

Development: Extending the Do-It-Yourself Tradition

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Abstract

With the current political situations in many countries we find that more responsibility for curriculum and teacher development is being moved from the central administration to individual schools and teachers who are told "do-it-yourself".

This move has advantages and disadvantages but other factors remain that were not considered by the central administration and need to be considered now by individuals. The prime concern with the devolution of responsibility is to ensure that development is effective.

Finally another set of factors are discussed which might suggest the need for a paradigm shift in the way we think about teacher development if we want to make the outcomes of the do-it-yourself approach successful.

Introduction Kia Ora Katoa, Nga Mihi No Aotearoa

Historically New Zealand and Australia were occupied by resourceful indigenous people who had learnt to exist in difficult environments. When the British colonization of these countries began the early settlers demonstrated similar skills, with a scattered population and poor communication between settlements, this resourcefulness was a necessity for survival.

As time has gone on this 'do-it-yourself' tradition has continued at all levels of society from research with limited resources, to farming where anything can be fixed with a piece of Number 8 fencing wire, and in teaching where teachers have invented, adapted and developed many innovations that the school was unable to purchase.

Another reason for the success of the do-it yourself tradition might relate to the Scottish ancestry and the background of poverty that some of our forbears brought to the colonies. They knew that if something was not wanted then no matter how cheap, it was not a bargain, and they had quickly learned that expertise cost money and their own work, even second rate work, was less expensive and conserved their financial resources.

Now we have the rise of the 'New Right' in politics (i.e. right as in left/right). The immediate effect of this movement seems to be a reallocation of scarce resources. More funds are moved to schools and even more resources are taken away from the Ministry. These more funds are to cover the costs of responsibilities which were never fully funded by the Ministry in the old environment and the official cry is 'do-it-yourself' (d-i-y).

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This push for do-it-yourself (or yourselves) is evident in a number of areas. I want to mention curriculum development with the associated resource development, and then concentrate more on teacher development which is my current research area.

Curriculum and Resource Development In the last few decades curriculum

development has been the responsibility of the central agency. Syllabus development for students from ages 5 to 15 and prescriptions for awards for students in their last three years at school have been developed on the research, development and dissemination (RDD) model with very little been done at the research end apart from looking at overseas trends, a small group doing the development, and then, with varying amounts of support the documents have been disseminated.

In mathematics for primary schools the developments have been extended to include textbooks which in many instances were prepared on the assumption that the teachers lacked confidence in mathematics and would therefore want the 'teacher-proof curriculum'. Perhaps this is the major research done in New Zealand mathematics education but unfortunately it has not yet been written up. The hypothesis seemed to have two parts: 1) that a teacher proof curriculum was possible, and 2) that such a curriculum would improve mathematics learning. The results of this experiment seem to me to indicate that both hypotheses need to be rejected.

In the new environment in New Zealand a "National Curriculum" is produced, and sent out. This is the dd model - absolutely no research here (or in the UK), a small d for development reflecting the minimal time span for development and consultation, and another small d for the support in dissemination. The expectation of government is that if they legislate then d-i-y teacher development will ensure that the new curricula is adopted. The Ministry is letting some contracts for short courses so that they can say that they did some teacher development but these are likely to have a minimal affect as past experience suggests that the result will be that the curriculum will be adapted rather than adopted.

The other d-i-y ramification is that our professional association (New Zealand Association of Mathematics Teachers) has decided to take a more positive and proactive leadership role in the development of future mathematics curricula. It is doubtful if the government had expected or planned for this.

With the devolution of responsibility from the centre we have a situation where, without compensatory funds, primary schools have to buy texts from the open-market and as New Zealand publishers and authors are not yet geared up for this, overseas resources are being used. In the long run alternative series of New Zealand resources are likely to become available and more schools will probably move to approaches that are not dependent on texts.

Teacher Development In New Zealand ongoing teacher development, like curriculum development, was controlled from the centre. For mathematics, a number of strategies were evident: • a small number of in-term week-long residential courses were organized, • permanent advisers for primary school mathematics, for rural schools, and for junior classes were appointed, • from time to time seconded high school mathematics advisers existed, • inspectors were appointed with responsibility for mathematics, • teacher refresher courses (week-long residential holiday courses) regularly occurred, and • local in-service committees organized one-day long "teacher-

only-days".

At the same time the only other major players were the mathematics associations who regularly organised meetings.

In the new environment the in-term week-long courses have stopped, the advisory service is slowly moving to user-pay, the inspectors have no subject responsibility and as review officers they are instructed to review and not to provide services, vacation courses have been reduced in number and the teachers pay more to participate in them. No funding is assigned for local in-service organisation but all schools have had to include a clause in their charters that indicate their responsibility to ensure that staff have professional development opportunities.

