COACTION
PUBLISHING

By design: negotiating flexible learning in the built environment discipline

Richard Tucker[a],* and Gayle Morris[b]

[a]*School of Architecture and Building, Waterfront Campus, Deakin University, Geelong, Australia;* [b]*Centre for the Enhancement of Teaching and Learning, The University of Hong Kong, Hong Kong*

The term 'flexible education' is now firmly entrenched within Australian higher education discourse, yet the term is a contested one imbued with a multiplicity of meanings. This paper describes a process designed to elucidate how the idea of flexible education can be translated into teaching models that are informed by the specific demands of disciplinary contexts. The process uses a flexible learning 'matching' tool to articulate the understandings and preferences of students and academics of the Built Environment to bridge the gap between student expectations of flexibility and their teacher's willingness and ability to provide that flexibility within the limits of the pedagogical context and teaching resources. The findings suggest an informed starting point for educators in the Built Environment and other creative disciplines from which to traverse the complexities inherent in negotiating flexibility in an increasingly digital world.

Keywords: flexible learning; flexible delivery

Introduction

In Australia the term 'flexible education' is commonly used to incorporate flexible teaching, flexible learning and other related terms with which it is often used synonymously (e.g., e-learning, open learning, recourse-based learning, distance learning and self-directed learning). Most Australian Universities claim flexible provision as a strategic teaching and learning objective, and the pervasiveness of the idea of 'flexibility' has only been increased by the most recent report to influence Australian higher education policy and discourse – the 2008 Bradley Review (Bradley et al. 2008). Yet there is no universally accepted definition of what is meant by flexible education (Casey and Wilson 2005; Kirkpatrick 1997; Ling et al. 2001; Morrison and Pitfield 2006; Nicoll 1998; Normand, Littlejohn, and Falconer 2008; Nunan 1996; Sappey 2005). Nor is there agreement on how flexibility (no matter how it is defined) as an institutional objective should be implemented at the teacher/student interface; where teachers have to provide for flexibility within budgetary limits often informed by the requirements of more traditional teaching.

---

*Corresponding author: Email: rtucker@deakin.edu

1

The project described in this paper aimed to articulate the meaning of 'flexible' learning for students and teachers at an Australian school of architecture and building, where traditionally the dominant teaching form has been studio-based and thus face-to-face, by developing a 'matching' process for negotiating student and teacher competing demands. The matching process aimed to bridge the gap between student expectations of flexibility and their teacher's willingness and ability to provide that flexibility within the limits of pedagogical context and available teaching resources (finances, technology, staff – see Palmer on these difficulties –(Palmer 2001)). The process in Normand and Littlejohn's (2006, 22) terms is illustrative of a bottom-up initiative, enabling a 'teaching–learning' discourse rather than a 'managerialist discourse,' and thus providing the foundation for more robust course development and design.

The project had three primary goals; namely, to:

1. Articulate a context related understanding of 'flexible' learning that it is contained within manageable and meaningful boundaries;
2. Advance a negotiation tool for matching students' expectations of flexible learning to teacher attributes, recourses and pedagogical intent;
3. Create two distinct models of flexible learning to be used as a basis for informing appropriate flexibility for (1) theory-lecture-based and (2) design-studio-based learning.

These goals address a need to bridge two distant extremes; those of traditional modes of higher education delivery, which provide the basis of most teachers' experience, in contrast to what the modern student demands, which is (as Van den Brande defines flexible learning (1993, 22)) being able to 'learn when they want (frequency, timing, duration), how they want (modes of learning), and what they want (that is learners can define what constitutes learning to them).' Taking a lead from the central importance of context in making meaning of flexibility (Casey and Wilson 2005; Kirkpatrick 1997; Ling et al. 2001; Morrison and Pitfield 2006; Sappey 2005), and from the primacy of the individual agency of teachers and students over institutional rhetoric and policy (Bigum and Rowan 2004; Errington 2004; Nicoll and Chappell 1998; Normand, Littlejohn and Falconer 2008), our study is underpinned by the argument that the precise meaning and value of flexible education can only be found in the details of the experience of teachers and students engaged in their specific discipline context.

To articulate student/teachers experiences we have used a model of flexible learning based on the work of Nikolova and Collis (1998) and Collis and Moonen (2004), who discuss five basic 'categories' of flexibility (time, content, access/entry requirements, instructional approach and delivery), which can be further split into 19 'dimensions.' The model supports bottom-up analysis enabling discourse among those providing and receiving learning flexibility. This is consistent with Kennedy et al. (2008) who suggest that rather 'than making assumptions about what students like – and are like – universitites and their staff must look to the evidence to inform both policy and practice' (118). The 19 flexibility dimensions are grouped into the five operationalising categories as follows:

- aspects of **time**
  1. time and date at which module starts and finishes
  2. periods of time students are able to participate
  3. pace of learning
  4. time when assessment occurs
  5. sequence in which topics are covered
- aspects of **content**
  6. choice of topics covered
  7. amount of learning activities expected to be completed
  8. level of difficulty of module content
  9. assessment standards
- aspects of **access/entry requirements**
  10. pre-requisites for module participation
- aspects of instructional approach/design
  11. social organisation of learning (group or individual)
  12. times available for support
  13. choice of who decides what modes of flexible learning are available
  14. language for communication
- aspects of **delivery**
  15. time and place where support is available
  16. methods of obtaining support
  17. types of support available
  18. places for studying
  19. delivery channels (i.e., lectures, tutorials, internet, podcasts)

Before we consider in detail our own analysis of how these 19 dimensions can be used to identify appropriate pedagogic models, we shall briefly consider the literature on how the implementation of institutional flexible education policy has been received by learners and teachers.

