



## Engaged student learning

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High-impact strategies to enhance student achievement

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## Executive summary

### Aims and methodology

The principal aim of this research project was to produce a systematic review of the academic literature on high-impact pedagogical strategies and student engagement in learning within higher education (HE) in order to provide answers to the questions outlined below:

1. Which pedagogies are commonly used in disciplines to generate engaged student learning?
2. For which of these pedagogies is there a robust evidence base evaluating the effectiveness of the pedagogy in generating student engagement?
3. What are the key elements of effective practice that are identified within this literature?
4. What gaps are there in the existing literature in relation to: (a) discipline specific pedagogies that are not widely evaluated and for which there is a strong prima facie case that they are high impact; (b) the scope for the existing evidence bases to be further strengthened and developed?

To ensure depth and breadth of coverage across disciplines (Arts and Humanities; Health and Social Care; Social Sciences; and STEM) broad definitions of pedagogy and engagement in academic learning were applied to the literature search. Five search engines were used (Education Research Complete; ERIC; ISI Web of Science; Psych INFO; and Scopus). In addition, we drew on our own database: Sharing Higher Education Database (SHED) (Evans 2014a) which catalogues 44 relevant higher education journals, associations, and networks focused on teaching and learning in higher education.

To address student engagement in learning, our search embraced a broad range of constructs: (a) student involvement, level of academic challenge, extent of active/collaborative learning, student-faculty interaction (Gibbs 2010; Kuh 2008); (b) cognitive, metacognitive, self-regulatory, behavioural, and affective dimensions (Chapman 2003); (c) resilience (Wimpenny, Lal and Savin-Baden 2011); (d) student-directed (Smith 2014); (e) students as change partners (Healey, Flint and Harrington 2014; (f) learning transfer (Evans 2015a); sustainability (Boud 2010); self-regulation (Evans 2015a, c).

The comprehensive and systematic literature review of higher education articles (2005-15) identified 21,055 potential research articles. Using increasingly refined filtering processes, 1,741 relevant articles were identified. A focused sample of 273 full articles was examined in depth to provide a rich and detailed snapshot of the current pedagogical landscape within higher education and as such the results must be viewed as illuminative and informative rather than universal (Land and Gordon 2015).

An online SurveyMonkey questionnaire of higher education Fellows (NTFs, PFHEAs and SFHEAs) was undertaken to ensure full coverage of disciplinary areas and to also inform the disciplinary narratives for Arts and Humanities, Health and Social Care, Social Sciences, and STEM.

To provide a more fine-grained level of analysis, ten case studies were drawn from the literature review to exemplify how high-impact pedagogies across the four main discipline areas were being used within specific disciplines. The case study articles were selected based on their strengths in pedagogy, methodology, and impact.

### The pedagogical landscape within higher education

The research literature on pedagogy and engagement within higher education is vast; the quality of this research is highly variable. Only 13% of articles (n=36) within the focused sample demonstrated significant strengths in pedagogy, methodology, and impact (category A case studies) measured against indices of pedagogical clarity;

methodological transparency; methodological congruence; evidence-based; accessibility of findings; and evidence/potential of transferability of ideas across disciplinary boundaries.

The dominance of the US higher education context is evident with 46% of articles produced by US higher education affiliated researchers. Fifteen percent of articles are from researchers affiliated to UK institutions; a total of 35 countries are represented within the focused sample.

Arts and Humanities and Health and Social Care disciplines are significantly under-represented in the HE pedagogical literature; the former contributing only 10% and the latter 9% of the research articles with reference to the main dataset (n=1642).

Emphasis is on undergraduate learning and teaching provision with less than 20% of articles considering postgraduate students. Pedagogical interventions are generally short in nature (less than a year in 75% of articles) and sample sizes are relatively small (e.g. 50 persons or less in 63% of the articles).

A range of pedagogical approaches are evident within and across disciplines. While different disciplines naturally emphasise the delivery of specific content they also use a similar range of pedagogical approaches (active; collaborative; experiential; reflective; assessment focused) with 50% of articles within the focused sample suggesting considerable potential for transfer of key principles of practice across disciplines. Evidence of generic guidance is evidenced in many areas and specifically with regard to team formation and team assessment.

Expert accounts of disciplinary practice (NTFs, PFHEAs and SFHEAs) emphasise the importance of real-world engagement as an essential part of student learning to understand within disciplines using 'real assessment'; with students working as producers (Arts and Humanities); engaging in 'outside in' experiences working with patients and experts (Health and Social Care); becoming scholar practitioners working with the outside world (Social Sciences) and becoming researchers (STEM).

Most articles measured students' perceptions of learning. Thirty-five percent of articles looked at indicators of student performance (test performance; quality of writing; skills performance; products); relatively fewer articles focused on student's ability to transfer ideas from one context to another. Where transfer was considered, simulations were found to be particularly effective in promoting deeper levels of learning.

The more robust studies (based on pedagogical clarity, methodological clarity and coherence; evidence-based; with measures of impact) included a range of pedagogical approaches: visual representations; integrated approaches to curriculum development; co-operative learning activities; inquiry approaches including simulations, problem-based and project-based learning; assessment initiatives with students as producers, co-assessors, and self-assessors. In analysing the effectiveness of pedagogy, the interaction between the context, the discipline, the pedagogy, and the learners and teachers within the specific environment are all important (Evans 2015d). In trying to frame the why and how of the pedagogical approach and within the immediate (module, programme, discipline, institution and larger scales (national and international contexts) the nested nature of pedagogy, informed by many layers with varying degrees of influence (Kek and Huijser 2011), needs to be acknowledged.

The strongest pedagogical designs (categorised as grade A articles using our categories of evidence criteria) were those where the theoretical underpinnings of the learning and teaching approaches clearly supported the purposes of the learning experience and were explicitly articulated. Pedagogies were critical rather than descriptive. There is a strong emphasis on making the learning goals explicit to the learner and engaging the learner in dialogue about the learning process. Underpinning principles evidenced in the selected ten case studies include the notions of accessibility; authenticity; agency; criticality; flexibility; manageability; sensitivity to the needs of the context, and the specific requirements of the discipline. There is strong evidence of learner-centredness (Cullen and Harris 2009).

As part of the 'real-world' agenda, co-assessment approaches promoting dialogic and self-regulatory practice are promising in their focus on meaningful assessment. Involvement of students working with the wider community has clear impacts on identity development and student integration into higher education and wider contexts. Working with students as producers/co-producers also shows positive outcomes especially with regards to student engagement with, and development of, research, and future research engagement. There is an increasing emphasis on 'feeding up' assessment practice to support students' application of knowledge, understanding, and skills beyond the immediate confines of a programme; this aligns with Boud's (2000; 2010) notion of sustainable assessment. The importance of learning transfer is an important dimension of sustainable practice, however, the lack of longitudinal research designs (2%) currently limits analysis of the longer term impacts of interventions on students' learning beyond a module/programme of study.

## Models of student engagement

Student engagement is conceived of in many different ways to include single and multiple dimensional frameworks (e.g. engagement in individual learning, structure and process (Trowler and Trowler 2010); engagement as encompassing identity, knowledge, skills, and participation (Aitken and Sinnema 2008); engagement as including behavioural, cognitive, and affective dimensions (Chapman 2003). Disciplinary engagement cultures underpinned by different principles can be equally effective in generating student commitment to studying (Brint, Cantwell and Hannenan 2008); the issue is in ensuring such cultures are relevant to 21<sup>st</sup> century learning requirements within and across disciplines and making the principles underpinning such cultures explicit and negotiable.

Sustainability measures of engagement including students as change and research partners (HEA 2014; Healey *et al.* 2014); conceptions of belonging, retention, and success (Krause and Armitage 2014); resilience (Evans and Hardaker 2015); self-regulation (Evans 2015a,b); sustainable assessment- student self- and co-assessment (Boud 2000); dialogic feedback and interactions (Carless 2011; Wegerif 2015) are present within and across disciplinary discourses but are not widely represented within the literature and require more emphasis.

## Elements of effective practice

The term 'high impact' has been widely associated with undergraduate learning opportunities that lead to student retention, successful completion of programmes, and encourage student behaviours that lead to meaningful learning gains. These ways of assessing high impact while useful are also quite limited. Capturing what constitutes high-impact pedagogy is complex and requires a nuanced approach that addresses evidence about the quality of learning. A key aim of learning has to be to adequately equip students with the knowledge, capabilities, and personal qualities that will enable them to thrive in complex and changing contexts; this signals the importance of pedagogies that support the development of students' self-regulation of their own learning. Course design must be mindful of facilitating rather than impeding students' efforts to self-regulate. High-impact pedagogies should be encouraging approaches to learning and teaching that support students in cultivating deep understandings of what it is to think and learn within a discipline, the ability to self-monitor their own learning and to be sensitive to their own individual needs and the requirements of the context. High-impact practices by definition need to be accessible to all students, and attuned to an understanding of individual differences; they should be inclusive.

Effective pedagogical designs included a number of key design elements:

- the selection of appropriate research-informed approaches to meet specific identified learning needs;
- a critical pedagogical stance was employed (Bédard *et al.* 2012; Bernstein 2008) with a critical evaluation of learning gains (Feeney *et al.* 2013; Lay and Smarick 2006);
- manageability was addressed through attending to what was appropriate workload for students and lecturers (Baltzis and Koukias 2009);
- assessment was holistic in that it was an integral aspect of the pedagogical model;
- the pedagogical design was sensitive and adaptive to the changing requirements of the context.

Effective inclusive pedagogies, although less well-represented within the literature, adopted a universal design stance in promoting adaptive learning and teaching environments to enable access for all learners rather than focusing on adapted designs to suit the needs of specific groups; a broad view of inclusion is used. Emphasis is on connectionist approaches (involving pointing out to students connections, between knowledge areas, helping students to connect with what they already know, from sources, and from each other, and to use their own methods (Hockings 2010)); self-regulatory processes underpinned by an understanding of how we learn using a cognitive styles approach (Evans and Waring 2014); and culturally inclusive approaches (Eaves 2011).

Thematic analysis of the 273 articles identified many aspects of good pedagogical practice of which five themes were dominant within the literature; these included the following:

- Real-world student engagement is promoted through the use of real-life examples; tackling cogent and relevant issues; active research; meaningful assessment to engage diverse groups of learners to support 'feeding up' of knowledge and understanding from higher education into workplace contexts and integration within wider communities beyond HE (Patterson *et al.* 2011).
- Student self-understanding is supported through experiential approaches including the use of guided critical reflection with direction to suitable tools (Grace 2011; Zajonc 2013).
- Advance access to course materials is promoted to enable students to familiarise themselves with materials and to prepare for learning prior to taught sessions (e.g. flipping (Educause 2012); just-in-time approaches

(Novak 2011)). Associated with pre-release of materials is the requirement for students to do something with the materials as part of active learning agendas.

- Enhancing student access to learning is achieved by ensuring accessibility of ideas at the perceptual level (e.g. through the use of object-based learning, visuals) (Chatterjee 2010; Estevez *et al.* 2010) and at higher levels of information processing through appropriate scaffolding and the use of tools and models to support understanding (e. g. concept maps (Coller and Scott 2009; DeMeo 2007; Goldberg and Ingram 2011); and guided reflection tools (Carroll 2005; Waring and Evans 2015).
- Principles of effective assessment and feedback practice have been well-rehearsed within the literature (see Evans 2013 review on assessment feedback). Important emphases within assessment include the importance of: explicit guidance; appropriate, timely, and sustainable feedback; focused questioning; real-time feedback; feeding up beyond a module; self- and co- assessment; peer engagement with a focus on formative rather than summative support from peers; authentic and meaningful assessment; quality projects; students as producers; emphasis on translation of understandings into practice; assessment aligned to objectives of course design; appropriate diversification of, and guided choices in assessment.

These themes are attuned to Bass's (2012) notion of post-course design, which acknowledges the learning that takes place beyond the formal curriculum and brings the outside in by connecting with opportunities for learning more widely within HE and beyond in order to promote a post-course consciousness:

paying attention to such elements as prior learning and prior conceptions, experiential knowledge, program-wide learning goals, and the long view of expert practice. There are also many ways to create assignments (and reflections to go with assignments) that gesture beyond the course itself - to life experience, to other courses, or to larger communities of practice... (Bass 2012, pp. 26-27).

## Recommendations

A greater emphasis is needed on research-informed pedagogies; this requires a more informed understanding of pedagogy as a dynamic process, underpinned by theories, beliefs, values, and dialogue realised in real settings (Waring and Evans 2015). The need for the adoption of critical pedagogies (Waring and Evans 2015) is important.

Discipline-specific approaches to pedagogic research are necessary to support learners and teachers to apply generic and discipline-specific ideas and distinctive forms of teaching to the contexts in which they work and learn. Signature pedagogies need to be more explicit and especially within Arts and Humanities and Health and Social Care. Related to the notion of signature pedagogies is the need for clear identification of threshold concepts (Meyer and Land 2005) and clarification as to what a deep approach looks like within disciplines within 21<sup>st</sup> century learning environments (Evans 2015a). What comprises meaningful learning within the disciplines needs to be explicit. As part of this agenda, disciplinary perspectives, and HE perspectives on the principles underpinning overarching and disciplinary engagement cultures need to be shared and justified. To support nuanced disciplinary understandings, explicit induction into ways of thinking and doing are important at all levels (discipline, faculty, and institution) for students and lecturers.

The use of effective pedagogical approaches is relatively ubiquitous across disciplines but these pedagogies are enacted in nuanced ways within disciplines making translation of ideas across contexts difficult when they should not be. There needs to be greater transparency in the reporting of pedagogies and an associated clarification of how ideas can be applied beyond the immediate discipline; what generic principles can be taken away and be applied creatively to other contexts?

While learner-centred approaches emphasising connectionist teaching approaches and real-world assessment are a feature of the high-impact pedagogies described in this report, there is room for greater explication of the role of students in the learning process and as co-partners; this latter area is not well represented within the literature reviewed.

The importance of individual differences in learning and the need for critical rather than descriptive pedagogies (Waring and Evans 2015) is highlighted. Inclusive pedagogy needs to embrace a wide range of differences and needs to be attuned to the impact of pedagogical initiatives on individual learners. There are a range of approaches to supporting inclusive practice that warrant attention; particularly the development of adaptive environments rather than adapted (Waring and Evans 2015); the former enables all students to navigate their own pathways through the choices afforded within the learning design; the latter adapts practice to suit the needs of specific learners and is more limited. The concept of universal design and how this can be applied more fruitfully to all aspects of pedagogy and particularly the integration of technology to assist learning has considerable mileage

as do consideration of connectionist approaches to learning and teaching, and clear framing of learning and teaching activities (Hockings 2010).

The relative lag of assessment practice within higher education (HE) to meet the changing requirements of 21<sup>st</sup> century learning environments can impede meaningful learning. To maximise the potential of pedagogical innovations, assessment is the lynchpin as it must keep pace with what disciplinary knowledge is seen as valuable and relevant within HE and wider contexts and needs to accurately measure meaningful learning. Pedagogies aimed at developing deeper approaches to learning are most successful when assessment practice is aligned to capture and reward a shared understanding of what constitutes 'deep' within a discipline. To meet these needs the importance of real-world assessment in bringing the 'outside in' is highlighted. Assessment practice needs to be meaningful in order to tap into deep learning requirements. Institutional policies and procedures need to be able to respond quickly to the requirements of module and programme-level assessment requirements to ensure currency and alignment of practice. Reducing the burden of assessment and ensuring congruence between module and programme-level assessment are important in supporting an integrated and holistic approach to assessment.

Areas of practice that warrant further attention within the research literature include service learning initiatives, team development, self-regulation approaches, creative and dialogic pedagogies, and contemplative pedagogies; all of which have potential within and across all disciplines and are aligned closely to the requirements of 21<sup>st</sup> century learning needs. Attention is given to student perceptions of pedagogies within the literature, but few articles explicitly focus on the management of students' learning needs within and across learning environments; pedagogies to facilitate learning transitions are important (Krause and Armitage 2014).

The evidence base to support the power of simulation activities to promote learning transfer is strong and yet simulations comprise 3% of the wider literature. There needs to be better awareness of the range of evidence-based approaches and combinations of approaches that are available to support the development of specific types of student and lecturer learning to enable informed use of such approaches in practice (Bukist and Groccia 2011). HEIs can play a considerable role in the dissemination of such information through the development of integrated learning and teaching networks that enable research and teaching-focused staff to collaborate together on such initiatives. Greater emphasis on team-based rather than individually constructed course design is important in enabling shared understandings, development and the use of effective pedagogies (Bass 2012).

Research initiatives need to be directed to facilitating more longitudinal studies with a greater emphasis on postgraduate learning and teaching pedagogies. Only 1% of articles looked at cultural pedagogical perspectives. The relevance of predominantly western conceptions of learning models to other cultural contexts is another prime concern. More attention needs to be given to how different pedagogical cultures can be subsumed, enabling more comprehensive but culturally attuned pedagogies. Greater promotion of cross-cultural studies to explore the relevance of learning and teaching approaches to different contexts is required.

In summary, in moving engagement agendas forward, students and lecturers need agreement on what meaningful and quality learning experiences are and how these can best be provided. The freedom to learn, to have opportunities to connect in being able to take disciplinary understandings forward, and being able to apply and offer them to workplace and other contexts as co-partners and producers are key concerns in developing students as partners within higher education within 21<sup>st</sup> century learning environments. The potential of technology to assist flexible pedagogies - to bring the outside in - and to promote learner agency is key to pedagogical development. Supporting students to manage the higher education pedagogical landscape requires an emphasis on the development of self-regulatory skills in order to support student autonomy in learning.

## Section 1: Introduction

The principal aim of this research was to produce a systematic review of the academic literature on high-impact strategies and student engagement in learning.

In the context of this report, while broader definitions of engagement are recognised, for example to include student engagement in quality enhancement and assurance processes, the focus is purely on students' direct involvement in the learning process and "educationally purposeful activities" (Coates 2005, p. 26) across the disciplines (Arts and Humanities; Health and Social Care; Social Sciences; and STEM). The focus of this research was therefore on academic engagement which is linked to learning tasks rather than being more broadly situated to include institutional engagement (Willis 1993) which refers to a more social perspective. This review is cognisant

of the fact that the relationship between levels of student engagement and student achievement are complex, and that the quality of reporting of pedagogies within and across disciplines is highly variable.

## Research questions

1. Which pedagogies are commonly used in disciplines to generate engaged student learning?
2. For which of these pedagogies is there a robust evidence base evaluating the effectiveness of the pedagogy in generating student engagement?
3. What are the key elements of effective practice that are identified within this literature?
4. What gaps are there in the existing literature in relation to: (a) discipline specific pedagogies that are not widely evaluated and for which there is a strong prima facie case that they are high impact; (b) the scope for the existing evidence bases to be further strengthened and developed?

The report includes nine sections: Executive Summary; (1) Introduction to the context of student engagement and high-impact pedagogies; (2) Methodology; (3) The higher education pedagogical landscape; (4) High-impact pedagogies; (5) Key elements of effective practice; (6) Narratives about disciplinary pedagogies; (7) Case studies; (8) Conclusions and recommendations.

## Initial considerations and challenges

The potential research area covered by '*high-impact pedagogies*' and '*student engagement*' is wide reaching. Our data search process had to be comprehensive in order to fully exploit key defining relevant research articles that were representative across a range of disciplines and cultural contexts to ensure coverage of the "pure-hard/pure-soft/applied-hard/applied-soft classification of discipline" (HEA, invitation to tender document 2014, p. 24). It was important that the case studies chosen illustrated impact and best practice, and added to conceptual understanding of student engagement. The requirement to locate pedagogies demonstrating strong impact on student engagement and those with potential for impact meant that a wide net was needed to capture relevant research articles.

## Addressing student engagement

Even within the definitions of student engagement, as offered by Coates (2005) and Trowler (2010), which largely focus on student engagement in the learning process, the multi-faceted nature of this construct leads to considerable variation in how student engagement is perceived and measured making comparisons of different articles difficult.

The concept of student engagement suggests positive involvement in programmes through active participation and interaction at a class level. Often underpinning this assertion is the assumption that any activities that get students more involved are a positive step towards improving the quality of student learning. This is followed by enhanced learning outcomes, evidenced in both better degree results and improved future life skills (Trowler and Trowler 2010). Pedagogies that promote student engagement are therefore contrasted with less personalised or less student-centred approaches that have traditionally characterised higher education, but which are not in line with the demands of a mass system that also charges students (Richardson 2007).

There is a need for a clearer and operational understanding of student engagement and its specific relationship to achievement and learning gain. The relationship between impact and engagement requires closer analysis as it presently assumes a directly causal link between pedagogy and learning outcomes which have a largely behavioural dimension. There is also a normative assumption – that is, that any form of pedagogic activity that gets students involved is a good thing, without the scrutiny of its form, quality or even how this may work for students with diverse learning needs. Being actively involved is not the same as being engaged, and so-called involved students may still undertake "surface learning" (Marton and Saljo 1976) or experience learner "alienation" (Mann 2001). In addition to the behavioural dimension of student engagement as measured by students' physical involvement, and in some cases their 'learning outcomes', there is a cognitive and emotional dimension in terms of students' knowledge and understanding and affective relationships to their learning (Trowler 2010); these have been potentially overlooked. The student engagement remit has also extended to activities that fall outside the more formal process of learning at programme level, such as engagement in extra-curricular pursuits and employability (Owens and Tibby 2013).

If student engagement is related to the tangible improvement of the quality of student learning, through participation in purposeful learning activities, this is where the issue of pedagogic impact might lie (Coates 2007).

Student engagement linked to teacher activities such as using more 'interactive' forms of learning or teacher accessibility outside of teaching sessions, including more 'open door' approaches that allow for student consultation can generate engaged and independent student learning that entails: higher levels of student attention and subject interest, greater involvement and active participation, as well as co-production in aspects of learning design, and delivery (Kuh 2008).

There are numerous student engagement constructs and combinations of constructs, the most important of which is unclear: (a) student involvement, level of academic challenge, extent of active/collaborative learning, student-faculty interaction (Gibbs 2010; Kuh 2008); (b) cognitive, metacognitive, self-regulatory; cognitive, behavioural, and affective dimensions (Chapman 2003); (c) resilience (Wimpenny and Savin-Baden 2011); (d) student-directed (Smith 2014); (e) students as change partners (Healey, Flint and Harrington 2014; (f) learning transfer (Evans 2015a); sustainability (Boud 2010); self-regulation (Evans 2015a, c). In summary, in order to ensure full coverage of engagement a broad definition of the concept to encompass the variety of constructs was required.

## Identifying high-impact pedagogies

While student engagement has been linked to learning gain and student achievement in higher education (Buckley 2013; Gibbs 2010; 2012; Healey, Flint and Harrington 2014; Kuh 2008; Trowler 2010), the nature of the relationship between these variables is complex and problematic. Engagement does not necessarily imply higher quality learning outcomes and the link between engagement and learning outcomes is not clearly established. There is also the question of the difference in perceptions of levels of engagement in studies between students and lecturers (O' Doherty 2010), leading to questions of what information is collected and the relative value of such information in making the case for high-impact pedagogies.

MacFarlane (2015) argues the need to understand student-centred pedagogies from a student rights perspective, rather than purely in terms of the efficiency and effectiveness of student learning, paying critical attention to the impact of the engagement agenda on a student's freedom to learn (p. 347). Identifying high-impact pedagogies is problematic. The difficulty in trying to compare learning and teaching approaches and to make sense of what counts as knowledge makes:

the more interactive and stimulating the pedagogic conditions... the more realistic and relevant to participants the learning milieu is – the more the consequent outcomes will be complex, generative and yet unpredictable. (*Dalrymple, Kemp and Smith 2014, p. 76*).

The term high impact has been widely associated with undergraduate learning opportunities that lead to student retention and successful completion of programmes; and encourage student behaviours that lead to meaningful learning gains. These ways of assessing high impact, while useful, are also quite limited. A degree is only meaningful when it represents forms of learning that are both valued by society and empowering to the individual (Schneider 2008). What is valued is also subject to change. A key aim of learning has to be to adequately equip students with the knowledge, capabilities and personal qualities that will enable them to thrive in complex and changing contexts; this signals the importance of pedagogies that support the development of students' self-regulation of their own learning.

Characteristically, high-impact practices (HIPs) share several traits in that they require students to: spend considerable time and effort on purposeful tasks; interact with faculty and peers about substantive matters; experience diversity through contact with people who are different from themselves; see how what they are learning works in different settings, and receive frequent feedback about their performance.

These opportunities to integrate, synthesise, and apply knowledge are essential to deep, meaningful learning experiences. (*Kuh 2008 p. 17*).

The fact that many of these experiences lie outside the taught curriculum requires taught programmes to connect with experiential opportunities afforded within and beyond the HE environment to support students to have integrative experiences elsewhere (Das 2012). A key measure of high impact is connectivity:

If we are beginning to see that the greatest impact on learning is in these boundary-crossing, integrative, and socially networked experiences, then we need to re-create dimensions of these experiences in the learning designs that bridge the classroom with life outside of it. The connection between integrative thinking, or experiential learning, and the social network, or participatory culture, is no longer peripheral to our enterprise but is the nexus that should guide and reshape our curricula in the current disruptive moment in higher education learning. (Das 2012, p. 32).

High-impact pedagogies, therefore, should be encouraging approaches to learning and teaching that support students in: cultivating deep understandings of what it is to think and learn within a discipline; developing self-monitoring of their own learning; enhancing their sensitivity to context in order to enable them to apply their understandings, and to contribute to knowledge and resource development. High-impact practices by definition need to be accessible to all students, and attuned to an understanding of individual differences; they should be inclusive.

Capturing what constitutes high-impact pedagogy is complex and requires a nuanced approach that addresses evidence about the quality of learning. There are many evidence-based teaching approaches (modernised lectures; problem-based learning; case study/ narrative story-based; team-based; pre-preparation approaches (inter-teaching; flipping; just-in-time); service learning; web-based computer-aided personalised systems of instruction; blended learning); selection is a key issue. The teaching approach or combinations of elements within approaches, and of several approaches need to meet the requirements of the context. It is therefore about ensuring the right selection of teaching approaches that allow alignment between the context for teaching in combination with one's goals for, and conceptions of, teaching and learning (Bukist and Groccia 2011).