The Ministry claims to have moved about 60% of the old inservice budget to schools and uses the other 40% for teacher development through a contract system. The 60% is probably an inflated value as in the old system many hidden costs remained hidden while now all costs are up front.

The contract system obviously supports current political initiatives, and luckily for mathematics, we are one of these, but funding is minimal and there is no way that every teacher of mathematics in both primary and secondary schools is touched by these contracts.

Thus schools are forced into the do-it-yourself position and are taking initiatives at the local level.

Purposes of development Purpose of teacher development T dev concerned with content change or teacher change - what is taught or how it is taught - TG no use by itself for second

hardly ever do teachers focus directly on improving learning outcomes.

focus - subject, school improvement, personal growth

centre model focuses on subject aspect, not individ or school

(school thinks of school, hod thinks of subject)

school usually focuses on school improvement

3 dimensions - school/subject/personal

within subject: content & processes

learning activities are drawn from this 3 d model and assessed without

specific behav objectives - holistic - big chunks

Needs appraisal -(cf assessment)

Is staff development to provide teachers and students with a competitive edge, or is it valued in itself? (Robertson, 1992)

- professional development as personal development, congruence between the person as person and the person as teacher. (Raymond, Butt & Townsend, 1992).

Need plan for pda map is more important than a timetable (?H&F)

Influences on development My research (Begg, 1991), overseas work

(Fullan, 1991 and Owen et al, 1988) and work in New Zealand in the context

of science education (Bell & Pearson, in press) have identified numerous

factors that influence development positively. These include: -

understanding the change process, - adequate time, - adequate

resources, - numbers of people (not too few, not too many), - modelling

of new skills, - reflection and feedback, and - support and

assistancetogether with a number of factors that relate to local control,

- ownership, - being close to the workplace - local issues are

addressed, and - teachers are involved in planning.

Advantages and disadvantages of the d-i-y approach
The d-i-y position for teacher development at least takes the factors related to local control (ownership, being close to the workplace, local issues are addressed, and teachers are involved in planning) into consideration. The other factors have often been ignored by the central administration and are just as likely to be ignored at the local level.

With the central control of development many teachers were not involved at all in spite of the belief that centrally controlled activities ensured equity, and the philosophy behind the national control seemed to be an authoritarian one which disempowered teachers and encouraged dependency. The d-i-y approach at least allows autonomy and professionalism although it may take some time for teachers to move from what they are used to.

Hargreaves Self initiated

The 'fast track' development of a national curriculum is Policy decisions - few national, many local

Present assessment and national standards emphasise the recall of low level facts with the implication of deskilling the teacher and the student.

(Apple and Jungck, 1992)

No expertise - efficiency solution not design solution

Behaviourist not constructivist (make own explicit first)

Areas needing attention Numerous other factors need to be considered with respect to teacher development whether a central system or an d-i-y system is being used.

Joyce and Showers (1980) categorised four purposes for inservice and five training components.

Four purposes for inservice

A General awareness of new skills theory/skill/strategy

B Organised knowledge of underlying concepts and theory real situation

C Learning of new skills feedback

D Application on-the-job the-job

Five training components

1 Presentation of

2 Modelling of skill

3 Practice in simulated or

4 Structured and open-ended

5 Coaching assistance on-

Bolam (1987) linked these in the following matrix as the result of some research he was associated with.

Level of impact	A. General awareness of new skills	B. Organised knowledge of underlying concepts and theory	C. Learning of new skills	D. Application on-the-job
Training method component				

1. Presentation/description (e.g. lecture) of new skills ÷ ÷ ÷ ÷

2. Modelling the new skills

A paradigm shift?

constructivism - big chunks prior knowledge

assessment

authority-autonomy

gender and culture Robertson - staff development- gender bias

Interest in professional development

Needs to be considered alongside other commitments - women bear a disproportionate responsibility for having the children. (Robertson, 1992)

Gender friendliness of DIY

Cultural friendliness of DIY

professionalism • Needs appraisal or DIY self directed (Clark in H&F)

- planning

- but will they do it - other commitments (need time)

reflection - metacognition (writing)

Reflecting on

search for ground where we stand (in the present) as the locus of ones roots (in the past) and as a source of nourishment for growth (into the future). (Oberg & Underwood, 1989, p 164)

- note the importance of pre-teaching influences (influence how a teacher teaches, but also act as lifelong reference points). (Raymond, Butt & Townsend, 1992).

