The structuration of blended learning: putting holistic design principles into practice

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Abstract
This paper considers the challenges faced by those seeking to design effective blended learning. Using a 2-year case study involving cohorts of approximately 200 students, it demonstrates how Anthony Giddens’ structuration theory can provide a metaframework for assisting educational designers in creating coherent blended learning experiences that reinforce intended learning outcomes. It calls for educational designers to be sensitive to both their audience and the unintended and unanticipated consequences of their actions and shows how a holistic annual review framework can reinforce or suppress emergent behaviour through unit development.

Introduction
The term blended learning has been adopted widely to describe combinations of face-to-face and technology-based learning. Although loosely defined, the emphasis on ‘blend’ forces proponents to address key questions about the mix of communication channels and activities required to achieve desired learning outcomes. Addressing such questions has become a common theme in accounts of blended learning activity. O’Toole and Absalom (2003) argue that simple substitution of face-to-face for technology-based learning is unlikely to be successful and, instead, call for designers to integrate communication channels on the basis of their relative merits and collective abilities to reinforce progress towards intended learning outcomes. MacDonald and McAttee (2003) reach similar conclusions in their reflection on the timing and nature
of communications used for student support, and Laurillard’s (2002) ‘conversation’ model in inviting the consideration of ‘media for purpose’ follows. Kerres and de Witt (2003) offer a 3C-conceptual framework that invites blended learning designers to consider the content of learning materials, the communication between learners and tutors and between learners and their peers, and the construction of the learners’ sense of place and direction within the activities that denote the learning landscape. They also encourage designers to reflect on the costs that their decisions impose upon the learner. Graff (2003) looks across these three dimensions, exploring relationships between the learners’ cognitive styles and the sense of classroom community engendered by a blended learning environment, and concludes that designs must be sensitive to the needs of learners as individuals.

Although empirically different, all these studies point to the challenge of appreciating how the nature and form of communication shapes the student learning experience and the actual learning outcomes. Formulating generic guidelines is not easy, as Kerres and de Witt (2003) observe, but two recurrent themes are discernable. The first is a notion of systemic reinforcement amongst learner activities, communications, support, and assessment (see for instance, Boyle, Bradley, Chalk, Jones & Pickard, 2003; Khine & Lourdusamy, 2003). The second is a call for an acute sense of audience on behalf of blended learning designers (eg, Graff, 2003). This paper now seeks to show how Giddens’ (1984) structuration theory offers a framework for addressing these concerns.

**Structuration theory**

Anthony Giddens’ (1984) structuration theory offers a framework for reconciling a conceptual divide that he identifies between sociologists who give precedence to the knowledgeable human agent and those who regard society as a social object amenable to explanation in terms of its effects. His work has considerable relevance for educationalists: most would not regard the education system as some kind of magnetic field in which teachers and students are simply pushed about like iron filings; yet the subjectivism of individual accounts similarly fails to capture all that is of concern (Willmott, 1999). Giddens’ central premise is that this dualism must be reconceptualised as a duality of structure. To achieve this, he offers an account of the mechanisms underlying Marx’s famous phrase: ‘Men make history, but not in circumstances of their own choosing’.

For Giddens, social structure and individual action are mutually producing. Social objects are no longer extant forces; they are the emergent properties of self-organising social systems. Giddens conceptualises structures as ‘memory traces’ that shape (and are simultaneously shaped by) the rules, practices, and routines used to negotiate daily lives. Structures become more solid the more they are grooved in day-to-day routines or repeated across different locations. Individuals use their understanding of structure–action relationships to plan future action, modifying their understanding by reflecting on the extent to which desired outcomes are achieved.
Giddens’ theory is not without its critics (see for instance Held & Thompson, 1990; Willmott, 1999), but it does provide two contributions of particular importance to our interest in learning design. First, he invites careful consideration of routines through which social structure and individual action are mutually producing and second, he encourages those interested in change to be sensitive to the unintended and unanticipated consequences of action. In support of this first contribution, Giddens offers three axes or dimensions along which the interplay of structure and action may be analysed. He associates:

- interactions involving communication with social structures that dictate what is significant;
- interactions involving power with social structures of domination;
- interactions involving sanctions with social structures that dictate what is legitimate.