Background

The implementation of flexibility

There has been limited research on how flexible education can be appropriately translated into teaching models informed by the specific demands of other disciplinary contexts, including the focus of this paper; the Built Environment. Within the wide range of Telescopia, a project involving the application of a flexible delivery platform for trans-European tele-learning, Collis, Vingerhoets and Moonen (1997) suggest that moving from fixed to flexible is more difficult to implement for some of the 19 dimensions than for others. Thus, Time- and Place-flexibility are easiest to implement, but offering flexibility on the other dimensions is difficult because; (1) the costs of realising flexibility are high and, (2) increased flexibility on a number of the dimensions leads to conflicts between institutional management, teachers and learners. Collis, Vingerhoets, and Moonen see that 'the transition between offering a well-designed and well-supported course, and offering more of a 'cafeteria' of options will require conceptual changes not only for course providers but also for the broader society' (Collis et al. 1997).

Within work that focuses on student experiences, only a few studies engage with the disciplinary contexts. For example, McShane, Peat, and Masters (2007) have shown that chemistry undergraduates enroled in a traditional, research-focussed university continued to expect face-to-face lectures when given online options (26). They also found that undergraduates, particularly with little previous exposure to online instruction, preferred on-campus timetable structures and that half of the surveyed group never accessed the online material made available. Their evidence suggested that a sudden move to web-based learning alienated less technically competent students or those without access to adequate computers. McShane et al. concluded that flexible practices should be introduced from the first year via a staged and coordinated process (26). In line with these findings, Dobozy (2008) has shown that first year students do not cope with flexible access provision and suggests that universities therefore have an ethical obligation to help early students to improve their engagement levels. Similarly, Samarawickrema (2005) demonstrated that first-year design students were highly teacher dependent, required better access to academic staff and that all categories of learners experienced difficulties related to online study in their first semester. Pillay, Irving, and Tones (2007) investigated a diagnostic tool for assessing Tertiary students' readiness for online learning. They found (221) that 'online students rated flexible pacing, time of study and management of conflicts between study time and other commitments as more important, and social interaction as less important, than classroom students.'

It is commonly suggested that online learning should augment, rather than replace, experiential face-to-face learning (Jones and Richardson 2002). Similarly, Poindexter (2003) warns against incorporating technology in isolation, advocating a more holistic approach that uses multiple strategies and takes into account the changing student generation. As with all instructional tools and approaches, the use of technology needs to grow out of sound learning objectives and resonate with an evidence base about how students' learn. Given the focus of this study, we might add that this evidence base ought to include the disciplinary contexts in which we teach – for different disciplinary cultures have their own discursive practices and their own ways of thinking, relating and being. Others, such as Shaffer (2004), offer a slightly different starting point by exploring how the psychological implications of new media may require a new way of understanding 'how tools and thoughts contribute equivalently (though perhaps still not equally) to educational and practical outcomes' (1). Shaffer raises the possibility that it is the relationship between technology and cognitive activity that informs social and pedagogical choices in the context of rapidly emerging technologies.

Teaching/learning flexibility nexus: a matching process

As Nikolova and Collis have explained (1998, 67), at one extreme of the flexibility continuum are traditional courses with module dates that are fixed, content that is pre-determined, instructional approaches chosen, learning materials prepared in advance and course organisation that is pre-defined. The other extreme of the continuum 'is a just-in-time, workplace-based, problem-induced learning, about which the learner makes key choices and which occurs life-long.' We argue that it is somewhere between the two extremes that appropriately flexible learning exists – at a point that matches student expectations with teacher willingness, ability and resources. The method used by us to identify this nexus builds on a process first posited by Nikolova and Collis

(1998) that maps the 19 flexibility dimensions to generic flexible module profiles to inform the adaptation for flexibility of a course's teaching modules. Our method is also in line with the work of De Boer and Collis (2005) who aimed to operationalise flexibility by examining the extent to which the 19 dimensions were being offered in practice by instructors. Only 12 dimensions were considered in the De Boer study; that is, those seen to represent aspects of flexibility that could be determined by instructors. The 12 excluded dimension numbers 5, 7, 13 and 16 (although De Boer and Collis have varied their dimension descriptions from the 19 listed in our introduction).

