

QAA Shared Modules Collaborative Enhancement Project

Shared Modules Literature Review



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Introduction

Increasingly, efforts to address difference in the classroom and achieve equitable outcomes for all students are driving the way in which HE provision is designed and delivered. As HE institutions continue to leverage modularisation to offer innovative, personalised and high quality education and widen participation, there is growing awareness and emphasis on inclusivity, responding to the different needs of students to enhance student experience and the value of the curriculum.

Modules form the basic building blocks of modern degree programmes. It is through modules that curriculum is delivered and it is through the curriculum that disciplinary knowledge, skills and identities are transmitted and embedded in students.

The modular structure on which HE degree programmes are based provides a means of dividing a curriculum into smaller units based on content and level of study in order to offer choice to students and programme designers and facilitates interdisciplinary education. The benefits of broad-based interdisciplinary education have extensively discussed in the literature.¹ One of the consequences of the flexibility that the modular structure of HE programmes offers is that students with very different disciplinary backgrounds can come together to share modules. Sharing modules opens the door to significant portions of the curriculums of degree programmes to be delivered using modules that are taken by students on more than one degree programme. Shared modules draw attention to issues that arise when students who may have a different disciplinary focus and identity, based on their degree programmes, are brought together in the same learning environment. These modules can be taken by students who are on specialist degree programmes, whose design may be heavily influenced by professional body requirements, and by students who are on more flexible modular programmes with different pathways.

The term 'shared module' is not defined in the HE literature and there is no systematic body of literature on the notion of shared modules as the common or unifying theme. The issue of disciplinary heterogeneity amongst the student body at module level is largely unexplored. For example, Berry (1979) discusses teaching mathematics to mixed discipline classes; Forte and Fowler (2009) refer to a common learning unit in a study of participation in interprofessional education. Gantogtokh and Quinlan (2017) in a study of postgraduate interdisciplinary programmes identify heterogeneity in the disciplinary backgrounds of students as a specific feature. This characteristic is also a defining feature of shared modules. Gantogtokh and Quinlan (2017) also acknowledge that

¹ See for example, Knight et al. 2013; Power and Handley (2019). They present arguments that modern day 'wicked' problems require interdisciplinary solutions. Muldur (2012) argues that gaining an understanding of reality is not based on individual disciplines and specialisation but on insights from a combination of disciplines

the interdisciplinarity literature does not explicitly address the issue of teaching students from different disciplinary backgrounds, a gap which this project on shared modules aims to address.

To aid understanding and a systematic exploration of the identity, heterogeneity and curriculum issues that relate to shared modules, this literature review synthesises insights from the literature on modularisation, interdisciplinarity, interprofessional education and curriculum design in higher education. Through this synthesis we set out the basis for formulating a typology of shared modules and ascertaining the factors that may influence their design and success. This literature review is structured as follows: We first explore the background of modularisation as a principle and its curricular implications. Since shared modules involve disciplinary heterogeneity and interaction, we then draw insights on the literature on disciplinary identity, interdisciplinarity and interprofessional modules before turning attention to curriculum design models and frameworks.

Broader context

A growing body of research and educational policy exists on how modules could be designed and delivered to ensure inclusivity. This work explores how diversity can be understood and catered for in HE provision. When modules are shared, teachers are faced with classrooms that are heterogenous and which may also be quite large. These environments present a unique set of challenges and opportunities, both curricular and pedagogic, for delivering high quality education.

In the context of a shared module classroom, the fragmentation of the curriculum that can come from modularisation is juxtaposed with disciplinary heterogeneity and interaction at the student body level. Shared module classrooms can be described as comprising of different groups or parts. Shavit et al. (2016) argue that heterogeneity is not the same as diversity. They define heterogeneity as referring to a collective entity that is made up of different parts. They point out that attributing heterogeneity to an entity implies an integration of mutual interactions among different entities that all belong to the same collective, whereas attributing diversity to a collection of objects or entities entails neither interactions nor a common collective. It is important to identify the key considerations and the design and delivery methods that may impact positively on the student experience and outcomes in the case of shared modules.

Modularisation and fragmentation

Before we can explore the specifics of curricular and pedagogical issues in shared modules, we need to explore modularisation as an organising principle in HE. Modular degrees are constructed from a series of discrete units. Generally, modular degrees diverge from the idea of a traditional university 'subject' which tends to be studied in full, developing sequentially. This is not absolute as it is

possible to structure single degrees using a modular approach that supports sequential learning both within and between levels. Modules provide a content-based division of the curriculum, unlike semesterisation which is time based (French 2015). The introduction of modular degrees was thought to provide a better mechanism for the delivery of key skills, or 'transferable skills,' and to assist in the development of vocationally oriented courses and support a shift from 'craft' methods of teaching and learning to 'mass production' (Ketteridge et al. 2002: 87). French (2015) discusses how modularisation potentially opens and expands student markets through flexible and open curricula that allows for greater student mobility. Modular degrees are linked to credit transfers, which permit students to transfer between courses and between universities. Course transfers within an institution enable students to take modules from different disciplines or to change courses while retaining credit (within limits) which may be particularly valuable to students who do not have a clear idea of what course they want to undertake when commencing university study.