We believe that these dimensions provide much needed guidance to those seeking to design coherent blended learning experiences, but they need to be complemented by a consistent conceptualisation of information technology (IT), which is not readily available in Giddens’ work.

Giddens’ handling of the problem of structure and action has attracted the attention of information systems researchers who are keen to understand how information technologies, such as email and groupware, inspire and become embedded within new working practices (see for instance Jones, 1999 or Walsham, 1993). Some conceptualisations of IT have focused on its impact as a finished artefact that dictates particular forms of human interaction (see DeSanctis & Poole, 1994). Others, such as Orlikowski and Robey (1991) and Rose and Lewis (2001), have taken a broader view of IT as both product and process. They regard IT as the emergent outcome of interplay between structures and actions, collectively known as the IT development process. Process is most commonly purposeful, and those who assume responsibility for it intend their IT to be interpreted in particular ways and to inspire particular behaviours as a consequence. Development efforts seek to encourage particular interactions to become routine for their target users; these serve to embed the IT system in social practices that its product features both enable and constrain. Developers are encouraged to maintain an acute sense of their target audience(s) to reduce the risks of features being misinterpreted, but Orlikowski and Hoffman (1997) caution that unanticipated outcomes are inevitable. They propose an ‘improvisational’ model of change management in which would-be managers are encouraged to expect unanticipated outcomes and to make conscious interventions (to work practices and/or IT features) to encourage desirable emergent behaviours and discourage undesirable ones. We believe that this combined product/process view of IT and its accompanying note about the inevitability of unanticipated outcomes sharpen Giddens’ contribution to blended learning design.

A full review of the possible contributions and pitfalls of structuration theory is outside the scope of this paper, but it is useful here to summarise the two core design principles (DPs) that we have drawn from Giddens’ work:
We now present a case study that demonstrates how these core principles were applied.

**Case study**

Our case study involves a 1st-year undergraduate unit taught within the business school of our (post-92) university. In September 2002, the unit (known as Emerging Technologies and Issues) was included within the portfolio of Business IT undergraduate courses to increase 1st-year students’ exposure to new information technologies and to new ways of working. Like other 1st-year units, it was designed to set the students’ expectations of academic endeavour and to lay the foundations for more advanced study. The element that was redesigned for blended learning delivery had originally been planned on a weekly 1 + 1 model of a 1-hour lecture reinforced by a 1-hour tutorial running for 9 weeks. The summative assessment was to be individual, face-to-face demonstrations of web pages produced by the students.

The holistic redesign for blended learning was prompted by a secondment, which reduced the teaching team by a third. The remaining team members decided to redirect ‘back-fill’ resources from the secondment into redesigning the unit for blended learning delivery rather than funding part-time staff cover.

**DP1: pursue intended outcomes through careful attention to the axes of structuration**

With support from senior management, clear objectives were set for unit redesign, which had to be undertaken within the framework set down by its approved specification document. Our reduced teaching team made ‘lean delivery’ essential, but our key design goal was to create a coherent system of input, activities, and assessment that covered the approved learning outcomes and reinforced intended academic behaviour and values. We conceptualised our social and technical design effort in terms of establishing four intended norms (INs):

- **IN1**: tutor as expert of last resort;
- **IN2**: attention to detail;
- **IN3**: regular engagement;
- **IN4**: demonstration of learning outcomes.

We now highlight our attention to Giddens’ axes of structuration in our efforts to establish each of these four norms.

**IN1: tutor as expert of last resort**

We regarded each of our intended outcomes as interconnected, and to help us promote IN3, we decided to keep a regular weekly lecture. We used this time to communicate
Many students found the approach unfamiliar at first—‘you’re a tutor, you’re meant to help us’. However, a slow but consistent prioritisation of support meant that the students were gradually weaned off this expectation, and within three weeks, ‘tutor as expert of last resort’ had become established as a cultural norm amongst those attending tutorials—‘don’t even bother asking, he knows you haven’t had a go yet!’ The tutors confirmed that peer support networks emerged for resolving frequently encountered problems and described tutorials as intense experiences; problems that were discussed were rarely trivial, and the tutors found themselves supplementing the web-based explanations with alternatives for the students who had tried but were genuinely stuck.