In common with our own project, a five-stage continuum of flexibility (see Figure 1) was used by De Boer and Collis to numerate each dimension. This continuum progresses from a traditional, 'closed' course tied down in terms of place, time and content towards more flexible, 'open,' learning where the design of the course is shared by students and academics. Once each dimension was given a flexibility value (1 being the most fixed and 5 being the most flexible), the mean was calculated. In the De Boer and Collis study, the greatest flexibility was offered in: Pace of Learning (3.06), Delivery Channels (3.40), Places for Studying (3.28) and Time and Place where support is available (3.18). De Boer and Collis suggest the study indicates two types of flexibility can be operationalised by instructors (2005, 46): Planning Flexibility, which maintains more or less the same pedagogy and teaching and learning programme while offering more flexibility in terms of delivery; and Interpersonal Flexibility, which implies a change in pedagogy to more 'student-centred contributions that relate to the experiences of the individual students and can be re-used by others as learning resources.' They concluded that the change to Interpersonal Flexibility is more difficult 'because instructors need to rethink their courses in terms of the activities within the course and also the assessment of those new activities.'

Methodology

In our project, as reported elsewhere (Tucker and Morris 2011), for each of the 19 dimensions a 'Flexible Learning Nexus' was calculated for the two types of teaching model that dominate built environment education – design-studio-based and theory-lecture-based modules. The nexus matched student and teacher expectations at a half-way point of flexibility. The 19 nexus were then collapsed to the five operationalising categories of time, content, access/entry requirements, instructional approach and delivery. The project utilised online questionnaires to profile learners and teachers and to identify what dimensions of flexibility both groups felt were appropriate to the two different learning contexts. Once each dimension was given a flexibility value, the mean was calculated between what students desired and what teachers felt able to provide.

The online questionnaire was in six sections: the first two profiled the participants by determining demographics and learning styles, the third considered attitudes to
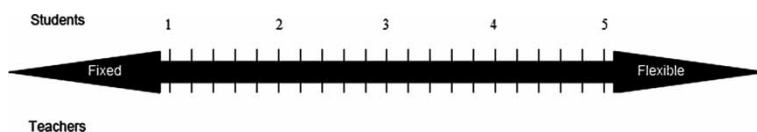

Figure 1.   Five-sage continuum of flexibility.

and learner/teacher confidence in the modules being studied/taught, the fourth considered awareness and understanding of what flexible education is, and the final two sections determined for each of the 19 dimensions what degree of flexibility both groups felt were appropriate to the two different learning contexts. In the fifth section, questions asked participants to determine an order of preference, for each dimension, between: 1. inflexible, 2. –intermediate and 3. flexible (see Table 1).

In the sixth section, participants were asked to rate, on a five-point Likert Scale, six different learning materials, five avenues of obtaining feedback and six learning spaces, for example, physical locations of study. After the data from the questionnaire were analysed, the findings were translated into the design of two generic modules – one lecture-based (delivering theory) and one studio-based (applying that theory to design practice). The generic modules were used as the basis for redesigning two specific modules that the students who had answered the entry questionnaires then participated in. Further research will see these specific modules evaluated through exit questionnaires and Student Evaluations of Teaching (SET).

Participants

Overall 78 students participated in the study. There was an approximately even split between male (40, 51.3%) and female (38, 48.7%) participants, with their ages ranging from 18 to 44 years of age with a mean age of 22. The majority of students were domestic (77, 98.7%) compared to international students (1, 1.3%). Students were enroled in three degree programmes: 31 (39.7%) were enroled in Architecture, eight (10.3%) were enroled in a Construction Management (CM) degree and 39 (50%) of students were enroled in a double degree (Architecture and CM). At the unit level, students were enroled in a total of 12 undergraduate units in the Architecture, CM and Archi/CM double degree courses. There were four, 1st year units, four, 2nd year units, two, 3rd year units and two, 4th year units. The majority of students were part-time, but all students, regardless of status attended classes on campus. One of the authors was directly involved in teaching one of the units, however, any perception of undue influence was mitigated by ensuring strict adherence to a high standard of research ethics. Participation was voluntary and the data deidentified to ensure anonymity. It should also be noted in terms of the participants' background, that the survey did not set out to specifically map students' previous experiencs of flexible learning, however, consistent with other research, for example, Kennedy et al. (2008) we would expect that in relation to experience of technologies, as one manifestation of flexible learning, patterns of access and use of a range of technologies would be widely disparate (108).

Table 1. Example of order-of-preference question for flexibility dimension.

Who should decide the level of difficulty of unit content?			
	1st Choice	2nd Choice	3rd Choice
1) Lecturer decides			
2) You, the learner, negotiates difficulty level with lecturer			
3) You, the learner, decides between basic, intermediate or advanced			

Thirteen lecturers participated in the study, approximately half (7, 53.8%) were male and their ages ranged between 29 and 60 with the mean age being 47. The lecturers ranged in experience from early career researchers in their 30s to senior academics late in their careers. Seven lecturers taught in all three degree programmes, one only in Architecture and five only in CM. Their units were selected to cover a range of online engagement, with some having the most basic level of online presence to those that had the majority of materials online.