Stages in writing

1) literal description of actual events from daily practice from insiders point of view,

2) review of these descriptions seeking a deeper understanding, 'seeking the ground'

3) broader reconsideration 'seeking the ground' (Oberg & Underwood, 1989)

Emphasis on doing not talking

Ignores views - not responsible - professional dev is personal growth - all growing

Naisbitt - hi tech / hi touch

Experiential learning (Rogers)

Summary New right - right wrong

AB Cynic can not make another person learn - as T we all know this - and if hard with a F4 boy think of a 45 year old diehard maths tchr

- Theory of change

- pragmatism

- describe current td needs

DIY can work

Conclusion New right right not wrong in terms of td

- individualism and collegiality

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usual state of p.d. mutual support (Raymond, Butt & Townsend, 1992).

- voluntary, self initiated (but “in order to know what we wish to do next, home....., we need to know ourselves, who we are, and how we came to be that way.” (Raymond, Butt & Townsend, 1992).

Andro-centredness suggests:

- world is viewed and understood within a particular framework
 - competition
 - hierarchical power
 - dominance
 - conflict
 - declarations of certainty
 - over confident reliance on rationality
 - quantifiable valued over subjective
 - preference for instrumental and rational over affective and intuitive
- (Robertson, 1992)

to make professional development programmes work for professional teachers ... we must give the responsibility for professional development to teachers themselves.

- adult development is voluntary
- being in control leads to making more use of
- each teacher is unique
- teachers already operate in self-directed ways. (Clarke, 1992)

Stress on leadership! /Male
(Robertson, 1992)

Women - stress relationships, people, communication, cooperative.(Robertson, 1992)

gender neutrality mask andro-centredness encourages validation of the male paradigm, prevents us acknowledging uncertainty and the validity of experimental knowledge and considering alternatives. (Robertson, 1992)
nb androcentredness is not synonymous with male-centredness but more masculine-centredness. (Robertson, 1992)

Stress on need for expertise rather than on what teachers already know (and expertise implies outside expert sources)(Robertson, 1992) /Male

research on teachers thinking supports the position that teachers are more active than passive, more ready to learn than resistant, more wise and knowledgeable than deficient, and more diverse and unique than they are homogeneous. (Clarke, 1992)

Principles of design

1. - make implicit theories explicit (regularly, 1/yr, journal?)
2. - start with strengths. Not deficit model but what strengths can we build on.
3. - five year plan - an Arabic saying “to the traveller with no destination, one road is as good as another.”
4. - look in own backyard (make the familiar strange)
5. - ask for support
6. - go first class (respect yourself - you deserve it)
7. - blow your own trumpet (Clarke, 1992)

Jackson, (1992) discusses

- way of know how
- improving conditions
- independence

but stresses reflection

- starting with thinking about episodes, about anecdotes
- locate episodes within a larger setting i.e. articulate the context.

Complex needs appraisal (req. expertise). Implementation is grounded in interpersonal communication but gender related aspects of this are ignored. (Robertson, 1992)

Classroom-based teacher development is guided by five conditions:

- focus improving quality of learning for science and technology
- shared power
- experiences in the classroom
- inter-related personal, educational and social reference points (x)

- constructive and critical actions (y)

Could be alone with other teachers or with students.

No one form of classroom-based teacher development.

(x) Reference points - personally meaningful, educationally defensible, socially justifiable.

(y) Reflective, interactive and transformative experiences. (Thiessen, 1992)

(Here down Begg, 1992b)

Bolam's analysis seems to fit the ideas of Fullan (1991) and Guskey (1986) in terms of the need to trial approaches and change behaviour first then attitudes changing later. If we accept this analysis then we conclude that if the desired effect is implemented change in the classroom then all five training components need to be included in a teacher development programme. With traditional teacher guides probably only the first training component is present and therefore all that is likely to be achieved is general awareness. If the desired changes are quite small then the descriptions in written form might substitute for the modelling of the new skills. The practice phase, and the two aspects of support (feedback and coaching assistance) need collegial cooperation of some type to supplement the input from a teachers guide.

As a general rule it seems that traditional teachers guides or other posted material should be regarded as a component of a professional development package but the other component needs to be forthcoming from within the school or from some other local network. Perhaps each teachers guides needs to include suggestions on ways they can be used to make them more effective.

This range of components is broad and includes opportunities for providing: ideas, resources (fixed or modifiable), models of teacher behaviours, and opportunities for on-going interactions with facilitators

These components have the potential to be used with a range of people including those in remote situations, those who have significant family commitments that make them unavailable for other activities, those that have specific interests that are not connected to the needs of others in

the school, and the normal needs that are identified in the majority of schools.

Having potential of course does not imply effectiveness but present development activities do not seem to affect large numbers of teachers and so the need to investigate methods that reach more people seems important.

Costs

Two main types of costs exist:

System costs that are borne by either the central authority or the school, and

Teacher costs that are borne by the individual teacher.