Many pedagogical innovations are focused at the module level and can be assessed according to the extent to which specific meaningful student learning indicators have been achieved at this micro-level. At the same time there is a need to pull back from this myopic perspective to consider the student learning journey beyond an immediate module to examine the programme level experience of the student, to look at how the student is taking learning forward from one module to another, and into employment as part of sustainable practice; learning transfer is important.

Finally, in considering validity arguments it is important to be cognisant of the temptation to value what we can measure rather than measuring what we value (Biesta 2010). The use of a holistic approach in this report to evaluate the nature of the research evidence was essential to ensure that factual evidence was used in conjunction with engagement with values as to what is educationally desirable to appreciate the requirements of cultural and discipline-specific contexts. We considered evidence-based research on professional rationale, processes, and practices that supported policy makers and practitioners to effect change to practice, informed by research rather than based on it; as part of this remit we considered the inclusive nature of pedagogies (Eaves 2011; Scott *et al.* 2014; Waring and Evans 2015).

## Section 2: Methodology

The project used a combination of research methods to answer the research question. The main source of information was a systematic literature review. To supplement the literature review an online questionnaire survey was undertaken with Fellows of the Higher Education Academy (HEA) to include National Teaching Fellows (NTFs), Principal Fellows (PFHEA) and Senior Fellows (SFHEA).

### Identification and sourcing of relevant literature

In order to capture 'high-impact' pedagogies and indicators of 'student engagement', we used a wide range of search terms to capture the holistic and multi-faceted nature of these constructs and to ensure comprehensive coverage of related research areas. To ensure both breadth and depth of cover across different levels (disciplines, institutions, national, and international) we used a range of sources and ensured an umbrella catch-all approach in the use of our key word search.

A systematic review of the literature was undertaken involving consultation of search engines; citation reports; relevant higher education related journals and associations; questionnaires to leading experts in the field (NTFs; SFHEAs and PFHEAs).

## Data sources

To ensure full coverage across disciplines (Arts and Humanities; Health and Social Care; Social Sciences; and STEM), five search engines were used: Education Research Complete; ERIC; ISI Web of Science; Psych INFO, and Scopus. In addition, we drew on our own database Sharing Higher Education Database (SHED) (Evans 2014) where we have identified and catalogued 44 relevant higher education journals, associations and networks focused on teaching and learning in higher education. Snowballing techniques were used to include relevant reports/books from key associations e.g. Association of National Teaching Fellows (ANTF) and the HEA.

An online questionnaire was also sent to NTFs and SFHEAs and PFHEAs to gain insights on further potential sources and perceptions of student engagement and also to create the disciplinary narratives (Section 6). Ethics clearance to undertake this survey was obtained from the University of Southampton and was in line with British Educational Research Association guidelines (BERA 2011).

## Systematic review inclusion criteria

Peer-reviewed journal articles from January 2005 to March 2015 were included in the review. The time frame was kept to the last ten years in light of the rapidly changing higher environment during that time. Papers included empirical (qualitative and/or quantitative) and theoretical articles. To be included, papers needed to focus on some aspect of the pedagogical and engagement areas within higher education as outlined in Table 1. Furthermore, only articles written in English were included.

Table 1: Search terms

**Pedagogy** (OR teaching OR teaching and learning OR discipline specific teaching and learning OR curriculum OR teaching methods OR teaching approaches OR (high impact) pedagogy OR signature pedagogy(ies) OR disciplinary pedagogies OR educational practices OR assessment OR high-impact educational practices);

**AND**

**Student Engagement** (OR learning task engagement OR student voice OR learning gain OR educational gain OR effectiveness OR performance OR student development OR student self-regulation OR learning transfer OR student partnerships/cooperation OR students as partners OR co-production OR deep approach to learning OR active/collaborative learning OR academic challenge);

**AND**

**Higher education** (OR postsecondary OR post-compulsory OR university OR college).

A comprehensive filtering process was adopted to identify potentially relevant articles. Our initial search using the search engines and data bases outlined above identified a potential 21,055 articles on student engagement and pedagogy. Comprehensive checking and rechecking of articles was undertaken to remove duplicate reports. A total of 1,741 articles were selected for further review having excluded many articles where they:

- > focused more on lecturer rather than student engagement;
- > were primarily instruction manual in format with no reference to pedagogy, focusing solely on the implementation of a tool or specific content;
- > focused on student opinion, perceptions, or experiences without sufficient reference to the pedagogical frame;
- > were position papers lacking a research basis;
- > solely focused on the organisational structures impacting learning and teaching;
- > focused on institutional learning and teaching policies;
- > centred on exploring teacher skills or how to be a good teacher;
- > were purely about theories of learning;
- > focused on student approaches to learning with no reference to pedagogy;
- > only discussed methodological issues;
- > reported studies comparing one teaching approach against another with little discussion of learning and teaching;
- > were focused on teaching and learning policy.

To assess the quality of research we considered 'pedagogical clarity'; 'methodological transparency'; 'methodological congruence'; 'evidence-based'; 'accessibility of findings'; and 'transferability' of the articles. A scoring system was used to measure each of the following constructs in relation to whether they were 'fully met', 'partially met', or 'not met', in order to ascertain specific cut-off points for inclusion or exclusion in the review. In

addition to selecting those articles that demonstrated robust evidence base for their effectiveness in terms of the knowledge and ideas presented for each construct it also allowed for articles to be included that demonstrated potential for high impact in line with the tender remit. Only those articles which 'fully' or 'partially' met *each* of the criterion areas (1-6) were included in the review. The following choice of constructs is informed by the work of Cools *et al.* (2011); Gibbs (2010); Gilbert *et al.* (2011); Kuh (2008); and Parsons *et al.* (2012):

1. pedagogical clarity - (i) the specific pedagogical approaches being used; (ii) has impact been considered and what is being evaluated for impact?; (iii) what are the context requirements and issues?;
2. methodological transparency - clear information provided about, for example context; methodology; methods; nature of sample and size; nature of intervention; and how effectiveness of pedagogy on student engagement has been measured;
3. methodological congruence - coherence between research question(s), methodology, methods, and data analysis processes;
4. evidence-based (i) practice is supported by data including reliability and validity measures; (ii) what measures have been used (direct/indirect)? (iii) breadth and depth (number of measures, timescales, students involved); (iv) data collection focus (self-report; student/lecturer perspectives);
5. accessibility of findings - are implications and recommendations from the study explicit?;
6. transferability - do the findings have applications in other situations beyond the immediate discipline?

Case studies were chosen to provide a finer-grained level of analysis to demonstrate how pedagogies were being applied within disciplines. To select potential case studies, articles were graded A–C in relation to the criteria outlined above. In making an overall assessment of the potential of the discipline-specific case studies we reviewed whether there was sufficient evidence: (i) regarding the efficacy of a pedagogical approach in specific educational contexts; (ii) to support conclusions about generalisability; and, fundamentally, (iii) that the pedagogy works. By using a classification system that draws on the approach used by Gilbert *et al.* (2011) we were able to identify pedagogies where there was a strong and robust evidence base for their effectiveness. At the same time we were able to identify those approaches that, although currently demonstrating insufficient evidence (e.g. may not have set out to measure impact, or the scale of study was too small to draw solid conclusions) may have potential for impact. Findings were judged on the validity and reliability of use of which ever method was used. We did not take a hierarchical view of the value of different methods. Using this framework we acknowledged that articles met the criteria for inclusion in different ways.

Table 2 demonstrates the classification system that was devised to assess the quality of the articles. The initial intention was to grade all papers A1 to A3; B1 to B2, and C1 to C2. In examining the 273 articles in detail, very few met the requirements for A1, making this highly granulated approach unnecessary; a simpler framework grading articles A to C was therefore adopted.

Table 2: Categories of evidence (Evans, Muijs and Tomlinson 2015)

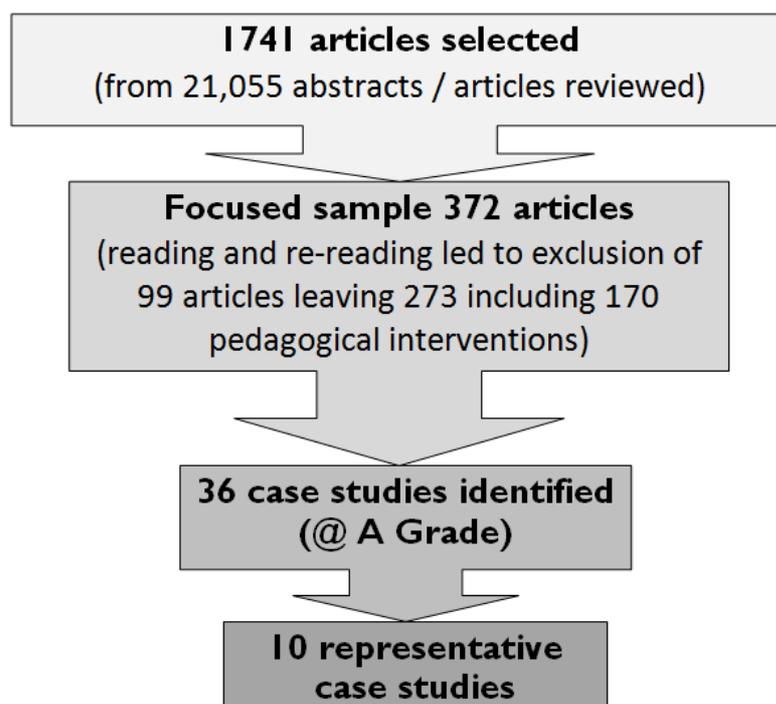
Category	Description
<b>Included</b>	
A1	Peer-reviewed; strong and central focus on student engagement and/or student learning as well as discipline-specific context; pedagogical approaches clear; methodological approaches transparent and coherent; supported by robust evidence base of how impact has been measured; findings accessible; evidence of transfer across contexts.
A2	Peer-reviewed; pedagogical approaches clear; key focus on student engagement and/or student learning as well as discipline-specific context; methodological approaches outlined and coherent; supported by evidence base of how impact has been measured; findings accessible; evidence of, and/or potential for transfer across contexts.
A3	Other reputable study (not necessarily peer-reviewed); pedagogical approaches clear; student engagement and/or student learning is one of the main foci; methodological approaches outlined and coherent; supported by consideration of impact; findings accessible; evidence of, and/or potential for transfer across contexts.
B1	Peer-reviewed; pedagogical approaches clear; student engagement and/or student learning is one of the main foci; methodological approaches outlined and coherent; potential for impact although not reported on; findings accessible; evidence of, and/or potential for transfer across contexts.
B2	Other reputable study (not necessarily peer-reviewed); pedagogical approaches clear; methodological approaches outlined and coherent; potential for impact although not reported on; findings accessible; evidence of, and/or potential for transfer across contexts.
<b>Excluded</b>	
C1	Peer-reviewed; pedagogical approaches unclear; methodological approaches implicit rather than explicit, research design lacks coherence; limited or lacking evidence base of how impact has been measured; findings vague; limited evidence of, and/or potential for transfer across contexts.
C2	Peer-reviewed/other study; pedagogical approaches unclear; methodological approaches implicit rather than explicit; lack of evidence base to support how impact has been measured; findings not accessible and do not relate directly to aim of article/report; lack of evidence of, and/or potential for transfer across contexts.

## Process of data collection and analysis

Regular moderation check points were established throughout the data collection and analysis process to ensure intra-rater and inter-rater reliability in assessment of articles by members of the research team (n=3). Data was entered into an Excel spreadsheet where data for each article was collected on 38 dimensions covering pedagogical approach, methodology and impact indicators. In the process of allocating articles to the four main discipline categories it became evident that there were many generic articles that covered learning and teaching issues in higher education, especially in relation to the use of technology, which were not specifically assigned to a discipline; this led to the creation of a fifth category which we classified as 'generic'.

Articles were allocated to the main discipline areas (Arts and Humanities; Health and Social Care; Social Sciences, and Science, Technology, Engineering, and Mathematics (STEM)) using the HEA classification system with cross reference to the Research Excellence Framework (REF 2014) subject panels. A point of difference was found in that in the HEA classification, Psychology was listed under STEM whereas for the Research Excellence Framework it is listed under Health; for the purposes of this review we allocated Psychology to STEM using the HEA categorisation system which can be found at <https://www.heacademy.ac.uk/workstreams-research/disciplines>.

From the initial 21,055 abstracts, 1,741 potential articles were selected once all duplicates had been removed from the collation of the separate searches. An in-depth analysis of 372 full articles was undertaken (23% of the sample); of these, 99 articles did not sufficiently meet the refined inclusion requirements and were excluded from further analysis. From this sample, 36 category A case studies were identified (13% of the reports). The findings reported are indicative rather than representative of the field, given the sheer size of the data base.



**FIGURE 1 FILTERING PROCESS**

Ten case studies (see Section 7), including two from Arts and Humanities, two from Social Sciences, and three each from Health and Social Care and STEM, were selected from the data base and their inclusion justified according to the quality criteria (pedagogical clarity; methodological transparency; methodological congruence; evidence-based; accessibility of findings; and transferability) in order to assess the extent to which identified pedagogical practises generate student engagement (including type of engagement), and the quality of the research base that evidences this. The case studies in this report will be presented in a consistent way to ensure coverage of the following:

- **key features** of the 'high-impact', discipline specific pedagogy in relation to context (e.g. student characteristics; learning conditions; materials; and tasks). What is innovative about the approach? How is the innovation being defined and contextualised?
- **key pedagogical principles:** including theoretical/conceptual frameworks underpinning frameworks.
- **pedagogic practice:** does the work generate insights into teaching practices and methods that are used for enhancing student engagement, and do these reflect any innovations in teaching delivery of course materials?
- **disciplinary-specific context:** how are student engagement practices linked to discipline-specific aims and values? What is the relationship of student engagement practices to the unique learning contexts of different disciplinary fields of study?
- **the culturally inclusive nature of pedagogy:** does it accommodate diverse groups and learners (e.g. socio-economic and ethnic), and with different learning styles (adaptive rather than adapted; an awareness of enriched styles pedagogies rather than impoverished ones? (Evans 2014; Waring and Evans 2014). Is the way in which diversity is built into pedagogic practice clear and explicit?
- **evidence base: making the case for high impact:** what aspects of student engagement have been considered (Gibbs 2010; Kuh 2008) (e.g. student involvement in process; level of academic challenge; extent of active/collaborative learning; student-faculty interaction; cognitive, metacognitive, self-regulatory; cognitive, behavioural, and affective dimensions (Chapman 2003). How have these aspects been measured?
- **relationship between engagement and educational outcomes:** has this been identified as well as other forms of student feedback and input on the efficacy of such practices?
- **evidence of impact in other areas:** generic applications of the discipline-specific pedagogy – have wider applications been considered?
- **issues for implementation and transfer to other learning contexts.**
- **direction to relevant sources:** to enable colleagues' access to techniques and information to judge the value of the approach for their own teaching.

## Analysis of datasets

A number of lenses were used to assist synthesis of the data: discipline focus; type(s) of student engagement; identification of core themes/processes/principles underpinning effective pedagogies in relation to specific types of student engagement in order to enable transfer of ideas (e.g. Aitken and Sinnema 2008). Descriptive statistics were used to provide an overview of the nature of the studies by discipline; pedagogical focus; research design; theoretical framework; methodology and methods (including measures of reliability and validity); sample nature and size; evidence of how effectiveness is measured; transparency of design; clarity of findings implications for practice; evidence of replication of approach.

A 'thematic content analytic approach' (Braun and Clarke 2006; Krippendorff 1980) was used to analyse the literature. This was the most appropriate approach given that there were not a sufficient number of robust quantitative studies to allow us to use meta-analytic analyses and we did not wish to exclude qualitative studies which predominate in certain discipline areas.

In Section 3, descriptive statistical analyses of the data will highlight the distribution of articles by discipline and by country of origin of the first author. The nature of the sample population addressed within pedagogies (undergraduate, postgraduate) will be described along with a discussion of methodological frameworks, and the pedagogical focus of the articles.

## Section 3: The higher education pedagogical landscape

### Disciplinary distribution of articles

Table 3: Breakdown of the disciplinary distribution of articles				
	1,741 article sample		273 article sample	
	N	% of sample	N	% of sample
<b>Arts and Humanities</b>	172	10	30	11
<b>Social Sciences</b>	519	29	104	38
<b>Generic</b>	336	19	32	12
<b>Health and Social Care</b>	164	9	22	8
<b>STEM</b>	543	31	78	28
<b>Mixed</b>	7	0.4	7	3

Within the focused sample, Social Science and STEM disciplines are well represented but there are relatively few articles from the Arts and Humanities and Health and Social Care disciplines. The lower representations in Arts and Humanities and Health and Social Care might not imply a lack of high-impact pedagogies but a less active pedagogical research tradition and also less emphasis on particular styles of writing within the academic literature. Within the focused sample compared to the larger dataset, Social Sciences articles are over-represented but the distribution of articles across the other disciplines largely follows the pattern within the larger dataset. The differing percentages for generic papers in the larger dataset compared to the focused sample can be explained by the fact that the second stage filtering process excluded a much higher percentage of generic papers.

In both the full and focused sample datasets there is an under-representation of certain disciplines. Within Arts and Humanities there are few articles within Archaeology, Dance, History and Music, and good representation from English, Languages and Media Communications. In Health and Social Care, the majority of articles are from Medicine and Dentistry, Social Work and Nursing, with little representation from Counselling, Nutrition and Physiotherapy. In the STEM disciplines there is strong representation from Biological Sciences, Computing, Chemistry, Psychology and Mathematics. There are fewer Environmental Sciences, Sports Sciences and Geology pedagogical articles. In Social Sciences, Business and Management, Education and Politics are well-represented with Teacher Education and Education articles being dominant as might be expected. Areas less well represented in the pedagogical literature from Social Sciences include Anthropology, Citizenship, Economics, Finance, Physical Education, Sport and Tourism.

## **Distribution of articles by country as defined by lead author affiliation**

The majority of published articles within the focused sample (n=273) demonstrate strong polarisation in that 74% of articles come from authors affiliated to higher education institutions in four countries: US (46%); UK (15%); Australia (9%); Canada (4%). An additional 2% of articles come from authors affiliated to institutions in New Zealand and Hong Kong, China. The remaining 22% come from 28 additional countries. The overall contribution from the UK, although greater than many countries, remains quite small as a percentage of the total and reflects the findings of Canning (2007) from nearly a decade ago where he commented on the relative poverty of scholarly written articles on teaching in higher education in the UK compared to the US; this situation appears to have not significantly changed. In analysing this data care is required in interpretation given that our selection criteria included only articles written in English.

## **Distribution of articles by methodology**

A total of 170 specific pedagogical interventions using a range of methodologies were identified in the focused sample (n=273). Twenty-five percent of articles employed quantitative methodologies including experimental/quasi-experimental designs; 26% employed qualitative methodologies including for example phenomenological and auto/ethnographic approaches; 23% used mixed methodologies with a further 18% specifically using case study approaches; 4% using action research; 5% employing pedagogical tools; 2% involved survey research; and only 2% of studies were longitudinal in nature.

In 75% of the articles, interventions were less than one year and many comprised a single event. In 63% of interventions, the sample sizes were relatively small (n=50 or less); 44% of articles comprised samples of 100 persons or more. Eleven percent of articles included sample sizes of 1,000 persons or more.

## **Distribution of articles by target population**

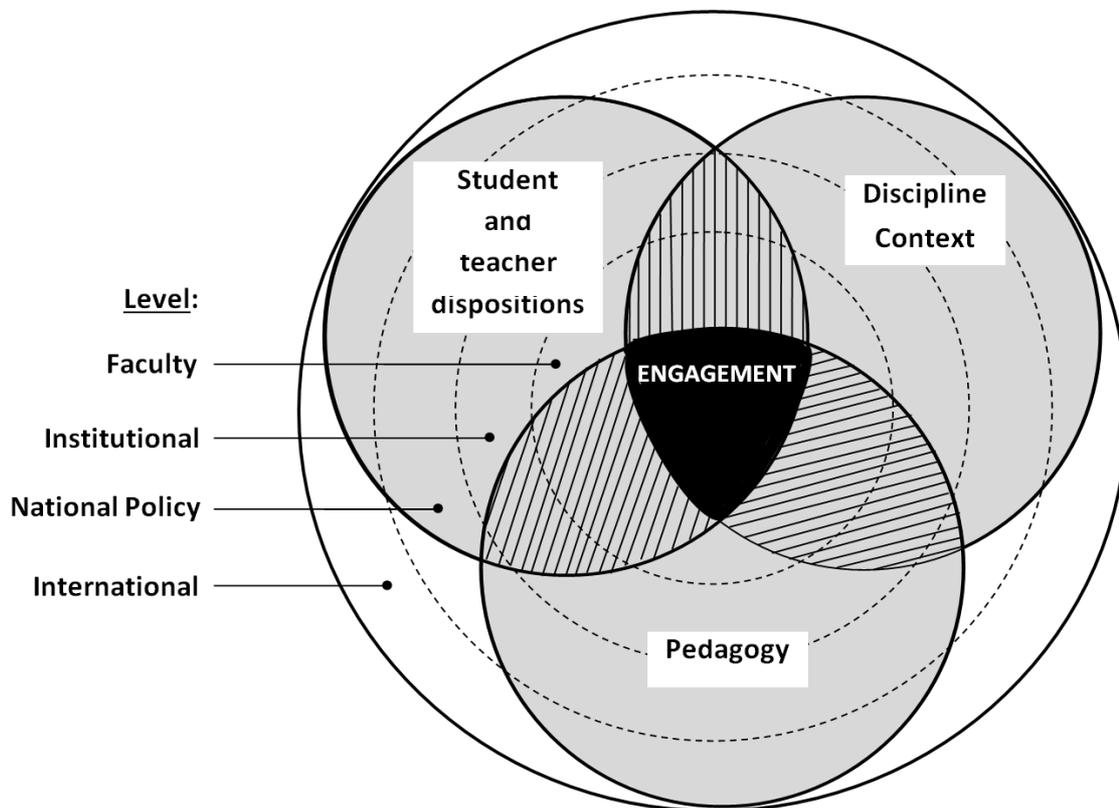
From the pedagogical intervention studies (n=170) forming part of the focused sample, 60% of articles focused exclusively on undergraduate populations. Seventeen percent of articles focused on postgraduate populations, with 4% focusing on lecturers' perspectives, 9% on undergraduate and lecturers, 7% on students and children, 2% on patients, and in 1% of the interventions the nature of the population involved was unclear.

## **Pedagogical focus**

A range of pedagogical approaches was evident within and across disciplines. Specific pedagogical approaches are not discrete but instead involve a hybrid of many pedagogical approaches. Furthermore, even where articles claim to be using a similar approach the way the approaches have been implemented may be very different and may also be informed by different theoretical approaches or emphases as required by the context.

How a particular theoretical approach has been interpreted often requires further explication. In analysing the use and effectiveness of pedagogy within and across disciplines the interaction between the context, the discipline, the pedagogy, and the learners and teachers within the specific environment are all important in trying to frame the why and how of the pedagogical approach and within the immediate (module, programme, discipline, institution) and larger scales (national and international contexts) acknowledging the nested nature of pedagogy informed by many layers with varying degrees of influence (Kek and Huijser 2011).

Figure 2 highlights the nested nature of pedagogy within higher education. The pedagogy that is enacted is not only influenced by immediate local needs, it is also influenced by faculty, institutional, national, and international policy initiatives within HE. In promoting student engagement, the requirements of the discipline, the context, and student and teacher dispositions all impact pedagogical decisions. The need to connect with the local and wider environment is a key dimension of the Higher Educational Pedagogical Landscape in order to support students to make sense of their learning and to value their contributions to learning within and beyond HE; the role of community is important in this. The student role as co-developer, co-producer or co-assessor is currently undeveloped within the HE Pedagogical Landscape but is an integral element of this model.



**FIGURE 2: SITUATING PEDAGOGY (EVANS 2015)**

An analysis of the pedagogies promoted within the 273 focused sample can be found in Table 4. Please note in interpreting the table that individual articles frequently referred to several pedagogical approaches. The following patterns were discerned: a range of pedagogical approaches were evident within and across disciplines; content/curriculum-driven pedagogies were a key focus in 28% of the articles; active approaches to learning were dominant in 25% of articles, with an additional 26% specifying collaborative approaches. Seventeen percent of articles focused on assessment.

Experiential approaches including simulations and problem-based learning were a focus in 16% of articles; with other inquiry and students as active researchers featuring in an additional 11% of articles and critical reflection in a further 17% of articles.

Metacognitive approaches to learning were evident in 19% of articles. Fifteen percent of articles focused on the use of technology (blended learning; m-learning; e-learning etc.) to support learning; 10% focused on specific elements of inclusion and/or individual differences (race; gender; learning difficulties; socio-economic differences; culture, etc.); 13% of articles emphasised the importance of authentic and real-world learning environments; 12% of articles explicitly focused on constructivist approaches to learning (in many other articles the constructivist approach is present but it is implicit). Four percent of articles specifically focused on critical pedagogies. A focus on visual pedagogies was evident in 10% of articles. Present, but not in large numbers in the dataset, were references to dialogic, narrative story-telling, and gaming learning activities.

Table 4: Pedagogical foci within the focused sample (n=273)

Pedagogical focus	Focused sample (n=273)
Active/interactive	25% (69)
Assessment	17.2% (47)
Content driven	28.2% (77)
Co-operative/collaborative/group/team-based	26.0% (71)
Inquiry/students as researchers	11% (31)
Experiential	
Problem/project-based learning	6.2% (17)
Simulations/scenarios	7.7% (21)
Service learning	2.9% (8)
Critical reflection/reflection	17.2% (47)
Thinking skills/cognitive/metacognitive/self-regulation/cognition	18.7% (51)
Perceptual: visuals	9.9% (27)
Critical pedagogy	5.5% (15)
Social justice	
Inclusive (individual differences – race – culture – gender...)	10.2% (28)
Technology-mediated pedagogies	14.6% (40)

## Distribution of pedagogies within disciplines

The pedagogical foci outlined in Table 4 are represented to varying degrees in all disciplines. Given the relatively small number of articles from Arts and Humanities and Health and Social Care, comparing disciplines using raw data is of very limited value. Table 5 shows the pattern of use of pedagogies within disciplines which highlights the mix of approaches used within each area.