Results

Awareness and understanding of flexible learning

Let us now consider the results of the fourth section of the questionnaire; that is, awareness and understanding of what flexible education is. There was an even split in our study between students who were aware that flexible learning was a core educational goal of their university and those who were not. All of the lecturers who responded were aware that flexible learning was a core educational goal. A single sample t-test examined students understanding of flexible learning with results indicated that students felt they had a significant understanding of flexible learning (M 2.50, SD .82) ([$\mu = 3$] t (77) -5.29, $p = 0001$). The majority of lecturers who responded indicated that they understood what flexible learning was (10, 76.9%) and that flexible learning was a familiar term to them (12, 92.3%). Two questions examined the general importance of flexible learning; (1) How important to you is it that your education is flexible? and (2) How flexible should your education be? An average of these items in a single sample t-test indicated that students felt flexible learning was significantly important (M 1.92, SD .61) ([$\mu = 3$] t (77) -15.44, $p = 0001$). A simple regression analysis revealed that 'Understanding' of flexible learning significantly predicted 'Importance' of flexible learning, ($\beta = 0.439$, $t(76) = 4.25$, $p < 0.0001$). Understanding of flexible learning also explained a significant proportion (19.20%) of the variance in importance of flexible learning, ($R^2 = 0.192$, $F(1, 77) = 18.11$, $p < 0.001$). Students felt that flexible learning was important for three reasons; educational, personal and economical reasons, and that this flexibility should allow them to learn how, when and what they wanted (see Table 2).

Pearson correlation analyses (Table 3) indicated that while the importance of flexibility in 'How' and 'What' students learnt significantly correlated, the importance of 'When' they learnt was not correlated with the other flexibility dimensions. In terms of what motivates flexibility, Economy, Education and Personal reasons all correlated with one another. However, only Economy and Personal reasons correlated with 'When,' only Educational and Personal correlated with 'How,' and none of the flexibility motivators correlated with 'What.'

Simple regression analyses examined how the importance of each of the flexibility motivators predicted the importance of the three different areas of flexibility – When, How and What. The first simple regression examined the ability of the three motivators (Economy, Personal and Education) to predict the importance of flexibility in 'When' students learnt. Results revealed that the model significantly predicted 50.8% of the variance in the importance of 'When' ($R^2 = 0.508$, $F(3, 74) = 25.42$, $p < 0.0001$). However, this finding was driven by the ability of Economy ($\beta = .285$, t (74) $= 2.89$, $p < 0.005$) and Personal ($\beta = .534$, $t(74) = 5. 220$, $p < 0.0001$) to

Table 2. One sample t-test.

	Mean (SD) [u = 3]	t (df 77)
Important When	1.73 (.80)	−14.003**
Important How	1.71 (.79)	−14.452**
Important What	2.10 (.96)	−8.244**
Important Economically	1.72(1.03)	−10.986**
Important Educationally	1.82 (.89)	−11.657**
Important Personally	2.15(1.04)	−7.148**

predict 'When.' Education as a motivator for flexibility in 'When' students could learn remained non-significant ($\beta = -.063$, $t(76) = -.717$, $p < .475$).

The second simple regression examined the ability of the three motivators to predict the importance of 'How' student's learnt. Results revealed that the model significantly predicted 39.1% of the variance in the importance of flexibility in 'How' students learnt ($R^2 = 0.391$, $F(3, 74) = 15.81$, $p < 0.0001$). However, this finding was driven only by the ability of Education ($\beta = .611$, $t(74) = 6.254$, $p < 0.0001$) to predict flexibility in 'How' students learnt. Both Personal and Economical remained non-significant in predicting 'How' (both $p < 0.53$).

The final simple regression examined the ability of the three motivators to predict the importance of flexibility in 'What' students learnt. Results revealed that the model did not significantly predict variance in the importance of 'What' ($R^2 = 0.052$, $F(3, 74) = 1.36$, $p < 0.260$).

The following findings can be interpreted from the above analyses of student understanding of flexible learning:

- Students felt that flexible learning was significantly important.
- As might be expected, students understanding of flexible learning predicted how important they felt flexible learning to be.
- Flexible learning was important to students for educational, economical and personal reasons.
- While economic and personal reasons predicted the importance to students of flexibility in when they learnt, educational reasons predicted the importance to students of flexibility in how they learnt.

Table 3. Pearson correlations.

	Important When	Important How	Important What	Important Economically	Important Educationally	Important Personally
Important When	1	0.201	0.019	0.568(**)	0.204	0.671(**)
Important How	0.201	1	0.279(*)	0.215	0.622(**)	0.244(*)
Important What	0.019	0.279(*)	1	−.088	0.128	0.100
Important Economically	0.568(**)	0.215	−0.088	1	0.255(*)	0.559(**)
Important Educationally	0.204	0.622(**)	0.128	0.255(*)	1	0.364(**)
Important Personally	0.671(**)	0.244(*)	0.100	0.559(**)	0.364(**)	1

● Students felt that it was important that what, how and when they learnt was flexible.

However, as we shall see now, these findings were not consistent with what students told us in detail in the final two sections of the questionnaire about their preferences regarding the 19 flexibility dimensions. For although this data also showed a desire for choice in 'when' and 'how' students learned, it suggested that students did not desire to choose 'what' they learned.

