

# Achieving educational change

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## Preface for editors and authors

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Section of book title: Institutional management of change: new frameworks.

## Introduction

Despite the title of this section of the book, this chapter is not about all but only institutional management. Instead it takes the correct departure point to be the question: "What is entailed in bringing about educational change?" i.e. beneficial change in Higher Education (HE), that is sufficiently big, widespread, and long lasting to be called "transformational". Such projects are essentially rollout projects that go from new theoretical ideas (e.g. about feedback), or new activity designs for supporting learning (e.g. reciprocal peer critiquing), to widespread changes in practice that are both measurably better and affect many learners. The chapter argues that even if your aim is to achieve institutional change, a major strategic decision is whether the best method is direct action at the institutional level, or indirect action at another level.

This chapter attempts to generalise from the institution-wide change at the University of Strathclyde achieved by the REAP project (Nicol, 2011) through the redesign of assessment and feedback practices in nine departments across five faculties, and with student numbers ranging from 190-560. Of the 10 redesigned modules, six showed measurable gains in student test results, and all showed high student satisfaction and positive staff attitudes about the teaching benefits to the department. Some redesigns showed reduced teacher workload, and none increased it, after allowing for the cost-to-change. Further indicators of organisational change were the change in institutional strategy for learning and teaching, the continuing reference to its ideas, and ongoing changes that explicitly claim a connection to it. Furthermore the educational success depended on being able to recruit and maintain action from course teams in each faculty, which is essentially an organisational change issue since it required that the project team in an educational development unit successfully work with teams in other departments, and hence achieve multiple changes with substantial common elements right across the institution.

This chapter is a companion piece to Draper & Nicol (2006), and Nicol & Draper (2009). The latter analysis gives more details of REAP, is structured around Lindquist's (1974) barriers to institutional change, and offers seven principles for constructing a project to achieve organisational change. This chapter develops that theme in a different way, asking what the key decisions are in shaping any such project. The argument is developed in three phases. First, we identify and discuss the major decisions made in designing a project to achieve change as if this largely depended on the project plan and project members' own actions. Next we discuss the main factors that prevent such a straightforward approach being sufficient by itself: essentially that communicating with and convincing other people constitute the chief project actions. Thirdly we revisit and comment on the main planning decisions in this light.

### **Seven big decisions in shaping an educational change project**

In this section we identify seven of the biggest decisions taken, whether explicitly or not, in shaping an educational project intended to change practice significantly. (And we invite the reader to consider, for any project that seems to have omitted some of them, whether it might have been more successful if it had addressed them.) They will be illustrated mainly in relation to the REAP project which was summarised above, and Twigg's Programme in Course Redesign (PCR).

The PCR, conceived and directed by Carol Twigg (2003) and funded by \$8.8M from the Pew charitable foundation, ran 1999-2002 and gave \$6M to 30 course teams in HE across the USA to introduce redesigned courses. They spanned many disciplines (including English, Maths, Chemistry, Psychology), and institutions of many kinds from community colleges to private 4-year universities. All 30 showed significant cost reductions, and 25 showed significant measured improvements in the learning outcomes.

It achieved its strategic purpose of demonstrating, contrary to what almost everyone in HE, particularly researchers, had assumed: that it is possible to reduce costs and raise learning quality simultaneously in HE. This fundamentally breaks the assumption of a zero-sum triangle of cost-quality-time: that to improve one or two of these measures requires accepting losses on the other one or two: in particular, that raising quality requires increasing costs. The PCR also showed that you get only what you aim for: that unless you have the explicit and consistently pursued goals of reducing costs and raising learning quality, then you do not get them in course redesigns.

#### **1. Selecting the project research type, and its consequences for cost and quality control**

Shayer (1992) characterises the developmental sequence of educational project types as: studying the primary effect, replicating it without the original researcher, and generalising it (rolling it out to teachers who were not volunteers). Unlike Shayer, this chapter does not presuppose that the teacher's method (i.e. learning design) for a course is the only locus for driving change, but it is still important to recognise a generalised research spectrum running from pure to applied (or from research through development to "rollout" i.e. establishing a new standard practice). A fundamental decision is which of these points to design a project for. This chapter is about achieving widespread change i.e. essentially rollout projects.