While we have considered dominant pedagogies within Arts and Humanities; Generic; Health and Social Care; Social Sciences, and STEM it is important to note from the outset the variation both within and across disciplines. Even within specific disciplines there were marked variations in pedagogical approaches used and even where the same approach was used it was construed quite differently depending on the theoretical framework underpinning the approach and the context in which the pedagogy was situated.

The four most dominant approaches used within each discipline are highlighted within Table 5. It is important to note that many articles feature a range of pedagogical approaches. The limited number of articles from Arts and Humanities and Health and Social Care both in the overall dataset (n=1741) and the focused sample (n=273) limits inferences that can be made.

However, certain patterns can be discerned when looking at the patterns of pedagogical foci both within and across disciplines. In considering the most used approaches *within disciplines* the key driver in STEM pedagogies is content (22%), this is also a key driver in most discipline areas although it is far less dominant in Social Sciences (9%) and Health and Social Care (4.5%). A strong focus on collaborative learning is dominant in all disciplines, and especially within Health and Social Care. In Arts and Humanities an assessment focus is dominant along with experiential pedagogical approaches. Reflective practice as a core focus is less prevalent in STEM compared to other disciplines particularly Arts and Humanities where it is most prevalent.

In Social Sciences, there is high emphasis on active learning which is also prevalent in STEM. In Social Sciences there is a balance of approaches with active, collaborative, and experiential approaches being evenly represented (these top three drivers are only separated by 0.6%). Technology-mediated pedagogies and individual difference pedagogies feature more highly in the Generic category as might be expected. Inquiry (students as researchers), while not dominant in any discipline, is more prevalent in STEM than in other areas. Inclusive pedagogies are not well-represented; their presence in STEM is especially low. The use of problem-based learning strategies is dominant in Health and Social Care. Simulations are more dominant in Social Sciences and are not represented within the focused samples in Arts and Humanities or Health and Social Care; in the case of the latter this finding is surprising. In looking at the larger data base (n=1,741) simulations represent only 3% of the pedagogies found and in Health and Social Care; a total of ten articles (0.6% of the total data base) focused on simulations. In both the focused and larger datasets simulations are more dominant within the Social Sciences. In the main dataset

(n=1,741), 53% of simulation studies come from Social Sciences compared to 19% from Health and Social Care; 21% from STEM, and only one study (<2%) from Arts and Humanities).

Table 5: Dominant pedagogical approaches

	Arts and Humanities	Health and Social Care	Social Sciences	STEM
1	Assessment	Collaborative	Active	Curriculum/content-driven
2	Experiential	Curriculum/content-driven	=Collaborative =Experiential	=Collaborative =Active
3	Curriculum/content-driven	Experiential		
4	Collaborative	=Critical Reflection =Active	=Critical Reflection =Assessment	Experiential

Table 6: Pedagogical mix within disciplines

Pedagogical Focus	Arts and Humanities	Health and Social Care	Generic	Social Sciences	STEM	Focused sample (273)
Active/interactive	9.1% (4)	10.9% (6)	9.3% (5)	11.9% (30)	13.6% (24)	69
Assessment	16% (7)	5.5% (3)	3.7% (2)	9.6% (24)	6.2% (11)	47
Content driven/Curriculum design	11.4% (5)	14.5% (8)	5.6% (3)	8.8% (22)	22.03% (39)	77
Co-operative/collaborative /group/team	9.1% (4)	16.4% (9)	9.3% (5)	11.6% (29)	13.6% (24)	71
Inquiry/students as researchers	4.5% (2)	1.8% (1)	3.7% (2)	5.9% (15)	6.2% (11)	31
Total	13.6%	12.7%	7.5%	11.6%	10.7%	45
Experiential	9.1% (4)	3.6% (2)	5.6% (3)	1.6% (4)	5.1% (9)	
Including:						
Problem/project-based learning	0	7.3% (4)	0	2.4% (6)	3.9% (7)	
Simulations/scenarios	0	0	1.9% (1)	6.8% (17)	1.7% (3)	
Service learning	4.5% (2)	1.8% (1)	0	0.8% (2)	1.1% (1)	
Critical reflection/reflection	11.4% (5)	10.9% (6)	11.1% (6)	9.6% (24)	3.4% (6)	47
Thinking skills/cognitive/metacognitive/self-regulation/cognition	6.8% (3)	9.1% (5)	5.6% (3)	8.8% (22)	10.2% (18)	51
Perceptual: visuals	0	0	5.6% (3)	5.2% (13)	6.2% (11)	27
Critical pedagogy	4.5% (2)	1.8% (1)	3.7% (2)	3.2% (8)	1.1% (2)	26
Social justice	2.3% (1)	5.5% (3)	3.7% (2)	1.9% (5)	0	
Inclusive (individual	4.5% (2)	5.5% (3)	14.8% (8)	5.2% (13)	1.1% (2)	28

differences)						
Technology-mediated pedagogies	6.8% (3)	5.5% (3)	16.7% (9)	6.8% (17)	4.5% (8)	40
Totals	44	55	54	251	177	581

## Section 4: High-impact pedagogies

### Overview

A very wide lens was used to try and capture the diversity in the interpretation, enactment and measurement of engagement strategies within higher education. Table 7 demonstrates the range of process and outcome measures featured within the articles grouped into five categories: cognitive; metacognitive; behavioural; students as producers; and sustainability measures. The articles included single and multi-dimensional frameworks (e.g. engagement in individual learning, structure and process (Trowler and Trowler 2010); engagement as encompassing identity, knowledge, skills, and participation (Aitken and Sinnema 2008); engagement as including behavioural, cognitive, and affective dimensions (Chapman 2003)).

Sustainability measures of engagement including students as change and research partners (HEA 2014; Healey *et al.* 2014); conceptions of belonging, retention, and success (Krause and Armitage 2014); resilience (Evans and Hardaker 2015); self-regulation (Evans 2015a, b); sustainable assessment- student self-assessment and co-assessment (Boud 2000); dialogic feedback and interactions (Carless 2011; Wegerif 2015) are mentioned but are not widely represented within the literature.

Exploring impact in the intervention studies (n=170; 63% of the 273 focused sample), 54% of the research articles focused on students' perceptions of value and the degree to which they felt their learning had been enhanced (some involving pre- and post-intervention surveys). A further 16.5% of articles specifically looked at the development of student understanding from the student perspective; 35% of articles looked at indicators of student performance (test; quality of writing; skills performance; products) with an additional 2.4% considering the transfer of knowledge and understanding to new contexts; 11.2 % of articles focused on student interaction variables (attendance; questions posted on line and in real time; time commitment; immersion).

Assessment of the development of knowledge and understanding within disciplines is explicit within 23% of the articles. From a metacognitive perspective, measurement emphasises students' development of critical thinking (19%), reflection (16%), and the ability of students to transfer ideas and information from one context to another. In developing specific skill sets, attention is given to writing skills (13%); visual competence (9%), with a much smaller focus on developing dialogic fluency (5%). On the whole, less attention is afforded to the development of affective dimensions (e.g. emotional regulation; competence; self-efficacy; self-knowledge including self-assessment). Thirteen percent of articles looked at student motivation and 4% of articles considered student development of identity within learning contexts. In considering behavioural dimensions of engagement student involvement in learning is measured in variety of ways from impoverished myopic models measuring purely the quantity of questions posed and length of time on task to enriched approaches which also consider the quality of questioning. Assessment of co-partnership initiatives are not well represented within the academic articles. This is representative of the overall data base. Development of peer and team working is evidenced in 10% of the interventions.

Table 7: Dimensions of engagement

Dimensions	Indicators
Cognitive	Knowledge and understanding: integration of knowledge and understanding Understanding of the discipline: contextualisation; understanding of threshold concepts; conceptual development Skills: Reading; writing; diagrammatic/visual understanding; dialogic skills; dialogic fluency; listening Problem-solving Research skills Cognitive; Conceptions of learning Information processing; Information literacy Assessment literacy Attentional skills Inclusive: focus on aspects of inclusion (gender, race, culture and sensitivities; social justice)
Metacognitive	Quality of critical reflection; reflection; reflexivity Analytical and critical thinking dispositions Self- and co-regulation Deep thinking Understanding of self; mindfulness Transfer – ability to apply knowledge and skills to real-world scenarios; development of research Ability to self-assess – self-judgement Strategy choices Ability to draw on own and others' experiences
Affective	Relational Relationship with the discipline Attitudes towards learning; to assessment; to learning spaces; group learning Goals in learning Engagement with resources Motivation; interest; positivity Beliefs and values: ability to articulate beliefs and values Holistic: well-being; identity Confidence: perceptions of competence Integrative: whole person in interaction with environment – beyond limits of the programme Integration and keeping sense of self
Behavioural	Attendance; commitment Approaches to learning – deep, surface, strategic (Evans 2015a) Active Involvement/participation); immersion: time on task; distribution of time on task; flow Involvement: interaction: participation in dialogue; questioning ; generation of questions; quality of questions; online presence; contribution to teams' peer collaboration; Engagement with technology Interpersonal: interaction; collaboration; team skills; co-operative Practical application; Management of tasks Professionalism
Students as producers	Student generation of content  Student producers of resources Student producers of research Completion of tasks As partners

	Entrepreneurial capacity Civic competence Preparation for employment
Sustainability: Life skills	Management of information: filtering skills  Feedback-seeking and using skills Emotions; Emotional regulation Resilience – persistence and adaptability Creativity generating Self-assessment Flexibility Creativity Resourcefulness; offering solutions Independent thinking Organisation

In measuring engagement, it is important to capture relevant 21<sup>st</sup> century life skills (Barnett 2011), such as a will to learn, to encounter strangeness; personal engagement with materials and experiences within higher education, preparedness to listen; willingness to be changed as a result of learning, and the determination to keep going. To Barnett's list an adaptability dimension needs to be added. Within and across disciplines how engagement is defined and measured may vary considerably; what is valued in one context may not be as relevant as in another. Making inferences regarding the impact of specific pedagogies is extremely difficult given the multidimensional nature of many of the pedagogical approaches used and the need to consider the specific contexts, precise nature of implementation, and the vast range of contextual and individual difference variables involved.

Acknowledging the complexities of assessing the quality of the articles, a holistic framework was used which included indices of pedagogical clarity, methodological transparency, methodological congruence, the nature of evidence, accessibility of findings, and evidence or potential for transferability of ideas. Thirty-six articles (13% of the focused sample) were graded as category A case studies with strengths in all three areas: pedagogy, methodology, and impact.

There were an additional 50 case studies that were strong in pedagogy and/or methodology, and/or impact in various combinations but not sufficiently strong in all three areas. In considering the 86 case studies their distribution across disciplines was as follows: Arts and Humanities (9.3%); Generic (8.1%); Health and Social Care (7.0%); Social Sciences (35%); and STEM (36%) and a further two studies where two discipline areas are represented in each article. From the focused dataset (n=273), there was evidence of transfer of ideas beyond a discipline in 14 of the articles (5%); and 119 articles (44%) had strong potential for transfer of ideas and approaches across disciplines.

In seeking to address the question: "For which of these pedagogies is there a robust evidence base evaluating the effectiveness of the pedagogy in generating student engagement?" a number of key themes were identified in the literature including an emphasis on the use of visual representations; integrated approaches to curriculum development; co-operative learning activities; inquiry including simulations, problem-based and project-based learning; assessment initiatives to include students as producers, co-assessors, and self-assessors.

## Visual representations and seeing the bigger picture

The literature highlights the importance of visual representations in supporting student understanding in particular contexts drawing on understandings of dual coding theory (Paivio 1986). The emphasis on visual representations is especially prevalent in articles supporting the development of understanding of concepts in science (e.g. teaching of atomic and molecular phenomena). Aldahmash and Abraham (2009, p. 1444) identified that animation sequences "allow students to mentally manipulate and then easily follow what happens during the progress of a reaction in a more holistic manner, rather than in a piecemeal fashion" making it easier for students to remember the detail. In investigating the difference between kinetic (computer-animated) and static visuals on students' understanding of concepts in organic chemistry using an experimental design (n=142), students using animated visuals did better than those using static visuals. They also identified that students with high spatial ability benefitted more than other students from kinetic exposure.

The importance of 3D visualisation to support student understanding of neuroanatomy is advocated by Estevez, Lindgren, and Bergethon (2010). Using an experimental design study (n=101) to investigate the value of 3D visualisation tools (development of physical models of the brain using modelling techniques) to support students' understandings of anatomy, they found that students performed significantly better on questions where 3D analysis was needed if they had been in the treatment group and had used the 3D tool. However, they also found that 3D modelling activity had no impact on final laboratory practical examinations or final grades in the course. They explain the lack of any relationship here to a lack of alignment between what the final examinations are testing and what is required in current practice in neurology.

The value of providing visual routes to support student understanding of the bigger picture is featured in DeMeo's (2007) workshop activity with students involving pre-session lectures and a one-week workshop. Using a graphic organiser tool to facilitate learning in Chemistry (a decision map – directional diagram to guide learning and specifically to problem solve), student participation improved. A relationship between students' perceptions of the value of the tool and their performance was identified. While 80% of students said that they would use the tool again there were differences in the ways that students made use of the tool. The most able students reported that the tool helped them most in problem-solving and understanding concepts and to a lesser extent with developing organisational skills. Importantly, similar results were found with a standalone workshop suggesting that such tools can be used effectively within a concentrated period of time and without substantial preparation and lead in time. The fact that weaker students did not find the tool as effective with problem-solving and understanding of concepts, although most agreed that they would use it again, suggested self-regulatory issues. DeMeo (2007) argues the importance of integrating conceptual and methodological content knowledge in order for a decision map to be useful to students: "the what we know with the how we know - in a form that the user must not blindly follow" (p. 546).

The potential of animations is highlighted in Bakhom's work (2008) where all lecturers found animation very important in helping to support student understanding of abstract concepts. For 13 lecturers using the animation approach, student grade improvement varied between 33% to 93%. Ninety-eight percent of students felt their improvement was due to better understanding acquired through the use of animations. Eilouti (2006) found the use of problem-based learning and visualisations in architecture as part of problem-based learning enhanced students' integration of theoretical knowledge, understanding of concepts, concentration and enjoyment. In Dickfos, Cameron and Hodgson's (2014) use of the *elevator pitch* in accounting education to focus understanding (time to put forward an argument within the journey in an elevator) using a blended learning formula (videos presentations; oral presentations; three-minute pitches in groups; self-reflection) 80% of students used the video as a learning tool to help them self-reflect, valuing the opportunity to revisit ideas.

The value of concept maps as a visualisation tool to support reflection and promote learning is evident. Farrell (2008) in a TESL course found group and individual concept maps were useful to examine what and how students know and for developing conceptual clarity.

Bullock and Christou (2009) identified that concept maps had an additive effect when combined with other pedagogical approaches; students did better with them. Similarly, Everett, Luera, Otto (2008) working with pre-service teachers and Goldberg and Ingram (2011) working with biologists in both studies found that concept maps were especially useful in assessing student understanding, and in supporting creativity and resourcefulness.

The benefits of visuals in a wide range of pedagogical approaches is evident. Garrill (2011) used a PBL approach to the analysis of images through the microscope to support critical thinking; this facilitated students' critical analysis of images and supported learning transfer. The value of video to support reflection is highlighted along with the value of video and video-editing in supporting reflective activity (Admiraal 2014; Fadde, Aud and Gilbert 2007). Clifton (2012) in developing a critical thinking tool, the study diamond, also comments on its visual value in promoting thinking.

## **Integrated approaches to curriculum development**

### *Epistemological development*

Coller and Scott (2009) in redesigning their undergraduate Mechanical Engineering curriculum and assessment around a video game to teach numerical principles found that students spent more time on work; that they worked at a deep level as evidenced from concept maps (n=86); and that the course supported the students' overall development. What is evident here is the integrated and aligned approach to curriculum development to support students' metacognitive development; the video game is an integral part of this pedagogy and not purely a

pedagogical tool. In redesigning the curriculum they changed the epistemology of the course to be aligned with real-world issues:

Because they are given genuine tasks with realistic constraints, and meaningful metrics for success, students think about and value the academic subject material the way a professional does. Technical details matter. The bean counting that goes into determining a grade becomes secondary... the video game itself might not be as important as the learning environment we built around it... (Coller and Scott 2009, p. 911).

## **Inclusive participatory pedagogies**

Evans and Waring (2015), in their application of the Personal Learning Styles Pedagogy (Evans and Waring 2009; 2014; Waring and Evans 2015), demonstrate how they have used an understanding of cognitive styles integrating Neuroscience, Psychology and Education perspectives to inform learning and teaching with an emphasis on self-regulation and critical reflective practice as part of a critical pedagogy approach.

In summary, they advocate the development of adaptive rather than adapted learning environments given that all individuals have the capacity to use a range of different ways to process information and that these cognitive styles can be developed. Care is taken within their approach to ensure: (i) *authenticity in design of curriculum including assessment*; (ii) *agency* - encouraging students to critically reflect on their own practice, build resilience, self-understanding and acknowledging individual perspectives of learning and teaching; (iii) *inclusivity and accessibility* - build on learners' previous personal learning and teaching histories; (iv) *modelling of good practice* – using and modelling appropriate pedagogical tools to explore specific dimensions of practice in order to make learning more explicit.

In working with early career teachers, emphasis was placed on explaining the rationale underpinning the module/programme design to support the development of a deep approach to learning through alignment of student and teacher perspectives on what matters, understanding the reasons for specific pedagogical approaches, and valuing the form of assessment as relevant to one's life. Evans and Waring are able to demonstrate high student completion rates; high quality of work and high student satisfaction rates using this approach over a sustained period of time. The approach has been used successfully both as a holistic integrated approach to curriculum development and to also fine tune specific aspects of practice (e.g. development of assessment competence, critical reflection and resilience). The framework is the outcome of evidence-based research and practice in naturalistic settings over the last 15 years, including the systematic analysis of 707 fully peer-reviewed journal articles from a total of 9,073 articles.

## **The cultural dimension**

Given the increasing heterogeneous nature of higher education, a high representation of culturally inclusive pedagogies would be expected within the literature but this is not the central focus of many articles. Only 16 articles out of 1,741, approximately one per cent focused on culturally inclusive pedagogies even though culturally inclusive pedagogies have been found to help address the achievement gap between majority students and those from under-represented groups (Anderson, Bond, Davis-Street, Gentlewarrior, Savas and Sheehy 2014).

Evans and Waring's work demonstrates the use of an inclusive participatory pedagogy that is culturally inclusive. They interpret culture broadly drawing on Spencer-Oatey's notion that culture is:

...a fuzzy set of attitudes, beliefs, behavioural conventions and basic assumptions and values that are shared by a group of people and that influence each member's behaviour and their interpretation of the meaning of other people's behaviour. (Spencer-Oatey 2000, p. 4).

Their pedagogy is centred on supporting the learning of all students by drawing on elements of good practice for all students; acknowledging individual students' learning histories; paying special attention to induction of students into new learning environments so that all have access, and promoting agency to enable learners to be independent in navigating learning environments. Drawing on learners' experiences and perspectives is promoted by Rychly and Graves (2012, p. 44) who identify the importance of using students' cultural characteristics, experiences, and perspectives as conduits for more effective teaching practices.

Hockings (2010) provides a very useful synthesis of inclusive learning and teaching in higher education that incorporates a broad notion of culture focusing on a wide range of student learning differences rather than on particular groups impacting curriculum, pedagogy and assessment. Several concepts promoted in this report are

particularly useful to consider. The first one is *Universal Design* (UD) – a term borrowed from architecture that was initially used to inform the design of environments that were usable by all people to the greatest extent, without the need for adaptation or specialised design. Bernacchio and Mullen (2007) apply the principles of UD to digitised resource development to enable curriculum to be more flexible.

Secondly, the concept of *connectionist teaching* involving pointing out to students connections, between knowledge areas, helping students to connect with what they already know, from sources, and from each other, and to use their own methods has value in supporting student engagement in, and a deep approach to, learning. Hitt *et al.* (2014) found that factors impacting the successful implementation of a North American and European model of pedagogy involving interactive engagement instructional resources and curriculum resources through Physics education research within the United Arab Emirates context was dependent on addressing students' previous learning experiences and culture-specific expectations.

Thirdly, *tight framing of pedagogic structures* may enable students to acquire understanding of the 'rules' of a discipline within higher education more quickly. Tight framing refers to tight control over the learning experience such as providing clear route maps through the learning experience for students; clarifying expectations, and establishing clear rules for engagement by all. Lee, Shen and Tsai (2010) found that development of self-regulatory strategies was important in enhancing the performance of 'low academic achievement' students in a web-based learning environment.

## Flipping the classroom

McLaughlin, Roth and Glatt (2014), with pharmaceutical students, adopted a version of the flipped classroom where they off-loaded content for students to learn on their own and devoted class time to engaging students in student-centred learning activities. Adopting a student-centred and flipped approach improved attendance and learning. Students perceived the value of the approach to their learning, with 85% (n=126) of students favouring the flipped learning experience over traditional lecture formats by the end of the course. Key elements in this approach include student responsibility to come to class with an understanding of the material in order to be able to fully participate in the learning and teaching experience and the use of *appropriate assessment*. The use of online videos prior to sessions, team work, formative assessment using clicker/audience response questions, and explicit instruction from the lecturer to focus learning using micro-lectures (one to three minutes in length); varied modes of summative assessment (student presentations, quizzes, examinations, projects; online reflective questions and answers) were all integral elements of their approach. Using a related approach, Novak (2011) noted cognitive and affective student learning gains using just-in-time teaching in Arts and Humanities where students engaged in pre-session questions and the lesson was developed around the student responses.

## Relevance – alignment of curriculum goals to professional contexts

Responding to changing approaches within psychiatric care within the healthcare system, Feeney, Jordan and McCarron (2013) implemented student training in recovery principles aligned with more holistic, patient-centred, recovery-based practices required in community mental health services. Their aim was to encourage change in students' attitudes to mental healthcare. From implementing a six-week recovery-focused teaching programme within a clinical placement in Psychiatry, medical students significantly increased their recovery knowledge and had more positive attitudes toward mental illness and Psychiatry when compared with those who had a traditional placement. Key features of the intervention included focused sessions on recovery delivered by 'patient teachers' (those with lived experience of sustained bouts of severe mental illness selected based on their recovery, their ability to articulate it, and their desire to teach); educational sessions delivered by a social worker and consultant psychiatrist; varied modes of assessment to include medical students presenting the recovery story of a patient that they met during their placement, and a recovery-oriented clinical educational assignment.

Another example that highlights the importance of relevance and addressing individual needs is Patterson, Campbell, Busch-Vishniac and Guillaume's (2011) work with Engineering students. Their premise is:

in order to attract and retain students in Engineering courses, the courses must be taught in a context that is familiar to students and, preferably, transparently relevant to the challenges facing society. (Patterson, Campbell, Busch-Vishniac and Guillaume 2011, p. 213).

Their aim was achieved through using learning and teaching exemplars based on familiar, real-life objects and situations to illustrate engineering principles. The choice of examples was critical in ensuring a transparent connection to the experiences of all students and the implementation of engineering principles. Patterson *et al.*

(2011) encourage an experiential approach to learning through the use of a specific tool (5Es) to develop knowledge and understanding of concepts (Engage, Explore, Explain, Elaborate and Evaluate). Working with 100 students, the use of real-life examples was valued by the students. Significantly more students in the course experiencing the 'real-life' examples rated their learning more highly than the control class. In supporting this approach the authors highlight the ease with which real-life examples using the 5Es approach can be incorporated into teaching within existing curriculum designs. The authors argue that in adopting this approach it is essential to ensure that the examples are familiar to all students; that individual examples demonstrate thematic coherence and breadth; that questions are relevant to societal needs, and cognitively, they need to contain a low level of abstraction in order for the student to make a clear connection to reality.

Responsiveness to work-related needs is illustrated in the following example. To meet healthcare climate shifts toward increased interdisciplinary patient care, Huitt, Killins and Brooks (2015) used team-based learning (TBL) as a substitute for one-third of cadaveric dissections in gross anatomy laboratories in two programmes in order to promote active learning, problem-solving skills, communication, and teamwork. Four main principles underpinned their implementation of TBL: (i) teams of students were purposefully created and managed throughout the duration of the course; (ii) students were held individually accountable for their own preparation and contribution to team performance; (iii) students received immediate and frequent feedback about their performance; (iv) assignments were designed to promote learning and team development. Key features of their design using the aforementioned principles included student pre-class preparation; clarification of learning objectives prior to taught sessions, assessment or readiness for each session, clinical case scenarios to test understanding and application of ideas. Results indicated that the inclusion of TBL improved students' attitudes towards working with peers and enhanced examination performance in certain areas. There were also indications that longer term retention of anatomical knowledge was enhanced but further work is needed to corroborate this finding.

A fourth example provided by Chiel, McManus and Shaw (2010) highlights the importance of enhancing the training of engineers through a closer integration of Maths, Science and Engineering. They specifically tackled the issue of teaching modelling, and mathematical analysis skills to Biology students and teaching Biology to Engineering students. Features of the programmes implemented included clear articulation of educational goals, a live interactive text book/tools to enable students to explore models and processes; benchmark problems providing key skills on which students could make continuous progress; assignment of students to teams of two throughout the semester where students provided weekly evaluations of their own and peers contributions and perceptions of the functioning of the team; regular one-on-one interactions with instructors throughout the semester; and a term project in which students reconstructed, analysed, extended, and then wrote in detail about a recently published biological model.

