scientific evidence.

Acquire Organisational Evidence - To complete the CAT project, students were required to acquire organisational data using various options as outlined above. On numerous occasions and most especially when presented with the CAT project, the initial reaction from students was "*I do not have access to data*". After first asking them to step back, take some time and review possible questions to ask, review what data is collected within their organisations, what data they and their peers refer to regularly, what metrics are tracked within the organisation

and across various departments, many students would then identify that organisational data did exist and identify what was within their control to access or how to go about accessing data. On some occasions, students still felt they did not have access to data. On a number of occasions this was indeed the fact and alternative solutions were provided as identified above. However, on other occasions an invaluable insight occurred for me when I recognised that the real issues included that students:

- could not identify what the organisational data was actually measuring. As such they could not match the data and measures to the 'concepts' they were investigating.
- only obvious metrics were identifiable ie performance ratings, revenue, gender, absenteeism, numbers attending training, happy sheet scores. What was less apparent, recognisable or used in the manner required by the CAT projects of what is the impact of X on Y were metrics like individuals objective job productivity, team productivity, measures of efficiency, quality metrics like number of errors, comparisons across groups like contractors versus permanent staff, those taking part in an intervention versus those whom did not. This article by Maria Belizon et al. is useful to inform programme content or in class discussions to help HR students identify possible data points that could be used in projects. (Belizon, M.J., Majarín, D. & Aguado, D. (2023) Human resources analytics in practice: A knowledge discovery process. European Management Review, 1–19. https://doi.org/10.1111/ emre.12605)

Appraise Organisational Evidence - With respect to organisational evidence, students were especially interested in appraising the trustworthiness of organisational evidence and were frequently enthralled and/or perplexed when the foundations of the data being used were found lacking. It often resulted in them identifying ways to improve the measures in use or add more measures to what the organisation was collecting. For example:

- measures focusing on quantity but not quality
- measures focused on behavioural dimensions but grounded in open questions or one item questions
- being unsure of what basis was behind measures used by external consultant surveys which provided annual average scores of performance

In some instances, this resulted in some students abandoning the 'best available organisational data' available to them and devising their own surveys and using validated instruments to collect new organisational data. For those without training on developing their own surveys, this did require additional content, 1:1 or team-based work, with students to inform them on

how to develop their own surveys. In this case strategies used included:

- students were referred to the book "*Taking the Measure of Work*" (Fields, 2002) to see examples of validated instruments on constructs that may be of relevance to them
- students were required to source published validated instruments which I would then review and approve before they designed the survey
- Once surveys were designed, I would review, provide feedback and approve those surveys. Additionally, all the ethics requirements of DCU Business School would have to be adhered to before any surveys were administered. Students would also liaise with their HR department or relevant manager to seek internal approvals for to distribute the surveys.

Analyse Organisational Data - The approach taken in modules on or using the evidence-based management lens discussed here all required students engaging with organisational data in some capacity as outlined above. The approach taken in many instances required students to analyse raw data themselves. However, it is important to note potential resistance from students and faculty to this approach. The reasons for students resisting included lack of comfort or knowledge on data analytics, a belief that developing those skills was not relevant to them/ their role/this module/this programme. These reasons are increasingly evident in research while concomitantly reports on future skills needs highlight the need to develop these very skills in more practitioners. Reasons for faculty resistance included that students do not need to learn how to analyse data as they could use data scientists within their own organisations. The requirement that students engage in some level of data analysis was grounded in the learning principles that *doing* facilitates learning and deep understanding (Ardley & Taylor, 2010; Leonard & Marquardt, 2010) and recognition of the increasing need for such skills in practitioners.

Aggregate the Evidence - Two key questions emerged when students were required to aggregate evidence. First, what to do when pieces of scientific evidence contradicted each other and second, what to rely on when scientific and organisational evidence contradicted each other. The CAT project required students to identify the basis for their final decision and recommendations ie its foundation in scientific and/or organisational evidence. These questions provided another valuable learning opportunity in respect of appraising the evidence in terms of trustworthiness and relevance to the question posed.

Does Teaching EBM Work?

