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## *A Logical Model for Curriculum Development*

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### **Abstract**

Curriculum development is presented in a model arranged on a logical rather than a chronological basis, with emphasis on process rather than on product or syllabus content. The writers relate various components of the model to recent researches into student learning, and advocate its use as practical assistance for self-organization when approaching curriculum development tasks.

### **An anecdotal (but hopefully relevant) introduction**

Given responsibility to help some university teachers develop effective curricula, we have long sought for a model which could provide guidance and reflect the reality of the process. Models in the literature (eg, Davies, 1971; Romiszowski, 1981; Cowan, 1980) show relationships among elements which we can appreciate after the curriculum development experience is complete. These models show a form of retrospective logic but offer limited help or guidance to those who need advice, direction or ideas before and during the development process.

It seems to us that the reason for this lack of constructive guidance originates in the *chronological* structure of existing models. The models summarize a sequence of operations which is little more than a formal statement of common sense, but do not obviously embody or proclaim the rationale or implications of the process which they encapsulate. Yet that rationale is arguably more meaningful—and potentially more helpful—than chronology.

Three years ago, while impatiently waiting at Heathrow for our delayed baggage, we continued a discussion of this issue which had re-opened in the viscous insomnia of an

overnight flight from the Middle East. Belligerently we demolished (yet again) the traditional cyclic diagrams in which aims and objectives are reviewed but once per iteration. We reflected on an earlier proposal by one of us (Cowan, 1980) to place aims centrally in the process. Decisively we moved aims and objectives to a commanding position in the centre of an empty sheet of paper where they would constantly influence and be in dialogue with other items in the process (yet to be fully defined).

We then thought back to the workshop programme which we had just completed. In this—as usual—Assessment had been the first topic to be covered. Our reason for dealing with it first was the indisputable fact that assessment (the ‘hidden curriculum’ identified by Snyder, 1971; and others) exerts as powerful an influence on learning as a published syllabus which summarizes the topics to be covered—or the published curriculum, which may offer some guidance on course objectives. Assessment, once decided, has also been known to influence the content and process of teaching.

Having opted to be logical rather than chronological, everything else now fell quickly into place (Figure 1). We had placed Learning before Teaching in our workshop programme, and now adopted the same location in our model, because you should not plan Teaching without prior consideration of how Learning will (or should) take place. Formative Evaluation of achievements and processes in relation to aspirations was placed to point purposefully forward to the Decisions which should be made before the next iteration.

The outline was just completed as our luggage reappeared! The remainder of the thinking (which is explained in this paper) was more easily assembled after a good night’s sleep. All we had left to do was to express further in the diagram our personal philosophy of curriculum development; a philosophy forged over many years through struggling to communicate concepts effectively in practical workshops for university teachers.

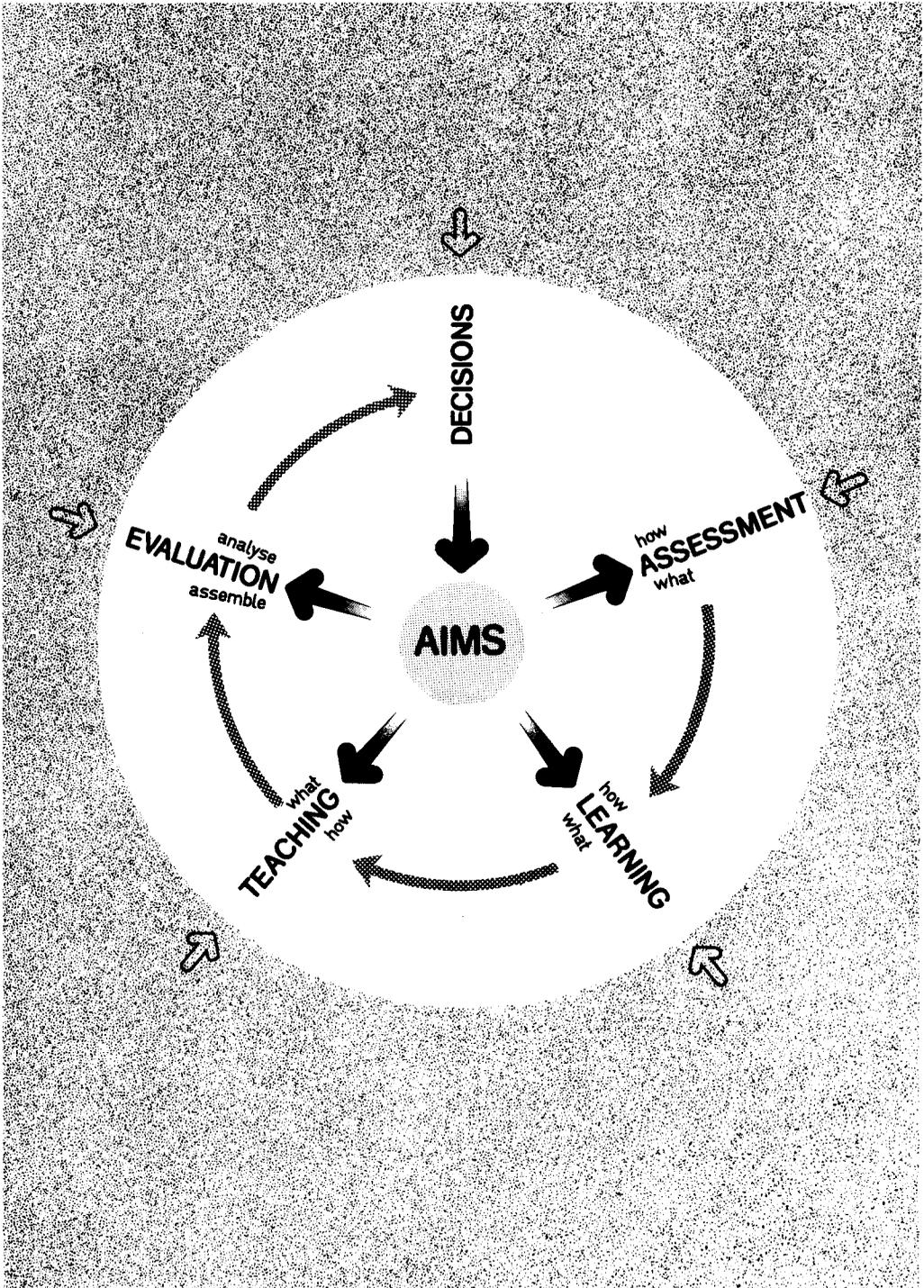
Thus it was that we obtained our model of curriculum development. For us at least it meaningfully expresses the important relationships between the various components—relationships of dynamic interdependence.

