



A cybernetic analysis of a university-wide curriculum innovation

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Abstract

Purpose – This paper seeks to describe and analyse an approach to course design as part of a strategic, technology-inspired, cross-university intervention to widen participation. A curriculum framework was developed for students who wished to make their work the focus of their study and could not readily access current university provision. A deliberate assumption was made that this would require a technologically inspired response to teaching, learning and assessment.

Design/methodology/approach – The approach taken was one of action research, by planning the curriculum framework, validating a course, delivery and review through interviews. Cybernetics was applied *post-hoc* to analyse the data generated.

Findings – Staff found the framework a useful source of inspiration and critique for current practices, although established practice and preconceptions could render the framework meaningless. The ideas in the framework are not enough to change the institution – authoritative sanction may be needed. The cybernetic concepts of variety and its absorption proved useful in analysing the framework, and highlighted weaknesses in the design of the framework regarding the organisation of teaching.

Research limitations/implications – Clarity about strategic purpose when making a change intervention is vital – in this instance raising the level of critical debate was more successful than recruitment. The establishment of an independent unit may be a more successful strategy than embedding university-wide. Further work is required to understand how to market novel approaches. The action research shows that the university has the capability to develop curriculum designs that offer new groups of students access to higher education while improving their work practice.

Originality/value – The findings from interview confirm the value that peers attach to this development. Although the pedagogical design in this action research is based on previous work, the cybernetic analysis and conclusions are new.

Keywords Cybernetics, Curriculum design, Curriculum framework, Work-focused learning, Work-based learning, Online distance learning, Universities

Paper type Research paper

Introduction

The Interdisciplinary Inquiry Based Learning (IDIBL) project uses an action research approach within the Institution with the aim of raising the capability of teaching staff to develop and deliver new programmes based on the IDIBL Framework. The framework followed the “Ultraversity” work-focused approach to learning (Millwood *et al.*, 2008a) developed by Ultralab at Anglia Ruskin University. The approach was intended for students who cannot easily attend university and who wish to make improvement in the work that they do the focus of their study. The approach was developed over the past seven years and offers a personalised experience based on a combination of action research methodology, online community of inquiry for support, and patchwork text for assessment with an exhibition replacing the “traditional”



dissertation. In the late 1990s, after pioneering on-line learning (Goodfellow, 2003), Ultralab developed two large-scale projects, which exploited the online learning community of practice (Bradshaw *et al.*, 2005; Wenger, 1998) for learning. The first of these was called “Talking Heads” which facilitated informal learning online for the headteachers in the England, in the years immediately prior to the establishment of the National College for School Leadership. It proved successful in offering new forms of frequent access to knowledge for busy professionals, unable to readily make use of face-to-face courses to fit their changing needs. The second project was Notschool.net which developed pedagogy and practice to reach adolescent learners “for who school did not fit” – their challenges ranged from illness, to mobility and truancy. The project became successful in the early years of the first decade of this century and the online approach developed proved to transform the participants lives. Each of these projects provided inspiration for the Ultraversity project, begun in 2003, which was designed to offer degree level study to prospective students who felt that the current offering from universities did not fit their lives. The IDIBL initiative began in 2007 after 150 students had graduated from Ultraversity.

The IDIBL initiative was funded by the university and it is also supported through the JISC Curriculum Design programme and as such is integral to the strategic direction set by the university to develop new streams of income based on different models of higher education (University of Bolton, 2010a, p. 9). In this context, the IDIBL project can be seen as a cross-institutional initiative with support from the senior management team as one of their strategic responses to changing and repositioning the business of the university. One of the key actions of the project was to develop the IDIBL framework that could be, “readily adapted by departments to their own subject disciplines and professional contexts of potential students” with the key project aim “to stimulate development across Bolton University of successful models of e-learning and inquiry-based learning where appropriate” (University of Bolton, 2007, p.1).

In the following sections, we will describe the framework and explain its dependence on the use of online technology. The approach to teaching using the framework is analysed from a cybernetics viewpoint, a position adopted at a recent review stage of the project. The paper will conclude with some observations about the potential of frameworks such as this for supporting institutional change initiatives.