Students' expectations of flexible learning matched to teacher attributes, recourses and pedagogical intent

The five collapsed nexus explained in the *Method* section are recreated below (Figure 2 - white representing matched flexibility for the learning context of design-studio-based teaching, and grey representing matched flexibility for lecture-based teaching).
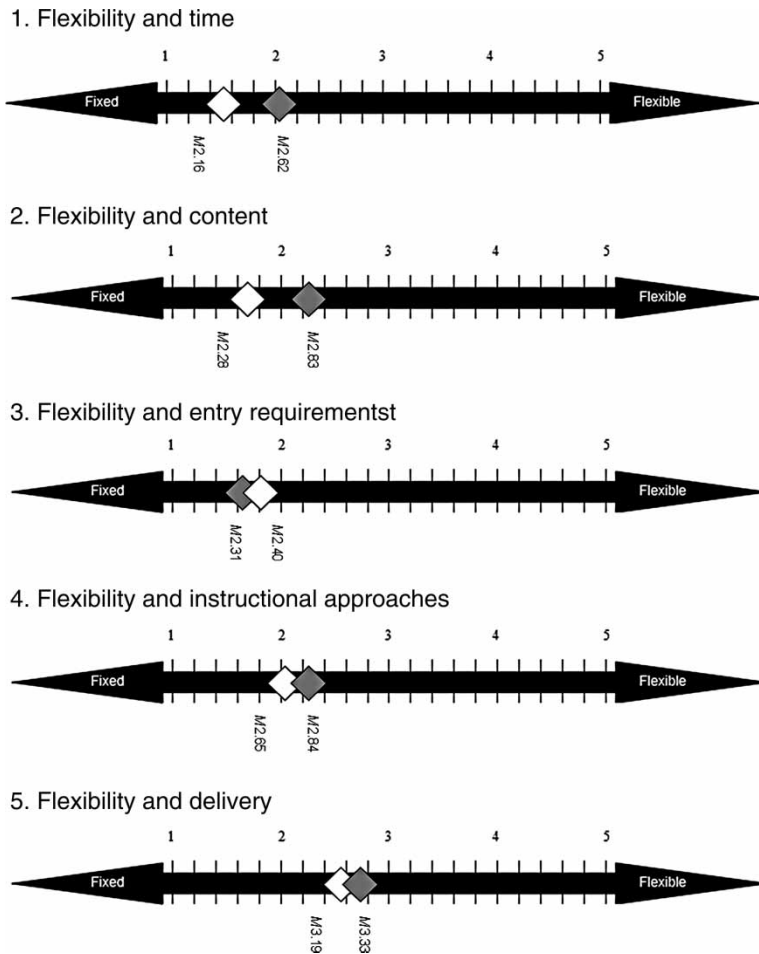

Figure 2. The Five Collapsed Nexus for Time, Content, Entry Requirements, Instructional Approaches and Delivery.

Although students rated at over 3.0 (i.e., 'flexible') six dimensions of flexibility in design-studio-based modules and three dimensions in theory-lecture-based modules, the collapsed-nexus demonstrated that for both staff and students, in neither learning context was flexibility in time, content or access/entry requirements seen as appropriate or desirable. In the fourth operationalising category – Instructional Approaches – if we remove the dimension of language (for this in most cases was not a possible variable) the collapsed nexus returns means of: Studio $= 3.57$, Lecture $= 3.37$. In the fifth operationalising category – Delivery – all five dimensions were desired as flexible by students, and the collapsed nexus for both learning contexts are again rated as 'flexible,' with means of: Studio $= 3.65$, Lecture $= 3.59$. The overall interpretation for the above five delivery dimensions is straightforward; students wanted flexibility in delivery and social organisation for both theory-lecture-based and studio/design modules. These findings are largely consistent with what De Boer and Collis found to be offered in practice by instructors.

Once the nexus were determined through survey, the flexibility ratings were translated into learning design implications or frameworks for each of the 19 dimensions – for both lecture-based and studio teaching (Table 4). The outcomes were arrived at by identifying for each dimension what the most fixed and flexible outcome might be and then scaling towards the dimension rating. Thus, for example, for Dimension 1 (time and date module starts and finishes), a 1.0 rating equated to fixed module start and finish and 5.0 to an elective that could be enrolled in at any time during the degree programme. With many of the dimensions it was not possible to provide choice due to the constraints of professional accreditation – which often dictates the order in which modules can be studied, prerequisites, assessment standards, and module and course content.

Table 4 sets out what might be usefully considered as prototypes of two of the main modes of teaching in the built environment, studio design and theory-lecture-based modules. At a glance it provides academics with a more nuanced reading of each of the flexibility dimensions. The table tries to illustrate through concrete examples what it might mean in practice. In doing so, it may expose dimensions hitherto not recognised, and therefore open flexibility doors where appropriate to do so. As prototypes, the objective is for academics to see possibilities emerging from the research findings, which could be used, but are of course open to negotiation and other interpretations.