Whereas an experiment introducing a new teaching method or technology can and should largely ignore costs in order to establish whether it can work at all and how, rollout is generally only worthwhile or even permissible if costs and quality are favourable. Almost certainly, then, any large scale change needs at least to contain and preferably to reduce costs; and similarly at least to maintain or preferably to raise learning outcomes. However Twigg's PCR showed that these requirements will not be met unless they are explicitly required and designed for in every case, a lesson the REAP project followed. Consequently, the decision to aim for widespread change immediately entails making cost and learning quality explicit and high priority requirements, with pervasive consequences for the project. Failure to recognise and act on this will usually doom a project, like so many others, to being not a rollout project but at most a demonstrator with no sustained change achieved.

#### **2. Select the level at which to apply the primary lever for change**

Even if the project purpose is to change a whole organisation, that does not necessarily mean the organisational level is the one to which to apply the lever, only that that is the level on which final success or failure is to be judged. Cf. to bring down a dam, is it most effective to blow it all up, or to drill a small hole somewhere, or to knock a small gap in the lip and let erosion enlarge it? In many ways the biggest decision a transformational project takes is what primary change (direct intervention, as opposed to indirect but intended effect) it will attempt, and the major part of this decision is selecting which level to act upon. Six are discussed here.

### The level of the individual teacher

Very many people (funders, pupils, parents) clamour for training of teachers (i.e. in HE, academics) as an important way to improve learning quality and quantity. Introducing more teacher training is in fact a common indirect institutional intervention. However the evidence suggests no effect on learner outcomes from the quality of the teacher's training (Chingos & Peterson, 2011) in the school sector, still less in HE. This seems to imply no effect of training (although there may be an effect of practice initially).

### The level of the individual learner

Interventions at the level of the learner but independently of normal classes may certainly be powerful: for example, prior selection for IQ or academic achievement is the biggest single factor predicting dropout rates. After entry, training students in study skills is another example of this kind of intervention. In the field of feedback, requiring students to specify what feedback questions they want answered (elective feedback) is a promising method. (For a description see Draper, 2011)

### The course level

Twigg's PCR and REAP both selected course (re)design as the main lever of change. These projects, as have many others also, demonstrated that this can be effective in changing learning outcomes significantly and repeatedly.

### The institutional level

However these are far from the only possibilities on the face of it. For example, we could imagine a university requiring that all course proposals, including renewal of approval for courses, to produce both direct evidence from test outcomes and student feedback, and evidence from the published educational literature to justify each course's learning and teaching design. This would transform learning and teaching into an evidence-based activity from the current folk medicine / "traditional practice" basis. The field of medicine illustrates both how slow this shift is in coming, but also its benefits. Another example would be the University of Surrey's Professional Year Programme, an institutional policy from its founding, which now sees 80% of students across all degree programmes include a sandwich year (between their 2nd and 4th years) of professional training placement outside the university.

### The disciplinary level

Still more interesting is the strategy embodied in Hestenes' work. Hestenes invested considerable person-years of work in developing the Force Concept Inventory (FCI) (Hestenes et al., 1992): a test instrument that shows what qualitative understanding students have of some basic (HE year 1) physics topics. He did not primarily develop and promote any new ways of teaching, no new learning activities, no special teacher training. Nevertheless the FCI has led to some of the biggest published educational improvements in HE (e.g. Crouch & Mazur (2001) who report a near-tripling of the amount learned on a course). This was brought about by an unusual strategy: the FCI has such tremendous "face validity" that academics teaching relevant courses simply cannot bear it when they see the poor results their own students manage on the test, and additionally the FCI delivers a simple tool by which each academic can measure the efficacy of their teaching, both before and after any change of method. Subsequently they have then either devised new methods, or sought to adopt other's methods which have shown success at this. Hake (1998), in his remarkable paper drawing on 62 courses with 6,542 students, reports the success following on from this due to the spreading adoption within HE physics teaching of new methods. This is the educational equivalent of a medical project that simply collects and publishes reliable cause-of-death statistics, or 5 year survival rates for different cancer treatments, rather than picking a single treatment to work on.