Sixty-one to 91% of students rated the course as excellent to very good over 10 years; students' competence perceptions were higher post-programme; 78% achieved A grades although there were variations in perceptions according to discipline with Engineering students demonstrating poorer attitudes towards, and lower perceptions of competence in, Biology compared to Biology students. Both biologists and engineers demonstrated increased competence in programming; however Biology students showed no significant improvement in their attitudes towards, and sense of competence in, Mathematics - although they were more willing to build or use mathematical models to understand biological systems. The authors posit that:

a single semester course, even one that explicitly focuses on the utility of Mathematics for Biology, is not enough to undo the years of negative experience that most Biology students have had with mathematics. (Chiel et al. 2010, p. 262).

The overall relative success of the programme was attributed by the authors to the adoption of a *continuous progress approach* which provided the students with better training for real-world problems.

## Co-operative learning activities

In managing the demands of large classes in Biology, Armstrong, Chang and Brickman (2007) examined the impact of co-operative learning activities on student achievement and attitudes in large-enrolment (>250) introductory Biology classes. A significant difference in test scores between control and experimental groups was not found, however over the duration of the course those students using co-operative learning methods demonstrated greater improvement in their knowledge of course material compared with students taught using a traditional lecture format. The authors note a lack of alignment between the expectations of co-operative learning in encouraging a deep approach to learning and the nature of assessment using multiple choice examinations which may not be receptive to measuring deep approaches. The authors found that average classroom attendance

was significantly higher in the co-operative learning groups relative to the control groups and students found that the group activities enabled them to understand the course material better. More than 92% of students saw the value of applying the strategies for use in other classes. Improving feedback between the teacher and the student was found to be an important element in supporting positive student learning outcomes within co-operative learning groups.

Guisasola, Zubimendi and Zuza (2010) found that Physics students (n=446), on the whole, benefitted from an interactive constructivist learning environment in learning about electrical capacitance and how to implement it effectively through following a specific teaching sequence (covering the social implications of the topic; group work; class discussion and teacher guidance; individual student reports; teacher discussion of reports in follow up session).

Specific features of the approach were that lectures took place after discussion sessions; the content emphasis was on connections with social scientific problems and everyday technological applications, scientific reasoning and qualitative approaches to concepts and theories. In learning about scientific models, the authors argue that students achieved better knowledge and understanding of scientific models by emphasising fundamental Physics principles and comparing and contrasting its usefulness rather than studying the model characteristics alone. While students in the experimental group were able to predict outcomes of the activities, model building skills were less well-developed. The authors highlight the importance of opportunities for students to engage in scientific activity and the difficult balance of developing questions that:

represent a challenge to stimulate reflection and search for solutions on the one hand and, on the other, not exceed the students' cognitive abilities. (Guisasola et al., p. 020102-8).

To support the development of student problem-solving and deeper conceptual understanding, Hitt, Isakovic, Fawwaz, Bawa'Aneh, El-Kork, Makkiyil and Qattan (2014) implemented Physics Education Research (PER)-based principles into their curriculum within the United Arab Emirates context. Features of PER included student-student interaction, hands-on activities, equality in teacher-student interactions, and an emphasis on sense making over answer making. Problem-solving skills were enhanced and drop-fail-withdrawal rates reduced from 50% to 24%. The authors highlight the importance of attending to students' prior classroom experiences in facilitating changes to the curriculum. A key feature of the design was the decision to:

use goal interdependence (requiring team consensus on solutions to learning tasks), rather than reward interdependence (including a co-operative group problem on individual exam scores), to foster mutual concern for success and individual accountability within teams. (Hitt et al. 2014, p. 020123-17).

## Inquiry

There is wide-based support for inquiry approaches to learning across disciplines including the use of simulations and problem/project-based learning.

In inquiry-based learning (Finkel 2000), the instructor must identify a problem or issue that provides a strong platform for engaging the course material. Once this problem is introduced, the following investigation and discussion is where the learning takes place. If students are interested in the problem, they will be highly intrinsically motivated to learn what is necessary to solve it. Limited or no extrinsic rewards are needed to keep students engaged. (Auman 2011, p.155)

Using an inquiry approach to support pre-service teacher education students in examining classroom practice, Barnett (2008) noted that students (n=62) found inquiry oriented cases valuable. The approach used a web-based Professional Development System including video cases; real-life examples, and multiple representations of case-based information. The students found the opportunity to be able to go back and review videos useful. The availability of multiple representations of the same context also helped students to articulate and clarify their beliefs.

Cacciatore and Sevan (2009) explored whether incremental change in the number of research-based inquiry experiments in the Chemistry curriculum (e.g. increased from one, to two, to three, out of ten total experiments), and variations in the Chemistry content and procedural complexity of the experiments produced incremental improvement in student performance and could therefore be seen as a reasonable alternative to immediate wholesale curriculum change. The key learning goals for high quality laboratory experiences were founded on NRC principles (1. Master subject matter; 2. Develop scientific reasoning; 3. Understand complexity and ambiguity of

empirical work; 4. Develop practical skills; 5. Understand the nature of science; 6. Cultivate interest in science and in learning science; 7. Develop teamwork abilities).

Features of the intervention included learning and applying principles of green chemistry.

Green chemistry emphasises the reduction of hazards to human health and the larger environment as well as resource conservation through informed design of chemicals and chemical processes. (*Cacciatore and Sevian 2006, p.1039*).

Students were engaged in authentic scientific inquiry; they were provided with an incomplete lab report (missing either a detailed procedure, calculations to support the results, or a discussion) and were asked to confirm or refute the report's findings. Students in the intervention group did significantly better than the control group on a complex experimental design and data analysis open-response problem that was directly related to the focus of the inquiry reports in stoichiometry, however they did not perform better than the control group on multiple-choice questions requiring general laboratory knowledge and skills not related to stoichiometry. There was a positive treatment effect on student development of reasoning skills needed for success in experimental work. The authors concluded that:

a very small intervention had a real effect that persisted at least two weeks. Nevertheless, this effect extended only to experimental work closely related to the content matter and laboratory techniques in the inquiry laboratory experiment. Our analysis suggests that students may need to conduct a number of inquiry experiments that address a wide range of chemistry content and laboratory techniques in order to acquire generally strong experimental skills. (*Cacciatore and Sevian 2009, p. 504*).

## Simulations

Latimer and Hempson (2012) investigated the impact of a deliberative polling event in political science on student knowledge, opinions about a policy issue, and levels of engagement.

Deliberation is an inquiry-based process that can offer students an opportunity to learn multiple perspectives on a particular issue (*Latimer and Hempson 2012, p. 385*).

Typically, deliberative polling includes the following:

a random representative sample is contacted, polled and invited to attend a one- or two-day deliberative polling event at a common location. Participants are then provided with carefully balanced briefing materials laying out the major arguments for and against a given set of policy proposals, policy-related issues, or electoral alternatives. The participants engage in dialogue with experts and decision makers based on questions they develop in small groups with trained unbiased moderators. After the deliberations, the sample of citizens is again asked the original questions. The resulting changes in opinion represent the conclusions the public would reach if they had an opportunity to discuss an issue, to engage with alternative points of view, and to become more informed. (*Latimer and Hempson 2012, p. 375*).

Key elements of this pedagogical model applied to the classroom included the provision of advance materials for students, clarifying how the groups would work, consensus within groups regarding formulation of questions to be presented to an expert. Students who engaged in deliberative dialogue were more likely to increase their knowledge, to change their opinions about the issue discussed, and to increase their levels of anticipated engagement. As noted by the authors the deliberation method can easily be adapted for any class/context where it is important to consider issues from opposing points of view.

Bernstein (2008) examined the impact of simulations on students' development of civic competence (the ability to make sense of vast amounts of information; work with others; understanding how the political system works and how to skilfully use this information to one's own benefit, internalising the political skill one has and concluding that one is capable of participating in politics). The simulation was valuable in supporting students' understanding of political processes through active involvement in the construction of knowledge. Students reported gains in political skills, knowledge, and efficacy. The main value of the simulation was in developing civic preparedness rather than the development of knowledge of specific political facts.

However, there was evidence that those simulations disenfranchised some learners. For example, African-American women chose not to participate as fully in the simulations compared to other students and white American women demonstrated lower perceived competence than their male counterparts. Bernstein argues that a simulation

"cannot overcome years of socialization women have faced that they are not as good at politics and do not fully belong in the political world" (Bernstein 2008, p. 15), although simulations such as this using a critical pedagogic lens can raise awareness and support the development of efficacy among students.

In considering an integrated approach to curriculum development the students (n=129) perceived that skills rather than knowledge impacted their confidence in being able to complete the necessary tasks but the course assessment predominantly tested knowledge rather than the skills development promoted through the simulation exercise suggesting a real need to align curriculum objectives and assessment more closely.

In taking forward the notion of 'aligned assessment', Auman (2011) implemented a simulation-based pedagogy in psychology informed by the notion of mindful learning (Langer 1997). Auman's integrated pedagogy was games-based and incorporated the use of multiple forms of assessment, use of rubrics, and collaborative team work. In this example and in previous ones there is an emphasis on the importance of pre-preparation by students using multiple assessment options (position paper; peer review; media campaign; reflection paper; engagement during activities; quizzes to assess knowledge; rubrics). Students' initial reticence about using the approach highlights the need for scaffolding and clarification of why it is a valuable approach. The students found the course demanding and enjoyable. Lecturer motivation was increased and students' end of course evaluations (n=129) demonstrated that they highly valued the debates and discussions (96%); personal accountability created by the game setting – having to find research and defend a position (74%); interactivity of the classroom environment (53%) and being stimulated thinking about the subject. While no differences were found in student scores in terms of knowledge gain for simulation and non-simulation groups it is evident that the students gained from the experience. The question of alignment between modes of teaching and assessment is pertinent acknowledging the fact that simulations are not solely tapping into knowledge gain and care is required to consider what kinds of knowledge and understanding are paramount in developing and what the best means to do this are.

Baltzis and Koukias (2009) integrated circuit simulation IT tools into laboratory work (n=518) in Electronics arguing that the technology-enabled students to achieve more productive results than in using an actual experiment. Typically the laboratory experiments included the simulation, team work, preparation work, an interactive teaching tool and instant feedback. For the experimental groups performance gains of 10% were noted; completion rates increased by 8% and transfer of learning was evident in that students demonstrated increased application of their knowledge to computer simulations and electronic measurement beyond the course increased. The simulation approach increased student interest but students were also dissatisfied with the increased workload required associated with preparation work. Similar longer term benefits of simulation activities are evidenced in Frederking's work (2005). He was able to demonstrate a carryover effect of simulation on politics students' (n=360) other modules beyond the length of the programme. The simulation groups did better on two of out of three of the examinations; students were more motivated and positive about their learning than the control group.

Hallinger, Lu and Showanasai (2010) used a problem-based simulation to support students' in learning to lead complex change in a business context underpinned by six principles: problem focus, co-operative group learning, self-directed tutorial groups, implementation focus, structured provision of learning resources, and multi-faceted performance-based assessment. While learning outcomes were not assessed, student feedback suggested the approach was effective in promoting student engagement. Further examination of simulation-based learning by the authors (Lu, Hallinger and Showanasai 2014) of three simulation-based learning (SBL) courses in management education over a seven-year period identified higher rates of student satisfaction than other non SBL courses. Students consistently evaluated SBL more highly than other comparison courses seeing SBL particularly with regards to being action-directed and engaging; more effective in providing feedback; and that from a cultural perspective Asian students responded positively to this form of learning.

Lay and Smarick (2006) using a "simulating a Senate Office" approach in politics found it to be an effective tool for civic education. Students who participated in the simulation gained considerable knowledge of the legislative process compared to their peers in the traditional course. They highlight the importance of ensuring that objectives are clear and that expectations of students are reasonable. They acknowledge that their data reveals only short term impact of the simulations on student knowledge and argue the value of simulation activity in supplementing traditional pedagogical approaches.

In using simulations in business, Arias-Aranda (2007) combined a computer application with real experts to provide two cohorts of students with an immersive experience in business management (n=75) which involved students in a process of interaction with other participants as well as benefiting from valuable feedback from experts acting as

economic agents. Thirty percent of the time was spent in theoretical activities with the students and 70% was focused on the decision making process and simulation dynamics.

Seven stages were used in implementing the simulation: Stage 1: Review of concepts and techniques of the decision-making process; Stage 2: Development of role-playing activities related to decision-making in strategic management; Stage 3: Description of the simulation rules; Stage 4: Assigning participants to work teams (firms) randomly; Stage 5: Simulation performing and complementary activities; Stage 6: Analysis of performance and simulation aftermath; Stage 7: Evaluation of the participants and the simulation experience.

High levels of student satisfaction were found. Students felt that the experience had increased their personal development of individual capabilities, especially those regarding decision-making, team-working and negotiation. Students valued knowledge application, competition and learning as the best points of the experience in general while the effort required, lack of knowledge of logistics, and the need for more experts were seen as relative weaknesses. The need to ensure realism and student immersion in the experience is highlighted.

## **Problem-based learning and project-based learning**

Project-based learning approaches are defined as involving solving a problem which may or may not be set by the student and result in an end product; they take time (Helle, Tynjälä and Olkinuora 2006); the emphasis is on the product with the students controlling the learning process. Problem-based learning emphasises the learning process with the teacher present as facilitator throughout. The approach is seen as more student centred and authentic with students determining what is needed to learn with lecturers acting in a more facilitative role. Problems to be addressed should involve real-world problems, that are unresolved and ill structured (Barrows 2002).

Bédard, Lison, Dalle, Côté and Boutin (2012) measured the impact of project-based and problem-based learning in Medicine and Engineering on students' engagement and persistence in higher education in three courses (n=480). Their key findings have implications for curriculum design when using project/problem-based learning approaches. They found that when students perceived the curriculum (their learning environment) as a contributing element that diminished their stress, they were much more likely to fully engage in the learning activities. Being able to articulate knowledge was important in predicting students' persistence in the curriculum; this emphasises the importance of students being clear about the knowledge to be acquired, being able to understand and articulate the subject knowledge. The most significant predictors for students' engagement and persistence were stress-related: "The right equilibrium between stress and available resources will generate productive energy thus, stimulating students" (Bédard, Lison, Dalle, Côté and Boutin 2012, p. 17). Students indicated that one of the aspects that most reduced their stress was that they appreciated the autonomy they were given in the curriculum (e.g. 'free slots' or 'open time' for group meeting, study time and even extracurricular activities. Contributing to stress reduction was peer support. The way this was fostered in the curricula was by sending out the message that collaboration was more valuable than competition. Moreover, the assessment of students' learning was designed not to encourage such competition.

Salaber (2014) demonstrated the positive impact of wiki-based activities within a management course (n=76). A wiki was introduced to promote student engagement and collaboration. Implementation of the wiki involved weekly problem-solving exercises in 15 teams of four or five students. Students could see all wikis but only edit their own group's work. Weekly tasks were posted on the wiki and the tutor could review the contributions before the seminar and orientate group discussions and give feedback where appropriate. Students were required to enter their collaborative answer on the wiki before each seminar. The introduction of wiki tasks increased student learning, engagement, and collaboration during seminars and lectures and out of class. Test results were correlated with the number of exam-related tasks edited, the total number of wiki page views, and the timing of wiki pages' viewing.

## **Service learning**

Service learning is an example of an experiential form of learning that combines academic study with service to the community (Deeley 2014) and in doing so provides a 'real-world' experience and opportunities for authentic assessment. Three required elements are present in service learning: academic credit, reciprocal relationships with the community, and reflection (Gerstenblatt and Gilbert 2014). Domakin (2014) describes the placement element of service learning as the signature pedagogy of social work, however, service learning designs have potential across disciplines and can be enacted as a one-time experience, a module, and/or an extended programme. A key issue is the nature of the relationships between academic and community partners, the quality of the reflective

elements of the work and, how the assessment element is designed, negotiated, and assessed in consultation with all stakeholders (students, academics, community). Given the potential of service learning to support both student and community learning, it is surprising that it is poorly represented in the literature. Only 33 of the 1,741 (2%) of articles focus on this experiential mode of learning and within this 42% of the 33 articles are located within the Social Sciences with relatively few from the other discipline areas.

## Assessment

The role of assessment in supporting innovative pedagogical designs and associated student learning is crucial and permeates the literature and particularly in the following areas: student self-assessment; students as partners in assessment including co-assessment; guided support; and authentic assessment. Salient to all these discussions about assessment is the nature of the role of the student in the assessment process as highlighted by Neary:

[we need to] to reinvent the relationship between teacher and student, so that the student is not simply consuming knowledge that is transmitted to them but becomes actively engaged in the production of knowledge with academic content and value. (Neary 2009, p. 8)

### *Self-assessment*

Boud, Lawson and Thompson (2013) found that students (n=182) using a web-based marking system who chose to engage in self-assessment improved their capacity to self-assess over time. They found that students' judgements improved over time converging with those of tutors. However, this convergence was not evident when students began a new unit of study and more accurate judgement did not occur in an initial task in a new unit until students had had opportunities to practice self-assessment over three semesters. Furthermore, they noted considerable variation across achievement levels, accurate estimators (the mid-achieving group) demonstrated the highest level of improvement, with the under-estimators (high achievers) demonstrating some increased performance, but improvements were not evident in under-achievers. The importance of supporting students' learning transitions to manage the requirements of assessment and supporting the development of student self-regulation skills are implicated in these findings.

### *Co-assessment*

Deeley (2014) using service learning working with public policy students highlights the potential of summative co-assessment to inform learning. In this particular context students self-assessed their own oral presentations and then agreed marks with their tutor. This co-assessment approach promoted a deep approach among students; it strengthened learning in that students were more aware of gaps in their learning; increased student confidence, and increased student-teacher relationships. As a strategy to develop student self-assessment skills there is considerable mileage in such an approach. The emphasis on co-partnership as part of service learning is also evident in W. Caldwell's (2007) work in a languages context where students worked as co-partners with lecturers and the community to plan an activity involving reading stories to children. The central involvement of the students as partners in planning the research design and operationalising it increased student confidence and students' perceived value of the project. Service learning emphasises the need for integration between theory and practice and an understanding of the fact that activities are defined by workplace communities is important (D. Anderson 2006). Pedagogies of transition that focus on supporting students to navigate such landscapes in order to give and receive, and to contribute effectively are required (Evans 2015a; Scott *et al.* 2014).

## Students as producers

Alvarez (2013) highlights how the involvement of students as producers of digital objects (Open Educational Resources: OERs) impacted curriculum development despite tensions regarding students' initial lack of desire to act as producers, collaborators, and constructors of innovative curriculum supported by technology. The evolution of OERs enabled the bridging of theory and practice and created opportunities for students to become involved in curriculum design. Positive outcomes of the approach included increased creativity from students while manipulating digital tools; greater flexibility afforded by the use of technologies and transformation of class-based and independent learning.

## Explicit guidance and support

Focused approaches to supporting student learning have been found to be highly successful. A key issue is identifying potential stumbling blocks for learners and providing specific instruction to attend to learner difficulties, although this may take time and students are particularly vulnerable as they transition from one module to another

(Boud *et al.* 2013). Highly focused work can be productive as exemplified by Brown, and Marshall (2012). They found strong positive impact from a focused pedagogical approach for teaching the writing of academic essay introductions using explicit guidance operationalised in a single two-hour workshop. The impact of the workshop was large; student performance in rhetorical structure and content of introductions was enhanced for students from a variety of backgrounds.

## **Authentic learning experiences**

The importance of 'real-world' authentic learning experiences is highlighted within and across disciplines and warrant further attention. The value of object-based learning (OBL) in leading to meaningful learning experiences has been championed by Chatterjee (2010) and Solway, Camic, Thomson and Chatterjee (2015) with clear evidence of impact in a variety of settings and across disciplines. Impacts on student well-being, communication, management, and organisational skills; independent thinking, and transferable skills have been reported using OBL approaches.

Building on the real-world perspective there has been much promising work in assessment practice, albeit with relatively small samples that warrant further investigation. The notion of student as producer interacting with family and the community as an integral part of assessment practice has demonstrated encouraging outcomes across disciplines (Carpenter and Pappenfus 2009; Crowl, Devitt, Jansen, Van Zee, and Winograd 2013; Erikson 2011; Garcia 2014). Carpenter and Pappenfus (2009) in Chemistry involved students as researchers engaging them in authentic scientific practice. The approach was effective in leading to publication outputs; students rated their own performances very highly, and there was evidence of students moving into research careers as part of this process.

Crowl *et al.* (2013) focused on prospective teacher application of Physics content beyond the classroom through the use of 'friends and family assignments' and in doing so encouraged students to apply scientific language and tools both inside and outside of the course facilitating both student learning and the learning of others within the wider community. Students' perceptions of competence and their own self views were enhanced. Erikson (2011) in developing a signature pedagogy in History developed assessment practice based on the premise that:

history education remains most effective when students leave the classroom to conduct research in archival sources and present findings to public audiences. (Erikson 2011, p. 389).

Assessment involved identifying a public need that existed outside of the context of the course, teaching students how to conduct research, writing to address the need, and preparation and hosting of a public presentation of research findings. The approach led to high student engagement, and a deeper understanding of historical knowledge. Burns (2013) also highlights the value to students of learning from the community and acting as co-partners in research as part of a sustainability pedagogy enabling students to have increased exposure to multiple perspectives.

Garcia (2014) in promoting 'pedagogy of the real' in sociology involved students as researchers and disseminators of research; individual and group ethnographies were part of the assessment. Students' work was displayed publically in a gallery. Seventy-five percent of students were positive about the assessment and the public dissemination of their work. In Duncan, Pilitsis and Piegaro's (2010) research on developing pre-service teachers' ability to critique and adapt inquiry-based instructional materials, what students valued most was developing their own online modules using a community of inquiry framework. Similarly, Figg and McCartney (2010) found that digital story telling as part of community-based practice involving students working with children enhanced students' writing skills and increased their awareness of educational opportunities. Further examples can be drawn from Mathematics where Green and Emerson (2008) used memos as an authentic assessment exercise to simulate real-world tasks although this solicited mixed opinions among students. Backstrom and Cooper (2013) also were successful in using online scenarios to support students' problem-solving and the application of skills to real-world scenarios in Law; this pedagogical design was valued highly by 79% of students. Another approach used by Bergstrom (2009) involved the application of economic ideas to study data generated by students' responses to demonstrate the relevance of Economics; this could be applied to other disciplines.

## Section 5: Key elements of effective practice

### Overview

The pedagogical approaches evidenced in the detailed analysis of 273 articles align with Chickering and Gamson's (1987) principles for good educational evidence-based practice (e.g. contact between students and faculty; reciprocity and cooperation among students; active learning; prompt feedback; stress time on task; high expectations for students' performance; and accommodation of diverse learning needs).

Five of Kuh's (2008) ten high-impact educational practices are also represented (writing intensive courses; collaborative assessment; service learning; undergraduate research). There is limited evidence of Kuh's other five high-impact strategies (first year seminars; common intellectual experiences, learning communities; diversity learning; internships and capstone projects). In delving deeper and beyond this level of abstraction it is possible to identify key elements of effective practice that are relevant to 21<sup>st</sup> century learning environments which also closely align with Alt's (2014) mapping of constructivist activities in higher education (knowledge construction; in-depth learning; authenticity; multiple perspectives; prior knowledge; teacher-student interaction; social interaction, and co-operative dialogue). See Appendix A for further explication of these constructs.).

There is a substantial attention given to assessment practice within the articles which warrants special emphasis in this review especially given the potential of poorly aligned assessment practice to undo pedagogical innovation and associated deep learning objectives (Auman 2011; Armstrong *et al.* 2007; Estevez *et al.* 2010).

The strongest pedagogical designs, using the grading criteria outlined in Section 2, were those where the theoretical underpinnings of the learning and teaching approaches clearly supported the purposes of the learning experience which were also explicitly articulated. Overarching design elements included: research-informed approaches were appropriate to meet specific learning needs; a critical pedagogical stance was employed (Bédard *et al.* 2012; Bernstein 2008) with a critical evaluation of learning gains (Feeney *et al.* 2013; Lay and Smarick 2006); manageability was addressed through attending to what was appropriate workload for students and lecturers (Baltzis and Koukias 2009); assessment was holistic in that it was an integral aspect of the pedagogical model; the pedagogical design was sensitive and adaptive to the changing requirements of the context.

Underpinning principles that are evidenced in the case studies include the notions of accessibility; authenticity; agency; criticality; flexibility; manageability; sensitivity to the needs of the context, and the specific requirements of the discipline. There is strong evidence of learner-centredness in the reviewed articles (Cullen and Harris 2009). Learner-centred approaches characteristically focus on creating *a sense of community* (through collaborative approaches to learning, create a sense of relevance; ensure accessibility to support structures); *share power and control over what is learned* (how information is presented; choice; student responsibilities; extent to which student is seen as a partner versus a recipient in the learning process), and *assessment and outcomes are tied directly to learning outcomes* (promotion of formative bi-directional feedback (lecturer to student and vice versa; supporting students to meet learning outcomes) (Cullen and Harris 2009). There is room, however for greater explication of the role of students in the learning process and as co-partners; this latter area is not well represented within the literature reviewed.

Effective inclusive pedagogies although less well represented within the literature adopted a universal design stance in promoting adaptive learning and teaching environments to enable access for all learners rather than focusing on adapted designs to suit the needs of specific groups; a broad view of inclusion is used. Emphasis is on connectionist approaches (involving pointing out to students connections between knowledge areas, helping students to connect with what they already know, from sources, and from each other, and to use their own methods (Hockings 2010); self-regulatory processes underpinned by an understanding of how we learn using a cognitive styles approach (Evans and Waring 2014); and culturally inclusive approaches (Eaves 2011). In adopting an inclusive pedagogical stance, lecturers need to consider what are the best ways to teach a specific aspect of curriculum, and promote access to teaching through consideration of principles of best practice appropriate for all learners; it is not about accommodating the needs of each individual learner (Waring and Evans 2015).