Some costs may belong to either of these.

Some examples of costs include:

System costs

- the costs of teacher relief;
- costs of experts (from advisory services, on contract to the Ministry, hired by a school or group, or allowed for in the staffing of schools);
- travel costs;
- cost of resources (from the centre or purchased by the schools); and
- fees reimbursed (for study, conferences or other activities).

Teacher costs

- private time given over for development;
- travel, resources, and fees not reimbursed by the system.

Effectiveness

I am not aware of research regarding the comparative effectiveness or cost effectiveness of different models of professional development. Indeed most of the evaluation of professional development activities has been done after the event by the providers who have a vested interest. More than that, I am aware of the exceptional difficulty in analyzing long term change in performance of students and/or teachers.

With no data on effectiveness of courses I am going to make some

"guesstimates" based on:

(i) whether or not a project has an input of new ideas, and

(ii) whether or not it is spread over time so that

- teachers might be involved in the planning and develop ownership
- time is available for the trialling/practice of new skills, and
- time and opportunities are available for feedback and support.

If one takes an arbitrary figure (say 10) as the potential effectiveness of a 1-day (5 hour) meeting of a group of teachers, then it seems reasonable to rate the effectiveness of a 1-week course as 80, while if the 5 days are spread over a period (say a term) then the potential might rise to 100.

If the 5 days are split into ten 2.5 hour sessions then the potential might rise to 120 but if the teachers are expected to hold all these sessions after school when they are tired then the figure could well fall back to 90.

If new ideas are provided by an expert or from a teachers guide then I would expect to multiply these guesstimates by 1.4 and if both were provided then perhaps by a factor of 1.7.

Obviously such "guesstimates" are not reliable but they give some insights into the potential cost effectiveness of various models and the methods of analysis would be appropriate if accurate measures were able to be obtained..

Cost-effectiveness

Cost effectiveness for an activity is a measure obtained by dividing the estimate of effectiveness by the cost. Cost effectiveness can be looked at from the viewpoints of the system, the teachers, or from an overall position. While it is reasonable for policy makers to look at cost-effectiveness for the system it is more equitable to look at overall cost effectiveness.

Some models

To illustrate this analysis I have used a series of alternatives with teachers only and then a series of alternatives with inputs from experts, teacher guides or both. This table shows my analysis:

Time Components	Cost/teacher	Effect	Cost effectiveness
1 day teachers only	200	10	$10/200 = 5\%$
1 week teachers only	1000	80	$80/1000 = 8\%$
5 days teachers only	1000	100	$100/1000 = 10\%$
10 half days teachers only	1000	90-120	9% to 12%
5 days teachers only	1000	100	$100/1000 = 10\%$
5 days with TG	1030	140	$140/1030 = 13.6\%$
5 days with expert	1250	140	$140/1250 = 11.2\%$
5 days with TG & expert	1280	170	$170/1280 = 13.3\%$

I have not tried to separate teacher and system cost but the obvious preference of policy makers in the present economic climate would be to try to have the major input (TRDs) replaced by the teachers own time. I have also not considered travel costs which have some distorting effects. One further consideration regarding cost is concerned not with the unit cost but with the total budget for professional development. Most schools seem to be budgeting for about 1.5 TRDs per teacher (\$300) and if the central system has disbursed about 70% of the total professional development budget then this means that only about \$400 per teacher is available in any one year for each teacher to cover all subjects. This implies that the options where the system cost is over \$200 need to be deleted from the range of practical options unless the teachers are willing to pay some of these costs or use their own time.

Another problem with teacher development is whether to try to impact with everyone or whether to work with people who are keen to move. On the one hand the law of diminishing returns suggests that it would be more cost effective to improve a large number by a small amount rather than a small

number by a large amount and one should start with those that need lots of improvement. On the other hand we know that you can lead a horse to water but you can't make them drink. Teachers guides do touch everybody, the take-up is not guaranteed but even for teachers who will not publicly move they may have some small effect.

Some possibilities for the future.

Apart from specific guides schools need to encourage the professional growth of teachers by subscribing to other professional reading such as journals and books and encourage the sharing of papers obtained by teachers who attend conferences, courses, or study programmes.

With advances in technology a number of new options for postal models are emerging and some experimentation is occurring with these overseas. These include the use of videos (that provide excellent modelling of new strategies) and e-mail and bulletin boards that mean that dialogue, feedback and support are all potentially available to even remote schools that wish to participate in these activities. Further costing and research needs to be done with these technological innovations to see whether their potential is cost effective.