The proposed framework

The IDIBL framework consists of a curriculum and a pedagogic approach to learning and teaching which are closely-linked in their design. The curriculum was defined by set of linked module definitions at HE levels 4-7 and the pedagogic approach by a set of practices of teaching, learning and assessment. The approach, was designed, to be highly personalised, to allow students in different work contexts to use it to structure action-inquiries that they identify as a part of their daily work. This paper argues that the creative idea behind the framework, defined by Robinson (2010) as an original idea that has value, was that it was intended for re-use and re-purposing to make the practice of validating new courses a less onerous process across the institution. These resources are published under a creative commons licence on the project web site (<http://idibl.bolton.ac.uk>) with the following aims:

The course will widen participation by satisfying students whose need is for flexibility with time, place and pedagogy. More specifically this could be because:

- they need to continue in full-time paid employment while they study;
- they wish to make their study directly relevant to their work;
- family commitments prevent their on-campus attendance;
- geographical location or poor transport links makes campus attendance difficult;
- they seek to develop further their communicative creativity and technological understanding as a complete professional;
- traditional examinations and academic essay writing are either intimidating or uninviting;
- they seek the company, support and intellectual challenge of fellow students rather than studying alone; and
- they seek the advantage offered by technology to enjoy the possibility of work on joint ventures and studying collaboratively (University of Bolton, 2008a).

Bosanquet and Fraser (2006) explore the understanding of the meaning behind the term curriculum in higher education and identify a series of very different understandings or definitions having different foci and requiring different student/teacher responsibilities. The model that we developed can be identified as emancipatory:

From this perspective, students are active creators of knowledge. Learning is a social act, which consists of a dialogical relationship between the teacher and student. The educational experience is negotiated, and the curriculum “emerges from the systematic reflection of those engaged in the pedagogical act” (Bosanquet and Fraser, 2006, p. 281).

The importance of identifying this stance is not only in stating our values and beliefs that led us to develop such a curriculum, but also in recognising that for many it is a view of curriculum that will be unfamiliar and challenging. In terms of the focus of the curriculum and the roles and responsibilities of teachers and students, there was likely to be an uphill struggle to persuade others of the framework’s value.

Curriculum

The module components of the IDIBL curriculum can be seen in Figure 1, which offers a coherent set of modules through level 4 to 7. A key feature is that it is a fixed set of modules with no choices or options, the course is designed to offer progression and students can find choice through their individual learning plan, negotiated as an inquiry proposal for each module.

The extract from a module definition in Table I is given to illustrate the configuration of the modules designed. In the era of mass produced higher education, the learning outcome has become adopted as the basic, assessable building block for the description of the curriculum (QAA, 2007, p. 13). This is attractive as a tool of management, but from the practitioners standpoint can be quite problematic, in that it over-simplifies what are complex attributes of a higher education that are difficult to describe and in so doing falsely claims to objectify the process of assessment (Hussey and Smith, 2002). In writing our learning outcomes and assessment criteria we have taken great care to construct them in such a way as to non prescriptive about a person’s work context and instead sought to describe future academic and professional capabilities we anticipate they will develop as a result of undertaking the module, but also adhering to established practice (Moon, 2003; Baume, 2010). The associated assessment criteria describe how the behavioural requirement of the learning outcomes will be evidenced and both elements are designed to reinforce the pedagogic approach

level 4	level 5	level 6	level 7	level 8
Certificate of Higher Education	Diploma/Foundation	Bachelor's	Master's	Doctorate
Year 1	Year 2	Year 3	Year 4+	Year 6+
Investigating the Professional Context	Organisational Impact	Review and Planning	Analysing the Professional Context	PhD by Practice or Publication
Understanding Reflective Practice	Reflection on Practice	Action Inquiry Project Preparation	Organisational Improvement	
Technology for Communication and Organisation	Independent Lifelong Learning	Implement Action Inquiry Project	Action Research	
Understanding Action Inquiry	Action in the Work Context	Exhibition, Validation and Synthesis	Action Research Preparation	
120 credits	120 credits	120 credits	180 credits	
			360 credits	

Source: University of Bolton (2008b)

Figure 1. IDIBL framework module components

Learning outcomes – when you have successfully completed this module you will:

Locate your chosen field of practice relative to professional domains, specialisms, subject disciplines

Analyse key issues of professional argument, debate or controversy of broad interest within your chosen field of practice in debate with peers with historical perspective and foresight

Critically evaluate professional requirements for your chosen field of practice in relation to your skills set and experience and your organisation's priorities for development

Identify and critically evaluate opportunities for professional development within your work-context/chosen field of practice

Assessment criteria – to demonstrate that you have achieved the learning outcome you will:

Show the inter-professional and inter-disciplinary connections of your work and identify bodies of knowledge that extend these and contribute to your professional development

Produce a critical account of consensual and competing ideas in your professional context using illustrative examples to support your interpretation, drawing from your contributions to debate with other student researchers

Synthesise different sources of information and carry out a gap analysis to identify in systematic way foci for your professional development

Produce a personal development plan that integrates work-based opportunities for learning with future module requirements providing justification from an analysis of the professional context

Table I. Learning outcomes and assessment criteria from the module "analysing the professional context"

rather than specific reference to disciplinary knowledge or skills. The curriculum design set out to ensure that the student could develop an individual learning plan in a professional context or discipline relevant to the student's work that addressed the "intended" learning outcomes.

Adaptation of the framework by validation of new courses based on it

At the IDIBL framework validation event, two sets of documents were submitted. The first described and explained the IDIBL framework and identified where programme specific additions and amendments would be required when seeking specific course approval via the minor modification regulations, a less onerous route to validate a course than a full validation (University of Bolton, 2008b). Second, a first instantiation of the framework in the Masters in Learning with Technology was validated as a proof of the concept of both the IDIBL curriculum design and the agile validation of new courses based on the framework. It was envisaged that subsequent uses of the framework would be able to use this experience to give the University confidence in allowing new programmes to only require minor modifications of the framework.

Pedagogic approach

The pedagogical elements of the framework are based on previous work (Millwood *et al.*, 2008a, b) and the key elements are briefly described in the following.

Student support

It was anticipated that students who were geographically and chronologically separated from each other and from staff would need new arrangements for supporting their study. The framework proposed that this should take place through an online community of inquiry, including learning sets for smaller group work. Online asynchronous dialogue would focus on their "practitioner-based enquiry or research" (Bradshaw *et al.*, 2005, p. 1). This is a tried and tested approach with different roles clearly identified including:

- staff as learning facilitators, "team-teaching";
- expert guests to provide process, subject, professional or disciplinary knowledge in response to students' contextual inquiries; and
- students taking responsibility to develop their own peer-to-peer support networks.

One of the key strengths that students report through this approach is the support and encouragement they can offer each other to continue with their studies (Millwood *et al.*, 2008a, p. 76).

Personalisation

The IDIBL framework has a fixed set of modules, but allows for personalisation to be achieved through negotiation of a set of learning activities and assessment product for each of the module learning outcomes in each module. Each module focuses on process in an action research cycle. This is in contrast to other approaches to personalisation, such as:

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- modular content frameworks, that allow students to choose modules across subjects and disciplines to construct their own pathway;
 - negotiated awards, where prior and experiential learning might be a key component; and
 - shell modules, where negotiation about the learning outcomes is undertaken on a one-to-one basis and where the learning outcomes themselves can be negotiated.

What the IDIBL framework aims to achieve is personalisation and choice for the students about their inquiry, but at the same time ensuring that they follow the pedagogical design of taking actions for improvement in the workplace.

Assessment

Assessment through patchwork media (Arnold *et al.*, 2009), a development of Patchwork Text (Winter *et al.*, 2003) is an approach to assessment born out of frustration with perceived limitations of the essay as a form of assessment in higher education. The approach aims to unlock students' skills and creativity by encouraging them to use their choice of a range of genre and media, not limiting their forms of expression to that of academic writing which early on in their academic career, may for some, be off-putting and difficult to master. Students construct a "patch" for each learning outcome as they progress through the module. These are negotiated to tie in with their work-focused action in the workplace and relate to the learning outcomes and assessment criteria. Finally the student produces a summative piece, called the stitching that gives an account for their learning journey.