Evaluations - Student module and programme evaluations are conducted annually and positive qualitative evaluations included "*the module was highly effective in teaching me an 'evidence based' approach to HR and strategic decision making", "the assignments were very effective as a learning tool", "practicing evidence-based research through assignment was a valuable and worthwhile practice", "it has changed how I will approach business cases and decision making", "I found it very interesting to read the articles made available to us as it definitely provided a different perspective"* and *"overall, it was a great module in terms of shaping my thinking pattern toward an evidence based system. I feel this module will have the biggest impact on me as it has shaped my thinking on an evidence-based approach."*

These evaluations also provided insight into what students did not like or found difficult or re-design ideas. These insights were used to inform some of the content in the previous section about the challenges experienced by students.

Feedback from judges invited to be part of the CAT project judging panel included: *"I am very impressed with the quality of the projects….I think the assignment you developed is a great example for all other universities, program's and teachers", "the calibre of projects was impressive and I have ideas I can take back to my organisation,"*

External Examiner feedback included *"I think this is an excellent assessment and indeed best practice,"*

Pre-Post Test -A pre-test post-test instrument (see Appendix 2) was designed based on material from the CEBMa and implemented on some programmes and/or modules to investigate if students EBM knowledge developed post taking the EBM content. Implementing a pre and post-test instrument such as this is also useful in illustrating to faculty or the School if and in what way teaching EBM impacts students' knowledge and skills.

Reflections: Whats Next?

The argument for introducing EBM to the DCU Executive MBA programme, the positive feedback from students on its success, the step-change in the quality of assignments aggregating, appraising and applying scientific evidence and organisational data were indicators of its success. Furthermore, there was recognition that the meta-competencies developed from evidence-based practice makes for a sustainable education.

These results and recognitions subsequently influenced DCU Business School, which is the ultimate measure of success. The DCU Strategy 2017-2022 explicitly required DCU Business School to undertake Curriculum Reform "*We will embark on a review of our curriculum to ensure that it challenges learners, preparing them for the world of work and lifelong learning*".

This curriculum review process commenced with identification of EBM as a stream of content that would be central to all undergraduate and postgraduate programmes commencing from 1st year undergraduate through to Masters programmes. As the module would span a diversity of programmes across the school totalling some 600 students, the Associate Dean of Teaching & Learning convened a taskforce of faculty from across disciplines to design the module. I was involved as a subject matter expert on EBM. This project, the teaching methods, the evaluations and the pre-post test results are discussed in Chapter "Developing Foundational Evidence-Based Practice Competencies: Critical Thinking for Business Students: A First Year Undergraduate Module" by Orla Feeney in this book.

Introducing, teaching and implementing EBM teaching has not been without its challenges. However, my experience, the feedback from (some not all) students during and post programme completion, how EBM principles and skills have been applied by students and faculty elsewhere on programmes and the evidence I have seen in the quality of CAT projects is such that my belief in and passion for EBM teaching remains. It develops meta-competency to learn how to learn, it provides a sustainable education and it bridges the research-practice gap. There is still room to develop our practice beginning with more evaluations of what EBM delivers in terms of knowledge and skills for our students. More is needed to identify if and how EBP skills developed in our students transfer to their workplaces. From here we can learn more about how to better teach EBM and illustrate its value. References

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About the Author

Claire Gubbins is a Professor of Organisational Behaviour & HRM at Dublin City University Business School, Ireland, Lead of the LInK Lab at the Irish Institute of Digital Business and she is founder and Director of the Masters in Strategic Learning & Development for the Centre of Executive and International Education at DCU in collaboration with the Learning & Development Institute of Ireland.

Her research interests centre around social relationships at work. She investigates the role of social networks in facilitating learning processes and tacit knowledge circulation; the impact of hybrid/remote working models on social networks and evidence based practice as a mechanism for continuous learning and sustainable education and advancing the HR profession. Her research is published extensively in top tier journals including Human Resource Management (US), Organisation Studies, Human Resource Management, Journal of Management Inquiry, Human Resource Development Quarterly, Advances in Developing Human Resources, Human Resource Development Review, Journal of Knowledge Management and European Journal of Training & Development, as well as numerous book chapters. She is co-author of two books: Learning & Development in Organisations: Strategy, Evidence and Practice with Oaktree Press and Learning and Development Effectiveness in Organisations: An Integrated Systems-Informed Model of Effectiveness with Palgrave.