The web-based materials were structured to explain samples of computer code that could be assembled to form a working example of a similar kind of system to that required by the assignment brief. The fact that this system was similar but not identical drove the learning model, as students had to understand what did and did not have to be modified to meet the specific needs of the assignment context. This case-based approach to developing programming skills has been used successfully elsewhere (c.f. Boyle et al., 2003) but assumes that students will eventually carry concepts across contexts. Once students had demonstrated willingness to engage with the challenge by accessing the web materials, tutors used their experience and personal communication skills in the face-to-face tutorials to support the students as individual learners, exercising their sense of audience to tailor explanations to suit individual needs. Tutors agreed that a heightened state of awareness about who had and had not engaged, coupled with explicit encouragement of peer support, enabled more time to be spent dealing with ‘interesting problems with interested students’.

IN2: attention to detail

It is difficult to underestimate the importance of ‘attention to detail’ to the successful implementation of business IT solutions. Its particular significance for the unit was communicated via the assignment brief as a very specific set of naming criteria with which the students’ submitted web pages must comply. The tutors exercised power over the definition of a valid submission to reinforce this. The students were informed in the assignment brief and in lectures and tutorials that submissions would be invalid if the web page naming criteria were not followed to the letter. To reinforce our intended outcome of ‘tutor as expert of last resort’, we made tools available in the e-learning environment so that the students could check for themselves that their submissions
complied. These tools were demonstrated in lectures to promote the norm of ‘regular engagement’ (see below).

At the appointed assignment hand-in time, the sanction for noncompliance with naming standards was applied as promised. We exercised our power over interpretation to classify work that failed to use the designated file names as failing to submit. Our university’s Common Undergraduate Regulatory Framework imposes a cap of 40% for late submissions up to an absolute deadline specified for each assignment, after which the assignment receives 0%. Students who had failed to use the correct file names were sent ‘personal’ emails (by an automated server process) to inform them that they had failed to make a valid submission on time and had until the absolute deadline to submit correctly named files for a maximum mark of 40%. On several occasions in the run-up to the absolute deadline, the students who were still missing correctly named files were emailed with a clear warning that their continued failure to comply would result in an automatic 0% when the absolute deadline passed.

It is important to note that 1st-year marks did not contribute to the calculation of award classification for our students; 1st year is a simple pass or fail. The sanction of a 40% cap would have a more profound effect on students in later years of study; however, its effects on our sample students are important to record. Despite the checking tools, in the 1st year of operation, 43% of the students failed to submit the two correctly named files for the appointed hand-in time. This figure dropped to 21% at the absolute deadline, which included a number of not-yet-official withdrawals. After the first deadline, many students were shocked to discover that they had fallen foul of the strict naming standard—‘I couldn’t believe it, I just assumed it was right, I’m not going to make that mistake again’. The fact that they could still pass encouraged most to make the necessary changes and to put their frustration down to experience; however, a minority ignored the emails about changing the names, and one became aggressive when he discovered that he had received 0% for his efforts. The failure of his appeal and his subsequent disciplinary action provided important institution-level reinforcement for the intended outcome of ‘attention to detail’ and was welcome back-up for the unit’s clear and consistent communication about the desired behaviour and the penalty for noncompliance.

IN3: regular engagement

The importance of ‘regular engagement’ for climbing the learning curves associated with web development and for undertaking the research necessary to produce the appropriate content was communicated as a key message in lectures. We were keen to reinforce this message with tutorials despite resource pressures.