Efficiency of the pedagogic approach afforded by technology

The ideas mentioned previously are central to the framework developed. In operationalising the approach there are challenges in ensuring that it is viable in terms of the resources required to offer a good learner experience, but not seen as inefficient and expensive from the institutional perspective. The evidence of the Ultraversity project (Millwood *et al.*, 2008a) indicates that as student numbers increased a new balance was found between staff activities of content delivery, facilitation and marking such that the approach was economically viable for the institution.

The affordances offered by ICT's make possible the approach described previously. These affordances include:

- the potential through the VLE to carry on asynchronous dialogue, thus permitting learning at a time and place of the learners choice through learner-paced conversations and activities, and the possibility to offer each-other mutual and moral support without physically meeting up;
- the potential to upload files so that learners can submit work remotely;
- the creative potential to combine text, visual, and dynamic multimedia which offers the opportunity to use alternative media to compose assessment work for the patchwork media described earlier; and
- the potential through the internet to search for and access information, allowing timely and low-cost access for students to read, quote and analyse authoritative information, journal articles and professional bodies.

Technology has not only made it possible to embrace these pedagogic ideas, it has made it possible to be more efficient, lowering the cost and raising the creativity and productivity for learners.

From the students' perspective, the fact that they can work full-time and also gain credit at a full-time rate made this an efficient and cost effective way to study. The section on findings addresses the balance between staff and student efficiency in more detail from cultural and cybernetic viewpoints.

Methodology for evaluation

This evaluative case study draws on empirical data collected from semi-structured interviews of stakeholders in the IDIBL project, documents produced for the validation process (University of Bolton, 2008a), and an evaluation of activities by the project team (University of Bolton, 2010b) working with academic and administrative staff and employers using e-mail and other evidence from personal communications.

It is worth drawing a key distinction between programme evaluations that simply seek to ascertain the worth of an action and evaluations that seek to also understand the how – a research led approach, “The idea is not just to discover whether a programme works, but to explain how it works” (Clarke, 1999, p. 4). With the latter approach there is the explicit aim to generate findings that are of value beyond the programme or project being evaluated, that is the evaluations purpose is not just to help the decision makers of the programme or project under study. Further, our aim is to identify the underlying mechanisms that are at work along the lines of Realistic Evaluation, “it is not actual programmes which work but the reasoning and opportunities of the people experiencing the programmes which make them work” (Pawson and Tilley, 1997, p. 2), extracting stakeholder views, theories, distinctions and experiences of the IDIBL framework.

The original theoretical proposition put forward by the IDIBL project was:

The framework describes an approach to teaching, learning, and assessment including generic modules will enable staff across the University to readily develop new courses along particular themes without the need to undertake a full-validation event or author new modules (University of Bolton, 2007, p. 1).

The evaluation activities were designed to elicit stakeholders' judgements about the validity of this statement and the ways in which they themselves see the university responding to curriculum initiatives.

Framework analysis and evaluation

Staff and the framework

The characteristics of the framework proposal presented challenges to the validation regulations and quality processes at the university that they were at least partially able to cope with. Although the IDIBL framework and its instantiation were approved, two subsequent course validations based on the framework were required to go through the full validation process, which defeated one of the project's aims. It is likely that this is because although validated, the idea of re-using such a framework was not fully enculturated in the University nor explicitly promoted by the Quality Assurance and Enhancement unit.

Practitioners did find that the framework was useful, although in ways that were not always as initially intended. For example; to support thinking beyond the current confines of HE practice, development of their ideas and persuasion colleagues. All this in the face of deeply embedded practices and beliefs about higher education that in practical terms make the framework's adoption and use a challenge.

I am not sure I would change it. Because I used it as a starting point and modified it from there. It is a useful tool and people could use it when practices accommodate it better [course developer].

I think it is valuable particularly as a thinking tool, even if practically you do not adopt it. It gives you an opportunity to re-think [course developer].

Yes. I myself feel more comfortable with the less specific but other people were not. They were not quite sure what we were asking for nor how it would be measured even though we had tried to create very detailed briefs that would make people feel better about it, but there was something people really didn't like. And also the managers didn't like because they couldn't pin people down to things. There was a notion that it would all turn into some terrible liberal nastiness! [course developer].