The spread of Problem Based Learning (PBL) in medical schools amounts to another example of disciplinary level transformational change. Note that in the UK, this was initiated only after heavy pressure from the disciplinary licensing body (the General Medical Council).

### Sector level

Twigg's longer term strategy is to bring about sector level change using a course level primary intervention, and the PCR and successor projects to spread the ideas now convincingly demonstrated. (She therefore selected a wide range of disciplines and of types of institution so as to demonstrate the sector-wide implications of her project.) Sector level primary interventions can and do occur in terms of government policy and funding changes, but have more often concerned broad curriculum specifications (i.e. which subjects get funded) than learning and teaching methods.

### Conclusion

Thus there are in fact a range of quite different strategic approaches for bringing about educational change. REAP demonstrated an institutional level *effect*, but using a course level primary *intervention*. PCR demonstrated a sector-wide effect, again using a course level primary intervention. Hestenes precipitated a discipline level effect, from a discipline level primary intervention. Requiring (more) teacher training in an HEI (HE Institution e.g. a university) attempts an institution level effect from an individual teacher level intervention.

### **3. The recognised problem area**

The next crucial choice for a project is that of the "issue": the widely recognisable educational problem to be tackled. In the context of this book, it is "feedback": an issue widely seen to be poorly handled in HE. This is important in getting immediate recognition from others of the relevance and importance of the project. Funding is often tied to initiatives defined by such pre-recognised issues.

We could say this is the level of "symptoms", of the apparent problem.

REAP's choice was "assessment and feedback" for this decision; while Twigg's choice was cost-benefit ratios with new learning technology. Any tour of recent funding initiatives throws up many alternative candidates e.g. student retention, flexible learning, graduate attributes, etc.

### **4. The role of evidence**

Another major decision is whether to invest resources in collecting and publishing evidence of the effect of the project on learning outcomes. It is a decision, not a detail that can be left for the project to decide later, because it takes resources: hiring people to collect and process data, extracting commitments from clients to support this. (PCR and REAP both found that it was advisable not to pay clients anything until the evaluation data was supplied.) However it is also an important decision because evidence has a large effect on persuasion, both within the project (convincing course teams) as well as externally, and for persistence (why should newcomers to a course team maintain the change in future?).

### **5. The educational aspiration**

Popular perceptions of problems, however, correspond to symptoms, and may not turn out to correspond to underlying causes (diagnoses). An important feature of a good project will be a less obvious idea about educational good, that can serve as the source for innovative suggestions about new learning designs. In Twigg it was "active learning"; in REAP it was "self-regulation" i.e. the idea that real aim of feedback should not be correcting the current product (e.g. an essay) but making the learner increasingly able to detect and remedy their own errors in the discipline. Without an aspiration of this kind, a project could have a collection of traditional remedies to draw upon, but would be less likely to achieve significant learning gains beyond the norm of current practice.

### **6. Design principles**

Even given a target symptom and a putative diagnosis, there is still a large gap before arriving at a plan of action that is practical in a specific context, and can be communicated to the people who must carry it out. REAP's approach to this was to have a set of 11 "design principles" prepared in advance of the project. These are short (6-14 words long) action-oriented heuristics, designed to start the process of bridging between abstract theory and practical action (e.g. "Provide opportunities to act on feedback").

Design principles play the role of families of remedies or treatments (cf. pain-killers, anti-inflammatories, antibiotics), as opposed to specific remedies (cf. aspirin, penicillin) which are analogous to the library of learning designs below. Design principles are also comparable to Alexander et al.'s (1977) "patterns" in the field of architecture, in that they do not specify a whole design or solution, but express a functional element which is common across many different good designs.