Our computer laboratories can handle a maximum of 25 students at a time (or less to allow for possible machine failures), so 230 students were going to require at least 10 hours of computer laboratory time for hands-on reinforcement of learning outcomes. This could not be covered by the remaining team members alongside other commitments. However, rather than seeing the students less frequently, we felt that routine
played a key role in defining the students’ time at the university and also in setting important expectations about the nature of academic work and support. We felt that this was particularly important for our 1st-year students, so we exercised power over student routines by booking 10 hours of computer laboratories each week and by scheduling the students to regular one-hour slots. To work within the resource constraints, we made ourselves available for 30 minutes in each hour-long tutorial to answer questions. The self-paced e-learning materials that we had created and the IN of ‘tutor as last resort’ made this approach workable and reinforced our message that this assignment was best addressed through regular weekly efforts rather than irregular spurts. In between regular tutorials, it was apparent from the hit logs that several students had taken advantage of the 24 × 7 off-site availability of the web materials to work through them at their own pace at times of the day and night that suited their individual preferences and circumstances.

Lecture slides were published on the schoolwide-managed learning environment so that the students who missed a lecture could still access them, but regular lecture attendees were rewarded by assignment hints and tips, such as repeated demonstrations of the name-checking tools, which were over and above the lecture slides. In other words, we exercised power over what was communicated, when and how to reinforce the message that ‘regular engagement’ was advantageous.

Not only was regular attendance rewarded, but the students were also informed that their use of the e-learning environment in scheduled tutorial times provided attendance data that would be passed to the 1st-year leader for the midyear Progress Board. This board meets to consider achievement and attendance across all 1st-year units of study; students falling below the required standard are invited to explain their reasons to the 1st-year leader so that preventative action may be taken to reduce the risk of failing the year. Aligning our unit policy of regular engagement with this institutional practice provided mutual reinforcement and a useful sanction to support our efforts.

**IN4: demonstration of learning outcomes**

We were conscious that the language of learning outcomes tends to work rather better for educationalists than for the students who are supposed to demonstrate them. To ensure that the intended unit-learning outcomes translated into specific student performances, we highlighted which of those from the definitive course document were being assessed and used a grid structure to communicate exactly what level of performance in each of the four different learning outcomes would be rewarded by what mark.

The structure and operation of the grid was explained in an assignment-briefing lecture. The students were advised to fulfil all the criteria for gaining 40%+ in a particular learning outcome before going on to attempt the 50%+ level of achievement, and so on.

The grid provided the interpretative scheme for shaping the way that we exercised our power as tutors to allocate marks, ensuring that achievement against the specified
learning outcomes was rewarded appropriately. This approach automatically applied a sanction to those who did not target their efforts towards the specified learning outcomes: their marks suffered as a direct consequence. We agreed that our feedback would be written in terms of assignment-learning outcomes, and all marks would be justified in terms of the criteria specified on the assignment brief. Following moderation, personal feedback that justified marks and explained in each case why the next category was not awarded was emailed to each student. Structuring feedback in this way reinforced the message that performance against specified learning outcomes was the key to high marks.

We now describe how our second blended learning DP helped to shape the IT that was developed to support the unit.

**DP2: design IT and work routines with an acute sense of audience and be ready to encourage/discourage unanticipated behaviour**

Our need for lean delivery and our desire for the unit to ‘practice what it preached’ about emerging technologies lead us to develop IT to support two key audiences: students and tutors.

We decided to build on the students’ familiarity with a web-based managed learning environment and made our tutorial expertise available as a set of web-based exercises and demonstrations. We did not include discussion forums, as we wanted to reward those students who were engaging with our e-learning materials with face-to-face support. We also felt that face-to-face support would increase opportunities for supporting students who were trying but struggling to adapt to web-based instruction. The 24 × 7 availability of our codified expertise and the system’s ongoing monitoring of student engagement enabled us to take the actions described earlier to promote our INs of ‘tutor as last resort’ (IN1) and ‘regular engagement’ (IN3).

The provision and monitoring of web-based instruction materials described in the paper so far could be handled by any of the industry-standard Virtual Learning Environments, but our requirements for technology support went further, and we were fortunate in having the technical skills to be able to write a suite of programmes and routines that:

1. enabled students’ assignment files to be picked up electronically from a designated place at a designated time;
2. provided us with fast navigation around the assignments;
3. detected any work similar to that submitted by other students;
4. highlighted breaches of assignment requirements; and
5. captured and emailed personalised feedback.