Some people were apprehensive about it and it's because it's different and not sufficiently tied down, as far as they are concerned [quality unit].

Individuals found the IDIBL framework attractive when the educational philosophy offered by the framework mapped onto the individual's beliefs about higher education and the work they were trying to achieve.

It wasn't so much the IDIBL framework but the work that you were doing [...] So this idea that we could have a flexible system that could relate to the changing notions of and demands of the industry. That's where I came from I think. But I also thought it was exciting, there was something exciting about it, it saw education in a more flexible way. Putting the onus on the student and less on this is what we are going to deliver to them. The idea that a student could move around easily and decide the focus of their study that was also attractive [course developer].

Marketing the framework to employers and students

Marketing the IDIBL framework fell into two parts. First, to invite employers (including professional associations and development agencies) to consider take part in creating a bespoke instance of the framework as a course and second, to recruit students to the Masters degree in Learning with Technology and Undergraduate and Masters in Regeneration.

Letters proved to bear little fruit, but face-to-face meetings with employers' representatives produced enthusiasm and encouragement; one project leader in school innovation reported that:

the course features in our bid documentation for [a Local Education Authority] as an example of how we might develop Continuing Professional Development capacity [course developer].

Other members of staff met with less understanding:

the industry couldn't understand it, even though it was a way to make it easier to do what the industry wanted to do because they had all been educated in a hugely hierarchical scenario

they couldn't understand it. They couldn't grasp it and so they were against anything that you couldn't pin down, it was against their experience [course developer].

Others were concerned that the framework should include direct content delivery – the step to fully negotiated learning was a step too far, and the action research progression through the framework not fully understood. Where a trusted relationship with an employer already existed, proper engagement did take place although not on the scale hoped for.

Whether the enthusiasm or trust existed or not, little significant development came from these contacts.

For recruitment, the marketing department of the university was similarly enthused by the framework and the courses, but while offering good advice and support for developing leaflets, the courses and approach did not figure strongly in the marketing activity of the university – the project team felt that the push needed would have taken a more significant involvement from the marketing department which was already heavily committed selling the existing university offer.

Again, few students were recruited through the traditional processes of distribution of leaflets and web site advertising. Most of those who enrolled were by word of mouth and personal contact.

It seemed that the materials created for marketing were difficult to make sense of and there was a failure to effectively communicate. Challenges include the apparent emptiness of the framework, the strangeness of its central concept and the absence of a clear statement of what would be learnt, all of which are more easily conveyed through dialogue.

The cybernetic viewpoint

The use of cybernetics theory to explain the workings of HE institutions is not widely exploited although Birnbaum (1998), pp. 177-200) does provide a holistic analysis and practical explanation of the organisation of the university from a cybernetic viewpoint. In addition, Britain *et al.* (2007) offer an explanation of the application of the Viable Systems Model (VSM) to e-learning in HE which usefully covers the main features of the VSM. This provided the starting point for our analysis, conducted in retrospect in order to reflect on and evaluate the IDIBL framework.

Cybernetic explanations are based on a systems analytical approach and can be applied at the micro and macro levels, to mechanical, biological and social systems. They are concerned with feedback loops between a system and its environment rather than identifying every constituent part. This avoids the necessity to understand every detailed causal relationship, which might lead to an over elaborate model which was ineffective as a predictor of real world activity. In turn, this means accepting that we may remain ignorant of the features of the processes within a sub-system and see these as a “black box” (Jackson, 2003, pp. 86-7).

A key concept in Cybernetic theory is that of variety. “Variety is a measurement of complexity originating in information theory. It refers to the number of states of which a system is capable of attaining” (Britain *et al.*, 2007). This idea was developed by Ashby (1956, p. 207) as “The Law of Requisite Variety” which states that “only variety can destroy variety” and interpreted by Stafford Beer in his Viable System Model (VSM) as “only variety can absorb variety” (Beer, 1985, p. 26). The VSM identifies amplifiers and attenuators as mechanisms for control, constituting a feedback loop. An

amplifier enhances influence by increasing variety, while an attenuator reduces the variety experienced.