### **7. A library of learning designs to suggest.**

In both REAP and PCR a crucial part of the project was discussions of course designs between project members and course teams. For this, another resource was vital: having key project members know about a large set of possible designs, mainly from the literature. Thus if a client asks "The principle of 'Encourage teacher-student and peer dialogue around learning' sounds good, but how could that be done?", then the advisor might suggest feedback vivas, or class EVS mediated class tests, or feedback vivas. (For descriptions see Draper, 2011.)

Experience both within REAP, and in REAP-based talks to other audiences, shows how important such a "quiverful" of designs is to the dialogue that is triggered, and to the inspiration they give to audiences. The nearest this resource came to a written form in designing the REAP project may be the literature review (Nicol & Macfarlane-Dick, 2006); but it could also be embodied in a repository of "interesting" designs like the one generated during the REAP conference (Nicol, 2011). In REAP, at least, this library was not a decision finalised in advance, so much as one constantly expanded and updated during the project.

## **Barriers to direct action**

### **Disciplinary Differences**

Although this section of the book is about institutional change management, as if a university were the natural unit of organisation, in reality HE is fundamentally cross-organised by discipline. Even at the level of first year students, a literature student learns and is taught in fundamentally different ways from, say, a chemistry student. The lives of the academic staff are much more bound to their discipline than to the HEI. Their next job is either in another HEI, or depends upon publications in journals controlled not by the HEI but by their discipline. More fundamentally, their ways of learning themselves and of teaching others, both good and bad, come from their discipline and not from any general theory or practice of education. It is because of this that the institutional level is not the only possible way to initiate transformational change: it has been done at the disciplinary level (among others).

It also means that even when an educationalist finds a concept about learning and teaching that applies across disciplines, academics will not recognise its meaning in their own discipline. At the simplest level, if we give a talk, we have to illustrate each method or idea with both an example from an essay based discipline and one from a calculation based discipline, or else the other half of the audience will shake their heads politely and say the idea is not relevant to them. If we simply talk in our own, to us natural, disciplinary language of education, then no-one at all other than educationalists will understand us. This matters to a change project when (like REAP) it needs to enlist staff across disciplines as fundamental participants. In that case, the problem of translating ideas across disciplines is fundamental to both the design and execution of the project.

### **Constructivism applies to rollout projects**

As discussed in Nicol & Draper (2009), in REAP we repeatedly experienced that at the end of presentations, people would approach us to discuss ideas they had had about applying the ideas in their own contexts, and that these ideas would go beyond what we could have suggested ourselves. This means that to communicate across disciplinary divides, we need not simple precision but a suggestive lack of exactness that draws the recipient into the process of making practical sense of the ideas. Thus something more than just "translation" is involved. We find we must apply constructivism not just to basic teaching of students, and not only to feedback (i.e. get away from prescriptions about feedback as if this were something teachers must do to passive students), but also and most radically to our interaction with

colleagues in rollout projects. This cannot be "staff training" or instruction. Simple assertions are not what brings about the desired effect. It is about trying to combine general educational ideas with knowledge of the course specific context: the discipline, the particular set of students, the existing learning and teaching practices there.

### **Many rollout projects consist of persuasion**

Some strategies for large scale change avoid a focus on communication difficulties. Hestenes, by addressing the discipline level, did not need to work on cross-discipline translation. Furthermore, by providing a validated test instrument, he did not even rely on convincing colleagues either by theory or by his own evidence: he manoeuvred them into themselves collecting the data that would convince them from their own classes.

However projects such as PCR and REAP that address the course level must get large numbers of people to change their ideas and behaviour in response to the project. This is also true of some other rather differently structured projects e.g. redesigning a university course database. That would involve enlisting those in central university units (registry, room bookings, etc.). Such projects must get large numbers of people to change their ideas and behaviour in response to the project. Consequently they are necessarily mainly about persuasion, as opposed to producing some object or piece of software.