This emphasis upon choice: promotes self-management and potentially increases student motivation, but it also requires students to develop the skills to interpret and connect the different aspects of their learning and to make informed choices on how to construct a meaningful degree that will enhance their employment prospects. Students display both intrinsic motivations (student's own interest in the content of the module) and extrinsic motivations (student's expectations of external reward based on the characteristics of the module) when electing to study a specific module (Hedges et al. 2014). However, as pointed out by Hennessey et al (2010), overall, there has been little focus by universities on the student's experience of modularisation. This oversight is even more pronounced for exploring how modularisation is experienced by students from different disciplines. For example, Garratt et al.(2023) distinguishes between tourist students who may only study a subject/module outside of their degree specialism for a short while and those students who study a subject as part of their home discipline. They identify confusion, anxiety and alienation as likely problems for the tourist students.

Disconnection and incoherence of the curriculum and teaching

A key challenge in designing modularised programmes arises in articulating the aims for both a module and for the programme(s) to which it contributes. Modularisation offers a way of both structuring and delivering the curriculum. Programme and module leaders' views of who the curriculum is for are more likely to be out of step because of modularisation, as a module can be shared by students enrolled on many different programmes. Consequently, programme and module leaders may have different notions of the potential consumers and goals of curriculum. There can

also be disciplinary differences and biases between programme and module leaders which could impact on curriculum design and on setting programme and module aims. Curriculum design is itself a multifaceted process requiring decisions to be made about content, rationale and philosophy, process and structure (Warren 2021). Each of these facets hold potential for tensions and disconnection between the aims of programme and module developers because the curriculum is influenced not only by design principles but also by the underpinning values of the developers. Tensions can arise over decision making and control which can impact on alignment of the curriculum of a shared module with different programme curricula.

Programme aims may differ for students which presents a threat to maintaining a coherent experience both within and across modules (French, 2015). Modular course structures have been seen to lead to intellectual fragmentation and incoherence and 'emphasize packaging knowledge into discrete units (Jenkins & Walker, 1994: 32). Billings suggests that cohort cohesion is fragmented when modules are taught to students from different disciplines (1996: 19). Hennessy et al. (2010) argue that students are forced to rapidly adjust their expectations and skills to new disciplines, including how to conform to expectations around assessment. This is not just a matter of learning new skills but of learning unfamiliar academic discourses that come with different methodologies, values and identities. Bridges (2000) highlighted the implications of modularisation for disciplinary identity. Incoherence does not only affect the student experience and their learning. Rich and Scott (1997) argue that a key feature of modularisation is a sense of alienation for academics. Hennessy et al (2010) emphasise the role of modularisation in not only lowering staff morale, but that staff can actively manipulate the nature of modules to limit choice and restrict the types of students (based on pre-requisites and eligibility) that may enrol with a motivation for this being to resist the increased workload that comes with modularisation.

One of the motivations for modularisation noted by French (2015) is to introduce interdisciplinarity in the curriculum. This has advantages and disadvantages. The opportunity to select modules from different disciplines can facilitate interdisciplinary learning, although this may be limited where the course structure is set and student choice restricted. Even where the structure is set, modules from different disciplines may form part of a programme. The interdisciplinary nature of modular programs may also make them more time-consuming and demanding for academics who must teach a diverse group of students from different disciplinary backgrounds, while ensuring that all students can achieve the intended learning outcomes. This corresponds with findings by North (2005) which showed that students' epistemological beliefs, learning strategies and outcomes are related to their disciplinary specialisation. It is not unreasonable to assume that the fragmentation and dislocation

of the curriculum that is associated with modularisation would be more pronounced if careful care is not taken to address the challenges that may arise when there is disciplinary heterogeneity in a classroom.

Disciplinary interaction

Shared modules, because they bring together students of different disciplines, naturally raise questions about the connections between disciplines and how these are addressed in teaching. HE institutions are traditionally organised on a disciplinary basis which has given rise to a body of work on disciplinarity, discipline classification schemes and disciplinary identity. The notion that academic disciplines serve to construct identities or indeed 'academic tribes' is well established in the academic literature (Becher and Trowler 2001; Neumann 2002; Tight 2008, 2014, Trowler et al 2012; Power et al 2019). Disciplinarity is embedded into modules/subjects through language, coverage, methods. Discipline based curriculum as defined by UNESCO's IBE emphasises 'specific, current, and factual information and skills as it emerges from the discipline experts' ([Discipline-based curriculum | International Bureau of Education \(unesco.org\)](https://www.unesco.org/en/ibe/curriculum)). Teaching from a discipline-based curriculum would be biased largely towards the language, concepts, practices and conventions of the teacher's disciplines. A discipline-based approach would foster specialisation and preservation of disciplinary conventions.