### Key themes

Inductive and deductive frames of analysis were used to identify elements of effective practice within the 273 articles; these are summarised in Table 8. The themes identified inductively were mapped to the PLSP inclusive pedagogical framework of Evans and Waring (2014) in relation to five key components of practice: exploration of student and teacher beliefs; careful selection and application of styles (tools); optimising conditions for

learning/sensitivity to learner context; design of learning environments; supporting learner autonomy: choices in learning/student voice. Areas less well represented included attention to students' learning histories; beliefs and values; and emotional regulation as part of self-regulation.

Five themes were dominant within the literature (and highlighted in Table 8); these included the following:

1. Real-world student engagement is promoted through the use of real life examples; tackling cogent and relevant issues; active research; meaningful assessment to engage diverse groups of learners to support 'feeding up' of knowledge and understanding from higher education into workplace contexts and integration within wider communities beyond HE (Patterson *et al.* 2011).
2. Student self-understanding is supported through experiential approaches including the use of guided critical reflection with direction to suitable tools (Grace 2011; Zajonc 2013).
3. Advance access to course materials is promoted to enable students to familiarise themselves with materials and to prepare for learning prior to taught sessions (e.g. flipping (Educause 2012)); just-in-time approaches – (Novak 2011). Associated with pre-release of materials is the requirement for students to do something with the materials as part of active learning agendas.
4. Enhancing student access to learning is achieved by ensuring accessibility of ideas at the perceptual level (e.g. through the use of object-based learning, visuals) (Chatterjee 2010; Estevez *et al.* 2010) and at higher levels of information processing through appropriate scaffolding and use of tools and models to support understanding (e. g. concept maps) (Coller and Scott 2009; DeMeo 2007; Goldberg and Ingram 2011; guided reflection tools (Carroll 2005; Waring and Evans 2015)).
5. Principles of effective assessment and feedback practice have been well-rehearsed within the literature (see Evans 2013 review on assessment feedback). Important emphases within assessment include the importance of: explicit guidance; appropriate, timely, and sustainable feedback; focused questioning; real time feedback; feeding up beyond a module; self- and co-assessment; peer engagement with a focus on formative rather than summative support from peers; authentic and meaningful assessment; quality projects; students as producers; emphasis on translation of understandings into practice; assessment aligned to objectives of course design; appropriate diversification of, and guided choices in assessment).

These themes are attuned to Bass's (2012) notion of post-course design which acknowledges the learning that takes place beyond the formal curriculum and brings the outside in by connecting with opportunities for learning more widely within HE and beyond in order to promote a post-course consciousness

paying attention to such elements as prior learning and prior conceptions, experiential knowledge, program-wide learning goals, and the long view of expert practice. There are also many ways to create assignments (and reflections to go with assignments) that gesture beyond the course itself—to life experience, to other courses, or to larger communities of practice... (Bass 2012, pp. 26-7).

Table 8: Elements of effective practice (Building on the work of Evans 2013; 2015a; Evans and Waring 2014)

#### Overarching design decisions

- Appropriate research-informed pedagogies are selected to meet specific learning needs to include the nature of knowledge, skills, and understanding to be acquired; a critical pedagogical stance is employed (Bédard *et al.* 2012; Bernstein 2008).
- Ensuring manageability - manageability is addressed through appropriate workload for students and lecturers (Baltzis and Koukias 2009), and critical evaluation of learning gains (Feeney *et al.* 2013; Lay and Smarick 2006).
- Holistic assessment as an integral aspect of the pedagogical model; sensitive and adaptive to the changing requirements of the context.

#### Beliefs and values

- Relevance is established to support student 'buy in' (Novak 2011).

#### Optimising conditions for learning/sensitivity to learner context

- Student transitions are supported - students' prior conceptions of learning, beliefs, understandings, and schema are considered (Cacciatore and Sevan 2009; Feeney *et al.* 2013; Krause and Armitage 2014).
- The underpinning principles of a programme are clarified with learners; objectives, ways of working, expectations, and interpretations of partnership (Evans and Waring 2015; Lay and Smarick 2006).

- Designing adaptive rather than adapted environments - to enable learners to navigate their own pathways through the learning environment facilitated by clear signposting of resources including potential networks of support (Waring and Evans 2015).
- Advance provision of resources enable students to manage their own learning and at their own pace (Chiel *et al.* 2010).

#### Design of learning environments

- What a 'deep approach' looks like within a discipline is clarified along with a focus on what the discipline specific threshold concepts are, and what might be problematic. Students have access to disciplinary discourses through explicit discussion of discipline requirements; their sense of fit and identity within disciplines is considered as part of the pedagogy (Bédard *et al.* 2012; Bluic 2011; Evans 2015a).
- Promoting access - Access to learning is promoted by ensuring accessibility of ideas at the perceptual level (e.g. through the use of object-based learning, visuals) (Chatterjee 2010; Estevez *et al.* 2010) and at higher levels of information processing through appropriate scaffolding and use of tools and models to support understanding (e. g. concept maps) (Coller and Scott 2009; DeMeo 2007; Goldberg and Ingram 2011). Sustained guidance in reflection (Carroll 2005; Waring and Evans 2015).
- Self-understanding is supported through guided critical reflection with direction to suitable tools (Grace 2011; Zajonc 2013).
- Advance access to course materials is provided to enable students to familiarise themselves with materials and to prepare prior to taught sessions (e.g. flipping; just-in-time (Novak 2011). Associated with pre-release of materials is the requirement for students to do something with the materials as part of active learning agendas.
- Multiple learning opportunities are provided to enable learners to test, practice, and apply their knowledge, understanding, and skills (Gusasola *et al.* 2010; Salaber 2014). Active learning defined broadly as doing something with learning resources can be done both individually and/or collaboratively.
- Ensuring opportunities for dialogue - opportunities for dialogue are facilitated (face-to-face and using online mobile technologies) to address misconceptions, and consolidate understandings (Guisasola *et al.* 2010; Hitt *et al.* 2014).
- Meaningful integration of IT resources into learning and teaching including assessment ensures pedagogy drives learning and technology assists (Baltzis and Koukias 2009; Dymoke and Hughes 2009) (See Cochrane 2014).
- Appropriate assessment - principles of effective assessment and feedback practice have been well-rehearsed within the literature (Evans 2013). Important emphases within assessment include (explicit guidance; appropriate, timely, and sustainable feedback; focused questioning; learning design to facilitate real time feedback; feeding up; self and co-assessment; peer engagement; authentic and meaningful assessment; quality projects; students as producers; concerned with translation into practice; aligned; appropriate diversification of assessment).

#### Supporting learner autonomy: choices in learning/student voice.

- Autonomy is addressed within the curriculum offer – e.g. guided choice in assessment; self-study; choices with problem/project based learning to enable individuals to work with, and separate from, the group; flexible groupings (Bédard *et al.* 2012; Ernst and Ernst 2005).
- Real-world engagement is promoted through the use of real-life examples; tackling cogent and relevant issues; active research; meaningful assessment to engage diverse groups of learners and to support feeding up from higher education into workplace and integration with wider communities beyond HE (Patterson *et al.* 2011).
- Purposeful creation and on-going management of student teams - includes training for students in how to work collaboratively (Huitt *et al.* 2015).
- Co-partnerships between students, lecturers, and community partners enable real-world agendas to be addressed (Burns 2013; Erikson 2011; Figg and McCartney 2010; Healy, Flint and Harrington 2014).

## Appropriate assessment

A key feature of effective practice from the reviewed articles was the integrated nature of assessment (Table 8). While principles of assessment practice have been clearly outlined (e.g. Evans 2013 review of 460 articles on

assessment feedback in higher education), there are nuanced approaches to assessment practice that warrant specific mention. Below is a summary of key features of the assessment designs that were identified:

*Explicit guidance* - ensuring students know what constitutes good and know how to improve their own work (Bahadourian, Tam, Greer and Rousseau 2006; Brown and Marshall 2012; Flaspohler, Rux, Flaspohler 2007). Providing a route map to guide students through the assessment jungle. Outlining and agreeing the student role within the assessment and feedback process. Showing how all elements of a programme fit together and working with students to understand marking criteria (Defeyter and McPartlin 2007; Evans and Waring 2015).

*Appropriate, timely, and sustainable feedback* - focused and aligned to the requirements of the programme. Feedback is given in sufficient time to enable learners to make the necessary amendments to satisfy the requirements of summative assessment (Evans 2013).

*Focused questioning* - identification of the correct question(s) e.g. in inquiry-based learning (Auman 2011) and just-in-time teaching where student responses to questions are seen as an integral part of the lesson and not as an add on (Novak 2011).

*Learning design to facilitate real time feedback* through the use of technology (Damron and Mott 2005; McLaughlin *et al.* 2014) and also through face-to-face dialogic opportunities (Wegerif 2015).

*Feeding up* - in developing a holistic approach to assessment there is increased emphasis on using summative assessment as formative in preparing students for their next module/employment (Evans and Waring 2015).

*Self- and co-assessment* - developing the capacity for students to make judgements about their own work. In developing sustainable assessment, supporting students' development of *self-assessment* skills is vital (Boud *et al.* 2013; Deeley 2014). The development of *co-assessment* promotes dialogic and self-regulatory practice on part of students and lecturers.

*Peer engagement* - maximising the possibilities for peer assisted learning. Highlighting the greater potential benefits of peer engagement (formative assessment) (Duah, Croft and Inglis 2014) over-peer assessment (summative assessment). Training for students in how to give and receive feedback is an essential component of peer engagement (Evans 2015a; 2015b).

*Authentic and meaningful assessment* - the examples cited in this report highlight the immediate and potential long-term benefits of students working on real problems that are relevant to their future careers and in real contexts (Arias-Aranda 2007; Barnett 2008; Bédard *et al.* 2012; Patterson *et al.* 2011).

*Assessment geared to supporting collaboration* rather than competition to engage peer support (e.g. criterion-based) (Bédard *et al.* 2012).

*Quality project* - encouraging students to engage deeply with materials (Crowl *et al.* 2013; Erikson 2011).

*Students as producers* - students working with the community engaged in the production of meaningful outputs/research. Students are encouraged to demonstrate 'a will to offer' their ideas up for scrutiny by the wider community (Alvarez 2013; Crowl *et al.* 2013; Erikson 2011).

*Assessment is concerned with translation into practice.* A key concern is how students in 21<sup>st</sup> century learning environments can apply their knowledge and skills to new environments and become effective boundary crossers (Feeney *et al.* 2013).

*Assessment alignment* - requires that the mode of assessment can and does adequately assess the knowledge and skills promoted in new learning environments (Armstrong *et al.* 2007; Bernstein 2008; Chiel *et al.* 2010).

*Appropriate diversification of assessment and sensitivity of assessment to student needs* to ensure learning requirements are met and that students diverse needs are attended to (Auman 2011). Ensuring individual agency through opportunities for students to work alone and in teams and to be assessed as individuals (Chiel *et al.* 2010). Individual accountability as part of team assessment (Huitt *et al.* 2015).

The strong move towards meaningful rather than meaningless assessment is promising; much of this work involved students and lecturers working with the wider community and in doing so promoting student sense of identity and integration of higher education and wider contexts. The student as producer or co-producer also shows positive outcomes especially with regards to student engagement with, and development of, research. There is an increasing emphasis on feeding up – how students can use the knowledge, understanding, and skills

across the higher education context and in work place contexts. The importance of learning transfer is noted although few of the articles employ longitudinal designs to look at the longer term impacts of interventions on students' learning beyond a programme of study.

## Section 6: Disciplinary narratives

A phenomenological approach (Morse 1994) was used to develop the disciplinary narratives about pedagogies that are outlined in this section. These narratives have been constructed from consultation with teaching experts within HE in order to provide a more complete and fine-grained picture of pedagogies within the disciplines. National Teaching Fellows, Principal Fellows and Senior Fellows of the HEA were consulted. One hundred and sixteen responses were collected from a survey monkey questionnaire (contributors who wished to be referenced can be found in Appendix B).

### Arts and Humanities

Expert colleagues in Art and Design, Dance, Design History and Graphic Design, Drama, English, Film, Radio and Television, History, Music, Philosophy and Theatre emphasised the importance of promoting student agency and innovation through student ownership of learning and authenticity of learning experiences. Agency is promoted through students as producers initiatives; consultation opportunities for students to discuss feedback, and student involvement in curriculum development. The need to integrate theory and practice in delivery in class and real-world settings is a fundamental concern.

Experiential learning experiences that are vocationally relevant are favoured and these are typically facilitated through workshop activities: "Workshops/studios are the bedrock of practice-based art and design teaching."

'Real assessment' is promoted by experts who articulated the importance of students working collaboratively within groups *as producers working* with clients to produce outputs (e.g. practical media production, exhibition activities, pop-up shop works, developing wikis, journals, and blogs). Experiential learning is seen as important in:

engaging students in questioning how they learn, using practical experience as the basis of knowledge and employing improvisation as a tool in developing creativities...where the outcomes depend upon group process ... has a major impact on learning engagement. (*Community music*).

An emphasis on peer learning is seen as an important part of the process in practical media production where students are involved in all stages of work (pre-production, shooting/recording, and the post-production process). Such an approach is seen as leading to "a more deeply engaged student but also a student with skills in independent learning" where the transition is managed to "transfer responsibility from the tutor as expert to the student as innovator, creator and expert in their own right" (Practical Media production).

Pedagogical approaches to support student agency and development are varied and include individual and group-based problem-based learning (hybrid seminar and lectures, creative hands on learning sessions, experimentation with writing). The use of 'rich' discussion forum activities as part of blended learning environments feature highly in accounts of good practice. The importance of *dialogue* through e-learning is encouraged to support engagement in activities. Such approaches are seen as important in involving "both students and tutor experiencing each other differently".

The importance of students "owning the ideas" frequents experts' accounts linking to the need for students to be able to demonstrate authenticity in their understanding of text, music, and other media. The importance of alternative modes of assessment is also highlighted.

### Health and Social Care

Colleagues in Health, Medical Education, Nursing, Veterinary Medicine, Psychological Therapies, and Social Work highlight the importance of 'real-world' relevance which is evidenced in a variety of approaches used (e.g. replication of clinical practice in training; participation in clinics; involvement of service users in teaching and assessment an 'outside in' approach - patients as teachers; outside experts in clinical practice teaching and assessing students, student hands on involvement in the design and use of health promotion projects). A key rationale behind this 'outside in' approach is the need for students "to see the reason behind the taught content and how it is used in practice, rather than just the theory" (Breast cancer diagnosis expert) and an understanding that "students studying for professional courses engage in what they believe will help them to achieve this. We

design curricula with this in mind, but need to use a range of methods to ensure that this link is clear and explicit to students”.

There is a strong emphasis *on interactive collaborative team-based learning to mirror* the requirements of the professional learning context (e.g. team-based learning; problem-based learning; action learning sets) and to encourage students to “co-create a shared understanding of a subject area”; there is thus a strong emphasis on the importance of dialogic learning.

Experiential learning opportunities are promoted to support student understanding using a variety of approaches (role play; problem-based learning; simulations and scenarios; case scenarios) supported within face-to-face and blended learning environments. Such approaches are justified on the basis that:

working in small groups dealing with clinical scenarios stimulates students' interest and highlights the relevance of what they are learning because it obviously relates to their future career. Integrating clinical and basic science is particularly attractive to the students. (*Medical Education*).

These learning contexts enable immediate feedback from tutors and peers.

Scenario-based learning is seen as

enhance[ing] student learning by making the student responsible for what they need to know... and by feeding back to the other students [this] means they improve communication skills, presentation skills, and the need to know what they are actually talking about. (*Nursing*).

*The use of thinking skills approaches* to support student learning are emphasised, for example, the use of structuring thinking using graphic organisers tools to enhance self-awareness and interpersonal skills. An emphasis on application within teaching sessions is supported by the use of flipping the classroom techniques which require pre- and post-session student and lecturer activities with an emphasis on student ownership of their own learning.

A range of assessment approaches is evident within health (formative assessment via audience response systems, active peer learning and knowledge transfer opportunities via classroom discussions). The use of electronic voting systems (EVS) is favoured as it

is participative and allows quieter students to have a voice in the classroom. EBL empowers students to take control of their learning, this helps our more experienced students take responsibility for how they learn (reflective of real life healthcare practice. (*Nursing and Health care*).

The use of experts within the field to assess student work is seen as particularly important in engaging students as it is “more valued if it is judged by experts”. As part of student-led assessment peer and self-assessment are seen as important.

## Social Sciences

In Social Sciences, much emphasis is placed on preparation for *working in professions* and importantly the requirements of professional membership within Education, Business, Economics, Marketing, Politics, and Law fields. Unsurprisingly, experts promote the notion of “scholar practitioners” (Business) in terms of readiness for employment. Connection with ‘real-world’ contexts is seen as essential and operationalised in a number of ways (through case-based and problem-based learning, simulations/scenarios, through the use of technology, and interactive video materials and cases as well as games-based activities, role play including mock trials; modelling teaching activities, and through students as researchers programmes with research built into final assessments). Access to, and on-going exchange with, practitioners is essential in being able to connect theory to practice – subject knowledge to professional practice:

marketing involves understanding current business practice and developing professional competencies hence students need supported, direct access and interaction with practitioners from their field in as many ways as possible.

The use of games and role plays is valuable in “enabling difficult ideas to be explored without personal blame or responsibility” (Higher Education). The ‘real-world’ context is also emphasised through off site projects solving real dilemmas, working with clients (children and adults), civic engagement - being involved in real policy change activities, start up enterprises, and co-production activities including research with academics. Permeating experts’ accounts are notions of authentic and pragmatic practice-based approaches to build critical thinking skills and

understanding: "it is hard to learn economics if it is not applied" (Economics) and to enable students "to put theory into practice" (Business).

Experiential learning activities involving small groups are dominant with an emphasis on facilitating dialogic exchange to enable students "to actively process material in order to contribute to a discussion" (Education). The importance of the visual nature of material is emphasised and seen as valuable in "supporting the development of a shared conceptual framework on which to build theoretical and comparative examples" (Education) and in crisis management:

providing the students with the ability to visualise the nature of a crisis is an important element in engaging them in the learning process. As a result, all presentation slides tend to have images that relate to the content/context of the slides.

The importance of active learning and dialogic exchange is evident within instructional design and feedback activities. Peer evaluation features in assessment practice with an emphasis on peer engagement activities such as student-led mentoring. Emphasis on *flipping learning* so students arrive prepared and informed to discuss ideas is dominant:

Instead of using class time to impart and dispense information the lecture/small group session is turned over to active teaching/learning activities. Information traditionally dispensed is made available to students beforehand (*Law*)

and students are enabled to manage their own learning by making use of resources provided from multiple sources. An emphasis on supporting student reflectivity through diversified assessment and through the use of video is evident in approaches. Supporting students' integration into communities of practice is dominant within education.

There is much emphasis on working in authentic learning environments, connecting with clients, and using a variety of approaches to stimulate personal responsibility, reflection and activity. There is a similar emphasis on the process of learning and how understanding is facilitated and in supporting individuals to become sensitised to work contexts.

## STEM

Using feedback from colleagues in Anatomy, Architecture, Biochemistry, Computer Sciences, Mathematics, Mechanical Engineering, Geography, Psychology and Zoology, it was possible to identify synergies in teaching approaches in many of the STEM subject areas. The importance of making individual students feel *valued in large groups* is emphasised.

Active experiential pedagogical approaches are favoured that

strike a balance between didactic teaching to ensure students receive core information in science and then student centred activities that allow them to explore an area and develop a deeper understanding (*Biomedical Science*).

In Geography, fieldwork is seen as essential in bringing "the theory and literature to life".

A strong emphasis is placed on the value of problem-based, work-based, design-based learning within groups so that "students can see that they are really learning to design as professionals do" (Chemical Engineering Design); "the team work and life-like examples are more engaging for [the students] and reflect real life computer science applications". The need for authenticity is operationalised through using life-like examples, working directly with industry, and through the use of external practitioners on panels to assess student work; perceived as important in supporting employability initiatives. In Computer Science, *gamification* approaches are favoured to enable authentic and team-based approaches that reflect real-life computer science applications. A focus on genuine problem solving and community engagement is seen as important in that

it prompts problem solving skills, teamwork, and drives curiosity to go further in exploring theory. It embeds ideas in the mind far better than a lecture on the theory of a subject, even a lecture delivered by an excellent lecturer, and it sets students up to become self-motivated go-getters. (*Environmental Science*).

Students as researchers is a core theme and linked to authentic practice in supporting students to disseminate their findings in professional settings and to successfully write for publication:

Students enjoy carrying out research, they often have the opportunity to create a real sense of ownership through designing and developing their own research projects, carrying out their own data collection, etc. Increasingly, students are facilitated in publishing their work - sometimes in student journals, but sometimes in mainstream journals too, which they see as contributing to their employability. *(Psychology)*.

To support understanding, assessment modes include frequent use of online quizzes, podcasts, Twitter, viva-type presentations, posters to solve genuine problems and a growing use of clickers in lectures to support immediate feedback along with the value of. Peer instruction and peer and group assessment is prevalent:

by assessing each other, they learn more and get to pass on their wisdom to peers. Small group work works really well - helps bring in other perspectives and an appreciation of each other, plus transferable skills such as good communication. *(Computing)*.

To support student understanding computing colleagues assert the value of face-to-face marking:

Face-to-face marking gives the opportunity to ensure that they understand what they have done well/not so well and the feedback they are getting and how it can be applied to future work. *(Computing)*.

The use of worked examples and visuals to facilitate understanding of core knowledge is stressed to enable more time for conceptual understanding. The integration of object-based learning (OBL) to support the acquisition of subject specific and interdisciplinary knowledge is noted (Zoology). In mathematics the importance of the availability of several simultaneous surfaces for cross-referencing is seen as important to facilitate student understanding.

## Summary

In the four integrated discipline narratives (6.1 – 6.4), there is an emphasis on real-world engagement as part of learning to understand within disciplines, and as an important element of assessment. Across all disciplines a range of approaches are used which emphasise experiential learning opportunities that include active and collaborative activities. Much emphasis is placed on group-based learning to reflect real-life contexts and to promote understanding through the use of dialogue; as part of this discussion the management of individual and group learning processes and particularly individual needs within large groups are highlighted (STEM). Meeting the requirements of professional bodies is a particularly strong pedagogical driver in Health and Social Care and Social Sciences. To promote student understanding a diversity of assessment approaches within and across disciplines is championed. An emphasis on deep approaches to learning as advocated by McCune and Entwistle (2011) to include a will to learn (understanding of the learning process) and a will to offer (to put forward own ideas for critical consideration by others) is evident in the narratives. There is much emphasis on student ownership of ideas and as: producers (Arts and Humanities); co-creators of shared understandings and producers of products for the community (Health and Social Care); adaptive and sensitive to workplace requirements (Social Sciences), and as researchers (STEM). The importance of student agency within learning environments is an important emphasis and is configured in many different ways within and across disciplines.

## Section 7: Case studies

### Introduction

The case studies were drawn from the systematic literature review using the quality filters outlined in Section 2 (pedagogical clarity; methodological transparency and congruence; evidence-based; accessibility of findings; transferability). A stratified sampling frame was used to ensure selection of case studies from each of the four key discipline areas: Arts and Humanities, Health and Social Care, Social Sciences, and STEM. Thirty-six A grade articles were identified (13% of the total number of full articles included in the detailed analysis) and from these, ten articles were selected as representative of their respective disciplines having reviewed all 273 articles in full. The case studies provide examples of, and give a flavour of, the larger dataset; they provide a fuller insight into how pedagogies are enacted within the disciplines.

The three Health and Social care case studies reflect three disciplines: Psychiatry, Medicine and Pharmacology, and three distinct pedagogical approaches: a recovery model featuring co-construction with patients, problem and project-based learning, and flipped classroom design. In terms of methodology, one case study employs a matched

comparison group quasi-experimental design, the other a pre-post design, one of which also included comparisons of course evaluation between two year cohorts.

The two Arts and Humanities case studies again reflect two different disciplines, Design and Digital e-learning, and respectively focus on self-assessment and active learning and the utilisation of online digital material. Both employ relatively sound methods, one including a quasi-experimental design, the other a mixed methods of programme survey, focus groups with student and lecturer and general observations.

In terms of substantive pedagogic themes, the cases all highlight to some degree the significance of integrating student-centred and activity-based approaches, often outside formal classroom contexts, and as a way of consolidating formal learning. The application of e-learning is shown to provide flexibility to students in terms of how they choose to engage with content, but also in promoting independent study. The formal class helps provide a context around which independent activities are based. The 'flipped classroom' model is one such example, whereby core formal learning time is given to diverse problem-based activities that follow from content-driven material that students engage with at their own time and which provides foundational knowledge.

The theme of co-construction and relational professional learning is also evident in the cases which look towards students' future professional activities. Students' co-construction of disciplinary knowledge not only between learners and between learner-teacher, but also between learners and occupational groups, points towards the importance of creative involvement and active participation. In health contexts this can serve to increase student understanding of health issues and develop more positive engagement with patients and other key clients and stakeholders. In arts-based disciplines, co-construction provokes the types of input and decision-making that is likely to feature strongly in future occupations. Across all cases, teacher skill in facilitation, especially in activity-based and student-centred pedagogies, has been shown to be a major component in how effectively these approaches work in practice.

In Social Sciences and STEM, a wider choice of case study was available. All of the selected case studies met the criteria of the guiding principles underpinning the systematic literature review. In terms of pedagogic clarity, the cases all revealed the ways in which specific teaching and learning practices, often initiated by a core group of teaching staff, had been conceived and applied within a clearly-defined HE learning context. They were also explicit in terms of the conceptual basis to the pedagogic intervention and how specific aspects of learning theory fed into the design and implementation of the intervention. In explaining the parameters of the pedagogic approach, relatively clear insights are provided in the specific respective role of the learner and teacher and how these came together in producing the intended learning outcomes. As such, the cases were able to make tangible connections between pedagogic approach and student engagement, and in terms of the specific areas which the various approaches were able to impact.