In the light of this we can review the seven project design decisions, and see that they constitute tools for persuasion and communication almost as much as they are decisions on project actions. In Nicol & Draper (2009) we picked out three of them as "rhetorical resources", which would all be useful although with different priorities, for convincing different kinds of stakeholder:

- The recognised problem (in this book it is feedback). This acts like the headline of a newspaper article, and will attract everyone who recognises this as a problem, in a single word. They are then more likely to read the rest of the proposal, attend a workshop, etc.
- The educational aspiration (in REAP's case, "learner self-regulation"). Many of the relevant stakeholders like to see that there is some educational theory underpinning a project, even if they do not easily understand it in any depth. It suggests that this is not just an effort to remedy an old problem, but is informed by a new and promising approach.
- Having design principles that are practically oriented starts to suggest possible learning designs to practitioners in a way that abstract aspirations do not (e.g. "self-regulation", "social constructivist"). Rhetorically, this instantly conveys the practicality of the project, the impression it can make a difference.

But we can see that most of the other decisions are also important for persuasion:

- Evidence, particularly if published in journals, is often very persuasive within the project, as discussed in Nicol & Draper (2009).
- The library of learning designs. Even if it were given a concrete, accessible form, this is probably most persuasive not directly, but because it means that project members can easily respond with suggestions to any problem raised by a client. Often these would not themselves be adopted, but they trigger creativity and a feeling of freeing up thinking in the client. A flow of suggestions tends to stimulate the listener into realising there are many, many possibilities (not a blank wall).
- Even making explicit the aims, entailed by rollout, of lowering costs and raising learning outcomes has important persuasive effects. Academics are quick to reject any change that reduces real or perceived learning outcomes, and they or their managers are quick to reject anything that raises their workload. Thus this fends off what would otherwise be speedy rejections.

Thus the project design decisions almost all serve directly to promote the persuasion which is the heart of projects like PCR and REAP. In those cases, communication with course teams across many disciplines is the biggest target, but other stakeholders are also important e.g. HEI management, funding bodies,

students. As sketched in Nicol & Draper (2009), the same resources can be used in different sequences and mixes for each audience. (Cf. Latour (1988) for a view of Pasteur's "scientific" success in terms of progressively capturing ever more and bigger interest groups within French society.)

### **Assemble communicative resources before the project**

The communicative resources required to change minds need to be largely assembled before the project begins. This is the reverse order to that in "pure" research projects, where evidence is a final product, along with catchphrases that improve post-project dissemination of new ideas that have been created during the project. Here however the persuasion needs to be the focus of both action and preparation in a project like this, just as the experimental design and required equipment is to an experimental project.

This has implications for funding decisions. Judging project proposals by which has signed up the best clients means awarding money for nothing after the real work has been done, like increasing your advertising budget only after your sales have increased, not in order to bring them about. Conversely, funding a proposal which has not already assembled its rhetorical resources means that no persuasion will be done until after the end of the project. Creating the resources can be a project in itself, and has somehow to be funded separately.

### **Summary**

In summary:

- There is a set of major decisions a rollout project embodies, explicitly or implicitly. There is not just one kind of project, one recipe for large scale or institutional change. (E.g. REAP style, leverage on discipline change by requiring each department to review their field's teaching innovations elsewhere and assess which to adopt, change the course approval form in an HEI to discuss deeper educational issues, ...)
- To initiate widespread change means first grasping that the project is essentially a rollout one.
- The next biggest decision is what level to select for the direct intervention.
- Many rollout projects are essentially comprised of persuasion: that is almost all the project team must do, their main deliverable.
- Many of the decisions constitute major rhetorical resources as much as they are decisions on project actions.
- The rhetorical resources need to be assembled before the project even begins, because the action of the project comprises doing the persuasion by using the resources.

Readers are referred to Nicol & Draper (2009) for example cases of course designs, REAP's list of 11 design principles, and further discussion of rhetorical resources.

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