Lattuca (2003) argues that how courses are designed and taught are influenced by epistemological stance and the persistence of disciplinary perspectives in academics thinking. A key feature of a disciplinary approach to curriculum design and teaching is the issue of disciplinary separation and its implication for overcoming boundaries to create interdisciplinary education and learning. Merely defining this separation is complex, with definitions including 'boundedness' (Klaassen, 2018), 'boundaries' (Davies and Devlin 2009) 'limit' (Frodeman, 2016), silos (Garratt et al. 2023) and 'silo thinking and acting' (Dalrymple and Miller, 2006). A significant question is to what extent disciplinarity shapes identity, informs practice and fosters exclusivity, and Chettiparamb (2007) cites Mills and Huber (2005) who suggest that "a disciplinary identity is by definition a pedagogic one" (p. 43). Chettiparamb (2011) asserts that disciplinary identities are encouraged and forged in HE through teaching.

Disciplinary identities are seen as important is determining how courses are designed and delivered. (Neumann 2001;). Studies have noted that there are disciplinary differences in how academics use

time for teaching and across disciplines in values and attitudes to assessment and curriculum (Neumann 2001; 2002 Jessop and Maleckar 2016) Academics have also considered whether a person starts off with an identity or whether the identity is developed by studying a subject. Dalrymple and Miller (2006) suggest that learner identity and a sense of belonging is influential from the beginning of academic studies.

In more recent work, Trowler (2011) however argues that 'nations' should now replace the notion of academic tribes as the influence of the knowledge structures of different disciplines on academic practices generally is considerably weaker than it was. This is because forces such as massification, modularisation and the offer of vocational courses by HE providers are significantly influencing the practices and focus of academics and blurring the lines between disciplines. Schijf et al. (2022), Blackmore and Kandiko (2012) also point to how there has been a shift from monodisciplinarity to multi or interdisciplinary programmes in universities to prepare students to address societal issues and problems, to expose them to different world views and to work in interdisciplinary teams. Within HE provision, these situations can lead to an interplay and tensions between specialisation and integration of knowledge in the product offering.

When an element of a module crosses disciplinary boundaries, it enters the realms of interdisciplinarity. Since it was used in an OECD report in 1972, the term interdisciplinarity has remained contested in the teaching and learning literature, fraught with definitional dilemmas particularly over the distinction between interdisciplinarity and other variations of disciplinarity namely, multidisciplinarity and cross-disciplinarity.² Yet, at the heart of all types of disciplinarity variation is a focus on connections and interactions between disciplines. Much of the literature on teaching in HE is on interdisciplinarity rather than other variations of disciplinarity. Shared modules present a configuration of features that can be related to interdisciplinarity. The literature on interdisciplinarity covers a range of questions that are relevant for approaching shared modules. These include typologies of interdisciplinarity, between disciplinarity and interdisciplinary teaching,

² In 1972 an OECD report provided the first comprehensive overview of the different variations of disciplinarity in HE. At times the term cross-disciplinarity is used to mean linking different fields of study while others use interdisciplinarity as the umbrella term for the different variations of disciplinarity. Mennes (2020) refers to the dominant theory of cross disciplinarity. The trinitarian typology of multi, inter and trans disciplinarity make up the cross -disciplinarity domain with the degree of disciplinary interaction used as the basis for distinguishing between the terms. (Klein 2010, Mennes 2020) Repko (2007) argues that multidisciplinary involves positioning two disciplines side by side and appreciating differences in disciplinary perspectives while interdisciplinarity is about blending or integration.

drivers of interdisciplinarity, how best to design the curriculum, the influences on interdisciplinary curriculum and teaching.

Typology of disciplinarity

One approach to viewing interdisciplinarity is to treat the concept as a term that describes a set of circumstances (Davies and Devlin 2007, 2010). As a variation of disciplinarity, the notion of interdisciplinarity applies to situations where disciplines are not completely autonomous but different levels of interaction exist between disciplines either for teaching or research purposes.

Determining interdisciplinarity is problematic and has given rise to several taxonomies. Chettiparamb (2007) published one of the most comprehensive reviews of interdisciplinarity in education. She notes that interdisciplinary teaching is also multifaceted and argues that when considering interdisciplinarity in teaching, defining the boundaries of interdisciplinarity is just as important as defining the boundaries of disciplinarity. Frodeman (2016) concurs, highlighting that the notion of limit must be a central consideration in the interdisciplinarity discourse. What all terms that are a variation of disciplinarity have in common is the way in which they challenge a strictly fragmented way of approaching teaching and learning that stems from strict disciplinarity.

