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Teacher Design Teams (TDTs)—building capacity for innovation, learning and curriculum implementation in the continuing professional development of in-career teachers

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From October to December 2005, six biology associates were employed to progress the connection between curriculum implementation and the continuing professional development of teachers at regional level. The associates worked with one hundred biology teachers in Teacher Design Teams (TDTs) and together they produced eighteen innovative classroom resources, which have now been made available for the teaching of biology nationally. This article considers the merits of the TDT approach as a form of curriculum implementation and continuing professional development with reference to international literature in the area and the reported experiences of biology associates in working with biology teachers in one region. Findings indicate the benefits which accrue, when teachers are actively engaged in the process of curriculum implementation through TDTs, as well as the challenges they face when inadequate curriculum support is provided.

Introduction

To maximize student uptake of the sciences in senior-cycle (two-year programme, 16–18-year-olds) in Ireland, science needs to be taught in stimulating, imaginative and creative ways that develop students' curiosity and entice them further to explore the wonders of the physical and living world. Science teacher education and models of in-service in Ireland have generally focused on subject content and have been more examination- rather than learner-centred; there is an urgent need for this to change. Science teachers need to be scaffolded in ways that reward discovery learning, keep them up to date with research findings and give every assistance to developing innovative ways of teaching and learning that support different ways of knowing.

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This article considers the insights gained from a recent state-run in-service programme for biology teachers that sought to develop innovative ways of teaching and learning through increasing teacher autonomy. The three-month in-service programme was entitled: 'The Leaving Certificate Biology, Home Economics and Junior Certificate Mathematics Curriculum Implementation and Professional Development Programme 2005'. The article discusses the biology component of the initiative and documents the main issues to emerge from the use of Teacher Development Teams (TDTs) in the implementation of curriculum change in biology teaching, in Irish second level schools. It begins with a brief overview of the Biology Support Service.

The Biology Support Service

Arising from the recommendations of the Task Force Report on the Physical Sciences (2001) to reform the science curriculum in both primary and post-primary education, a new biology syllabus for senior cycle was introduced in 2001 for first examination in 2003 (Department of Education and Science Leaving Certificate Biology Syllabus Ordinary Level and Higher Level, 2001). Other than a minor revision in 1977, the new syllabus marked the first major reform of biology since its introduction in 1969 for examination in 1971. The uptake of biology had grown steadily, showing an annual 2:1 bias in favour of girls, with 43.5% of the total cohort of Leaving Certificate (Established) students taking the subject in 2005—the sixth most popular subject in the examination (State Examinations Commission, 2005, p. 5).

The curriculum reform in biology in 2001—together with the reform of all senior-cycle science subjects—was a radical departure from previous reforms and placed a strong emphasis on teaching science for the enquiring mind to include mandatory student experiments, relating the subject to real-life situations, inviting school-industry partnerships and active teaching and learning methodologies. In-service support for biology teachers was offered in two phases from 2001. First a dedicated support service, the National Biology Support Service—ten teachers on a secondment arrangement from their schools, with one national coordinator—supported the subject on a three-year, year-by-year contract basis. The teachers, called 'Regional Development Officers' (RDOs), visited biology teachers in schools, held cluster events and workshops with hands-on experience of the new mandatory experiments and the use of data logging methods. A website was developed, regular newsletters were published and a handbook was produced in 2003—in association with the National Council for Curriculum and Assessment (NCCA)—to support the teaching of the subject. Teaching methodologies recommended focused on constructivist approaches to teaching with considerable currency given to activity-based learning and students doing experiments.

In 2005 the Teacher Education Service (TES) of the Department of Education and Science (DES) judged that the first intensive phase of curriculum

70 implementation was concluded and the support service was reduced to one
AQ3 coordinator, one RDO and six biology associates for a three-month period from
October to December of that year. This second phase of the service, renamed the
Biology Support Service, involved six biology associates, five of whom had been
members of the previous team. The aim of the service was to build capacity and
75 identify imaginative ways to support the teaching of biology and continuing
professional development (CPD) of teachers. It is the work of this latter support
service that is the basis of this article.

International theoretical basis for TDTs

80 The theoretical basis for the formation of TDTs—creative spaces where groups of
teachers work together—lies in the findings of a number of researchers (Giroux,
1992; Lieberman & Miller, 2005) who view teaching as a complex intellectual
activity with the inherent drive of experienced teachers to fulfill their learning, social
and intellectual needs as part of their own process of self-actualisation. According to
85 Giroux (1992), there is a need for teachers to influence the ideological conditions in
which they work: ‘Needless to say, the principles underlying management pedagogies
should be actively involved in producing curricular materials suited to the cultural
and social context in which they teach’ (p. 86).