Further research needs to be done on effectiveness but I feel strongly that this needs to be considered along with the practical issues of cost. It is possible, indeed probable that long-term effectiveness in terms of changes in teacher behaviour and in students outcomes are too hard to measure and are affected by so many variables that we will need to use a series of performance indicators as substitutes for measures of effectiveness.

Conclusions

I believe that problems to do with the lack of available expertise, the costs associated with remote schools, and the general inaccessibility of many professional development activities mean that for some time teachers guides or some other form of postal model may need to be supported if changes in schools are wanted. On the other hand, these posted components need to be viewed as only one component of development projects and schools or local networks need to build groups to use and support the use of the ideas from these components.

I believe that some postal materials need to be produced and distributed to all schools. This is only likely to be done if support is provided from the centre but in many instances seeding finance rather than full funding may be all that is needed to encourage groups to produce material.

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the issuing of textbooks which This is not new as most curriculum projects in the past have been done without adequate teacher support. New Zealand

An r d-i-y ramification is that professional associations such as the are taking and teacher development ad expected or planned for this but it should be regarded favourably. In the resource area, w, . A ourso book

In New Zealand economic Need to reflect on the interrelatedness between curriculum and teacher development
Need to plan

opment to teachers themselves. adult development is voluntary ol leads to making more use of - each teacher is unique
, 1992 ators that influence teacher development and it is probable that they also influence curriculum development (3 years for a major change)(standing the change process, , adequate resources, , modelling of new skills, reflection and feedback, and support and assistance)

research he was associated with.

- new ideas Where do ideas come from advisers, reflection on action
- Expertise leads to design solutions, no new input leads to efficiency solutions
- , courses, or study programmes.
- models where do we see models action research (invent own) prof reading
- trials and practice how can teacher trial & practice autonomy of teachers negotiate with colleagues
- feedback and reflection
- support and assistance support yourself need opportunities to reflect journal reflection
- ≠ ≠ tiveness and cost effectiveness wrt student learning outcomes teacher behaviour is it going to be it is spread over time so that planning and develop ownership/practice of new skills, and Some models- - role of - authority or -
- Andro-centredness suggests: d within a particular framework • competition al power • dominance • conflict • declarations of certainty n fident reliance on

rationalityifiable valued over subjective

- deficits or strengthsneeds appraisal

- - Reflecting on

2) discusses - way of know how but stresses reflection t episodes,
about anecdotes - emerging technologyOther ??Jaworski (1991) writes of
the anecdoting process as a means of using teacher experiences to draw out
underlying patterns and teachers' common concerns.

what strengths can we build on. road is as good as another."ard (make
the familiar strange)5. - ask for supportpect yourself - you deserve it)t

is guided by five conditions:ning for science and technology- shared
power- experiences in the classroomints (x)ther teachers or with
students.room-based teacher development.fensible, socially justifiable.a:
ucation, University of Waikato Hamilton: , Kia ora katoa, nga mihi n -
Greeting from New Zealand. Resource DDDDxt of science education (BellDD-I-Y
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directly`~`

If these five components are attended to by the d-i-y developers then we
will have a better system than the traditional one, although it would have
been possible to enhance the traditional approach by giving these same
components attention too.CE- costsTwo types of costs exist these are: (that
are borne by) such as- the costs of teacher relief;-ise;- travel costs;-
cost of resources; and - (t) such as:- ime given over for development;--
effectivenessVirtually nocost is availableM and it does not analyze Policy
decisions need information on effectiveness and with no data available one
reasonable alternative isbased on whether or not a project:- has an input
of new ideas;- ;involves teachers;- s by the participants;provides
opportunitiesng/practice of new skills;- providesreflection; and- gives
participants and assistance-c and include costs to the teacher as these
extra costs will certainly be considered by prospective participants when
they are invited to join a projectA furSome Further FactorsA number of
other factors that influence professional development need to be
considered, these include learning theory, reflection, the role of
assessment, strengths or deficits, gender and culture, role of the teacher,
and emerging technology.

learning theorythe the role of the teacherIs aParadigm S NeededRobinson
(1989) speaks of the traditional management model for professional
development and signals a preeference for an empowerment model. Such an
empowerment model would differ from the management model in a number of
important ways that are summarised in this table that I have modified from
Robinson's analysis.

Aspect of Change	Management Paradigm	Empowerment Paradigm
Focus	change	choiceSource
experts	teachers	Role of outsider
choice agent	View of outsider	change agent
facilitator / colleague	expert / salesperson	
Starting point	deficits	teachers strengthsView of

teacher	deficient	professional
Control	outside agents	teachers
Role of teacher	beginner	decision
maker	Indicator of success	adoption of new idea
decision making	Expectation	immediate adoption
development		gradual
Method	pressure for change	support to change
Outcome	apparent (but superficial)	gradual refinement
of	change, followed by	present practice,
and	reversion when pressure	possibly adoption of
is removed	new practices.	