Typologies and frameworks that are used to distinguish levels of disciplinary interaction could help in analysing shared modules. Considerable variation exists in the shared modules space. A shared module may be disciplinary, multidisciplinary, interdisciplinary, transdisciplinary based on the degree of integration or indeed sharing and interaction between disciplines in the design. Most writers argue that what is distinctive about interdisciplinarity is the blending/integration of the practices and assumptions of each discipline involved. Lattuca (2003) in a study of the practice of interdisciplinarity as understood by academics' actual experience from their work, both teaching and research, proposed that it is the *degree of interaction* between disciplines, rather than integration, one should consider when considering interdisciplinarity because this is more inclusive. She proposed an interdisciplinarity typology in which the interactions range from informed disciplinary scholarship to conceptual interdisciplinarity. Informed disciplinarity involves borrowing of examples from other disciplines to help students gain a broader picture of a topic being studied or make connections while maintaining the disciplinary focus of the class. The other elements in Lattuca's classification range from synthetic interdisciplinarity to transdisciplinarity and conceptual interdisciplinarity.

Transdisciplinarity involves the application of theories, concepts or methods across disciplines with the aim of developing an overarching synthesis. Courses/modules using this approach focus on a concept, theory or methods that can be applied across disciplines. Conceptual interdisciplinary courses are similar to transdisciplinary courses/modules as they adopt a variety of perspectives to examine a particular issue or problem. These do not have a clear disciplinary identity. Heckhausen (1972) identifies 6 broad types of interdisciplinarity (indiscriminate, pseudo, auxiliary, supplementary and unifying) and Davies and Devlin develop a 3 part typology distinguishing between relational, exchange and modification interdisciplinarity. In a study of interdisciplinarity in pharmacy education, Pearson and Hubball (2012) highlight the concept of an integration ladder with horizontal and vertical dimensions as a useful tool for analysing the nature of interdisciplinarity and to capture differences in cross disciplinary approaches. They suggest that in pharmacy education, this would involve connections between disciplines such as integration across basic science disciplines like medicinal chemistry, pharmaceuticals, and pharmacology. Horizontal integration is about crossing disciplinary boundaries and vertical aims to make connections as the curriculum progresses over time and between theory and practice. Synthetic interdisciplinarity occurs when the teaching of issues results in bridging disciplines. The teaching material is centred around issues found at either the boundaries or gaps of disciplines. In this approach to organising curriculum and teaching, different disciplinary experts explicate particular parts of a course/module.

Curriculum

An interdisciplinary curriculum would adopt an integrated approach that would seek to achieve understanding of themes and ideas that cut across disciplinary boundaries. It would also aim to explore the connections between disciplines ([Interdisciplinary approach | International Bureau of Education \(unesco.org\)](#)). The curriculum of a shared module may or may not cross disciplinary boundaries. For example, Garratt et al (2023) cites the case of the teaching of first year economics to students on different degree programmes. While shared modules may be used widely in HE, Turner et al. (2022) argue that opportunities for interdisciplinary learning in the UK HE sector are limited because of silos. They found that even in modules that staff identified as interdisciplinary, such as Principles of Business, a disciplinary interpretation or content focus was dominant. This persisted even though the university's curriculum development principles specified that module sharing should be considered in the design.

Another consideration that influences adopting an interdisciplinary approach to curriculum design is whether a module was designed specifically to help students overcome some existing fragmentation. Ashby and Exter (2018) review the literature on the state of interdisciplinarity and the benefits and challenges of introducing interdisciplinary curriculums into a higher education environment. They identify strategies and models that could be used in designing an interdisciplinary curriculum to provide a platform for instructional and curriculum designers for integration of interdisciplinary approaches into a curriculum design. Ashby and Exter 2018 identify benefits and challenges of introducing interdisciplinary curriculums into a higher education environment, and approaches that could be used in designing an interdisciplinary curriculum.

One way in which interdisciplinarity could be introduced in the curriculum is through sequential scheduling which will prepare students adequately for heterogenous classrooms (Pearson and Hubbell 2012, Gantogtokh and Quinlan 2017). At the programme level, the curriculum serves as a part of the coordination process for an interdisciplinary provision, together with explicitly stated vision for the programme and the support from staff (Klaessens 2018). Students participating in shared learning are expected to experience some integrative learning where connections are made. This will happen to varying extents for the different cohorts depending on their tendencies as learners (Pearson and Hubball 2012). This is because *'students from different programmes will have different interests, academic backgrounds and motivations for studying economics'* (Garratt et al. 2023 p.149). The perceptions of the tourists may be different to the 'home students'. Tourists are more likely to view the subject as inaccessible. It is inevitable that for some students, shared modules will offer an experience that is different from the ways of knowing of their 'core' disciplines (Davies and Devlin 2010)

Could placing disciplines on a spectrum better support the design of shared modules? Some researchers argue that rather than ringfencing disciplines, it is helpful to locate/ situate a discipline on a disciplinary continuum. For example, Dalrymple and Miller (2006) proposed a positioning for geography between physics and history. This can be compared to a positioning between a hard discipline (physics) and a soft discipline (history) as classified by Biglan (1973). This approach acknowledges some blurring of boundaries and fluidity between boundaries.