90 The TDT concept provides teachers with a creative space to reconsider the
teaching of their subject, the intellectual stimulus of working together and the
challenge to move the thinking forward. In this way, teachers are invited to become
curriculum makers.

95 The needs of in-career teachers are somewhat different from the needs of initial
teachers, as identified by Huberman (1993) with his concept of the professional life
cycles of teachers moving through differing stages from the beginning teacher to the
more experienced teacher. Experienced teachers often find, with issues like
competence in subject knowledge and classroom management resolved, that they
gain a better opportunity to develop a more imaginative relationship of learning in
their classroom. Experienced teachers have varying personal and professional needs
to develop their creativity, to share their experience, to leave the isolation of their
100 classroom and yet, according to Jarvis *et al.* (2001), to continue the intellectual
challenge of the subject that may have attracted them to teaching in the first instance.
Groups of teachers meeting to share and work together provide an opportunity to
extend their professional boundaries, recently suggested by the Teaching Council,
and as advocated by Carlgren (1999) to become part of a *curriculum-making* process:

105 As a consequence of recognizing teachers’ work outside the classroom as part of their
work, and as a practice in itself—a design practice—new ways of discussing the practice
of teacher education open up . . . in order to develop professionalism as designers of
school practice, they need experience of the practice of reflective curriculum planning.
(p. 54)

110 The problem at the heart of the issue, of providing CPD to experienced teachers, is
to find an appropriate approach, or several approaches, to win teachers' involvement
while simultaneously offering support and challenge in their personal, professional
and pedagogical development. The model needs to acknowledge the tacit embodied
1 AQ5 Schön (1983), in action as well as on action. The fact that teachers, therefore, hold a
significant key to curriculum implementation has been acknowledged by Tamir
(2004), among other policymakers and researchers alike:

The realization that teachers are the key to successful curriculum implementation
requires the design and implementation of adequate teacher-training materials and
strategies, as well as the promotion of research aimed at identifying the important
variables in this area and the effective ways to deal with them. (p. 288)

Working with teachers in this way, empowering them to design, to learn and to
change, develops not only the teaching of the subject but also the leadership capacity
of the teachers themselves. This type of leadership, referred to in the literature as
distributed leadership (Spillane *et al.*, 2003; Harris & Muijs, 2005), has a distinct
225 focus on the scholarship of teaching and is the type of learning that is required if
schools are to be transformed into learning communities (Sugrue & Furlong, 2002).
According to Spillane *et al.* (2003), enacting change consistent with the spirit of a
reform requires a transformation of core practices and for this to be achieved school
leadership is crucial. The insights gained from this study will show that the TDT
330 approach arguably has the capacity to develop, over time, this type of distributed
leadership and make a real difference to in-school professional collaboration.

The difficulty of developing the culture of change in schools is clearly seen when
one considers that increasingly organizations have a stronger culture of bureaucracy
335 than of leadership, where values of officialdom often outweigh inspirational leader-
ship and where the status quo and precedent are often maintained in preference to
innovation and change. The research findings of Callan (2006) into the culture of
post-primary schools in Ireland indicate deep-rooted traditions which timetables and
school structures legitimate. The administrative culture is often, it appears, more
340 concerned with protocols and precedent than it is with developing scholarship,
learning and innovation.

The TDT concept already had a number of antecedents in Ireland and in the
international research literature. Curriculum development by Stenhouse (1975) and
others in the 1970s recognized that curriculum development and teacher develop-
345 ment were inextricably linked. The teacher as curriculum maker was cited, by Trant
et al. (1973), in the Integrated Science Curriculum Innovation Project (ISCIP) in
the 1970s and involved teachers in a constructivist approach to science teaching
where the teacher developed an atmosphere of discovery, rather than using a lecture-
style classroom. The concept of teacher as curriculum developer was proposed by
Leonard (1986), in the junior English pilot project in 1983–1985.
350

Teachers became involved in the 1990s with the Transition Year Curriculum
Support Service, in developing curriculum and their own resource material. Many of

the resources produced for Transition Year involved a combination of teachers working collaboratively over a period of time together with agencies willing to support publication and dissemination. Exemplars of this type of TDT approach are to be found in the development of the *Ros na Run* resource pack for teachers of Irish, supported by Foras na Gaeilge and TnaG (Irish medium television channel) and the *Exploring Electronics* resource pack, supported by the Cork Institute of Technology and Motorola, and developed for science teachers and their students.