The chosen cases also demonstrated relatively rigorous methodological approaches for building an evidence base, the best ones often utilising a mixed methods approach or at least one which captured student progress over time for demonstrating the long-term effects of the intervention. While varying in degree of scale and ambition, the cases offer a sound evidence base by illuminating key areas of student engagement, ranging from: performance gain, improved knowledge and understanding, reported motivation and programme commitment and overall satisfaction with the intervening provision. Moreover, the case studies are in a strong position to make direct comparisons between pedagogies for student engagement and existing teaching approaches which have more minimal impact on student learning. In some cases, there is clear scope for the pedagogies used within one disciplinary context to be extrapolated to wider disciplinary contexts in HE.

One of the most salient themes in the research is that of active rather than passive student learning. All the cases demonstrate that students not only learn best, but also perceive their learning to have meaning and value, when they have some ownership over the process and are personally involved. By extension, students appear to be most engaged when they are able to make strong and explicit connections between what they are learning and its application, or least its manifest purpose. The cases point therefore towards experientially-rich and goal-directed involvement that moves students away from passive knowledge receipt which is principally teacher-centred and content-driven, towards more active and personally and professionally salient learning activities.

Nearly all the cases point towards some modes of simulation, or an applied dimension, that generates a number of inter-related effects: students' heightened sense of involvement, their co-production of the learning process, richer student-teacher and inter-peer interaction, enhanced knowledge and understanding and stronger overall commitment and motivation (see, in particular, Coller and Scott (2009) and Auman (2011) for simulation as a mode of problem generation and opening up learning content which had hitherto been remote to students). To

varying degrees, the cases encompass the range of dimensions of engagement, including: cognitive in terms of students' enhanced knowledge and understanding of core disciplinary material; affective in terms of students' sense of involvement, confidence and self-efficacy; and behavioural in terms of students' physical and embodied involvement in the learning process. The studies all demonstrate enhanced motivation towards study and a stronger willingness to persist and reach solutions within given learning activities.

A related theme in the cases is the influence of the task activities and the ways in which these are effectively coordinated by lecturers. The cases also therefore point to the significant role of teachers in facilitating engagement activities and the need for commitment and strategic planning on their part in developing and implementing good practice. They reveal how, for engagement pedagogies to be effectively implemented and have the intended impact, lectures need to explain the purpose of student activities and the expectations of all students. This is further consolidated by lecturers actively facilitating the process and providing key input and scaffolding throughout the engagement activities.

## Case study: Design (Arts and Humanities)

Boud, D., Lawson, A. and Thomson, D.G. (2013) Does student engagement in self-assessment calibrate their judgement over time? *Assessment and Evaluation in Higher Education*, **38** (8) 941-56.

### > Key features

The study addresses the question of whether more extensive opportunities for self-assessment than offered by the typical within-module, self-assessment intervention lead to students improving their capacity to make judgements about their own work.

### > Key pedagogical principles

This case is based on the key importance of self-assessment of quality of work in a professional environment, which students therefore need to develop in the course of their studies. Research on student self-assessment suggests that explicit opportunities need to be included for the skill of self-assessing to be developed, and that this should therefore form a part of the curriculum. Self-assessment is more than just making a one-off judgement, but requires both engagement over time and engagement with criteria and standards. Students need to learn to develop distance between themselves and their work. The researchers state that to do all this, students need to consistently make evaluations and relate these to the evaluations of others: reflect on the accuracy of these judgements, and look for reasons behind poor judgements and for ways to improve future judgements. Students need to acquire knowledge of relevant standards, the ability to compare their own work to these standards and the ability to close the gap between the two. They also need to be able to calibrate their judgements with those of experts.

### > Pedagogic practice

The study uses data from a web-based assessment system that enabled students to make self-assessments against descriptive assessment criteria. It examines the development of student judgement across course modules to explore whether students' judgements improve over time and whether any effects, in terms of students' grades, differ across a cohort. The programme took place in an undergraduate design course in an Australian university, in four modules, each of which was tutored by professional designers. The ReView web-based marking software was used to do this.

### > Disciplinary-specific context

The approach addresses a key issue in design as self-assessment of work quality will be of particular importance to practitioners in this field. At present most assessment provides very little scope for self-assessment with the majority being knowledge based with criteria set by the markers. This approach aims to rectify this by providing an explicitly self-assessing approach.

### > Is the pedagogy culturally inclusive?

The study only addressed differences by attainment level. Here it was found that higher attainers tended to underestimate, and lower attainers to overestimate their performance, while middle attainers initially overestimated but estimated correctly by the final assessment. Additionally, accurate estimators (mid-level attainers) and to a lesser extent under-estimators improved their performance over time, but over-estimators (low attainers) did not. This suggests the intervention works least well for low attainers, and best for middle attainers.

> Evidence base: making the case for high impact

A quasi-experimental design was used to look at the impact of this approach. Students were allocated criteria-based grades to their submitted work prior to knowledge of the criteria-based grades they were given by tutors. Lecturers or tutors graded on the same scales without knowledge of the student's judgement; this allowed the researchers to track students' self-assessment performance across tasks/modules. The data used in the study were students' individual self-assessment grades for up to four tasks in each subject taken per semester. Each of the tasks had descriptive criteria against which percentage marks were gathered as well as the total percentage mark for each task. Tutors' judgements of student performance were gathered for comparison with students' self-assessments, which the system also stored as percentage marks. This data could then be used to answer the following questions: (1) Do students' marks agree with tutors' within a subject? (2) Do differences between tutors and students decrease with each subject undertaken? (3) Does students' overall performance affect their ability to agree with tutor marks? (4) Does students' ability to calibrate lead to improved performance?

The aspects of student engagement this study addresses are therefore metacognition and self-regulation.

> Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

T-tests showed that while students and tutors differed significantly in their judgements on the first task, this was no longer the case by the second task, and the difference thereafter remained non-significant. The difference between student and tutor judgements of task decreased over time, being large and significant in the first semester, but non-significant by the fourth semester. The effect was not uniform across students with different attainment levels, however (see above).

> Evidence for impact in other areas

The authors state that further study in different disciplines is necessary as the results may follow from specific aspects of programme design. However, the issue of accurate self-assessment is potentially an important one in all areas, and web-based assessment methods are becoming increasingly prevalent and feasible across disciplines. Therefore, the approach has a great deal of potential for impact across disciplines.

> Issues for implementation and transfer to other learning contexts

As the results are not uniformly positive, there is scope for refinement of the approach in implementation and transfer. The authors suggest that the provision of more detailed feedback information from tutors on the quality of students' self-assessments, and the engagement of students in exercises working with standards and criteria to appreciate how they can apply them to their own work would be beneficial in enhancing impact. The approach also requires regular assessment within a module, and these would need to be structured in such a way as to allow this.

> Direction to relevant sources

The key source is Boud, D., Lawson, A. and Thomson, D.G. (2013) Does student engagement in self-assessment calibrate their judgement over time? *Assessment and Evaluation in Higher Education*, **38** (8) 941-56. The study took place at the University of Technology, Sydney, Australia.

> Additional resources

Boud, D.J. and Molloy, E. (2013) Decision-making for feedback. In: Boud, D. and Molloy, E. (eds.) *Feedback in Higher and Professional Education*. Abingdon: Routledge, pp. 202-17.

Molloy, E. and Boud, D.J. (2014) Feedback models for Learning, teaching and performance. In: Spector, J.M., Merrill, M.D., Elen, J. and Bishop, M.J. (eds.) *Handbook of Research on Educational Communications and Technology*. New York: Springer, pp. 412-24.

Jolly, B. and Boud, D.J. (2013) Written feedback: what is it good for and how can we do it well? In: Boud, D. and Molloy, E. (eds.) *Feedback in Higher and Professional Education*. Abingdon: Routledge, pp. 104-24.

Boud, D.J. and Molloy, E. (2013) What is the problem with feedback In: Boud, D. and Molloy, E. (eds.) *Feedback in Higher and Professional Education*. Abingdon: Routledge, pp. 1-10.

Molloy, E. and Boud, D.J. (2013) Changing conceptions of feedback. In: Boud, D. and Molloy, E. (eds.) *Feedback in Higher and Professional Education*. Abingdon: Routledge, pp. 11-33.

## Case study: Dance (Arts and Humanities)

Alvarez, I. (2013). High aspirations: Transforming Dance students from print consumers to digital producers. *Journal of Interactive Media in Education*, Special Issue, 1-16.

### > Key features

The case examines the application and transformative potential of Open Educational Resources (OERs) for undergraduate Dance learning. The case was based on a wider departmental-level initiative based on the creation of e-learning packages across a range of theory and practice-based programmes. The underlying aim of the project was not only to enhance the theory-practice link, but also encourage students to becoming creative digital authors and be in a stronger position to co-produce educational content with their lecturers.

### > Key pedagogical principles

The concept of 'student-as-producer' (Neary 2009) is drawn upon in developing a rationale for more strongly integrating innovative and flexible technology-enhanced learning, given its emphasis on the primacy of student as active participant rather than passive knowledge recipient. Student-as-producer involves more flexible arrangements to the delivery of course material for encouraging more exploratory, research-like endeavours that enable students to become 'productive collaborators'.

Relating this approach to e-learning, in particular digital production, enables students to engage in authentic research projects and develop autonomy. This in turn has scope for taking students closer to future professional roles as they are involved in the development of performance-based competences. This approach is strongly student-centred - it not only encompasses the development of students as digitally-literate professionals, but also as co-constructors of Dance-related knowledge and artefacts and enables them to become collaborative learners.

### > Pedagogic practice

Lecturers initially developed new OERs in collaboration with an e-tutor. These resources were accessible to students through the institution's virtual learning environment (VLE). The teacher first provided notes on the packages with their aims and background, followed by instruction on how to use them and links to examples and previous usage.

The process of embedding and monitoring the OERs went through a number of stages, including online discussions forums, frequent classroom observations to assess student and teacher engagement and individual e-learning sessions to test knowledge and understanding. In the majority of cases, the e-learning tasks were completed outside lessons which were then elaborated on and discussed further during the class time. Examples of these include an innovative digital wall production that involved students uploading a photo from a street artist and make commentaries on this, as well as mind maps.

### > Disciplinary-specific context

In Dance and Dance-related disciplines there is a need for students to actively work with new media technologies as these have become a more central feature of the industry. The traditional foci within this discipline has been on enhancing performance-based capabilities and seeing technology as being marginal, rather than critical to, these skills. Many students within this discipline are likely to be involved in Dance-related field that are not exclusively tied to performance. Moreover, in Dance-technology education there are a wide range of available online materials, mainly found through existing resources such as the National Resource Centre for Dance archive.

### > Is the pedagogy culturally inclusive?

This is not explicit. However, attention is given to student voice. The intention of the project was to make resources available to a diverse population. The approach was student-centred in that students could choose whether to engage in the production of digital resources; student beliefs were taken into account and one to one support was also available. The flexible asynchronous nature of the learning provided students with choice as to what resources they used and how they used them.

### > Evidence base: making the case for high impact

The case study used a combination of staff and student surveys and focus groups and observations to gauge staff and student perceptions and attitudes to digital technology application and their level of usage. The focus groups appeared to drill down further into staffs' perceptions of their potential and students' views on some of the impacts they had on their levels of engagement and learning development. A total of eight lecturers and 30 students

completed a staff and student-versioned questionnaire, all of whom were female. 55% of the sample were first-years, 7% second years and 38% third years. In order to evaluate outcomes, focus groups were set up at the end of each term to gauge students' attitudes, and lecturers were also asked to record their reflections.

> Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

The results of the case study reveal progression gain in students' appreciation and utilisation of the affordances of digital-based approaches within the programme. Initial survey data showed that students were unsure of the potential of more e-learning style approaches, as well as some reluctance to engage with the materials on offer. However, student focus groups' material indicated that those who had used the online material observed some positive impact in terms of technology enriching understanding of the theory-practice link and facilitating the connection of ideas. Other positive perceptions were around the flexible, a-synchronous nature of their learning which provided freedom from overly directive teacher-input, including choice of stimulus and area of activity.

The case also indicated the establishment of more blended learning as the VLE system evolved to incorporate more interactive, user-friendly and multi-modal software. This reshaped communication between students and lecturers and enabled clearer expectation mapping from lecturers and also help align activities more fully to assessment. The case showed stronger connections between readings, theory and how these can be applied, as well as an emerging identity-formation around future professional role through co-producing material. Students were able to engage with more authenticated activities that brought them closer to their aspired professional community.

The digitalised forum also enhanced the digital literacy skills and confidence of students and teachers, crucial for students' future professional development. For instance, the study reported gains in student awareness of content responsibility, copyright law and Creative Common licences. A wider impact of these tools was a shift in the learning culture within the disciplinary context of the case study. The main observed shift was the gradual movement from a traditional and paper-based resource culture to one which more readily embraces e-learning and digital literature and looked to maximise its affordances where possible.

> Evidence for impact in other areas

The study identifies the potential of Open Educational Resources for engagement with wider communities.

> Issues for implementation and transfer to other learning contexts

The case explored some very specific dance-based digital activities that tapped into specific disciplinary ways of thinking. Yet it also pointed to generic features that could be applied to a wide range of disciplinary field, especially tools such as digital wall input mind-mapping, performance analysis which clearly have scope to be applied in other arts- and performance-based disciplines. The case also, however, raises the challenges for effective implementation of digital material as both staff and student will need to be aware of its relevance and how to best use available resources. Strong level of staff commitment, facilitation and consolation during class-time are clearly needed. For successful implementation, additional learning support and the move towards more compulsory online activity may also be a requirement.

> Direction to relevant sources

Neary, M. (2009) Student as producer: Risk, responsibility and rich learning environments in higher education. In: Barlow, J., Louw, G. and Price, M. (eds.) *Social Purpose and Creativity – integrating learning in the real-world*. Brighton: Brighton University Press.

## Case study: Psychiatry (Health and Social Care)

Feeney, L., Jordan, I., and McCarron, P. (2013). Teaching recovery to medical students. *Psychiatric Rehabilitation Journal*, **36** (1) 35-41.

### > Key features

In Psychiatry there is a growing recognition of the need to move from an institutional to a community-based orientation to the care of severe mental health patients. A 'recovery model', which attends strongly to user needs in terms of their definition of a fulfilling life, rather than traditional conceptions of success based on symptom reduction, getting off medication and reduced bed usage are increasingly seen as more effective. This model requires greater respect for patient views, a level of co-construction with patients, and as such a change to the attitudes and behaviours of psychiatry practitioners.

### > Key pedagogical principles

A key principle underlying this case is co-construction with patients. Patients act as 'patient-teachers', allowing students to gain a depth of understanding of psychological distress that is not accessible through traditional clinical placement. The hypothesis is that this close collaboration with patients will enhance empathy in students and lead to greater knowledge of recovery principles, less stigmatising attitudes toward people with mental illnesses, and more positive attitudes toward psychiatry in general. This differs from the traditional model in which students clinical placements in psychiatry comprise, in the main, exposure to acutely unwell patients in inpatient settings and attendance at outpatient follow-up appointments which often focus on symptoms and medication compliance. The research team changed the traditional placement to include the following elements:

- three educational sessions focusing on recovery delivered by different 'patient teachers';
- an educational session on recovery delivered by the service's principal social worker;
- educational sessions with a consultant psychiatrist during which each medical student presents the recovery story of a patient that they met during their placement;
- a recovery-oriented clinical educational assignment.

### > Pedagogic practice

The case illustrates how involvement of patients and co-construction of teaching between patients and healthcare professionals can increase student understanding of mental health issues and develop more positive engagement with patients as well as with the discipline of Psychiatry itself.

### > Disciplinary-specific context

The case addresses a specific issue in Medicine, which is that students often have negative attitudes towards patients with severe mental health issues, and often have negative attitudes towards the field of Psychiatry itself. It addresses the key issue of doctor-patient relationships, and how the field can move to a more patient-oriented approach.

### > Is the pedagogy culturally inclusive?

This aspect is not specifically addressed in this case.

### > Evidence base: making the case for high impact

Two main quantitative instruments were used: the Recovery Knowledge Inventory and a Royal College of Psychiatrists questionnaire on attitudes towards people with mental health problems. In addition, focus group interviews were conducted with students. Key elements addressed are changes to student learning and attitudes, with the focus groups also focusing on optimism regarding recovery and views on the successful treatment of patients with mental health problems.

### > Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

The study used a quasi-experimental design with pre-and post-testing along with qualitative focus groups. Twenty-three students were allocated to a six-week alternative placement with the features mentioned above. The control groups consisted of 23 students who had followed the traditional placement in the unit the previous year, and 73 students who followed traditional placements in other settings. While at baseline no differences were found in either recovery knowledge or attitudes towards mental health between treatment and control groups, the post-test showed both significantly better knowledge and significantly more positive attitudes in the treatment groups. The

results demonstrate a strong positive association between the recovery teaching programme and an increase in knowledge about recovery as well as the development of more positive attitudes toward mental illness among medical students. The focus group interviews additionally suggest that post-placement the students in the treatment group had developed more optimistic views on the possibilities for recovery from mental health problems, and had a more holistic view of factors associated with recovery (including relationships with friends and peers) than they did prior to the placement. The academics participating were aware of the trial, so the possibility of Hawthorne effects cannot be discounted. There is also no measure of ultimate changes to practice in this relatively short-term intervention.

#### > Evidence for impact in other areas

While the case study itself does not report on possible implications beyond the specific application of psychiatric treatment of severe mental health issues, the potential for impact in the broader medical fields is clear. Co-construction of learning between students, practitioners, and patients may be beneficial in other areas of medicine where prejudicial attitudes to patients or a lack of understanding of patient needs may impede effective treatment (e.g. the treatment of obesity or addiction), and this type of pedagogy may therefore be very relevant to these areas. More broadly, co-constructive approaches may be useful in other fields where the relationship between professionals and laypersons is key, such as social work, and education.

#### > Issues for implementation and transfer to other learning contexts

A key issue is the selection of suitable individuals to work with. In this case patients were selected who had lived experience of severe mental illness over many years and had fully recovered, were able to articulate their experiences well, and wanted to teach students. Such individuals may not always be easy to find. Furthermore, the approach is predicated on close relationships with the professionals and academics, which therefore need to be open to this approach. Ethical and safeguarding issues would also need careful consideration.

#### > Direction to relevant sources

The key source is: Feeney, L., Jordan, I. and McCarron, P. (2013) Teaching recovery to medical students. *Psychiatric Rehabilitation Journal*, **36** (1) 35-41. The case study took place in the Cluain Mhuire Community Mental Health Service in South County Dublin, Ireland, in 2010-11.

## Case study: Medicine and Engineering (Health and Social Care and STEM)

Bédard, D., Lison, C., Dalle, D., Cote, D. and Boutin, N. (2012) Problem-based and project-based learning in Engineering and Medicine: Determinants of students' engagement and persistence. *Interdisciplinary Journal of Problem-based Learning*, **6** (2) 7-30.

#### > Key features

The case looks at the question of how student engagement and persistence are affected by participating in problem- and project-based curricula, and in particular what factors in the learning environment may positively predict engagement and persistence.

#### > Key pedagogical principles

Project-based learning (PtBL) and problem-based learning (PmBL) are sometimes confused with one another, but are nevertheless different. The key elements of PtBL are that projects involve the solution of a problem; often though not necessarily, set by the students himself and that they commonly result in an end product, often involving the construction of a concrete artefact (Helle *et al.* 2006), and often take place over a prolonged period. In PmBL, problems should be unresolved and ill-structured; learners should determine what it is they need to learn; teachers (tutors) should act as facilitators in the learning process; and real-world problems should be chosen. Therefore, in PtBL the learners control the learning process while in PmBL the learners orient the learning process. PtBL is more oriented to producing a product. It is clear that in both cases the learning environment will be of key importance to the engagement and persistence of students, which both methods demand from students to perhaps a greater extent than traditional curricular models.

#### > Pedagogic practice

PmBL in the medical programme requires students to meet twice within a one-week period. During the first meeting, a team of students (7-8 people) is presented with a new problem. Students begin discussing among

themselves with little intervention on behalf of the tutor. The discussion is catered around the formulation of hypotheses aimed at explaining the causes of the problem. Following the first meeting, students are provided with learning objectives and references. The latter are used to attempt to validate the hypotheses, answer unresolved questions, and attain the objectives. Two or three days later, the same group meets to cover the content of the literature received (e.g., research articles, book chapters) and exchange views on the value of the hypotheses and their possible answers to the questions. Tutors act as facilitators.

In the Engineering programme a similar approach was followed, with the exception that the role of the tutor is more one of subject expert, providing answers and facts as needed. In addition the engineering programme used PtBL, in which students are asked to conceive eight engineering projects throughout the four-year curriculum.

Six key characteristics of innovative curricula were used as a framework to analyse the programmes: student-centred teaching and learning, contextualisation of teaching and learning, reduction of 'disciplinary compartmentalisation', evaluation coherent with the spirit of innovation, curricular emphasis on the transfer of learning, and collegiality among professors.

#### > Disciplinary-specific context

The study takes place in two distinct contexts: an undergraduate medical programme employing a problem-based curriculum, and an undergraduate Engineering programme using both problem-and project-based curricular approaches.

#### > Is the pedagogy culturally inclusive?

There is no evidence in the paper of the extent to which these curricula, or the predictive models, are or are not culturally inclusive.

#### > Evidence base: making the case for high impact

A survey design was used, employing a 95-item survey developed using a three-step validation process: content analysis (five experts), construct analysis (10 students), and item analysis (102 students). Measures of self-efficacy, stress, new cognitive tasks and theories and beliefs about knowing were collected to act as mediators of the relationship between the innovative curriculum and persistence and engagement. Five-point Likert scales were used in the questionnaire: 480 students completed the questionnaire - 288 in Medicine, 192 in Engineering.

#### > Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

Results showed that predictors of student engagement differed between curricula, though in all cases the predictors account for almost two-thirds of variance in the dependent variable. By far the strongest relationship in all models, however, was that between support for stress and engagement. The data suggest that, in all three curricula, when students perceive the curriculum (their learning environment) as a contributing element that diminishes their stress, they are much more likely to engage in the learning activities fully. Furthermore, in both curricula, the predictive model also puts forth the variable stressors. This suggests that both stressors and methods of dealing with stress need to be present in an effective PmBL or PtBL learning environment. To learn, to be engaged, students need to be challenged to a certain extent. The right equilibrium between stress and available resources will generate productive energy thus, stimulating students. The other two main predictors are extent of reflexive thinking and contextualisation, to key elements of both PmBL and PtBL approaches.

In terms of persistence, overall explained variance was smaller, but stress-related variables were similarly the main predictors. Concerning curriculum design the implication of these findings is that the challenge of PmBL and PtBL curricula needs to be paired with stress redactors, in particular opportunities for non-directed activities ('free slots') of which the students take charge, and peer support fostered by collaboration.

#### > Evidence for impact in other areas

The paper itself reports on two distinct areas, Medicine and Health. No evidence for impact in other areas is presented, though PmBL approaches in particular are used extensively in other disciplines so the findings may be broadly applicable.

#### > Issues for implementation and transfer to other learning contexts

The paper highlights the need to balance challenge and supports. Peer support and explicit guidance regarding the programme requirements along with the addition and removal of scaffolding. The importance of ensuring autonomy for learners is highlighted through the provision of choice and 'down time' to allow students to

consolidate their learning and to develop their own networks of support. The importance of knowledge articulation is highlighted. Supporting students to understand threshold concepts within a discipline; providing access to disciplinary discourses and modelling how approaches can be applied are all valuable in supporting knowledge articulation and what it is to be a student of subject X.

> Direction to relevant sources

The key source is Bédard, D., Lison, C., Dalle, D., Cote, D. and Boutin, N. (2012) Problem-based and project-based learning in Engineering and Medicine: Determinants of students' engagement and persistence. *Interdisciplinary Journal of Problem-based Learning*, **6** (2) 7-30. The study took place at Université de Sherbrooke, Canada in 2006-7.

## Case study: Health (Health and Social Care)

McLaughlin, J.E., Roth, M.T., Glatt, N., Davidson, C., Griffin, L., Esserman, D.A. and Mumper, R.J. (2014) The flipped classroom: A course redesign to foster learning and engagement in a health professions school. *Academic Medicine*, **89** (2) 236-43.

> Key features

In Medical, Nursing, and Pharmacy disciplines, there is a concern that students are not fully acquiring both foundational knowledge and wider skills, including criticality, complex reasoning and communication required for successful future practice. Much of this is attributed to existing teaching practices within these areas which is largely based on a traditional curricula delivered in a classic lecture format. This case applies the pedagogic method of the 'flipped classroom' in fundamentally redesigning curricula material, what and how student learning within a formal classroom setting and the relationship between teacher and student. The results from a case study which applied this approach showed marked increases in students' engagement with course content and indicate students strongly valuing more active and applied approaches as a mode of learning subject matter and acquiring skills.

> Key pedagogical principles

Flipped classroom learning is a pedagogy based on the principles of active learning and which is highly student-centred and has a strong collaborative and problem-based dimension.

Active and activity-based learning has considerable variety of focus, format and assessment activity and works in conjunction with a traditional information-driven lecture material, but which is no longer the central to the learning process. This mode of learning is presented as the antithesis of passive learning, the main associated problem of which is students' continued inability to retain key information and make active connection with what they have learned. It is also informed in part by self-determination motivational principles based on fostering student autonomy and independence and appealing to a propensity for intrinsically-orientated study and inquiry. Yet at the same time it encourages co-production and relatedness between peers and between peers and teaches. The core exercises associated with flipped learning at best instil team-working, debate and self-reflection.

> Pedagogic practice

Flipped classroom approaches largely involve the bringing together of formal instructional pedagogies that are led and delivered by the expert teachers and a wide range of active learning task that occur beyond formal, content-based lecture material. The teaching-led part is the starting place rather than the central element of the learning experience, and in this case lecture material is pre-recorded and deposited on a virtual learning repository that students can engage with at their own time and pace. All the while, the classroom time is given over to a wider range of activities that are aimed towards consolidating understanding and engagement with this material. In restructuring classroom activities away from traditional didactic exchange, and instead utilising a diverse range of learning activities and aligned assessment tools, it places responsibility on student to engage the available material prior to experience the activity-based learning. This particular case used four core activities over a 75-minute class: 1) audience response to open questions based on the pre-recorded lecture material that student responded to through a clicker; 2) pair and share activities, including a range of rapid, reflective and proactive stimulus-response activities (e.g. discussion questions) that student work around in small groups towards providing structured and thought-through answers; 3) student presentations on an assigned set of readings for which they are graded; 4) a final quiz that tested student knowledge. In addition to these activities, the lecturer provides very small micro-lectures of one to three minutes, interspersed during the session that help re-introduce and reinforce formal substantive content and provide the occasion anchor should student require this.