She has over 20 years experience consulting with industry nationally and internationally in these same areas and is a regularly invited speaker at academic and industry events. She also designs and delivers executive education programmes and workshops for the Centre of Executive and International Education at DCU. She has served as a judge for the National Learning & Development Industry awards.

She received the DCU Presidents award for Excellence in Teaching Innovation in 2013 and was shortlisted on numerous occasions. She was awarded an International Advance HE Senior Fellowship for Teaching Excellence in 2021.

She is an invited Fellow of the Centre for Evidence Based Management (CEBMa). She serves on the council for The Learning & Development Institute of Ireland (L&DI) and the Irish Academy of Management (IAM). She is Chair of the IAM Early Career Development Network supporting early career academics nationally.

Previously Claire was a Fulbright Scholar at Carnegie Mellon University, a visiting Professor in Princess Nourah Bint Abdulrahman University in Riyadh, an Associate Editor for Human Resource Development Quarterly, Director of the award winning DCU Executive MBA Programme, Director of the Graduate Certificate in Strategic Leadership for DCU

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Appendix 1

CAT Project

Identify within your organisation a strategic HR decision/HR question which needs to be answered. It must be a question for which you can source relevant raw organisational data, either within your organisation, a colleague/friends organisation or within a comparable other organisation. This means the question must be based on something **already implemented**. Please do so in consultation with the instructor and where relevant colleagues in the HR function of your organisation.

You **must** gather a) scientific academic evidence and b) organisational data to help answer this question and make a decision. If either a) or b) is omitted the assignment is considered incomplete and not addressed as required and your grades will reflect this. Again, ensure you discuss your choice with the instructor before embarking on the project to ensure it fits with the task assigned and is sufficiently precise.

Please consult the instructor about accessing one set of data as a team and then investigating different questions from within that data set. You may also complete this assignment individually if you wish. Ensure you read the DCU Research Ethics guidelines document for the purposes of collecting your organisational data- it is available on the module LOOP page- and submit the completed ethics form BEFORE commencing data collection.

Some examples of broad possible questions include the following, but you may think of others and you will need to refine your question into an answerable question.

1. Does pay-for-performance improve organisational performance metrics in your company?
2. Is investing in workforce training financially beneficially to your department/organisation?
3. Are technology focused approaches to training delivery effective in helping achieve training/organisational performance metrics?
4. Are geographically dispersed teams likely to perform effectively as compared to non-geographically dispersed teams?
5. Does increased job autonomy improve employee performance?
6. Does flexible working practice increase employee commitment to the organisation?
7. How effective is downsizing on key business metrics?

8. Is high CEO compensation worth it for key business metrics?
9. Do more effective social network structures improve tacit knowledge sharing?
10. Does increased senior female representation improve key business metrics?

What to include in your report:

You should write this assignment as a consultancy assignment with a set of recommendations for action. The written report should include:

- Question
- Definitions of key concepts in the question
- PICOC for your Question
- Background to Question
- A description of the strategic decision and its location within the company's overall strategy
- Search Strategy (Scientific & Organisational)
- Evaluate the Best Available Relevant Scientific Evidence arising from your Search which answers your question (2-3 pages)
- Analyse and Evaluate the Best Available Relevant Organisational Data arising from your Search which answers your question (3-4 pages). Use the sessions delivered in the module on Data Analytics to enable this analysis and evaluation.
- Integrate the evidence from across the scientific and organisational evidence sourced and draw a conclusion as to what it supports, does not support and aspects of your question for which you have no evidence.
- Present a set of recommendations for the organisation on this question/decision with justification (using references to the scientific and organisational evidence).
- References
- Appendices

The key general criteria for grading are listed below:

- Clear question
- Definitions of key concepts in the question
- Clear and correct PICOC
- Evidence of ability to see and explain relationship between HR decision and Company strategy