A key principle identified by Beer was that the steps taken to absorb variety in an institutional system should be “designed to do so with minimal damage to people and to cost” (Beer, 1985, p. 35). Choices made will have intended and unintended consequences that will determine the success or otherwise of the organisation, impacting on factors such as human happiness, creativity, efficiency, productivity, innovation, the capability and capacity of an organisation to adapt to changing environments, etc. (Britain *et al.*, 2007, p. 11; Jackson, 2003, p. 100).

In addition, a VSM analysis, would anticipate that there needs to be opportunities for adaptation and self-organisation within sub-systems of the whole:

“parts must be granted autonomy so that they can absorb some of the massive environmental variety that would otherwise overwhelm the higher management levels” (Jackson, 2003, p. 107).

Getting an appropriate balance between the different feedback and control mechanisms is a key challenge of the designer of a system.

Cybernetic analysis applied to IDIBL

Focusing on the IDIBL course, environmental variety can be found in the range of states seen in students’ employment context and creative skills to communicate ideas. In the context of assessment this presents a variety problem for staff organising and marking assessment. This kind of problem is often managed in higher education by attenuating the variety. For example assessment through written exams on fixed questions enables the institution to treat all students as if they were identical, hiding the variety of their individual personalities, histories and learning journeys. This imposition may be costly in the context of widening participation and retention since some students will be put off by these conditions or not perform to their potential. An alternative solution, adopted by the IDIBL project, is to make available to students more options in the ways that they can produce assessment products. This necessitates an amplification, in the variety offered by the staff body, in terms of protocols and effort to enrich their response, marking and feedback to students. This approach reduces the potentially inhibiting “costs” to students (becoming an examination expert, studying seemingly irrelevant examples rather than their own, time spent producing assessment products separate from authentic work tasks), but at the same time increases the costs to the staff body (more difficult marking task, more varied and time consuming than for marking an exam, moderating issues of comparability, understanding student’s work context to provide appropriate feedback), and in turn this diverts them from other teaching tasks.

Another example is the personalisation of the curriculum in IDIBL. The challenge is to amplify variety in “management” to match “operations”, as seen by students in the states presented by staff. One solution is to offer a wide selection of modules, each with a particular narrow curriculum focus that students can select from. The IDIBL framework chooses a different solution – a fixed number of compulsory modules but with learning outcomes written in such a way that they can be used in a wide variety of work contexts. We argue that this amplification matches these particular students’ needs better.

The discussion about the struggle to innovate, persuade and sustain the IDIBL solution in traditional UK higher education is beyond this cybernetic analysis – although not discussed in this paper, in summary, the authors have found that the innovations in “teaching and learning regime” [ref] necessitated by the IDIBL framework, the re-invention of the identity of the HE tutor required and the strategic marketing and promotion approach are three key areas for attention.

In both of these cases the choices made have costs for each part of the system, and this raises the question: which choice overall produces the “best” results, does the “least” damage and maintains a viable solution?

In Table II we use a cybernetic viewpoint to explain how the implementation of the framework components can meet its challenges. In particular, addressing the needs that the framework was designed to meet outlined in the Proposed Framework section; time and place, the affordance offered by technology to vary the parameters under which we organise learning to that we can offer personalisation and choice – that is what, when and how students study. We also identify organisation of teaching, not explicitly addressed by the framework, as worthy of significant attention.

As well as identifying attenuators and amplifiers in the system, we also identify where self-organisation, that is students coordinating themselves in support of each other, is an important aspect of the design. This self-organisation could be analysed as a sub system – a “recursion” of the analysis (Beer, 1985, pp. 2-6) – but our system focus for this paper is at the level of the course as a whole.

This analysis, based on a partial VSM analysis, is presented in Table II is based on the following classical cybernetic diagram, interpreted for the “system in focus” and which the authors would wish to make “viable” – that of the teaching context of staff and students when undergoing an IDIBL designed course. Thus the diagram does not include the institutional context: in the analysis in Table II, it is mainly the feedback loop between operations (students) and management (staff) that is discussed (see Figure 2).

Conclusions and recommendations

Although the IDIBL framework proved useful to curriculum designers, this was not always in the way anticipated when it was created. Some staff found the framework valuable as a thinking tool to systematically critique current practices, exposing rigidity and assumptions behind curriculum design in the university’s existing practice.