We wrote these programmes to support the role of tutor as meticulous expert in the face of otherwise overwhelming student numbers. Automated name checking and pattern recognition in student files enabled quick turn-around of carefully analysed work. In this way, IT provided valuable support for our efforts to establish the norm of ‘attention
to detail’ (IN2). Our routine use of forms to frame personal feedback in terms of performance against desired learning outcomes provided cultural reinforcement for another of our INs (IN4). Reflecting on the 1st year of operation, we realised that the single free-format text box used to capture our comments caused much retyping of references to learning outcomes. For the 2nd year, we refined the system to take four boxes—one for each assignment-learning outcome and created predefined text to accompany each. Typing was reduced, and the system modification enforced a more consistent approach for tutor feedback.

This simple change demonstrates DP2 well. The design of the original assignment feedback screen had been informed by our knowledge of the marking process and by our understanding of tutors’ needs. However, we had failed to anticipate the level of repetitive typing that it would create. Following Orlikowski and Hoffman’s ‘improvisational’ change model, we reflected on the emergent behaviour and made changes to the IT system that consolidated the good practice of giving consistent feedback in terms of learning outcomes.

The value of DP2 can also be seen in our decision to switch from email feedback to web-based notification. Our initial strategy of emailing students with their assignment marks and feedback had forced us to deal with several ill-considered and unfounded complaints about the marks that we had awarded. On reflection, we realised that email culture invited a response and, indeed, somehow suggested that the marks might be more open to negotiation than with carbon-copy paper feedback sheets, which was the process used in other units. We considered printing onto the standard carbon-copy sheets for the 2nd year of operation, but problems of distributing the sheets to the students once lectures had finished led us to consider other options. We eventually devised a personal marks page for the business school’s managed learning environment—an ‘official’ channel, which the students did not associate with regular two-way communication. For the second cohort, we noticed a substantial fall in the number of challenges to marks, and our sense of audience was sharpened as we realised that we had underestimated the ‘two-way discussion’ culture associated with the students’ routine use of email.

A further demonstration of the value of DP2 is provided by our ongoing efforts to tackle students attempting to gain an unfair advantage. Our assignment brief expressly forbade students to use web-editing tools to write their pages. Forensic study of the first cohort’s work enabled us to discern telltale traces left behind when web-editing software was used. Our algorithms for the second cohort became more sophisticated but so too did the excuses for the appearance of such code. Mobile telephones and a strong sense of team spirit amongst those required to explain their work meant that once one student had been quizzed about the appearance of a particular piece of code, subsequent students would have remarkably consistent explanations. Whether picking up signals about explanations that fail to work for individual learner styles in face-to-face tutorials or in more formal end-of-year reflection, DP2 has resonance. Each incident like this, each example of unanticipated behaviour, sharpens our sense of audience and invites
us to consider changes to our systems and routines. Addressing the problem of unfair collaboration will therefore be a key challenge for the 3rd year of operation.

Reflecting upon the first 2 years
End-of-year feedback showed that both cohorts regarded the Emerging Technologies and Issues (ETI) assessment as challenging and interesting. This view is congruent with average assessment marks, which are remarkably consistent but slightly disappointing across the 2 years. The 45% averages largely reflect bipolar distributions in attainment: some students engaged well with the unit and its regime and scored well; others did not and made use of their summer reassessment entitlement. Although the levels and patterns of achievement across the 2 years are similar (see Table 1), there are marked differences in the timing and frequency of access to web-support materials and in the number of correct submissions at first attempt. The second cohort of students accessed the web-support materials less heavily than the first—the tutors saw them using a much broader range of sources—and there was much less of a last-minute ‘panic’ in the week of submission (See Figure 1). The improvement in first-time submission rates coincides with refinements to the online submission process, and the tutors were also able to highlight the experience of the previous year to emphasise the importance of submitting early and of testing submissions thoroughly. Within the bounds of the approved definitive document for the unit, our annual process of unit review and reflection enabled us to consolidate good practice, close loop holes, and increase the range of