- Effective search strategy described
- Thorough evaluation of the evidence under clear headings
- Effective integration of the evidence to identify the 'big picture' regarding what the evidence says
- A conclusion regarding what the evidence says about the question posed- i.e. answers the question posed
- Feasible, justified and related recommendations which stay within the boundaries of available evidence
- Use of scientific and organisational evidence which is directly applicable to the question posed.
- Structure & Flow of Report.
- References (scientific evidence) used- is it the 'best available evidence'?
- Grammar/readability (punctuation, spelling, sentence structure, proof read)
- Format (clearly referenced, proper bibliography, proper citations)
- Appearance (professional cover page, student names, ID numbers, typed, neat)

Assignment Tips:

- See CAT Guidelines Document and Sample CAT on LOOP
- See online EBM Modules
- Sample Size:
  - > See Data Analytics module for more on what is sample size.
- Statistical Analysis:
  - > You need the original raw data- not data where the analysis has already been done e.g by consultants.
  - > You should report results on statistical analysis in layman terms to demonstrate understanding.
    - The level of statistical analyses required will depend on your question but likely includes:
    - Descriptive statistics e.g. reporting means/averages is not sufficient
    - Need to produce t-tests, correlations, regressions, ANOVA (not all of these will be relevant to everyone's question so choose the appropriate statistical test for the question posed).

        - You can, if you wish but not necessary, include control data (other variables which may effect the variables you are studying- but just the minimum) in your analysis e.g. gender, age, education etc.
        - If your results reveal no relationship- that is fine- critique your approach, context and discuss your 'no relationship' finding in context of scientific evidence
    - > The Background section of the report should make the link to organisational strategy clear.
    - > Critically appraise everything!
- If doing your <u>own survey</u>
    - > You must use published measures/scales/instruments- you can not 'make up' your own questions- see "Taking the Measure of Work" Book, link posted on LOOP for a sample of such measures/scales/instruments on some topics
    - > See ethics form/cover letter posted on LOOP where doing your own survey
    - > Calculate Cronbach alpha (reliability) for each measure you use in your own survey
    - > You can, if you wish but its not necessary, include control data (other variables which may effect the variables you are studying- but just the minimum) in your survey & analysis e.g. gender, age, education etc.
    - > See Andy Field book on SPSS or Data Analytics module

Grades & Progressing Your Report for a Presentation to a Panel of Judges:

- Based on the grades awarded to the reports, the top 3 reports will prepare and deliver a presentation to a panel of academic judges in the field.
- The judging panel will rank order the presentations based on grading criteria they develop.
- Their rank will determine the following:
    - > 3rd runner up will receive an additional 5% on their report grade
    - > 2nd runner up will receive an additional 10% on their report grade
    - > Winner will receive an additional 15% on their report grade
- All students should attend these presentations.
- There will be time for questions & answers and meeting the judging panel afterwards.

Appendix 2

Pre-Post Test Instrucment

1. How would you define critical thinking? (*Select one or more*)
   a. The process by which one acquires knowledge through experience, thought and sensory input.
   b. The capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically.
   c. The objective analysis of an issue and the data, facts and evidence relating to it.
   d. The ability to think clearly and rationally, understanding the logical connection between the different components of a decision or a problem.
2. Why do we need critical thinking in business? *(Select one or more*)
   a. The process by which one acquires knowledge through a. So we can influence people.
   b. So we can recognise falsehoods in evidence presented to us.
   c. So we can recognise flawed reasoning.
   d. So we can criticise more effectively.
3. Why do students need to use critical thinking? (*Select one or more*)
   a. So we can understand how verbal and nonverbal behaviours are implicated in our interpersonal interactions.
   b. So we can identify and manage our emotions and the emotions of others.
   c. So we can evaluate the strength of the evidence to support different arguments.
   d. So we can enhance our 'perspective taking' skills when engaging with fellow students.
4. Critical evaluation means identifying only negative aspects when making an analysis. (*Select one*)
   a. True
   b. False
5. Research conducted by a top university professor published in a top academic journal does not need to be critically evaluated. (*Select one*)
   a. True
   b. False

6. Imagine you are preparing for your first year exams. Would you regard the following statement from a lecturer as evidence of how to perform well in exams? (*Select one*)