> Disciplinary-specific context

There is a continued challenge among health-based disciplines in producing knowledgeable and engaged healthcare graduates and potential practitioners, particularly through the increasingly complex healthcare system. This relates to the way in which a disciplinary area that is based on extensive information and the need to acquire core foundational knowledge before it can be applied is able to best transfer its knowledge base. Given the applied nature, which is often problem-based, it is imperative for students to be able to apply this once it is learnt and to be able to share this practice with colleagues.

> Is the pedagogy culturally inclusive?

While this is not an explicit feature of the case, the case authors discuss how the range of class-based activities and related assessment features can accommodate students with a broad range of different learning styles and need suggesting an integrated approach to inclusion within this pedagogical format. For instance, quizzes and presentations are able to tap into different skills than traditional written assignment formats. It is argued that through flipping students can self-pace and self-guide their learning. Through the use of appropriate assessment students were able to receive immediate feedback concerning misconceptions or gaps in their knowledge.

> Evidence base: making the case for high impact

Based on a major redesign of an existing first year specialist postgraduate Pharmacy programme and using the above pedagogic practices linked to flipped learning, the case researchers sought to explore students' perceptions of active learning, preference for delivery mode and typical engagement behaviour and whether these has changed before and after the flipped approach. A total of 150 out of 162 students enrolled on the programme and completed the pre- and post-course test. This included 104 female students, 111 white students and 121 who held at least a Bachelor's degree). In addition, end of programme evaluation was compared between the 2011 cohort who has not experienced flipped learning and the 2012 cohort who had. Student online activity in relation to logging on to course website was also recorded.

> Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

Comparisons of the 2011 and 2012 programme evaluation revealed that those who had experience the flipped method perceived it to have strongly enhanced their learning, mainly in terms of it promoting greater understanding and application of key concepts, applying knowledge and skills learnt and perceiving these skills to be directly relevant in future lives. In addition, this data indicated a more positive appraisal of teachers' input and perceived effort in trying to involve students. In comparing students' attitudes on the pre-test and post-test, paired t-tests revealed some significant perception changes on what constituted purposeful educational activities. These were mainly found around perceptions of interactive, applied class activities greatly enhancing learning ( $p < .001$ ) and in-class discussion greatly enhancing personal learning ( $p < .001$ ). In addition, perception of the pre-recorded lecturer materials (iLAMS) showed that learning key material prior to class enhanced learning during the activities and this has help in the preparations of the classes. At the same time, preference from the traditional lecture format declined on the post-testy by 72%.

> Evidence for impact in other areas

This was not evidenced in this case.

> Issues for implementation and transfer to other learning contexts

This case suggests that there is considerable scope for such pedagogies to be incorporated into other similar disciplines which require strong concept-practice linkages and have an applied component. Moreover, the actual activities they draw upon can be adapted to a broad range of disciplinary areas and have generic value; and the practice of preloading the actual lecture material prior the main class and using it instead as a basis rather than centrepiece clearly has significant cross-disciplinary potential.

> Direction to relevant sources

Prince, M. (2004) Does active learning work? A review of the research. *Journal of Engineering Education*, **93** (3) 223-31.

## Case study: Education (Social Sciences)

Auman, C. (2011) Using simulation games to increase student and instructor engagement. *College Teaching*, 59 (4) 154-61.

### > Key features

This article provides a helpful case study of active learning for promoting student engagement and involvement on an educational Psychology programme, using game-based simulations to develop students' learning and motivation within their programme. The paper outlines some of the key principles for game-based simulated forms of learning which are designed to draw learners closer to the substantive subject content and theory. This approach provides a real-world mapping of key ideas, mainly from a central conflict point which students inhabit through immersive and proactive researching and inter-peer collaboration and dialogue. Introducing simulation activities further enables the diversification of assessment which taps into multiple skills, including justifying a case position, peer review, and reflection.

### > Key pedagogic principles

Starting from the premise that quality of learning entails the movement away from teacher-centred, passive forms of content transmission towards a more active, student-centred approach, the study combines a mindful and collaborative approach to pedagogy. Mindful learning (Langer 1997) involves students meta-reflection on and being attuned to here-and-now task co-ordination and responsiveness. This is mediated through collaborative spaces of inter-student activities, facilitated by the teacher who provides an initial conceptual platform and then guides students towards independent inquiry. Collaborative learning entails student working in small groups, sharing goals, and developing mutual forms of understanding. The underlying goal of collaborative learning is: knowledge building achieved through fuller engagement; interpersonal skills through stronger inter-peer interaction; and understanding through more critical thinking of the task in hand.

### > Pedagogic practice

The case utilises an innovative simulation task activity to improve student engagement and to transform existing patterns of course delivery. Simulation activities have been utilised in a number of other cases in the social sciences (see Arias-Aranda 2007; Bernstein 2008; Rackaway 2008; Rindaldo 2014). In terms of teacher co-ordination, simulations often run in parallel with more traditional content-led delivery that introduces students to conceptual issues. Simulations in formal learning are based on real-world problems, but which connect to wider conceptual material connected to a course. In the current case, the instructor developed a simulation case based on a school discipline-related policy scenario salient to a future scenario educational Psychology students would potentially face. Simulation games took place over a week-long period with students divided into assigned simulated roles (e.g. teacher, parent, pupil, school administrator). Each day involved a different set of activities intended to tap into a different set of learning outcomes. Students initially wrote a position paper, stating their position and providing supporting evidence. This is followed by peer-review whereby students met and reviewed each other's papers. Students then presented their case to an acting board of representatives via a range of potential media. This is followed by a reflection paper that outlines what students have learned from the process, what went well and could be improved. The teacher facilitates and guides discussion in the process; and all the while students collaborate by reviewing, facilitating discussion and asking probing questions.

### > Disciplinary-specific context

Simulation games are based on substantive conceptual areas of educational psychology and debates that are splitting the discipline (moral education vs discipline policies), and then developing ways of enacting these through dialogue and role acting. At best, they bridge theory and practice and fulfil a wider goal disciplinary goal in promoting practitioner awareness and engagement with contemporary issues.

A latent outcome for practitioner-orientated disciplines such as educational Psychology is students' exposure to novel pedagogies that they can apply in their own future practice. In this particular case, simulation exercises required students to extensively research an area - for example, moral development, theories of motivation - which will place them in a better place to make a strong case for implementing a policy from the perspective of their assigned role. The multiplicity of topics coverage in simulation games, and the multiple perspectives from the various peer groups, exposes students to a broad conceptual range of information and research. Simulation activities further enables students to develop their research skills and utilise resources effectively. Transferable

skills towards future practitioner roles are also honed through the presenting of a case argument and meta-reflection on the process.

> Is the pedagogy culturally-inclusive?

While the culturally inclusive nature of this pedagogical approach is not explicit it is implied. While not all students may find collaborative learning as valuable as others, the pedagogical design enabled multiple assessments of student learning; students could choose any format to write their position statements; rubrics were provided to all students to support their learning. In addition explicit guidance was given to the requirements for debates and key theories were signposted to enable students to more easily see the connections between the materials and their roles within the learning context.

> Evidence-base: making the case for high impact

Much of the evidence is based on a mixture of quantitative test scores, student interviews and course evaluation, which also included a focus group. In addition, observation and reflection was made by the lecturer who was able to record activities, interaction levels and the quality of engagement during the simulation activities. The pre and post-tests were given to the whole year cohort and administered over two semesters and in six sections (three simulation classes, two traditional classes and one service class). Fifty-one participants had experienced only the traditional class delivery and seventy-eight had experienced the simulation classes. The main evidence here are students' and the lecturer's positive reflections on this approach for opening up cognitive and affective spaces and bringing them more involved in the subject matter, which the traditional approach does not achieve.

> Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

While no significant differences in student scores on traditional knowledge of subject area were reported for the simulation and traditional groups, the qualitative data indicated considerable benefits of participating in this method. Students were initially reticent about this approach suggesting the need for greater scaffolding, but did find it demanding and enjoyable. Student quotes from interviews indicate much stronger levels of engagement and deeper and better quality learning through active discussions and dialogue that the exercises afforded, as well as the sharpening of perspectives and researching skills (e.g. undertaking independent library searches). End of course evaluations indicated highly valued debates and discussions, perceptions of personal accountability, enhanced peer interaction, and stimulated thinking about the subject. This was also supported by lecturer observations whereby the lecturer also observed greater levels of co-ownership of the classroom leadership where activities become more evenly distributed, further preventing students becoming uninvolved any area of activity. End-of-course feedback also indicated the enhancement of other team-based and interpersonal skills such as public speaking.

Reflective analysis from the teacher indicates stronger levels of co-production between lecturer and student: while the lecturer facilitates conceptual acquisition, the learner develops and applies the concepts further, opening up areas of knowledge unfamiliar to the lecturer. The lecturer also reported increased levels of personal motivation and improved skills at decentring expert knowledge.

> Evidence of impact in other areas

This is not explicitly discussed in this case paper.

> Issues for implementation and transfer to other learning contexts

The techniques of active simulation, and resultant active learning, have applicability to other disciplinary contexts in the social sciences involving topical subject matters with multiple perspectives and conflict positions. While the case author does not develop this implication in the paper, the link to wider areas covered in this case, such as ethics and citizenship, have potential for application to other political and Social Sciences.

> Direction to relevant sources

Langer, E.J. (1997) *The power of mindful learning*. Cambridge, MA: Dacpo.

## Case study: Politics (Social Sciences)

Latimer, C. and Hempson, K.M. (2012) Using deliberation in the classroom: a teaching pedagogy to enhance student knowledge, opinion formation and civic engagement. *Journal of Political Science Education*, 8 (4) 371-88.

### > Key features

Political apathy and civic disengagement represents a significant issue among the student body, extending to those studying political and social sciences. This leads to a range of issues during and after formal study, including students' continued disengagement with course material and wider public policy, the inability to grasp key knowledge and the nuance of policy and a likely disinclination to become civically involved. This case study illuminates a pedagogical intervention within an undergraduate public policy programme, based on policy deliberation. This helped address the above issue and resulted in some significant changes in students' overall knowledge, strength of opinion and commitment to future civic engagement. The study makes a case for incorporating such an approach into lecturers' existing pedagogic arsenal in order to bring pertinent policy issues closer to students' emerging intellectual orientations.

### > Key pedagogical principles

The case draws broadly upon aspects of critical pedagogy and the importance of political science disciplines in challenging student assumptions and beliefs about the worlds through active debate and discussion. This is mainly realised through a more participatory and dialogic approach whereby learners, through an interactive and discursive environment with peers and teachers, are able to discuss, test out and reformulate ideas. This is contrasted with traditional modes of teaching delivery within political science based on a predominately teaching-centred overview of political theory and policy, occasionally complemented with student questions. The case works with a method known as deliberation and applies a specific technique known as deliberative dialogue. The underpinning principle of deliberation is a more direct involvement in the policy process through a sharing of ideas and opinion with others in a similar position with the end goal of forming a firmer and more rounded judgment around a policy decision. Through deliberating an issue, individuals become more involved, informed and reflexive over a policy matter, helping them move from a relatively uninformed or disengagement stance to one of more measured opinion. Utilising practices of political deliberation in formal classroom has been found to enrich students' knowledge and understanding, sharpen political attitudes and improve self-efficacy in shaping democratic decisions.

### > Disciplinary-specific context

Within political science disciplines there is a growing emphasis on students being able to apply their learning to wider civic and democratic ends. Moreover, that they are able to adopt a reflective and measured engagement with a particular policy rather than more reactive one that confirms their existing beliefs and prejudices. Political students are in a prime position to engage with, and actively promote civic issues and be politically active in later life; so there is a clear need to instil such dispositions through formal learning. The social capital Politics students acquire from their education can strengthen their levels of trust and efficacy in the democratic process and minimise potential disengagement. There are also core skills to be acquired in political sciences such as negotiation, mediation and decoding of multi-layered policies that students will require in future work.

### > Is the pedagogy culturally inclusive?

While the study not did explicitly address the issue of cultural inclusiveness, students were supported in developing greater understanding of their own interests and preferences. Explicit instruction was provided to all students on how the deliberative polling activity would work and during the process the students were supported to ensure that differing viewpoints were discussed.

### > Evidence base: making the case for high impact

The case applied the practice of deliberative political polling to the classroom context. In deliberative political polling, a random representative sample of citizens attends a one or two day deliberative polling event at a common location. They are briefed on an issue and provided with materials arguing for or against a policy or policy-related issue. They then discuss these in small groups, after which they engage in dialogue with experts and decision maker based on questions and issues raised in discussions.

Undergraduate students on an introductory politics and government course were divided into a treatment and control group (n 52 and n 50) the former undertook a class based on deliberative political polling and the latter a

traditional teacher-led session which also explored the policy issue within the deliberation. The topic under consideration was the introduction of a new Wal-Mart store in a local area and the permutations this entailed for the local region. The treatment group were presented with a case for deliberation and asked to develop a set of views and formulate a question. The next session involved students discussing and deliberating the issue in small groups and agreeing a common question which they were to present to a trained moderator. Prior to their respective pedagogic activities, both groups completed a pre-test survey and afterwards a post-test survey. The survey was designed to explore the effect of the different pedagogies on students' level of knowledge of policy detail, the level of their opinion and belief change and overall propensity towards future civic engagement.

- Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

While the survey test revealed an increase in knowledge relating to the specific Wal-Mart policy for both groups, the treatment group revealed a high knowledge increase, up to 36.6%. Knowledge criteria included the size of the stores, employer pay, health benefit entitlement, unions and relationship to other business. This is both a result of the detail students cover in deliberation as well as a by-product of tacit learning occurring through deliberation and advanced reasoning. It is also achieved through stronger level of student-instructor interaction through instructor facilitation of questions. The second main outcome difference was in students belief and opinion formation and change with the treatment group showing a significant shift on 11 survey questions compared to four of the control group - for example on opinions regarding the affordability of prices. Again, the instructor's clarification on key knowledge areas was seen have a significant role here. The third main outcome difference was in the anticipated level future civic engagement. The group exposed to deliberation anticipated becoming involved in student politics, attending meetings for a civic organisation and potential leadership in a political group.

- Evidence for impact in other areas

This is not provided in this case study.

- Issues for implementation and transfer to other learning contexts

Some issue are raised in terms of modelling class activities on a genuine policy deliberation poll and properly applying this to a class context, as well as the challenging on finding trained moderators who are fully versed on policy communication and facilitation. However, the case reveals powerful potential in dialogical approaches which have some cross-over in other social science disciplines in attempting to open up and debate relevant social and policy issues and broker better knowledge of issues.

- Direction to relevant sources

Harriger, K and McMillan, J. (2007) *Speaking of Politics: preparing college students for democratic citizenship through deliberative dialogue*. Dayton, OH: Kettering Foundation Press.

## Case study: Mechanical Engineering (STEM)

Coller, B.D. and Scott, M.J. (2009) Effectiveness of using a video game to teach a course in Mechanical Engineering. *Computers and Education*, **53** (3) 900-12.

- Key features

Mechanical Engineering programmes require a good understanding of numerical methods which is often a mandatory component within such degree programmes internationally. One of the recurring challenges identified by the case authors is the continued difficulty of engaging students in core mathematical concepts as this is often perceived to be lacking in relevance and practical application, abstract and dry. In response to low achievement results and low satisfaction scores, the case authors significantly redesigned a core course by incorporating video game activities to enable student to better learn a core mathematical concepts module. This also enabled a clearer understanding of the concepts and how these directly relate to vehicle design.

- Key pedagogic principles

Video game simulation pedagogy is contrasted with traditional textbook approaches when addressing the challenge of engaging students in a 'root finding' numerical problem-solving activities. The latter is presented as a de-contextualised learning process, largely based on a deductive process of arriving at a 'correct' answer - which the authors describe as an 'artificial engineering problem': their generic mathematical quality, while important, is not sufficiently connected to the engineering context.

There are three key principles to the embedding of video games into formal curricula:

1. it provides an immediate and goal-directed context whereby players know why they are involved in the process and what is to be achieved; feedback is also immediate;
2. active and critical learning is promoted, entailing a larger element of risk-taking and its direct experiences facilitate intuitive processes of knowledge and skills;
3. video games involve a fantastical process of imagination and creativity that immerses learners. This approach ultimately involves a process of active and deeper learning.

The case draws upon an inter-related set of learning concepts. One is a problem-based approach which propels students towards more authenticated and open-ended challenges that they are likely to face in a real professional context. This invariably draws students into a future professional role, enabling them to make an epistemic and personal transition from the role of engineering student to engineering profession. Relatedly, students embark upon situated learning and are able to embody the values and thinking styles of a professional community. A further underlying feature is creative and play-based learning which enables student to experiment without inhibition and find a strong level of flow and task immersion. This again contrasts with traditional classroom and text-based learning approach which inhibit more intuitive and lateral thinking due to meeting rigid outcome specifications.

#### > Pedagogic practice

The lecturers developed a video game-based numerical methods course that mirrored the design of a video game. This involves students initially designing a computer programme for the basic working of a car, working through core algorithmic principles for its basic operation (e.g. steering around a serpentine track). The next stage is developing a computer code that enables more sophisticated vehicle functioning. While this results in often unsatisfactory outcomes, it encourages students to probe and reflect, all the while making greater cognitive effort to further research and learn computational methods and their underpinning algorithmic rules. After a few weeks, the level of design challenge increases and students have to manipulate speed-over-distance based on formulating strategies for calculating optimal shift points. Throughout the process, students and tutors interact and work together in formulating appropriate strategies, although it is student-led.

#### > Disciplinary-specific context

This pedagogic intervention connects strongly to the applied engineering domain; particularly in the application of abstract mathematical concepts to concrete real-world domains. Many of the former only become fully comprehensible in the design of material objects and can often be learned by experimental and tacit processes. One of the underpinning learning outcomes of mechanical engineering programmes is the enhancement of students' professional awareness and knowledge and early enrichment of professional dispositions such as creativity and problem-solving.

#### > Is the pedagogy culturally inclusive?

While the authors have explored the entire student body on their course for one of the outcome measures, they make limited reference to the cultural inclusiveness of this approach, although there are allusions to this approach accommodating a broader spectrum of student cognitive styles. The gender, ethnic and socio-economic composition of the undergraduate students on the programme and taking part in the study are not disclosed.

#### > Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

In order to test cognitive engagement the authors used concept mapping which adopted a multi-level scoring scheme. This enabled the concept map evaluators to identify four measures of knowledge manifest in each student's concept map: number of major topics listed; number of numerical techniques per major topic; number of defining features per major topic; number of connections between primary topics. The case enlisted 86 undergraduate students to construct concept maps, 38 of whom undertook the video-game simulation module the remainder took four different traditional class-based modules. The different modules, including the game simulation, were taught by experienced lecturers of similar pedagogic standing.

#### > Relationship between engagement and educational outcomes

The first discernible outcome was the time students spent on task over the course of a week across the module cycle, which the case authors use to examine students' level of intrinsic motivation, deep engagement and intellectual intensity. By surveying the entire mechanical engineering body at the case institution, and by comparing the different course across the entire mechanical engineering programme, the data indicated that

students spent on average twice longer periods outside of class working on the game-based numerical methods course than all other courses in the curriculum.

Another key outcome of this research, which linked to students' deeper engagement, is their level of conceptual understanding. The concept maps provided a clear indicator of students' conceptual understanding of mathematical principles and contrasts were able to be drawn between students who had experienced the video-game simulation and those who had experienced traditional class-based materials. In terms of relatively low-level cognitive process and learning (e.g. memorising facts and route learning) there is no difference between the groups. However, in terms of engaging in the deeper process of learning in terms of students' conceptual understanding by defining features of numerical methods and the relationship between concepts, significant differences emerge between groups. It is evident that the students exposed to the video-game simulations have tapped into broader conceptual resources that were not as manifest for the class-based group.

#### > Evidence for impact in other areas

The case is based on a specific academic domain and challenge, but this intervention would appear directly applicable to similar cognate disciplines within engineering and other physical sciences.

#### > Issues for implementation and transfer to other learning contexts

The case raises important potential for the use of technology-enhanced learning. While the case authors do not explicitly discuss the applications to other disciplines, it clearly has potential reach to other STEM disciplines; particularly those which have a mandatory mathematical component which students find challenging and tangential to their immediate course interests. While this case draws on a mathematically-specific learning domain, there may be potential for other applied disciplines to utilise video simulation for promoting problem-focused, and active learning. Moreover, the impact of video-game simulation for fostering deeper and more engaged learning has potentially wider disciplinary reach, particularly for teaching practitioners aiming to provide an epistemic scaffold around subject matters which seem remote to students' immediate learning interests and styles.

#### > Direction to relevant sources

Coller, B. and Shernoff, D. (2009) Video-game education in Mechanical Engineering: a look at student engagement. *International Journal of Engineering Education*, **25** (2) 308-17.

## Case study: Biology (STEM)

Armstrong, N., Chang, S-M. and Brickman, M. (2007) Co-operative learning in industrial-sized Biology classes. *CBE- Life Sciences*, **6** (2) 163-71.

#### > Key features

This case highlights the continued challenges of using a large lecture approach for enhancing student knowledge and sustaining interest in subject matter, using the example of an introductory Biology module. The case draws upon a study which incorporated regular collaborative exchange within a 250> introductory module and revealed some improvements in student knowledge and understanding, test performance over the semester, attendance and an overall more favourable attitude towards this mode of lecturing. While this case offers an initial exploration of more student-centred lecturing methods, it reveals its promising scope for engaging students transiting to HE, and which can be extrapolated to other disciplinary contexts.

#### > Key pedagogical principles

The case draws upon concepts of co-operative learning which involves student interacting on a common problem and formulating a solution together through active discussion and debate. As a variant of problem-based learning, co-operative learning entails students working with a topic that has some applied aspect and which often complements conceptual ideas within a formal class. It is also an active form of learning in that students have to take full ownership of their learning and input within a fairly structured problem frame and ensure that they and other student within their group make equitable contributions. Within co-operative interaction, peers can actively aid a student's conceptual grasp by providing additional scaffolding to what the lecturer has formally provided. In some ways this can re-shape students' existing intellectual framework through exposure to alternative perspective of others. Co-operative learning is therefore a form of deeper learning, important in large-class, teacher-centred context, and which has potential to enhance student learning gain.

#### > Pedagogic practice

In applying co-operative learning to a large introductory lecture module, students were randomly generated into small groups of 6-8 where they remain for the duration of the course. Students were set the predefined expectation criteria for their involvement – preparing for the class, contributing to group discussions and showing due regard for other group members' views. Lecturers provided fairly short content overviews of a topic, interspersed by a group activity which in this case study was multiple choice questions which students feedback electronically to the tutor during the session. In this case, the lecture part had a problem-centred, case theme which formed the basis for the student exercise, for example diagnostic malpractice and DNA testing. Students must also peer rate other group members at the end of module in terms of their input and contribution to the functioning of group discussion.

> **Disciplinary-specific context**

The approach is salient to Natural Science disciplines which require students to assimilate key factual information and develop an early conceptual understanding, particularly those subject areas which have real-world applications. For such disciplines, group collaboration in future work settings such as laboratories is likely to feature strongly in their practices.

> **Is the pedagogy culturally inclusive?**

This is not addressed in this case study, although it does raise some issues about students' verbal ability and potential social confidence in group settings. The sample contained a proportion of students with a special need who were able to negotiate group membership through discussion with the tutor.

> **Evidence base: making the case for high impact**

The case study divided students into a co-operative learning group (treatment) and a traditional lecture group (control) with both groups given a pre-test to determine demographic data, self-reported grade point average and prior experience of science courses. Student performance was measured using multiple-choice exams, including six quizzes, a midterm exam involving 50 questions and a final term exam involving 80 questions. The quizzes and exams drew upon different questions but were aimed at similar levels of conceptual difficulty. Student achievement was measured in terms of students' scores on factual recall, conceptual understanding and relative performance from the beginning to completion of the module. In addition to raw achievement data, student attendance was also monitored through video record and students in the treatment group were administered a survey to gauge their views and attitudes towards this method of teaching.

> **Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?**

Comparison between the final assessment performance and the pre-test scores showed some significantly greater improvement for the co-operative learning group, suggesting some cumulative effects of the co-operative learning environment. Average classroom attendance was also significantly higher for the treatment group, while also being low for the control group and with a higher drop-out percentage. The end of course survey revealed significantly favourable attitudes towards the co-operative learning environment, both in terms of grasping subject matter and also student enthusiasm towards course material. Ninety-two percent of students surveyed believed that this approach should be used in other classes. There was also evidence of improved comprehension brought upon by group discussion and quiz questions. Open questions to the survey indicated students' higher level of positivity about course design and perceptions of a more personalised involvement in the teaching and learning process. Given that student attitude is a precursor to level of student engagement, the survey response indicates a relatively high-impact approach.

> **Evidence for impact in other areas**

Not discussed explicitly in the case paper

> **Issues for implementation and transfer to other learning contexts.**

The results of this study indicate potential for restructuring large lecture formats into more student-centred activities, although it also highlights the need for continued research on how this specifically affects learning and promotes students' understanding. The case indicated potential for this approach to be utilised in other disciplinary contexts, particularly those containing large student numbers. While the case and quiz material was tailored towards Biological sciences, it is apparent such case material could be adapted for other disciplines which require students to gain factual knowledge and understanding, e.g. Law and Medicine.

The case also points to the importance of structured planning and meaningful group activities and for whole group involvement. This includes the proper co-ordination of the collaborative learning activities, arranging students into

group and adopting careful forms of peer assessment between students to evaluate student input to the learning. It further requires skilled lecturers who are able to initially provide a firm subject context, explain the task briefs and also facilitate, where possible, the group discussions.