Findings in relation to other categorisations of flexible education

There are, of course, others ways of characterising models of online delivery than the 19-dimension/five-operationalising categorisation of Nikolova and Collis. For example, Roberts (2002) describes a four model categorisation of online delivery – the naïve model (where only lecture notes are provided online), the standard model (with an email list and other online resources), the evolutionary model (which scores most highly for flexibility) and the radical model (which is largely based on group work) (5–6). Using this categorisation it can be seen that the two modules described in Table 4 are variations on an 'evolutionary' model, with the lecture/theory module representing a standard/evolutionary hybrid. How ever, it should be stressed that both of the two modules are intended to have significant face-to-face components. The U.S. Department of Education (2009) use an alternative conceptual framework which identifies three key components when considering online delivery, either

Table 4. Flexibility dimensions set out against general module characteristics for design- and theory-lecture-based modules.

Flexible learning dimension	Nexus		Learning design implications	
	Studio/ design model	Lecture/ theory model	Studio/design model	Lecture/theory model
Time				
1. Time and date module starts and finishes	2.11	1.60	Fixed	Fixed
2. Periods of time students to Participate	3.17	2.25	Lectures fixed tutorial times chosen by students and varying as assignments required	Lectures fixed Tutorial times chosen by students at the beginning of Semester
3. Pace of learning	3.17	2.69	Project-based assignment and formative assessment allows learning pace to develop within fixed semester duration limits	Project-based assignment allows learning pace to develop within fixed 4-weekly duration limits
4. Time when assessment occurs	2.15	2.08	Fixed	Fixed
5. Sequence in which topics are covered	2.49	2.22	Malleable within assignment limits	Fixed
Content				
6. Choice of topics covered	3.34	2.59	Students choose between assignments	Student choose specialisation
7. Amount of learning activities completed	2.92	2.12	Fixed	Fixed
8. Level of difficulty of module content	2.89	2.5	Students determine project complexity	Fixed
9. Assessment standards	2.19	1.93	Fixed	Fixed
Access/entry requirements				
10. Pre-requisites for module participation	2.31	2.40	Fixed	Fixed
Pedagogy				
11. Social organization (group or individual)	3.47	3.39	Student has choice unless 'teamwork' skills are a focus options for those students that have to work alone	Student has choice unless 'teamwork' skills are a focus options for those students that have to work alone
12. Times available for support	3.18	2.85	Face-to-face fixed within 6-hour studio sessions	Face-to-face fixed to hourly tutorials but feedback available regularly via online discussion boards
13. Who chooses modes of flexible learning	2.84	2.67	Predetermined by matching process	Predetermined by matching process
14. Language for communication	1.77	1.46	Fixed	Fixed

Table 4 (*Continued*)

Flexible learning dimension	Nexus		Learning design implications	
	Studio/ design model	Lecture/ theory model	Studio/design model	Lecture/theory model
Delivery				
15. Time and place where support is available	2.93	2.70	Face-to-face fixed within 6-hour studio sessions	Face-to-face fixed to hourly tutorials but feedback available regularly via online discussion boards
16. Methods of obtaining support	3.46	3.23	Predominantly face-to-face 'sign-up' tutorials with some on-line feedback	Heavy online support available via unit web-page discussion thread Email Supporting face-to-face
17. Types of support available for	3.52	3.26	Predominantly face-to-face Peer-support and peer-feedback opportunities	Online Email Face-to-face Discussion board for reflective discussions
18. Places for studying	3.15	2.96	Studio Lecture theatre	Lecture theatre Tutorial rooms Online via unit webpage Mobile devices
19. Delivery channels	3.81	3.62	A range of electronic resources linked to from the course home page Studio workshops Paper course notes Lecture slides in Power Point format Assignment marking guidelines Full contact details of all instructors Pre-recorded audio lectures available from the web for key lectures 'Live' lectures	A range of electronic resources linked to from the course home page Electronic copies of all printed course materials Lecture slides in Power-Point format Assignment marking guidelines Full contact details of all instructors Copies of past examinations for the cours Hints and tips for the current examination Model answers An electronic course discussion list Pre-recorded audio lectures available from the unit webpage for all lectures Animations to explain many of the concepts 'Live' lectures Web-based archives of mailing list discussions from previous semesters Electronic assignments submission, recording marking and return

'wholly online' or as part of a blended approach, '(1) whether the activity served as a replacement for or an enhancement to conventional face-to-face instruction, (2) the type of learning experience (pedagogical approach) and (3) whether communication was primarily synchronous or asynchronous' (3). Each component represents what might be conceived of as a key decision point where the response opens up or limits the way in which technology might be incorporated.

Discussion

The generic modules represented in Table 4 are not intended to be prescriptions or templates but, rather, to offer academics an informed starting point from which to traverse the complexities inherent in negotiating flexibility. In that sense they represent one way of representing what typical design-studio-based and theory-lecture-based fexible learning modules might look like. Both types of flexible module could be said to be consistent with De Boer and Collis's Planning Flexibility mode of flexible teaching in that they maintain more or less the same pedagogy, while offering more flexibility in terms of delivery. Academics are often unclear about how to incorporate aspects of flexibility and the appropriation of technology is often more by 'feel' rather than an theoretically informed perspective. The generic modules may ease that gap by providing academics a template from which to consider the pedagogical benefits of and the changes required to provide for flexible learning. The modules also provide an organisational framework that brings coherence to elements of flexible learning and conventional models of delivery.