   "In the 15 years I have worked as a lecturer I have noticed students are more likely to perform well in exams if they have attended lectures."

   a. Yes
   b. No

7. According to DCU's Professor of Enterprise & Innovation, 50% of new businesses fail in their first year. Would you regard this as evidence? (*Select one*)

   a. Yes
   b. No

8. Imagine you are completing an essay for your HR101 module on Motivating Employees. Would you regard an Irish Times article written by a top CEO reflecting on her experiences of motivating people as evidence? (*Select one*)

   a. Yes
   b. No

9. Read the following abstract of an empirical study entitled "The effect of early entrepreneurship education"

   The aim of this study is to analyse the effectiveness of early entrepreneurship education. To this end, we evaluate a leading entrepreneurship education program that is taught worldwide in the final grade of primary school. We focus on pupils' development of entrepreneurship knowledge and a set of non-cognitive skills relevant for entrepreneurial activity.

   The study was conducted between February and July in 2010, and again during the same period in 2011. In total 120 schools participated in the study. Random assignment to the treatment or control group took place at the class level. Classes assigned to the control group were excluded from participating in the education program.

   To gather data for determining the effect of the education program, all pupils had to complete two extensive questionnaires, measuring entrepreneurial knowledge and non-cognitive entrepreneurial skills. The questionnaires were sent to all 120 schools in February 2010, before the education program started. The second questionnaire was sent out to both treatment and control classes in July 2010, after the education program ended. The results indicate that knowledge is unaffected by the program. However, the program has a robust positive effect on non-cognitive entrepreneurial skills.

What is this study's research question? (*Select one*)

a. Evaluate a leading entrepreneurship program.
b. How does early entrepreneurship education affect non-cognitive entrepreneurial skills.
c. Can final grade primary school pupils learn to be entrepreneurs.
d. Jurisdictional differences in early entrepreneurship education.

10. Read the following results from a study entitled "The Relationship Between Employee Engagement and employee turnover: A Meta-Analysis":

Based on 521 cross-sectional studies with a total sample size of 9,939 business units and 23,567 employees, this meta-analysis examined the relationship at the business-unit level between employee engagement and turnover. We found a significant correlation between overall engagement and business-unit turnover.

What conclusion(s) can be drawn based on these findings? (*Select one or more*)

a. The findings indicate that a higher level of employee engagement leads to a lower turnover.
b. The findings indicate there is a weak relationship between employee satisfaction and turnover.
c. It is unclear whether a higher level of employee engagement leads to a lower turnover.
d. Given the large number of studies a causal relation between employee satisfaction and performance is likely.
e. The findings suggest there is no causal relation between employee satisfaction and performance.

11. Determine which of the following journals are peer reviewed by looking up their information page in the A-Z Journals Database. (*Select Yes or No*)

a. Strategic Management Journal
b. Harvard Business Review
c. Accountancy Ireland
d. Employee Relations

12. In 2017, Deloitte published a report focusing on key competencies in the digital age. On page 29, you will find Figure 11. illustrating the future importance of skills.

Rank the proportion of jobs as a percentage of total employment for which the following skills will be important in 2030:

a. Critical thinking
b. Active Listening
c. Judgement and Decision Making
d. Active Learning

13. Which of the following statements regarding peer-reviewed journals are correct. (*Select one or more*)
    a. Research articles published in peer reviewed journals are evaluated and critiqued by independent, anonymous scientists in the same field.
    b. The process of peer review ensures that a research article is valid and reliable.
    c. A research article published in a peer reviewed journal with a high impact factor does not need to be critically appraised.
    d. Peer review gives you some assurance that a research article is not seriously flawed.
14. Imagine you are trying to get fit. You are thinking about downloading Nike's fitness tracker app. Would you consider as evidence the outcome of a Nike survey that indicates that most people find it easier to get fit when using a fitness app? (*Select one*)
    a. Yes
    b. No
15. Over a 5-year period, whose professional expertise would you judge to be most valid and reliable? Check all that apply. (Select one or more)
    a. An eye surgeon specializing in eye laser surgery.
    b. A management consultant specializing in culture change.
    c. A car salesman specialized in selling second hand cars.