The framework had a particular view of how new courses could be created which worked best when staff had already identified the problem of relevance to the students’ employment and were in ill-defined subjects that were newly emerging or fast changing. For these staff the framework was a valuable source of inspiration and of practical help in validating their own courses.

However, the approach does not fit well with the practice of academics developing new courses in a piecemeal way, either around an area of specific interest to them or by re-working old modules and courses. For colleagues who have a very different view of what a curriculum is and what it is to study at higher education, the framework approach can be almost meaningless.

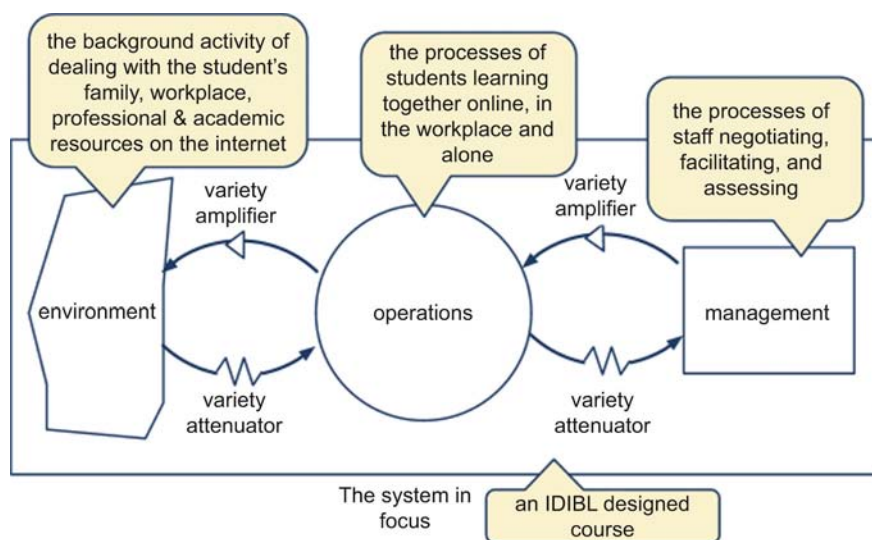
Although validated as a framework by the university, this did not accord it with the status of a regulation or even guideline. If the framework is to be established in the

<p>Aspects of organisation addressed by the IDIBL framework course design:</p>	<p>Students' needs (as listed in the earlier section "Proposed Framework")</p> <p>5. They seek to develop further their communicative creativity and technological understanding as a complete professional</p> <p>6. Traditional examinations and academic essay writing are either intimidating or uninviting</p> <p>7. They seek the company, support and intellectual challenge of fellow students rather than studying alone</p> <p>8. They seek the advantage offered by technology to enjoy the possibility of work on joint ventures and studying collaboratively</p>	<p>Variety challenge: the mismatch in states of management (staff) and operations (students)</p> <p>How to assess a wide range of products derived from authentic work activity and offer choice in creative student expression</p>	<p>Amplifier: increase in the number of states of the management (staff) presented to the operations (students)</p> <p>More options in the ways that students can produce assessment products (following the Patchwork Media approach) and a greater range of responses to students when marking and giving feedback</p>	<p>Attenuator: decrease in the number of states of the operations (students) presented to the management (staff)</p> <p>There is no attenuation in this case – we match variety in the operations through amplification and suffer the cost in increased labour</p>	<p>Self-organisation: variety absorbed within the sub-system of operations (students)</p> <p>Students are encouraged to share and critique drafts – each is unique, so plagiarism is unlikely</p>
<p>Assessment</p>					
<p>Student support</p>		<p>How to offer moral and academic support without face-to-face contact</p>	<p>Team teaching enables different staff to offer support to groups of students</p>	<p>Hotseat protocols of topic-focused, time-limited conversations</p> <p>Staff monitor selected forums and conversation threads, making considered interventions rather than responding to everything</p>	<p>Different online forums provide opportunity for self-organisation of support between students. Students discuss hotseat responses between themselves and accept answers from questions "near enough" to their concern</p>

(continued)