The pedagogical approach that is used is important here. The success of any type of module is as much a matter of pedagogy as it is of curriculum design. For example, pedagogical approaches could be constructivist, collaborative, inquiry-based, integrative or reflective. Some pedagogical

approaches may require integration of background or previously acquired information. A lecturer may also be less familiar with those students who are from outside their own department and may communicate more easily with those from their own department/ or on a study track that is closely affiliated to the lecturers' own discipline. Contributions on how best to accommodate different student bodies identify practices relating to knowing the audience, relevance of topics, breath of syllabus, creating a level playing field in communication and choice of assessment. Apart from content knowledge, the pedagogical approach that is taken on a shared module is important. Some approaches may require the student to bring background knowledge which they can apply to their understanding of the content. Including interdisciplinarity in a curriculum can bring benefits that prepare learners to make connections between fields of knowledge and support their ability to engage with complex problem solving and decision making.

Drivers of interdisciplinarity

Pedagogy encompasses a wide range of elements and approaches to embed inclusive learning. Lyall et al. (2015) highlight four main drivers to successfully embed interdisciplinary learning and teaching into the curriculum: individual-level (personal connections between academics enabling interdisciplinarity), university-level (university strategy or regulations towards interdisciplinarity), socio-cultural and economic (trends in education and workforce requirements) and external drivers (requirements of professional bodies and availability of funding). Nevertheless, institutional and regulatory requirements can still hamper the development of interdisciplinary teaching and learning. First, Canning (2005) finds that the Quality Assurance Agency for Higher Education tends to maintain a strong disciplinary bias, as a result of which assessing the quality of multidisciplinary courses and the quality of the student experience of combined degree courses has proved challenging. Furthermore, teachers may find difficult to adjust to classrooms filled with students from heterogenous academic backgrounds (Gantogtokh and Quinlan 2017). For example, as the nature of assessments and expectations around them usually display strong disciplinary roots, students from other disciplines may experience a lower level of assessment literacy, as they adjust to the specific disciplinary requirements. They face larger workloads than their monodisciplinary peers and are left with a feeling of academic homelessness and isolation (O'Donovan 2019; Weissman 2013). To improve the inclusion of students from various disciplinary backgrounds, O'Donovan (2019) argues that teachers need not necessarily attempt to 'iron out' epistemological differences but rather aim to highlight and explain what these differences mean.

Rientes & Héliot (2018) ask whether shared modules can effectively 'create' interdisciplinary students. Using a social network analysis research method, they find that most students continue to primarily learn from their same-discipline fellow students, and also prefer to nurture ties with the same discipline students. In such context, one way to improve the inclusion of students coming from various disciplinary backgrounds is to rely on multidisciplinary team teaching (Pharo et al. 2014; Self & Sang Baek 2017).

Further to this, McClam and Flores-Scott (2012) suggest that we move away from interdisciplinarity and adopt a more transdisciplinary perspective, whereby coordination of teaching and learning activities operate more holistically (i.e., at a higher institutional level). Such approach would prevent potential fragmentation and alienation biases. Nevertheless, it is beyond the scope of our research project, as we seek to address how to better integrate students from a variety of disciplinary backgrounds in shared modules.

Several factors have been identified as challenges to module delivery in instances where student bodies are heterogeneous. Forte and Fowler (2009) find that barriers include working with people who think in a different way, students' entrenchment in professional identity or underdeveloped student identity, differences in motivation among the cohort, the levels of maturity of the student cohort and students' inability to make a link with practice. Pearson and Hubbell (2012) identify negotiating the institutional traditions of disciplinary structures and disciplinary differences as key elements to achieve interdisciplinarity because of differences in understandings of knowledge and approaches to teaching and learning. They also call for investing the time and effort to design and implement integrated curricula; and using learning-centered pedagogical strategies.

The focus of the definitions and discussions of interdisciplinarity in teaching or the curriculum is typically on module content and the make-up of teaching teams to reflect different disciplines. There is little on the heterogeneity of learners or the difference that exists in the collective entity of learners that study a module. The literature on the practice of interdisciplinarity focuses on what can help people and projects to work well when different disciplines are brought together. Much of the literature focuses on opportunities students have to study with faculty from different disciplines.

There appears to be a lack of evidence that explores academics' approach and challenges/benefits when teaching one module to heterogeneous student bodies. The majority of publications on how

interdisciplinarity affects teaching and curriculum relate to issues that arise when academics with different disciplinary expertise come together to design or teach a module or programmes and to the delivery of an interdisciplinary curriculum by one person. See for example Foley 2016.

Core to the idea of curriculum modularisation and shared modules lies the promise of fostering interdisciplinary learning which is seen as a way to improve the usefulness of what universities offer the students (Chettiparamb 2017), and to stimulate student employability in order justify higher tuition fees (Lyall et al. 2015). However, while universities may be keen to develop shared modules and interdisciplinary classes, primarily for economic motives (to capitalise on economies of scale of teaching multiple disciplines cohorts), little is done in practice to stimulate genuine interdisciplinary learning and teaching, still considered different from normal (monodisciplinary) practices (Lindvig & Ulriksen 2019).