Rice (1992) takes this a little further and stresses the need for introspection, reflection and self direction as the three identifiable behaviours needed in the promotion of a professional development ethos. In the d-i-y model I would think we need a new "autonomy" paradigm. The empowerment model provides a good stepping stone and Rice's three behaviours are admirable, but the reliance on outsiders for expertise, facilitative skills, and for support is unlikely to be practical. Changing from d-i-yourself to d-i-yourselves which suggests networking between like-minded people is likely to be the extent of outside assistance.

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and teacher development need to be viewed as two parts of a complex process which does not start with one and finish with the other but is much more intertwined. The development process has often been viewed as a stop-start process or a project-centred one, it makes more sense to see development as a natural growth process which goes on regardless, is subject to growth spurts, but is never at rest.

Both curriculum and teacher development have often been () but the focus now is more on change in teaching (how it is taught). This is not to say that teachers are not concerned about student learning outcomes but rather that they wish to focus on the variable that they have most control of. Within the development activities the focus might be on the mathematicson or on, the emphasis usually being decided by the controller of the finance. Thus a central administration is likely to focus on the school and the subject, a improvementa ead f epartmentthe , and the individual teachers personal growth is often neglected.

WTakingfurther suggestse empowerment model provides atowards this would be assumed in it, indeed the idea of self-direction nearly encompasses the model. The further step is the lack of or.

This lack of reliance is partly due to the pragmatic difficulties of all having assistance available, but it is also based on the view of the teacher as a professional, an expert, and an independent person. Some

teachers may still feel a need for outside assistance, especially during the move from one paradigm to the other, and an approach to one which provides such help.

The process of a national curriculum is a natural growth process which is subject to growth spurts. The old road is as good as another."

curriculum documents (syllabuses and frameworks) journals (professional reading) advisers, reflection on action

perhaps if experts are needed then teachers must become the experts
a

change is learning and Fullan & Stiegelbauer (1991) stress the importance of understanding the theory of change. In fact, teachers' decision making takes this and

and from time to time responsibility for mathematics-day long "teacher-only-days". The environment, the advisory service is moving to user-pay, responsibility and school-based development opportunities. The contract system. The 60% increase in all costs are up front. This contract system's current political initiatives and mathematics (luckily) is currently it is unlikely primary and secondary schools will be touched by these contracts.

The "fast track"
"not

a development process, it is merely an approximate documentation of the present state of the art in a new format to satisfy politicians. It should not be but should be seen with mathematics teaching (how the subject and). It is neglected even though personal development that moves teachers towards congruence between their roles as person and as teacher is professional development. The development process is needed. A is not necessarily needed, indeed it may well be counterproductive, but a long term (perhaps) is desirable. To get anywhere, and the old road is as good as another is worth noting.

Clarke (1992) says that "..." and he suggests that "opment to teachers themselves (because) adult development is voluntary, leads to making more use of each teacher is unique, and"

fits with the ideas of Clarke and empowers teachers. Bolam's include the necessary components. This analysis fits with . If we accept this? In the past they have often come from outsiders but other sources such as the schools, teachers' guides and, and teachers are all sources. One view in favour of outside experts was that they lead (a change in what was happening) while (doing the old things more efficiently). The idea that teachers as professionals become experts and their activity will bring them in contact with new ideas seems to have been ignored. Teachers can of new

skills and strategies by networking with colleagues or by being involved in projects. They by networking with colleagues, , or by obtaining videos that demonstrate the practice

also see models secondhand by reading essential journals and by listening at . Have usually only contained new ideas but for changes in practice could be modelling.

What opportunities exist for to trial and new strategies? One can negotiate with colleagues and to trial and practice new strategies, and one has considerable as a teacher to try out things within the classroom without seeking permission. Probably the most important collaborators in such trialling are the students. Trialling is likely to lead slowly to aim will start to change after one has reflected-on-action and decided what the pros and cons of the trial are. How do teachers get feedback? A who is willing to watch and provide feedback or to act as a sounding board is useful. Another way is by listening carefully to the feedback from students. Self initiated feedback in terms of reflections on action is a third way and numerous strategies such as using journals provide ways of doing this. s and teachers' common concerns and this is also related to getting to a basic understanding of what is happening. The assistance and support that are often needed are at three levels - the administrative, the professional and the personal level. The most important notion is to when you want it. The same is true of assistance. Traditionally most of our professional development activities have been individualistic but mutual support can be gained by taking a collegial approach either with colleagues from within the school or through networks of teachers beyond the school.