Table II.
Analysis of requisite variety

<p>Aspects of organisation addressed by the IDIBL framework course design:</p>	<p>Students' needs (as listed in the earlier section "Proposed Framework")</p>	<p>Variety challenge: the problems presented by management (staff) and operations (students)</p>	<p>Amplifier: increase in the number of states of the management (staff) presented to the operations (students)</p>	<p>Attenuator: decrease in the number of states of the operations (students) presented to the management (staff)</p>	<p>Self-organisation: variety absorbed within the sub-system of operations (students)</p>
<p>Personalised curriculum</p>	<p>2. They wish to make their study directly relevant to their work</p>	<p>How to offer a personalised curriculum effectively and efficiently to students in an "infinite" variety or states, that is each having their own interests, work contexts, career aspirations</p>	<p>Individual learning plans negotiated between tutor and students at the level of the module specifying learning activities and assessment products</p>	<p>Peer support through learning sets where critical feedback is offered on plans and work produced given and received between students soaking up potential workload in responding to every individual concern Limited number of modules with learning outcomes written to be applicable to a wide range of work contexts</p>	<p>Students act autonomously in their workplace to undertake their inquiries accessing professional support from work colleagues</p>
<p>Access</p>	<p>1. They need to continue in full-time paid employment while they study 3. Family commitments prevent their on-campus attendance. 4. Geographical location or poor transport links makes campus attendance difficult</p>	<p>How to be flexible in terms of time and location for students who have family and work commitments</p>	<p>Asynchronous forum communications mean staff are able to take advantage of the affordance of many-to-many communications</p>		<p>Asynchronous communications allow students to determine when and from where to interact</p>



Source: After Beer (1985, p. 27)

Figure 2.
Diagram of the system in
focus – an IDIBL designed
course

“fabric” of the institution and to be more than an experiment to develop inquiry-based forms of learning, then more effort would be required to ensure the framework was “officially” adopted. This highlights a gap between the university’s strategy and implementation.

The framework omitted to explicitly address the organisational approach implied by the framework. For example, the notions of team teaching, online community of inquiry for teaching staff and new productivity and management arrangements, which were present in the earlier examples of the approach, were not addressed.

This suggests the following analysis (see Table III): Cybernetic analysis is useful to course designers, in particular the notion of “absorption” of variety, when considering the impact of choices they make on students and teachers. This involves seeking to minimise the negative impact on both groups and making better use of internal, self-organising, mechanisms for absorbing variety as well as attenuators and amplifiers.

For cross-institutional initiatives that seek to promote a particular pedagogical approach, it is vital that at an institutional level there is clarity about what is trying to be achieved. If the purpose is to better understand an organisation and stimulate new ideas and thoughts widely, the framework approach is worth replicating. If however, the immediate imperative is to recruit significant numbers of students, then such activities probably need to be located in a dedicated unit. In cybernetic terms, this unit is its own “organisation” on a level containing the course organisation as analysed previously – designed to amplify variety in the university’s managerial structures (“management”) and attenuate variety in the course (“operations”). This simpler environment insulates the innovation from the conservative effect of the existing university organisational design.

Finally, this paper has not explored fully the problems of explaining the approach to potential students and employers, whose preconceptions of what it is to study in higher

Table III.
Proposal to match variety
issues related to teaching

Aspects of organisational approach not addressed by the IDIBL framework course design:	Variety challenge: the problems presented by mismatch in states of management (staff) and operations (students)	Amplifier: increase in the number of states of the management (staff) presented to the operations (students)	Attenuator: decrease in the number of states of the operations (students) presented to the management (staff)	Self organisation: variety absorbed within the sub-system of management (staff)
Teaching	How to avoid the inefficiency of asynchronous and geographically separate activity by following the expectations of the “standard” productivity arrangement in UK higher education	Opportunity to access advice from all members of the staff Team questions from individual students answered publicly. Clarity about the expectations of responsiveness from staff	Creation of frequently asked questions code of conduct for online behaviour-reduced personal response, emphasis on self-organisation through online community of inquiry	Self-organisation and team teaching allows for new, flexible working practices such as sharing the responsibility to respond to students and modelling desired behaviours through discourse between staff

education were found not to match the IDIBL framework as we communicated it, despite the learner-centred motivation in our design. This is a challenging problem that the success or failure of the approach ultimately rests on.

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Further reading

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