Ways forward

Interdisciplinary Teaching Teams

Some studies have explored the merits of having one tutor compared to having team teaching on interdisciplinary modules. Such an approach would match the heterogeneity of the curriculum and student body with that of the academics. Self and Baek (2017) report on shared modules taken within the School of Design and Human Engineering in an East Asian HEI by all students majoring or minoring at either the industrial design or human systems engineering departments. They highlight the disciplinary convergence in the design field but found that while the team teaching was more effective in providing students with greater opportunities to understand the relevance of the different disciplines to the course subject, students taught by a single instructor provided a more positive overall opinion of course quality and felt more encouraged to participate. Toynton (2005) report on the experience of mature learners and tutors on modules where an interdisciplinary approach is adopted to discipline based modules. They found that *'mature students may find this approach initially discomfoting but this is outweighed by the learning and empowerment it provides. Interdisciplinarity was also challenging for the tutors, who nevertheless did acknowledge that the move to interdisciplinarity brought positive learning outcomes'*.

Here interdisciplinarity stems from the teaching team and the literature focuses on the effectiveness of teaching teams with some of it drawing from the experience of interdisciplinary research teams. Stephenson et al (2010) posit that *interdisciplinarians need to be 'post-conventional' in the*

sense that they do not feel bound by the conventions of their own discipline and recognise the legitimacy and value of other perspectives and methods of inquiry.

Disciplinary protectionism is recognised and well documented. Teachers can be tribalistic. They come with discipline-based knowledge and teaching skills and the teacher's stance or orientation can positively or negatively impact on student learning. Teacher disciplinarity means that the focus is likely to be on the dominant concepts, theories and methods of the discipline with the goal of training someone to be a disciplinary expert. This is why most studies highlight the importance of or argue for interdisciplinary teaching to be delivered by teams that share the students' disciplinary values and assumptions (Klaessens 2018). Disciplinarity of the teaching team has an impact on key elements that drive learning such as assessment. Neumann (2002) argues that academics test their students on those issues which they consider particularly significant within the discipline, whether they be questions of approach and understanding or matters of factual content. Accordingly, it can be expected that both modes of assessment and the determination of grades within them will reflect disciplinary characteristics.

Interprofessional education

While sharing of modules may be ad hoc in some areas, in others this is well established practice with specific norms and practices associated. A core example comes from health and social care disciplines where the concept of interprofessional education is well established. This unites students from diverse educational backgrounds and different branches of the broader field under one interdisciplinary umbrella (Barr et al 2009). This practice is explicitly designed to use 'common learning' to produce well-rounded professionals who can collaborate across their silos, roles and expertise with an understanding and respect for different contributions for a common good of a good patient experience (Langton, 2009).

The highly focused and vocational nature of healthcare offers a number of advantages which might not be replicable in other subject areas with a less obvious career path. Langton (2009:40) outlines the following models as being standard practice of how to embed an interprofessional approach into the curriculum:

1. Implants of one or more modules into new or existing curriculum
2. Practice placement-based
3. Common curriculum across all professions
4. E-learning in parallel
5. Work based
6. More than one of the above.

Embedding this form of professional common learning in work or practice-based settings (points 1 & 5) allows authentic replication of authentic experiences and processes. This idea is advanced by D'Eon (2005) who argues this requires a distinct 'cooperative' and experiential learning approach where the activities undertaken in these multi-professional settings increase in complexity and authenticity as the programme of study progresses, thus deepening the collaboration and promoting interdependence. This form of collaboration might not be expected in other disciplines which may either be too general, too theoretical or too siloed to replicate these models. Implanting modules is highly transferable to a range of disciplines provided they were in broadly cognate areas, but the benefits of collaboration are perhaps less transparent in areas where this does not directly correspond to conditions in the workplace. In terms of pedagogy, situating collaboration in this way strongly evokes principles of constructivist learning, with this social learning models being a particular focus even in digital learning environments (Gordon, Booth and Bywater, 2010). As this form of interdisciplinarity is well developed in this sphere, there is a substantial amount of research and evaluation on the topic and good practice identified. This ranges from building community with collaborative events and for a (Howell, 2021), the focus on creating 'objects' collaboratively to drive learning (Baerheim and Rassheim, 2019). This collaborative approach has been shown however, to influence students' perception of both their own professional identity and other professions due to a weakening of student's self-concept of belonging to specific 'in-groups' (Stull and Blue, 2014) even if professional identity was very high upon commencing their studies (Coster et al 2008). Bjorke and Haavie (2006) use the term shared module in their paper on an innovative interprofessional shared module that was taken by students on eight degree programmes. A feature of these modules is that they involve a level of disciplinary interaction at the student body level. Bjorke and Haavie (2006) identify challenges at organisation, teaching and learning and individual levels including the balance between generic and special knowledge for the disciplines

Conceptualisations of curriculum/Curriculum design principles - The reflective curriculum