All the above To measure cost-effectiveness it is important to have a measure of the two separate components. Costs are comparatively easy to obtain although a decision needs to be made as to whether one includes all the costs or only the costs that the organisation has to bear. s is more difficult, while improved student learning outcomes are the purpose of most development activities, teacher behaviour what teachers usually focus on, and as some measure of effectiveness is needed before policy decisions are made, the measure will probably be based on whether the development

activity includes the necessary. ed on whether or not a project-0approach might be to start with some arbitrary figure (say 1) the potential effectiveness of an activity then multiply it by a series of "guessed" multipliers to represent the inclusion of the various factors. For example a the potential effectiveness of a week long course might be doubled if it is spread over a term with opportunities for trialling and practice between sessions. It might be multiplied by a further 1.5 if all the management and focus issues are decided upon by the participants, and so on.

The shift from behaviourism to which is affecting our view of mathematics education does not seem to be having the same effect on teacher development or curriculum development. The of teachers and the interests and areas of enquiry that they identify should be the subject of development activities

and self-assessment should be stressed in the evaluation.

Both of these aspects suggest the autonomy of the learner needs to be given more emphasis.

Teacher adult and the processes involved. This understanding at the meta-level suggests another aspect of constructivism.

In curriculum development too, constructivism needs to be given more credence as we move away from a curriculum that defines the topic in behaviouristic goals. I... how we came to be that way Raymond, Butt & Townsend, 1992). The nt for growth (into the future) (Oberg & Underwood, 1989). These quotes suggest the initial stage where reflection is needed to establish a plan and the later review stages where plans are modified. Ling in one'sard and making the familiar strange is one way of considering situations from other people's points of view and is another technique of relection that helps one see development activities in a fuller way. Journal writing is a third way of aiding reflection although it takes time as one moves through the s that are outlined by (view, 2) stresses reflection and suggestst episodes, about anecdotes and then locating thea larger setting i.e. articulatingnas in left/right). The

includingiated resource development, andchool have been developed on a) model with very little research being done, dissemination stage ofd the issuing of resourcared on the assumption that idence in mathematics and ed about unfortunately it has notp. The hypothesis had- curriculum was possible, and-uggestealand a "National Curriculum" wa model - no r because there was absolutely no researchwhat is called The expectation of government walopment will ensure that the new, curriculum projectskely to have a minimal effect andtheis that without compensatory fundssbook long run alternative more schools willmove to approaches that are not

has also beenThe role of the mathematics asociations and similar networks is growing to fill the void.irThereally jectttempt to document Ignoring the national curriculum and looking at criculum and teacher development, one seesand finish with the other but involves both in an wayIdeally development does not start and stop development (Begg, 1991). As on the school and the subject, is concerned withThe of t alan important part of and as for a traveller, A nusually required as teachers are aware of what they want to develop and an appraisal may br threatening and & Stiegelbauer;. These include: erstanding the change process, , - adequate resources, th respect tot whether a central system or aing matrix as the result ofthi& Stiegelbauer teacher development programme.

N? In the past they have oftenprofessional reading have new ideas that may

come into has often Modelling new strategies of new skills and strategy
networking action research view can also gain insights by reading
traditionally but easily provide more details about the way that strategies
can be implemented They negotiate with colleagues and and practice new
strategies have to try out things T
F as a sounding board is useful and an alternative asking for and
through reflection no other of getting feedback exist for Journal writing is one
aid to reflection. 2) SA personal, professional and . Traditionally most
staff

This can in some form by people by it preclude from by with atypical by those with
the common needs that are If these tional approach by giving these Cost and
C Two- system costs and teacher costs. and include the costs of: teacher
relief, , travel, and and include the cost of and the costs of
E Considerable exists about the components needed in development activities
but little compares the effectiveness of the models. ost and do in
performance of students comparative ed on whether or not a project,, by
the participants, ng/practice of new skills, reflection; and anclusion of the
various factors. For example week-ade decisions not reliable but they give an
insight into the potential come more appropriate when accurate measures
were C Considerable ra comparion of of development is lacking of ivities has
been donees look at the no data available one is obtained by dividing the
measure of effectiveness
by It both understand
as these

associated with cost effectiveness ar getchang T returns suggests that it would
easier the L and this suggests a building on strengths rather than
weaknesses which is not the traditional view.
Gailraith (1991) and Begg (1991b) have highlighted the difficulties of a
curriculum that is meant be taught from a constructivist perspective and
assessment goals that are written in behavioral terms. According to Apple
and Jungck (1992) the ping the teacher and the student. This change in
focus for assessment is needed to develop a consistent theory for learning,
teaching, curriculum, and assessment. G (1992) T
Self ass• planning
E

a
Begg, Andy (1991b) Assessment and Constructivism, a paper presented at the
ICMI study conference on Assessment in Mathematics Education and its
Effects, Spain, April 1991 Gailbraith, P (1991) Paradigms, Problems and
Assessment: Some ideological implications, a paper presented at the annual
conference of the Mathematics Education Rresearch Group of Australasia,

Perth, July 1991

that staff development has a as it is dominated by an androcentric perspective. This means the d within a particular framework where competition, cal power, dominance, conflict, declarations of certainty are accepted;where an nfident reliance on rationality exists;where the is ,and there is al over affective and intuitive.

perspective The 'maleness' of this perspective is very different from that of women which stresses ople, communication, and cooperation.