One of the limitations of the tool presented here is that it may appear to offer up a prescription, or a kind of 'one size fits all' solution that is driven purely by student want and not a considered position grounded in robust instructional design or learning theory. As noted previously, the intention is to offer academics a way forward in terms of brokering several key dimensions of flexibility based on local evidence. The key here is in 'brokering;' for as with any mode of delivery, it is incumbent to be guided by an evidence base about how students learn, and the corresponding kinds of learning experiences we wish our students to have. But, as Shaffer's work reveals, these positions too are contested as new theories emerge on cognition and technology that challenge traditional notions of how we learn.

Conclusions

Using a flexible learning 'matching' tool, this project was able to articulate the understandings and preferences of students and academics of the Built Environment to bridge the gap between student expectations of flexibility and their teacher's willingness and ability to provide that flexibility within the limits of the pedagogical context and available teaching resources. The findings suggest an informed starting point from which to navigate the pedagogical complexities inherent in negotiating flexibility in an increasingly digital world. With that in mind, there are a number of implications for thinking about flexible learning within the Built Environment disciplines and a number of conclusions that can be drawn about teachers and learners in this specificic discipliniary context. These implications and conclusions are:

- For studio modules, only in content did students demand less flexibility than teachers offered, whereas for lecture modules students in all cases demanded greater flexibility than teachers. This demonstrates that, for Built Environment students, and perhaps too for students in other creative disciplines, learning can be more flexible than it is at present. In particular, the demand by students for more flexibility than their teachers are providing is greatest for the operationalising category of content delivery. Thus, as we have argued elsewhere (Tucker and Morris 2011) what our Built Environment students desired of teaching, and what their 'teachers were able to provide, were multiple mediums of knowledge delivery that allowed students flexibility in when and where they could learn.'
- Multiple mediums of delivery (types of learning material) were seen by students as more important for theory-lecture-based modules than for design-studio-based modules. This we suggest is largely due to the preference for face-to-face feedback in design. This preference is because much of design learning is experiential and thus feedback is usually individualised to the artefact created as a demonstration of that learning – artefact which, in the case of design is different for every student.
- For the categories of Time, Content and Acess/Entry requirements, students did not demand flexibilty. This is perhaps because in such an amorphous, creative learning context as design, students desire a learning structure that is clear and unshifting. In other words, when designing artefacts (such as buildings), students may not wish to be designing their education.
- Thus, the desire for fixidity in most dimensions, in a context where learning outcomes are less fixed, might be said to be related to the paradox of choice that sees learners in general experience a decrease in confidence when there is an increase in options. Indeed, this effect on learner confidence might be even greater where, as is the case for students learning how to design, there is uncertainty in the learning outcome and where assignment solutions are infinite.

The research that underpins this project was a direct attempt to engage with students and academics about the meaning and value of flexible education – as a lived practice in their local discipline contexts. It is not without limitations. The sample size was limited and was restricted to the built environment disciplines. Moreover, it is likely that each new cohort of students' preferences will be shaped by their particular experiences and so the extent to which our findings can be extrapolated to future cohorts and different disciplinary contexts requires further investigation. Future research will endeavour to map students' learning preferences to those expressed in the flexible learning survey to explore any significant patterns. As the growth in flexible learning continues within higher education, there is a corresponding need to find new ways of understanding and measuring qualitatively different learning experiences of students in specific learning contexts. Disciplines by their nature emphasise some skills, ways of knowing and being over others which, as our findings suggest, leads to appropriating technologies for different purposes. It is our hope that research of this nature will add to our understandings of student learning and enable a more authentic basis from which to negotiate flexible learning in an increasingly digital world.

Acknowledgements

References

Bigum, C. & Rowan, L. (2004) 'Flexible learning in teacher education: Myths, muddles and models'', *Asia-Pacific Journal of Teacher Education*, vol. 32, no. 3, pp. 213–226.

Bradley, D., Noonan, P., Nugent, H. & Scales, B. (2008) *Review of Australian higher education – final report*. Commonwealth of Australia, Canberra.

Casey, J. & Wilson, P. (2005) *A practical guide to providing flexible learning in further and higher education*. Quality Assurance Agency for Higher Education Scotland, Glasgow. Available online at: http//www.enhancementthemes.ac.uk/documents/flexibleDelivery/FD_Flexible_Learning_JCaseyFINALWEB.pdf [accessed 15 November 2010].

Collis, B. & Moonen, J. (2004) *Flexible learning in a digital world*, 2nd edn, Routledge and Falmer, London.

Collis, B., Vingerhoets, J. & Moonen, J. (1997) 'Flexibility as a key construct in european training: experiences from the telescopia project', *British Journal of Educational Technology,* vol 28 no. 3, pp. 199–217.