If modularisation contributes to a fragmentation of learning, lack of cohesion and alienation, then in what ways should shared modules be organised to avoid these pitfalls? In most models of curriculum design, academics are taken as the main architects of developing, reviewing and enhancing curriculum. Most models also differentiate between external and internal influences on curriculum design. Knight et al. (2013) identify student characteristics, faculty and discipline as the three internal factors that influence curriculum design at the module level. Neumann (2001)

highlights how studies have found that curricular differences based on whether a discipline is 'hard' or 'soft'. There are also cultural elements to curriculum design that may impact negatively on inclusivity. The norm in academia is for curriculum design to be undertaken by a specialist in an area which may increase the tensions between fragmentation and interaction that is inherent in shared modules (Muldur 2012).

Biggs (2001) discusses the role of quality assurance (QA) in building a reflective institution. As part of prospective QA that is concerned with 'reviewing how well the whole institution works in achieving its mission, and how it may be improved' (Biggs, 2001, p. 223), a quality model (QM) should be put in place. The QM elements provide a generic framework for curriculum design that consists of three important stages: 1) specifying desired outcomes in terms of learning content and skills; 2) arranging teaching/learning activities to encourage students to engage with activities to achieve the desired outcomes; and 3) designing assessment to test whether and how the desired outcomes were achieved.

Embedding reflection as a core component of the curriculum design has the chance to offer solutions to the challenges shared modules poses around fragmentation and incoherence. The term 'reflective curriculum' is commonly used amongst educational practitioners. However, it does not seem to be an established concept in research literature. Reflective generally refers to a characteristic of some action associated with reflection, which is the process of meaning-making through learners' experience that enables deeper understanding (Rodgers, 2002). Hence, practices, issues and challenges associated with both reflective teaching and reflective learning would be the subject of reflective curriculum. Whereas some scholars are interested in various aspects of teaching strategies, planning and context in relation to reflection (Ashwin and Boud, 2020; Gregson and Duncan, 2020; Silcock, 2010), the majority of scholarly attention seem to be devoted to reflective practice in general or its particular examples, such as assessment, journals, blogs or podcasts (Harvey et al., 2016; Kane et al., 2004; Ketonen and Nieminen, 2023; Morrison, 1996; Pavlovich, 2007; Ross, 2011). Some works discuss the aspects of reflective teaching in connection with reflective learning emphasising the interrelated nature of these two activities (Ashwin and Boud, 2020; Gregson and Duncan, 2020; Fullana et al., 2016).

With regards to reflective learning, research mostly explores a learner's perspective, even though there is a substantial overlap in topics with the research on reflective teaching. For example, such topics as students' perceptions and experiences (Sargent, 2015; Tan, 2021), as well as specific tools

facilitating reflection (Wolf, 2010) and reflective practice (Harvey et al., 2016) are being explored. That suggests that the bodies of literature on reflective teaching and reflective learning are closely connected, as exploring teaching practices cannot be completed without taking into account a learner's perspective. Hence, to reconstruct the issues associated with reflective curriculum, these two bodies of literature should be taken together without drawing a border between them.

Designing reflective curriculum involves several challenges which are likely compounded by the practical and disciplinary challenges of shared modules. In addition to a possible lack of authenticity in designing assessment, scholars pay attention to broader contextual issues. For example, Clarke (2011) suggests that promoting a culture of reflection in large classrooms represents a major challenge for many educators drawing attention to the importance of educational environment in stimulating reflection in large group settings. Specifically, that participants *'liked the fact that student ideas and suggestions were encouraged during lectures; they felt part of a group of students and staff committed to learning and they developed the capacity to value perspectives other than their own'* (2011, p. 528). Furthermore, the study identifies additional challenges associated with implementing reflective practices, such lower level of engagement with reflective tasks of male students compared to female students, which should also be taken into consideration by practitioners in designing reflective curriculum.

Gender differences in developing reflecting thinking have also been observed by Sargent (2015). Also, the paper draws attention to other challenges associated with the central component of reflective curriculum – reflective thinking. As Sargent (2015) explains, in higher education reflective thinking develops only after learners are able to think abstractly. Furthermore, due to the close connection with experiential learning, facilitating reflective practices brings additional challenges, as learners' experiences differ in terms of quantity, patterns and quality. This means that individual differences should be considered in designing reflective curriculum.

Definition of shared modules

Determining the nature of a shared module presents challenges, not least because of differences in the degree of disciplinary interaction but also because of the positioning of the module in a degree programme. The following table draws together and defines various models of shared modules based on practice in the literature, the experience of the project team and broader considerations of interdisciplinarity. As this area is under-researched, this project will explore the prevalence and experience of these types.