> Direction to relevant sources (for co-operative learning)

Anderson, W.L., Mitchell, S.M. and Osgood, M.P. (2005) Comparison of student performance in co-operative learning and traditional lecture-based Biochemistry class. *Biochemistry and Molecular Biology Education*, **33** (6) 387-93.

## Case study: Technology-enhanced learning (STEM)

Lee, T-H., Shen, P-D. and Tsai, C-W. (2010) Enhance low-achieving students' learning involvement in Taiwan's higher education: an approach via e-learning with problem-based learning and self-regulated learning. *Teaching in Higher Education*, **15** (5) 553-65.

> Key features

This case explores the redesigning of core technology-based modules for enhancing student involvement among a student population within a private vocational university in Taiwan who have historically shown low motivation, confidence and negativity towards core modules. Much of the existing design of course material has been based on textbooks and the application of non-contextualised course content and which is largely based on rote learning. Applying the core principles of problem-based and self-regulated learning in the design of a software programme module, the case found evidence of some significant improvements in student involvement and skills on completion of the programme.

> Key pedagogical principles

This case is underpinned by problem-based learning and self-regulatory learning within a computing software education context. Existing research on both these forms of learning reveals to make students more responsible towards their learning and more intrinsically motivated, as well as enhancing practical skills in subject areas. Problem-based learning (PBL) promotes more authentic modes of engagement through the use of applied or professionally-related problems that students have to actively work through in reaching solutions. As a quasi-experiential mode of learning, students are provided with a meaningful context which links present challenge to a future application; in turn enriching students' applied knowledge and awareness. Self-regulated learning (SRL) is based on students taking charge of their own learning and self-generating thoughts and actions that contribute towards the purposive alignment between learning demands and students' motivation towards meeting these. Zimmerman (1989) defines self-regulated learning as learners being: "metacognitively, motivationally, and behaviourally active participants in their own learning process" (p. 329). It thus requires students' active involvement and task immersion but with facilitation from teachers by promoting the tools and explaining the parameters for achieving this condition.

> Pedagogic practice

The case emphasises teachers' own professional development and understanding of these pedagogic principles and toolkit in the first instance in order for this to be successfully implemented. The use of experts in this area during regular meeting over a six-month period, as well as extensive professional engagement, assisted teachers with the effective implementation of PBL and SRL. Both involved the redesign of course content and activities. For the problem-based component, the lecturer introduced more challenging and real-world problem situations via role allocation (e.g. using Excel as a marketing manager to report sales figures; PowerPoint to present marketing material etc.). The lecturer initially facilitated this by providing personal examples and illustration of the application and then guiding students towards making their own ones. For the self-directed learning component, the lecturer provided an additional class teaching students the principles and application of SRL and how it can be used to guide their learning. Students were required to read and review their practices before the formal class.

> Disciplinary-specific context:

The context for this case is generic computer training provision provided to student across different disciplines. Computer skills development is clearly of relevance in the country of the case study, given its emerging economy, but also as used in most core vocational disciplines as a pedagogic tool in its own right. ICT skills have been shown to be below expected standards and particularly among vocational student who are likely to require a competent grasp of these for future employment.

> Is the pedagogy culturally inclusive?

The focus of this study is specifically on fairly low-achieving Taiwanese students and from non-traditional backgrounds; the course in application software has been specifically designed to support the learning of the specific needs of this group of students.

> Evidence base: making the case for high impact

An experimental design was used to measure students' course involvement by comparing this to their levels of involvement prior to experiencing the PBL and SRL pedagogic interventions. 102 first year students (female n 71, male n 31) completed a questionnaire at three different points in time – the beginning of the second week as a pre-test, mid-term after eight weeks and then at the end of the module and experimental phase. The questionnaire was based on a Personal Involvement Inventory which includes three core dimensions of involvement: interests, needs and values. The authors were able to measure how students' involvement in the programme was enhanced over time depending on which mode of pedagogy they had experienced. Students were randomly divided into four separate groups – a group that experience PBR and SRL approaches (n=28), a PRB and non-SRL group (n=25), a non-PRB and SRL group (n=24) and a non PBL and non-SRL group). Students in all groups were exposed to the same core syllabus of Word, Excel and PowerPoint but which were delivered differently according to their allocated pedagogy.

> Has a relationship between engagement and educational outcomes been identified as well as other forms of student feedback and input on the efficacy of such practices?

The results indicated a significant increase in score on the pre-test and post-test when comparing the results of PBL and non-PBL teaching methods, and the data showed an increase in involvement as students progressed through the course. Similar increases were evident when SRL and non-SRL groups were compared. Out of all the four experimental groups, the combined PBL and SRL pedagogies had the most significant impact on students' level of engagement. The other combination of PBL and non-STR and SRL and non-PBL had medium effect, indicating that at least one of these approaches can enhance students' involvement in online and technology-based courses. The case points to evidence that using the existing approach with no intervention contributed to an actual decline in involvement and motivation over time.

> Evidence for impact in other areas

This is not stated in the study as it focused on computer software domains.

> Issues for implementation and transfer to other learning contexts

The case raises specific and important issues for addressing student motivation, interest and performance among lower-achieving and less academic-orientated students who are enrolled on vocational programme and who need to acquire core skills in ICT. PBL and SRL have considerable reach across disciplinary domains but, as the case illustrates, teachers need to be engaged and familiar with the principles and applications of PBL and SRL as well as committed to develop specific tools and resources that are tailored towards subject matter. The study also highlights generic challenges common across technology-mediated provision which is its potential for displacement and distraction rather than being a vehicle for learning. Incorporative more active and student-centred pedagogies can help counteract such opposing outcomes.

> Direction to relevant sources

Tan, O.S. (2007) *Problem-based learning in E-learning breakthroughs*. Singapore: Thomson Learning.

Zimmerman, B.J. (1989) A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, 81 (3) 329–39.

## Section 8: Conclusions and recommendations

### Quality: research-informed practice

The research literature on pedagogy and engagement within higher education is vast; however, the quality of this research is highly variable. Only 13% of articles (n=36) demonstrated significant strengths in pedagogy, methodology and impact measured against indices of pedagogical clarity; methodological transparency; methodological congruence; evidence-based; accessibility of findings; cultural inclusivity; and evidence/potential of transferability of ideas across disciplinary boundaries.

1. A greater emphasis on research-informed practice is required along with more sophisticated notions of pedagogy. Pedagogy should not be reduced to an association with teaching approaches, methods and student-teacher relationships. Pedagogy is a dynamic process, underpinned by theories, beliefs, values and dialogue realised in real settings (Waring and Evans 2015).
2. The theoretical and conceptual underpinnings of teaching approaches used in practice need further explication and justification. Many articles claim explicitly or implicitly to be using a constructivist approach (Alt 2014). How a constructivist approach is interpreted within the discipline requires explanation and contextualisation. In 21<sup>st</sup> century learning environments there one needs to move beyond the 'what' and 'how' aspects of learning conceptions to explore the 'why' aspects; the reasons for learning (Peterson, Brown and Irving 2010).
3. To support shared understandings and promotion of meaningful approaches a greater emphasis on team-based rather than individual design of learning environments is advocated (Bass 2012).
4. More standardised and transparent reporting of pedagogical research is needed along with a more critical analysis of what approaches are most suitable for specific types of learning. The power of simulations to support learning transfer is clearly evidenced and yet only 3% of articles (n=1741) focused on this area.
5. Research initiatives need to be directed to facilitating more longitudinal studies in order to explore the impacts of pedagogical approaches on learning transfer.

### Disciplinary focus

Arts and Humanities and Health and Social Care disciplines are significantly under-represented in the HE pedagogical literature; the former contributing only 10% and the latter 9% of the research articles with reference to the main dataset (n=1741).

1. Discipline-specific approaches to pedagogic research are necessary to support learners and teachers to apply generic and discipline-specific ideas and distinctive forms of teaching to the contexts in which they work and learn (Young 2010). The cultures of student engagement vary across disciplines (Brint, Cantwell and Hanneman 2008). In the Natural Sciences, Engineering, and Business, engagement cultures appear to be based on different principles although these different principles have been found to be equally effective in generating student commitment to studying.
2. Signature pedagogies need to be more explicit and especially within Arts and Humanities. Signature pedagogies are 'about identifying ways of thinking, content, and practices that are critical to an understanding of a discipline and shaping pedagogies and practices to enable students to engage with, make meaning and adopt discipline specific ways of thinking or habits of mind' (Donnison and Marshman 2013, p. 60; Shulman 2005). Related to this notion of signature pedagogies is the need for clear identification of threshold concepts (Meyer and Land 2005). In order to be effective, lecturers need to know which modes of disciplinary discourse are critical for an understanding of the material they wish to teach (Airey and Linder 2009; Erikson 2011).
3. Clear articulation is needed about what meaningful learning approaches comprise within and across disciplines. Approaches to learning and teaching that support students in cultivating deep understandings of what it is to think and learn within a discipline, self-monitoring of their own learning, and enhancing their sensitivity to self and contextual requirements are needed. What comprises meaningful learning within the disciplines needs to be explicit. It is a long time since Marton and Saljo (1976) introduced the concepts of surface and deep approaches to the HE academic learning community. Understanding what a deep approach is within a discipline needs to be updated to 21<sup>st</sup> century learning environment requirements. There needs to be a shared understanding of what constitutes 'deep' in a specific context acknowledging that this will be different both within and across disciplines; making what is deep explicit is

essential (Evans 2015a). As part of this agenda, disciplinary perspectives, and HE perspectives on the principles underpinning overarching and disciplinary engagement cultures need to be shared and justified.

4. In developing an inclusive approach to teaching the importance of students' and lecturers' identification with a discipline and sense of fit is important (Bliuc *et al.* 2011). To support nuanced disciplinary understandings, explicit induction into ways of thinking and doing are important at all levels (discipline, faculty and institution) for students and lecturers. To support learner transitions, identifying what is and what might be troublesome knowledge for students whether it be conceptual, tacit, ritual or other forms of knowledge utilising the potential of metacognitive thinking tools is important (Cousins 2007; Foote 2013).

## Facilitating transfer of ideas across disciplines

The use of effective pedagogical approaches is relatively ubiquitous across disciplines with 50% of articles in the focused sample demonstrating considerable potential for transfer of key principles of practice across disciplines. These pedagogies are, however, enacted in nuanced ways within disciplines making translation of ideas across contexts difficult when they should not be.

- > To support translation of ideas across contexts, practitioners need to demonstrate greater transparency in the reporting of their pedagogies. Dissemination of ideas can be facilitated by clear sign-posting by HEI practitioners of how ideas can be applied within and beyond the immediate discipline. What are the generic principles that can be taken away and be applied creatively to other contexts? To support the transfer of ideas across contexts explicit guidance – a 'route map' is needed to demonstrate what the key learning and teaching points are that can be transferred both within and across disciplines. It is important to highlight generic principles and clearly outline the context of the study and potential stumbling blocks for those wishing to implement ideas in different contexts.
- > Initiatives promoting and facilitating interdisciplinary pedagogical research are important at HE, policy, and funding levels.

## Critical pedagogies and inclusive practice

The importance of individual differences in learning and the need for critical rather than descriptive pedagogies (Waring and Evans 2015) is highlighted within the focused sample of articles. Pedagogical interventions had varying impact on the learning of individuals. "Critical pedagogies supply a significant amount of the intellectual capital of the discipline of pedagogy" (Canning 2007, p. 400) enabling a reflexive research and practice-informed approach to critiquing learning and teaching from different perspectives. Consideration of who is advantaged and disadvantaged by pedagogical initiatives at a number of levels is of profound importance. Not all students valued specific pedagogical interventions (Backstrom and Cooper 2013) and some were disadvantaged by them.

Only 1% of articles considered the cultural dimension of learning as a key element of pedagogical designs. There is a lack of work addressing the range of cultural differences and few cross-cultural studies explored the impact of cultural differences on the translation of pedagogies across contexts.

1. In supporting the development of inclusive pedagogies a greater emphasis needs to be focused on the development of student self-regulatory processes, along with consideration of creative and dialogic practices to support the development of self-understanding.
2. Greater attention needs to be given to individual differences in learning utilising knowledge from Education, Neuroscience, and Psychology to consider principles of effective practice for all learners. Inclusive pedagogy needs to embrace a wide range of differences and needs to be attuned to the impact of pedagogical initiatives on individual learners. There are a range of approaches to supporting inclusive practice that warrant attention; particularly the development of adaptive environments rather than adapted (Waring and Evans 2015); the former enables all students to navigate their own pathways through the choices afforded within the learning design; the latter adapts practice to suit the needs of specific learners and is more limited. The concept of universal design and how this can be applied more fruitfully to all aspects of pedagogy and particularly the integration of technology to assist learning has considerable mileage as do consideration of connectionist approaches to learning and teaching and clear framing of learning and teaching activities (Hockings 2010).
3. The relevance of western conceptions of learning models to other cultural contexts requires attention especially given the predominance of western models of learning and teaching within the dataset.
4. In promoting engagement, Bédard *et al.*, (2012, p. 17) highlight the need for "The right equilibrium between stress and available resources" in order to generate "productive energy". They acknowledge the

importance of student autonomy in supporting such an equilibrium which aligns with the idea of adaptive environments that give students informed choices of how they navigate and work in learning environments. In balancing stress and resources Lay and Smarick (2006) emphasise the importance of clear objectives and reasonable expectations of students. How students perceive their workloads is important in promoting engagement (Baltzis and Koukias 2009). Greater explication of the role of the student in the learning process and engagement in co-partnership is important in addressing student perceptions of the relative value of the learning activity; the perceived workload, and their contribution within and beyond the immediate learning context.

5. A critically informed understanding of how best to integrate technology and pedagogy is highlighted. Technology is only valuable if it addresses a specific instructional deficit and does not become a focus in its own right (J. Caldwell 2007). Further analysis is needed on how technology can most fruitfully assist assessment practices and how such integration of technology is impacting curriculum design (e.g. the effective use of automated response systems/clickers within lecture contexts (Damron and Mott 2005); the potential of mobile technologies; (Bruce-Low *et al.* (2013); the use of wikis (Dymoke and Hughes 2009)). A critically informed approach is necessary to ensure that the technology enhances rather than undermines the purposes of assessment so that fundamental understanding is not compromised by a potential distracting emphasis on practical technological issues. J. Caldwell's (2007) review of effective automated response systems; Cochrane's (2014) review of mobile Web 2.0 technologies, and Gilbert, Whitelock and Gale's (2011) *Synthesis report on assessment and feedback with technology enhancement* are all valuable in informing pedagogical developments integrating technology and assessment in future work. Wegerif (2015) points to the need for a dialogic theory that "combines an understanding of the role of technology with an understanding of the importance of maintaining different voices in tension" (p. 438) a key question is how assessment practice can support the development of better collective as well as individual thinking.

## Assessment as a driver

The relative lag of assessment practice within HE to meet the changing requirements of 21<sup>st</sup> century learning environments can impede meaningful learning. To maximise the potential of pedagogical innovations, assessment is the lynchpin as it must keep pace with what disciplinary knowledge is seen as valuable and relevant within HE and wider contexts and needs to accurately measure meaningful learning. Pedagogies aimed at developing deeper approaches to learning are most successful when assessment practice is aligned to capture and reward a shared understanding of what constitutes 'deep' within a discipline. Ironically, current drivers aimed at enhancing student satisfaction and quality of assessment and feedback within HE may be undermining effective practice (e.g. emphasis on fast turn-around times for marking and feedback may lead to less meaningful assessment practice; rubrics and explicit guidance on assessment and feedback may encourage an instrumental approach if self-regulatory practice is not built into the process). Assessment practice needs to keep pace with the changing nature of knowledge and requirements within the disciplines to also ensure meaningful learning.

1. To meet these needs the importance of real-world assessment in bringing the 'outside in' is advocated.
2. Assessment practice needs to be meaningful in order to tap into deep learning requirements.
3. Institutional policies and procedures need to be able to respond quickly to the requirements of module and programme level assessment to ensure currency and alignment of practice.
4. Reducing the burden of assessment and ensuring congruence between module and programme level assessment are important in supporting an integrated and holistic approach to assessment.

## Gaps within the higher education pedagogy landscape

While learner-centred approaches emphasising connectionist teaching approaches and real-world assessment are a feature of the high-impact pedagogies described in this report, there is room for greater explication of the role of students in the learning process and as co-partners; this latter area is not well represented within the literature reviewed.

- > Areas of practice that warrant greater attention within the research literature include service learning initiatives, team development, self-regulation approaches, creative and dialogic pedagogies, and contemplative pedagogies; all of which have potential within and across all disciplines and are aligned closely to the requirements of 21<sup>st</sup> century learning needs.
- > Service learning represents an integrated approach to incorporating inquiry and real-world experiences combining academic study with service to the community. While service learning is more highly represented in

certain disciplines such as social work, core concepts developed and used within community placements have applications that can easily be used across disciplines.

Much emphasis has been placed on creative approaches to learning and teaching (inquiry-based learning; problem- and project-based learning; constructivism, and collaborative learning), however further research is required on the efficacy of teams in learning (Persky 2012; Postholm 2008) to include a focus on:

- > the building of co-operative teams; team assessment; flexible groupings (H. Ernst and T. Ernst 2005);
- > peer assessment (summative assessment) (Chambers, R. Channel, R. and Channel, P. (2014), peer assistance (Duah, Croft and Inglis 2014), and peer engagement activities (formative assessment) (Evans 2015b);
- > Action learning sets (Claxton, Mathers, and Wetherill 2005); building critical communities (Bette 2011).

Within the current context of socially mediated learning 'small C' creativity emphasises group endeavour over the individual and the power of 'liquid learning' through online learning mediated by social networks (McWilliams and Dawson 2008). Das (2012) argues that pedagogical practice for creativity should aim to provide deep subject domain knowledge especially given the increasingly diverse and complex, fragmented and converged 'fields' of knowledge and discipline (p. 192).

- > As part of this discussion, the role of the individual in generating 'big C' creativity (novel endeavour) should not be comprised within co-operative learning environments (Cain 2012); a question is how current pedagogical approaches are supporting the balance between co-operative and individual endeavour.

Attention is given to student perceptions of pedagogies within the literature but few articles explicitly focus on the management of students' learning needs within and across learning environments. In managing emotional regulation, contemplative pedagogies focused on *interiority* (meditation with biological, psychological and spiritual implications investigating the truth of a claim through inner research and first-hand experience). Contemplative pedagogies include a range of approaches (mindfulness; concentration; open awareness; sustaining contradictions; guided meditation; labyrinth walking; use of silence etc.) are about cultivating inner awareness. There is substantial evidence for the impact of such practices such as meditation and mindfulness on brain activity (Carroll 2005; Kunken *et al.* 2013), and stress reduction (Zajonc 2013). Contemplative pedagogies are also *sentipensate* in centralising the combination of sensing and thinking (Bettez 2011).

- > There needs to be a greater emphasis on pedagogies to facilitate learning transitions (Krause and Armitage 2014). These should include a focus on students and lecturers' beliefs and values (Ferrare and Hora 2014; Evans and Waring 2014); and development of student metacognitive, cognitive, and affective capacity as part of self-regulation.
- > Contemplative practices have potential for further integration into learning and teaching as part of a holistic approach as to what it is to be a learner (Carroll 2005; Grace 2011; Zajonc 2013). To support such practices students need to be supported in developing the skills to be able to reflect critically and reflexively. The importance of preparation and sustained guidance in reflection through the use of appropriate tools is highlighted (Carroll 2005; Garcia and Roblin 2008; Firedog, Blankenship, Green, Stroup and Walter 2012; Waring and Evans 2015).

In attending to the concerns raised above it is important to acknowledge the nested nature of pedagogy within HE (Evans 2015d) and the implications of these findings for HEI practitioners; disciplines, HE institutions; policy and funding bodies. The relative importance of each of these concerns will vary according to the nature of stakeholder involvement but all are implicated in how the pedagogies are enacted in practice.

Table 9: Attending to higher education pedagogy: core areas of development

	<b>Core Areas of Development</b>	<b>HEI teacher</b>	<b>Discipline</b>	<b>HEI</b>	<b>Policy</b>	<b>Funding Bodies</b>
8.1	<b>Quality</b> <ul style="list-style-type: none"> <li>➤ Evidence-based (research informed practice).</li> <li>➤ Longitudinal research designs.</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>
8.2	<b>Disciplinary focus: exposition of disciplinary pedagogies</b> <ul style="list-style-type: none"> <li>➤ Representation from Arts and Humanities and Health and Social Care in pedagogical literature.</li> <li>➤ Making signature pedagogies explicit (clarifying what constitutes deep engagement and learning; what the key threshold concepts are).</li> <li>➤ Ensuring explicit induction for students into what it is to think within a discipline.</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>-</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>-</li> </ul>
8.3	<b>Facilitating transfer of ideas across disciplines</b> <ul style="list-style-type: none"> <li>➤ Explication of principles.</li> <li>➤ Cross and interdisciplinary approaches.</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> </ul>
8.4	<b>Critical pedagogies and inclusive practice</b> <ul style="list-style-type: none"> <li>➤ Addressing the cultural dimension of pedagogies.</li> <li>➤ Supporting self-regulatory practice.</li> <li>➤ Creative dialogic opportunities.</li> <li>➤ &gt; Use of technology to support connected and integrated learning environments.</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>
8.5	<b>Assessment as a driver</b> <ul style="list-style-type: none"> <li>➤ Assessment practice aligned to deep learning objectives.</li> <li>➤ Ensuring institutional learning and teaching policies support development of meaningful assessment.</li> <li>➤ HE structures flexible and able to adapt; to be able to facilitate innovative assessment.</li> <li>➤ Reducing the burden of assessment – alignment</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>✓</li> <li>✓</li> <li>✓</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>✓</li> <li>-</li> <li>✓</li> </ul>	<ul style="list-style-type: none"> <li>-</li> <li>✓</li> <li>-</li> <li>-</li> </ul>

	between module and programme level assessment: a less is more approach.					
8.6	<b>Gaps within the higher education pedagogy landscape</b> <ul style="list-style-type: none"> <li>➤ Students as co-partners</li> <li>➤ Promoting collaborative, self-regulatory, and reflective pedagogical practices.</li> <li>➤ Managing individual and collective endeavours in learning to ensure student agency.</li> <li>➤ Supporting learner transitions;</li> <li>➤ Attention to post-graduate experience.</li> <li>➤ Structures and processes to facilitate sharing of good practice.</li> </ul>	✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
		✓	✓	✓	✓	✓
8.7	<b>Integration</b> <ul style="list-style-type: none"> <li>➤ Clarifying principles underpinning a pedagogical design.</li> <li>➤ Ensuring an integrated and holistic approach to support student learning within and across modules and programmes of study.</li> </ul>	✓	✓	✓	-	-
		✓	✓	✓	✓	✓

## Integration

How the elements of effective pedagogies including assessment are integrated into meaningful learning experiences is fundamental. In developing students as genuine partners, the way in which all the elements of pedagogy are fused together needs to be carefully explained to students if they are to see the affordances of the various elements in order to buy into the pedagogical design; this highlights the importance of:

- ensuring pedagogical approaches are aligned with meaningful assessment;
- ensuring congruence between modules and programmes of study to support the holistic learning of the student. How is one module impacting others? Where are the points of congruence and departure between modules?
- ensuring students and lecturers are clear about the rationale underpinning learning and teaching approaches;
- ensuring shared understandings of what is valuable in learning and what constitutes good;
- addressing students' and lecturers' beliefs and perceptions about the affordances of the learning environment in relation to perceived challenge, supports, and expectations;
- ensuring an integrated approach to pedagogical innovation so that all elements support rather than undo one another and being mindful that quick fixes do not undermine the integrity of longer term development of pedagogy;
- acknowledging the incubation period of new interventions: what can be done to facilitate the embedding of new initiatives from student and lecturer perspectives?
- clarifying what elements of impact are important and why;
- reviewing the relative value of approaches in supporting enhancements in student learning outcomes. Several articles highlight the value of very specific and cost effective activities on student learning outcomes;
- ensuring the mode of assessment can and does adequately assess the knowledge and skills one is trying to promote in new learning environments (Armstrong et al 2007; Bernstein 2008; Chiel *et al.* 2010).

There needs to be better awareness of the range of evidence-based approaches and combinations of approaches that are available to support the development of specific types of student and lecturer learning to enable informed use of such approaches in practice. HEIs can play a considerable role in the dissemination of such information through the development of integrated learning and teaching networks that enable research and teaching focused staff to collaborate together on such initiatives. Greater emphasis on team-based rather than individually constructed course design is important in enabling shared understandings and development, and use of effective pedagogies.

In summary, in moving engagement agendas forward students and lecturers need agreement on what meaningful and quality learning experiences are and how these can best be provided. The freedom to learn, to have opportunities to connect in being able to take disciplinary understandings forward and being able to apply and offer them to workplace and other contexts as co-partners and producers are key concerns in developing students as partners within higher education within 21st Century learning environments. The potential of technology to assist flexible pedagogies, to bring the outside in, and to promote learner agency is key to pedagogical development. Supporting students to manage the higher education pedagogical landscape requires an emphasis on the development of self-regulatory skills in order to support student autonomy in learning.

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## Appendix A

### Constructivist activities within higher education

Table 10: Constructivist activities within higher education (Alt 2014)

<b>1</b>	Knowledge construction – multiple opportunities given to students to investigate real problems, raise questions, and search for possible explanations while using various methodological approaches.
<b>2</b>	In-depth learning – the extent to which students are given opportunities to deeply explore a certain subject matter.
<b>3</b>	Authenticity – giving relevant meaning to the learned concepts and addressing real life events related to the topic of study.
<b>4</b>	Multiple perspectives – presenting complex ideas from several points of view.
<b>5</b>	Prior knowledge – connecting the subject materials to students’ existing knowledge and to other module content.
<b>6</b>	Teacher-student interaction – teacher role including guidance toward reflection on learning processes.
<b>7</b>	Social interaction - opportunities for a variety of learning opportunities with other students.
<b>8</b>	Co-operative dialogue – dialogical activities in which students can express opinions and original ideas.

## Appendix B

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