Figure 1: Comparing week-by-week accesses of web materials (Abs deadline = Absolute deadline for assignment)
skills developed by the students to fulfil the assignment brief. This incremental upshift in expectations is not atypical of IT units where skills must keep pace with newly emerging technologies, but it does invite a consideration of our apparently similar averages in a new light. Overall, as a consequence of changes made to the unit, the team believes that students will be better prepared for subsequent years of study. This raises serious issues for the scope and timeframe appropriate for evaluating our approach when its impact is intended to have lasting significance. It is not a normal practice in our institution’s student surveys to ask about units other than those in the year being studied; and even if it were, it may well be that the origins of norms, now considered a routine part of academic life, have slipped from students’ discursive consciousness. Such concerns are raised not to emphasise limits on the value of the students’ voice in blended learning design but rather as a reminder that the students’ voice also has echoes in action, and to stress that the summative evaluation of a holistic approach depends upon a rich, longitudinal dataset. We are pursuing this more long-term evaluation in parallel to our annual review cycles, and in the latter, our second design principle (DP2) reminds us that there is still work to do in tackling problems of unfair collaboration and overall levels of achievement. This work is planned for the 3rd year of operation.

### Conclusion

Our review of blended learning highlighted key challenges of user-centred design and of systemic reinforcement of learner activities, communications, support, and assessment. We believe that Giddens’ structuration theory offers a metaframework with which to address such challenges. To address the criticism that Giddens’ work is difficult to operationalise, we identified two key blended learning DPs and highlighted their application in a case study:

1. DP1: pursue intended outcomes through careful attention to the axes of structuration (communication, power and sanction)

   Demonstrated in our efforts to establish four INs
   - IN1: tutor as expert of last resort
   - IN2: attention to detail
   - IN3: regular engagement
   - IN4: demonstrate learning outcomes

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<tr>
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<tbody>
<tr>
<td>Students enrolled on the Emerging Technologies and Issues (ETI) unit</td>
<td>230</td>
<td>180</td>
</tr>
<tr>
<td>Students engaged in assessment</td>
<td>187</td>
<td>151</td>
</tr>
<tr>
<td>Valid assignment submissions on time (%)</td>
<td>70 (130/187)</td>
<td>90 (136/151)</td>
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<tr>
<td>Students failing to meet absolute deadline (%)</td>
<td>2.7 (5/187)</td>
<td>2.6 (4/151)</td>
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<tr>
<td>Average mark (%)</td>
<td>45.8</td>
<td>45.4</td>
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<tr>
<td>Standard deviation</td>
<td>17.3</td>
<td>11.3</td>
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2. DP2: design IT and work routines with an acute sense of audience and be ready to encourage/discourage unanticipated behaviour
   Demonstrated in our design decisions to
   • Reduce typing and reinforce good feedback practice
   • Switch from email to web-based feedback distribution
   • Address unfair collaboration

We are conscious that in illustrating DP1 and DP2 in this case study, we appear to be outlining a ‘regime’ in which students are ‘micromanaged’ towards intended aims. It would be interesting to see how many of our students recognise this apparently cold and calculating account, which has inevitably been stripped bare of the careful ‘packaging’ that experienced tutors employ when turning principles into practice for students whom they regard as individuals, learners with whom they enjoy working, not action-research subjects.

In considering the transferability of our approach, it is important to distinguish between the detail of actions demonstrated in this unit and the two DPs that we have drawn from Giddens’ work. The detail of our actions was contingent upon the nature of the unit, its pass/fail status, its role as a 1st-year unit in laying foundations for further years of study, our willingness as a small, close-knit team to innovate, confidence in our abilities to do so from senior management, and our specialist technical skills. Readers of this paper will likely find themselves in very different circumstances; however, it is DPs 1 and 2 that we offer as something more generic. In doing so, we follow Giddens in acknowledging that it is our audience who are best placed to assess their relevance and utility in settings other than the one presented. For our part, we have been convinced sufficiently to extend these DPs to other units, and the experience has made us increasingly aware that evaluating the application of holistic DPs requires careful study of rich, longitudinal data. We are beginning to build that dataset, and it is showing some outstanding levels of achievement as these cohorts move into higher levels of the programme, which we look forward to reporting over time. In the meantime, we would be keen to learn whether others find value in adopting a holistic view of the structuration of blended learning.

References