De Boer, D. & Collis, B. (2005) 'Becoming more systematic about flexible learning: Beyond time and distance', ALT-J', *Research in Learning Technology*, vol. 13, no. 1, pp. 33–48.

Dobozy, E. (2008) 'Plan your study around your life, not the other way around: How are semi-engaged students coping with flexible access?' *Paper presented at the EDU-COM conference*, Khon Kaen, Thailand.

Errington, E. (2004) 'The impact of teacher beliefs on flexible learning innovation: some practices and possibilities for academic developers' *Innovations in Education and Teaching International,* vol. 411, no. 1, pp. 39 – 47.

Jones, S. & Richardson, J. (2002) 'Designing an IT-augmented student-centred learning environment', *Paper presentat at the HERDSA Conference*, Perth, Australia.

Kennedy, G. et al. (2008) 'First year students' experiences with technology: are they really digital natives?', *Educational Technology*, vol. 24, no. 1, pp. 108–122.

Kirkpatrick, D. (1997) 'Becoming flexible: contested territory', *Studies in Continuing Education,* vol. 19, no. 2, pp. 160 – 173.

Ling, P., et al. (2001) *The effectiveness of models of flexible provision of higher education – 01/9*, Department of Education, Training and Youth Affairs, Canberra. Available online at: http://www.dest.gov.au/sectors/higher_education/publications_resources/profiles/archives/models_of_flexible_provision_higher_education.htm [accessed 15 November 2010].

McShane, K., Peat, M. & Masters, A. F. (2007) 'Playing it safe? Students' study preferences in a flexible chemistry module', *Australian. Journal. of Education. in Chemistry*, no. 67: 24–30.

Morrison, L. & Pitfield, M. (2006) 'Flexibility in initial teacher education: implications for pedagogy and practice'', *Journal of Education for Teaching*, vol. 32, no. 2, pp. 185–196.

Nicoll, K. (1998) '"Fixing" The "Facts": flexible learning as policy invention', *Higher Education Research & Development,* vol. 17, no. 3, pp. 291 – 304.

Nicoll, K. & Chappell, C. (1998) 'Policy effects: "Flexible learning" In higher education and the "De-differentiation" Of the vocational sector', *Studies in Continuing Education*, vol. 20, no. 1, pp. 39–50.

Nikolova, I. & Collis, B. (1998) 'Flexible learning and design of instruction', *British Journal of Educational Technology*, vol. 29, no. 1, pp. 59–72.

Normand, C. & Littlejohn, A. (2006) *Enhancing practice – flexible delivery – a model for analysis and implementation of flexible programme delivery*, The Quality Assurance Agency for Higher Education, Gloucester. Available online at: www.enhancementthemes.ac.uk/documents/flexibleDelivery/flexible_delivery_QAA_124.pdf [accessed 15 November 2010].

Normand, C., Littlejohn, A. & Falconer, I. (2008) 'A model for effective implementation of flexible programme delivery'', *Innovations in Education and Teaching International*, vol. 45, no. 1, pp. 25–36.

Nunan, T. (1996) 'Flexible delivery – what is it and why is it a part of current educational debate? ', In *Higher Education Research and Development Society of Australasia Annual Conference*, Perth, pp. 595–600.

Palmer, S. (2001) 'Engineering flexible teaching and learning in engineering education', *European Journal of Engineering Education*, vol. 26, no. 1, pp. 1–13.

Pillay, H., Irving, K. & Tones, M. (2007) 'Validation of the diagnostic tool for assessing" Tertiary students', *Higer Education Research and Development*, vol. 26, no. 2, pp. 217–34.

Poindexter, S. (2003) 'The case for holistic learning', *Change*, vol. 35, no. 1, pp. 24–31.

Roberts, T. S. (2002) '*Flexible learning: how can we get there from here?*', ASCILITE 2002, Auckland, New Zealand, pp. 8–11, December 2002.

Samarawickrema, G. R. (2005) 'Determinants of student readiness for flexible learning: some preliminary findings', *Distance Education*, vol. 26, no. 1, pp. 49–66.

Sappey, J. (2005) 'The commodification of higher education: flexible delivery and its implications for the academic labour process', in *Reworking Work-AIRAANZ 19th Conference*, eds M. Baird, R. Cooper & M. Westcott, The Association of Industrial Relations Academics of Australia and New Zealand, Sydney, pp. 495–502.

Shaffer, D. (2004) 'Pedagogical praxis: the professions as models for post-industrial education', *Teachers College Record*, vol. 106, no. 7, pp. 1401–1421.

Tucker, R. & Morris, G. (2011) 'Anytime, anywhere, anyplace: articulating the meaning of flexible delivery in built environment education, *British Journal of Educational Technology,* vol. 41, pp. 904–915.

U.S. Department of Education. (2009) *Evaluation of evidence-based practices in online learning:a meta-analysis and review of online learning studies.* Available online at: http//www.ed.gov/about/offices/list/opepd/ppss/reports.html [accessed 15 November 2010].

Van Den Brande, L. (1993) *Flexible and distance learning*, John Wiley & Sons, New York.