Shared module type	Definition	Teaching	Challenges
<i>Implanted</i>	When a module is taken from a different disciplinary area and inserted into an existing or new programme of study	<ul style="list-style-type: none"> • Often taught by disciplinary expert from the implanted topic • Taught to a cohort studying a specific area 	<ul style="list-style-type: none"> • Different pedagogic approaches/traditions • Students may lack experience/require scaffolding for new discipline area • ‘Implanted’ staff member may have no relationship with students
<i>Multidisciplinary</i>	When two or more closely related disciplines (e.g. economics and finance) are brought together in a module	<ul style="list-style-type: none"> • Can be co-taught by academics from each discipline • Or can be taught by academics with expertise in both areas • Can bring together students from a wide range of disciplines 	<ul style="list-style-type: none"> • Different pedagogic approaches/traditions • Students may only specialise in one area (or prefer to) • Communicating the value of the different discipline to students • Administrative arrangements
<i>Interdisciplinary</i>	When two or more distinctly separate disciplines are brought together in a module (e.g. Sociology and Medicine making a Sociology of Health module)	<ul style="list-style-type: none"> • Can involve academics from different disciplines co-developing a module • Can bring together students from a wide range of disciplines 	<ul style="list-style-type: none"> • Different pedagogic approaches/traditions • Communicating the value of the different discipline to students • May have narrow appeal (e.g. small cohorts) • Administrative arrangements

<i>Transdisciplinary</i>	When a module goes beyond disciplinary boundaries and includes content which is relevant to a broad range of different disciplines (e.g. research methods)	<ul style="list-style-type: none"> • Brings together large cohorts of students from different areas 	<ul style="list-style-type: none"> • Cohesion/community on module • Academics likely have specific specialism/focus • Administrative arrangements
<i>Interprofessional</i>	When a module brings together a range of different disciplines that are linked by their future professional overlaps (e.g. healthcare professionals)	<ul style="list-style-type: none"> • Brings together large cohorts of students from different areas • Designed to replicate future work-based practices, relationships and environments 	<ul style="list-style-type: none"> • Cohesion/community on module • Requires wider embeddedness to be effective • Administrative arrangements

Just as important for understanding the nature of module sharing, is the student pathways that underpin module sharing. Based on this review, we are proposing the following possibilities for such pathways.

- Shared by students on different programmes or pathways in the same disciplinary area
- Shared by students from different disciplinary areas which are within the same school or faculty
- Shared by students from different disciplinary areas which are in different schools or faculties
- Can be selected by students on a combined honours programme

Each of these has different implications for students' experience, particularly in terms of identity and belonging. There is little attention in the literature to how students' characteristics are brought into curriculum design and the learning environment in the case of shared modules.

Motivations are largely underexplored in the literature, as such a key focus of this study will be to explore what drives decision making around using shared modules. Based again upon the existing literature and our own experience, the following areas have been determined for exploration:

- Delivery of professional body requirements that apply to more than one programme or pathway
- Practical reasons/ efficiency
- Opportunities for interaction between students from different disciplines (e.g. to support professional development).
- Opportunities for students to elect to study outside their home discipline.
- A multidisciplinary approach to module content. (Defined as: the study of topics from the viewpoint of more than one discipline, but the boundaries between disciplines remain.)
- A transdisciplinary approach to module content. (Defined as: dissolves the boundaries between the conventional disciplines and organizes teaching and learning around the construction of meaning in the context of real-world problems or themes.)
- Attractive offer to potential applicants for a programme

Conclusion

The literature shows that over the years academics have grappled with the challenges of delivering high quality teaching to mixed classrooms. These challenges are complex and multifaceted. More recently, the emphasis on diversity has shifted attention away from disciplinary heterogeneity and interaction. Little is known about approaches about the approaches adopted to designing curriculum for shared module and the factors that impact on curriculum design.

Shared modules are not synonymous with interdisciplinary modules. While disciplinary interaction is an essential feature of shared modules and interdisciplinary modules the distinction between them has not been acknowledged and explored in the literature. In the shared modules space, a tension exists between the fragmentation that comes from modularisation and disciplinarity and the integration that comes from heterogeneity.

Common problems identified from the literature when there is sharing of modules include fragmentation of learning, lack of cohesion and alienation, student motivational differences and identity entrenchment. Disciplinary polarity can also be a source of tension. The literature suggests possible ways forward when working in mixed discipline contexts, notably use of multi and interdisciplinary teams, coordination strategies, repositioning of disciplines and curriculum design and review approaches.

Intentionally reflecting on disciplinarity and heterogeneity, rather than diversity may give rise to different perspectives when considering inclusivity in curriculum design and pedagogy. This emphasis directs attention to identifying and breaking down silos and barriers that can affect the delivery of quality teaching on shared modules. The view offered in some of the interdisciplinarity literature, that considering disciplinary interaction as opposed to disciplinary integration allows for a more inclusive way of addressing mixed discipline contexts, is helpful for our work. Explicitly recognising and cultivating disciplinary interaction in appropriate ways will enhance the student experience and promote inclusivity. To achieve this, there is a case for moving away from a diffuse consideration of the practice of module sharing that currently exists in the literature to establishing a formal definition and taxonomy of shared modules.

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