We have used this model, tentatively at first, in subsequent curriculum development workshops. We have also referred to it in papers and conferences—to explain our approach. Somewhat to our surprise, it has been firmly grasped and frequently quoted as a framework for thinking, planning and discussion, by ordinary university teachers grappling with the immediate and real problems of curriculum development. Some of them have been kind enough to ask why our model has not been published. That question prompts us to offer it here, as a model of reality; a depiction of the relationships among the aspects of curriculum development which, in our view, should receive attention from any conscientious university teacher.

We leave it to you to decide if the model is valid and if the relationships described in the subsequent sections are helpful to you.

### **The main features (refer to Figure 1)**

*Aims* (which include objectives, of course) sit at the very centre of the diagram. Nothing that takes place in the course is relevant or purposeful unless it serves to further the



*Figure 1*

Aims. That is why strong arrows thrust out from Aims towards all the items of the perimeter of our circular diagram—except in the case of decision-making.

The Decisions about what should be taught, to whom, by whom and with what emphases, are influenced by factors which come mainly from outside the process of curriculum development, from the society of which teachers are a part and to which teachers are answerable. Hence the main emphasis on the link between Aims and Decisions is inwards, *from* the Decisions *towards* the Aims, which decision-takers select or amend.

The arrows, however, are all double-headed; for activities on the periphery of the model affect aims. Aims are not static and sacrosanct but must be dynamic and respond to changed circumstances: to problems identified by Assessment, to difficulties (and potential) discovered in the Learning process, to new possibilities in Teaching, and to data unearthed during Evaluation. These arrows are vital to the model, because they stress what is almost its fundamental equation. In sound curriculum development, aims must equal (or be equivalent to) assessment—just as aims must be equivalent to teaching and learning. This ‘equality’, of course, can be achieved by modification of either side of the equation, which is why—and how—the process is a dynamic one.

*Assessment*, as already mentioned, is known to be a purposeful influence (Snyder, 1971) which affects not only *what* is learnt (‘Is it examinable?’— the ‘hidden curriculum’) but also how deeply it is learnt (Parlett and King, 1971). It is therefore essential to make Aims and Assessment as compatible as possible (hence the outwards arrow) so that the messages which they send out (both radially and circumferentially) encourage the same Learning.

*Learning* is the desired outcome of education—despite the fact that, for many academics, education and teaching are synonymous. Recent researches into learning needs (eg, Cowan, 1984) and learning styles (Marton *et al*, 1984) have led to radical changes in teaching methods, indicating that an appreciation of learning and the learner should influence the Teaching (the circumferential arrow) as much as Aims (the radial arrow), although in a different way.

*Teaching* appears at this stage in the diagram—as a response to the items which have been mentioned so far and as the vehicle for achieving the Aims. Galileo wrote that ‘You cannot teach a man anything; you can only help him to learn’. It is in that spirit that we place Teaching, whether didactic or facilitative, at this relatively late stage on the perimeter of our diagram, and in a position secondary to Learning, which it facilitates.

*Evaluation*, in the context of curriculum development, is a *formative* review which pinpoints scope and suggestions for improvement in the next iteration of the systematic process. It should therefore point forward into the decision-making.

Whatever the methodology of Evaluation (but particularly when the illuminative form (Parlett and Hamilton, 1972) is followed) there is first an assembling of objective data which is subsequently analysed to yield useful information. A subjective response is then made to that information, based on the values and aspirations of those involved. In our view no ‘valuing’ should take place in the initial stages of this process; but we adhere to current usage and describe the assembling and analysis of data as

'Evaluation', being that part of the process which is normally entrusted to an evaluator.