She suggests that the apparent of development activities actually the f the male paradigm, prevents theof aa0that influenceThe shiftwhich is affecting or curriculum developmentthe learner andtarning point for—the traditional deficit model.

Galb with behavioural, and aAenderd within aand where a ge and considering alternatives. She also emphasises the need for developmentactivities ed alongside other commitments asbility for having the children.A d-i-y approach to development activities should be

,`xy as the decisions would be made by women but in the initial stages it may be important to have opportunities for decision-making without men present as their outlook is likely to continue to emphasise the

androcentric view.he role of the teacherThe change from passive acceptance of authority to one of professional is not only one of the aims of professional development (and education in general) but is also required within the learning process as we move from the traditional approaches to development. This means that teachers will be involved in planning, in encouraging participation, and in carrying through the development activities.

The aim of a teacher (or outsider) in the relover is ecessary and it is probably better to think of the role as that of a facilitatoringsand use than the more positive leadership role that developer suggests. The building of support networks could well be a further role of the facilitator.development These include the use of videos,ue, feedback and support are potentially available tobe done with thesey areThis lack of reliance arisebecause ofc difficulties of available, butapproach to a Moving from a traditional view, through empowerment, and on to an autonomous view of teachers and development activities seems to be a natural extension of the do-it-yourself tradition for which are countries are well known. At the same time it fits well with both the philosophy of devolution espoused by the political new right and with a humanistic view of development.

Some may say that it d-i-y development will not work with some people, but then nor did the traditional approach. Others may feel that politicians will still make all the important educational policy decisions but autonomous professionals will undermine bad decisions and do what is best for education.

Perhaps the "New Right" of politics isin the right/ sense and has done education a favour in its devolution of responsibility for teacher development.

Gancurriculum (Ministry of Education, 1992)s produced, and sent out. This wa

example of Ministry of Education (1992) Mathematics in the National Curriculum – Draft. Wellington: Learning Media
and decreasing Some funds were moved to schools but within schools are to cover their New Zealand, it interests me to know whether the same thrust exists in Australia and other countries with new-right policies. NZ teacher development. I would anticipate a similar thrust in a model with dissemination development. If it had been a project it might have evidence. It would have had a draft NC professional development program (and perhaps claim a large D) but the

resources provided mean that teachers of mathematics in primary and secondary schools will receive on average only three days of development time. Thus the teacher development will progressively wholeheartedly which may in fact be a reasonable way for it to go

, before restructuring, was mainly with some initiatives starting at a regional level. A, the advisers are but do not in service have been reduced in number and region in-service organisation but schools all have and some funds were provided as part of a total school grant for this activity. clawbacks from the 60% are normal, and the future looks bleak when other subjects will take their turn and then science that they have most control of and they are only likely to start using new teaching activities when they are sure that better learning will occur. appraisal may be this with minor source of math, pay more to participate in-service schools industry claims to have moved an inflated value as had many hidden costs. clawbacks from the 60% are normal, not F, it can only be an two parts of a, and ideally

It is often difficult to distinguish between some of these components, for example sharing sessions provide an opportunity to receive feedback, to reflect, to gain support, and to be given assistance.

1) colleagues in the same school and in If the professionalism of teachers is to be built up then we must empower them to come up with ideas and not deskill them by using a dependency model that relies on outside experts. 2) by visiting each others' classrooms, When teachers discuss ideas and what they have seen, make a commitment to try something, come together to share experiences, and from this sharing develop confidence, we find that modelling is occurring and is being taken further to incorporate aspects of the other components. 3) Related to the modelling of skills and is their trialling (practice). Teachers may need encouragement from peers to do this but the who want to know what the teacher is trying to do and why. 4) feedback, and support a sounding board is useful. A self initiated feedback through reflection on action is another way of getting feedback and numerous strategies exist for doing this. Journal writing is one aid to reflection. Looking in one's own backyard and making the familiar strange (Clarke, 1992) is one way of considering situations from other people's points of view and is another technique of reflection that helps one see development activities in a fuller way.

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