*Decisions* emerge from a subjective process of comparing performance (as reported in the Evaluation) with aspirations, in relation to a framework of ruling values. Decisions may influence aspects of process indirectly; but they should be translated first into restatements of Aims, within the context of resource constraints (of which more is written below).

### **Other (minor) features of the model**

1. Having introduced the major elements of the model, we should now explain the cryptic subheadings attached to Assessment, Learning and Teaching, which imply 'How' before 'What'.

Curriculum development will remain a wasteful process, involving repeated rediscovery of educational wheels, until academics learn to their advantage that teachers with objectives at the same level, expressed in the same general terms, can *and should* operate in a similar fashion, despite radical differences in their subject areas. We have demonstrated this principle with deceptive simplicity in the case of assessment (Cowan and Harding, 1984). Forms of question (multiple-choice or otherwise) *are* interchangeable, provided the objective level and style of demand is unchanged. Thus 'how' to assess is the question to be answered in detail by the teacher before he fills in the subject matter, or 'what' to assess.

Similarly we have given examples (Cowan and Harding, 1984) of detailed plans for small group learning in a variety of contexts ('*how*' to teach) which need make no mention of 'what' is taught (the specific subject matter) until later. It is relevant to note that Heriot-Watt first-year students (Agnew and Cowan, 1986) discover for themselves that how to learn is a universal truth, applicable (within limits), of course, no matter *what* is to be learnt at the same level of demand.

The model therefore reminds us to consider 'how' before 'what' at each stage in curriculum development.

2. The shaded area represents the constraints of the real world, within which a particular development must be planned. These constraints often strongly influence the outcomes; yet their presence is singularly disregarded in other models of curriculum development.

We are convinced that such constraints (*and* potential) should be comprehensively and objectively defined, so that their existence can be recognized positively in the development process. Response to constraints should be a distinct component of the development process—and is so, in our model.

The shaded area outside the main part of the diagram is therefore quite important, because it reflects reality and reminds the model user to seek means of monitoring the curriculum development process.

3. The external arrows represent positive contributions from outside the system, for which a conscious provision should also be made. Assessment schemes, for example, can be plagiarized from a variety of subject areas—once we learn to analyse them in terms of domain and level rather than of subject matter.

The same is true of teaching methods. Findings from researches into student learning are published frequently. We should also use the insights and advice which they offer.

Even questions asked by visitors or acquaintances can focus our evaluation on previously unconsidered worthwhile issues.

None of these sources will be thoroughly exploited unless conscious thought is given to so doing; that is why we emphasize the presence and importance of these external arrows.

### **What difference does it make to have a new model?**

It is quite possible that our model, and the explanations accompanying it, will bring about no change whatsoever in the way you undertake curriculum development, or in the form of the curricula which you offer to your students. Nevertheless it has been our general experience since we drafted the model, that *we*

—devote more care to preparing assessment schemes and coursework tasks which accurately and self-sufficiently convey our aims and objectives to our learners

—plan our ‘teaching and learning situations’ as a direct response to what is known about learning in that particular context (Cowan, 1983)

—analyse published accounts of teaching in terms of domains and levels, seeking useful and usable formats and strategies which can be divorced from subject matter and used in *our* courses

—carefully separate the collection and assembling of data in evaluation from analysis; and discipline ourselves to defer valuing and decision-making until that analysis is fully complete

—make a thorough and usually early analysis of the constraints and potential in the situation within which our developments are to take place

—keep our aims and objectives under review constantly, and adopt procedures which leave them open to dynamic revision

—feel no embarrassment (and often satisfaction) in leaping (apparently erratically) from one part of the diagram to another, as priorities demand.

When this model has been offered as a framework for curriculum development in our workshops for university teachers, we have found that

—the participants use the ‘how before what’ concept constructively, to make plans jointly and to adapt or plagiarize many useful ideas from other disciplines and from each other

—we do not need to justify the early emphasis in our programme on researches into student learning

—participants use the concepts and vocabulary of the model readily in their discussions, and presumably do so because it is meaningful and helpful

—willingness to innovate in methods of teaching for given objectives is more evident than previously

—the role of formative evaluation, as the systematic link into subsequent iterations, is properly appreciated and participants approach the task of learning to evaluate *for*

each other with an apparent appreciation of the potential of this aspect of curriculum development.

These outcomes represent a distinct improvement over our prior experience in otherwise similar workshops.

### **Closing comment**

This paper has been written throughout in the first-person plural, because we have been reporting a way of organizing and representing curriculum development which we value—for its usefulness and for its apparently rational linking of the various components of the process. This précis of our thinking is presented not because it is *the* answer but simply because it seems reasonable to share with others a framework which has been helpful to us. We hope that some readers will find it worthwhile to fill out the details and implications of the model in their own terms, and perhaps review and expand their thinking about the curriculum development process.

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