Nieveen *et al.* (2005), in the University of Twente in the Netherlands, used TDTs as part of the PIVOT programme: a school-based curriculum innovation to integrate curriculum development with teacher development. The project sought to identify ways to generate more ownership and commitment and to create mechanisms for schools and teachers to come to the forefront of curriculum improvement. In the University of Leeds, Millar *et al.* (in press) worked with TDTs composed of both teachers and researchers—in a school–university partnership—to develop research-based classroom materials for the teaching of physics and biology. These classroom materials were then transferred to other classrooms with good transferability rates and increased student motivation recorded. This is the conceptual basis for TDTs.

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Methodology and limitations of the Action Research Study

The biology associates worked in their regions from October to December 2005. Their work was supported through ongoing contact with the author at the Department of Education & Professional Studies, University of Limerick. A strategic plan was needed that would develop capacity among teachers and it was decided to establish TDTs in each region similar to those in the EUDIST 2005 project. The EUDIST 2005 project in the University of Limerick was a follow-on from the Lucent Science Mentor Teacher Initiative. This latter initiative, which ran from 2001 to 2006 and was funded by the company Lucent Technologies, involved thirty science teachers and fifteen schools in the environs of the University of Limerick. The project focused on mentoring initial teachers, and findings, by Kiely (2005), indicated the readiness of in-career teachers to reconsider their approaches to teaching and learning. The EUDIST 2005 project, a Comenius 2.1 project—involving Germany, Spain, Sweden, Austria and Ireland—researched the perspectives and experiences of seven Lucent Science Mentor teachers in four case-study schools in Ireland. This was done using a TDT approach, sharing insights with a number of key policymakers and making the findings available to other teachers (Mooney Simmie, 2006).

The TDT concept provides a creative space for small groups of teachers to plan, design and work together—for the benefit of the subject and their own professional development. When used by the biology associates, it was to become the vehicle for professional dialogue on teaching and learning and provided the necessary ‘space’ for learning and creativity. The work of the associates focused largely on the following main areas:

- 195 (i) Biology teachers were identified in each region—through school visits, the national website, newsletters, previously known contacts and local branch meetings of the voluntary subject association, the Irish Science Teachers Association (ISTA)—who were willing to join a TDT with a view to developing learner-centred approaches to the teaching of biology.
- 200 (ii) Liaison was established at regional level with Education Centres, local branches of the ISTA and third-level education institutions. This liaison was aimed at coordinating services in each region.
- 205 (iii) Carrying out a number of school visits in each region, bearing in mind that school visits, while still a significant part of the service, were not as high a priority in this stage of the implementation phase as they might have been in the initial stage. The aim of the school visit was to develop the supportive role of the service by assisting teachers within their own environment.

The action-research approach used in the study followed the guiding principles of Elliott (1991), Hopkins (2000) and McNiff (2003). The overall aim of the research was to improve practice—in this case the support service practice of in-career teacher education—and this was done using reflective journals that critically and systematically interrogated the thinking and action of the author and the six biology associates. The author kept critical reflections of the pre-planning stage, the development days, the focus group interview and the dissemination seminar. The six biology associates kept personal reflections during their working week and made their weekly critical reflection public. The following comment indicates that it was a useful exercise, that it helped with motivation and that it guided the work in each region:

I found it was good to write it down. You could see how much work was being done. How you were getting on. You could see the progress of your groups and teams and, you know, it was a good reference point.

220 While the research study yielded valuable insights into the commitment and creativity of some experienced teachers and raised significant questions about models of in-service, it had several limitations. The in-service support was only in place for a three-month period. The research did not extend to multiple iterations of the action-research cycle and it did not track the resources produced by the TDTs into biology classrooms, for their impact on teaching and learning. Notwithstanding those limitations, the study raised significant questions about the evolving mind-set change needed for support service personnel, the process of empowering teachers through TDTs and the extent that the resources produced were either learner-centred or subject-centred.

230 **AQ1** The findings from the TDTs were disseminated in March 2006 at a national seminar (in Athlone) in association with the ISTA Annual Conference. The audience included biology teachers who had become involved in the TDTs, and policymakers; including representatives of the TES, the DES, the NCCA and the Teaching Council. The aim of the seminar was to reflect on and share experiences of the work

of the TDTs and to progress the professional dialogue with regard to the future of CPD in Ireland. The resources were then made available to all biology teachers through the website of the support service and a series of national network meetings in May 2006.

Outcomes of the research study

The specific findings arising from the study are presented under three subheadings:

- Changes in the mind-set of the biology associates;
- Reported challenges in the implementation of the biology curriculum;
- Resources produced by the TDTs.

Changes in the mind-set of the biology associates

The research study opened up dialogue, during two development days in the University of Limerick, on the need to re-conceptualise the role of support service personnel and to reconsider the evolving nature of the agent of change in the curriculum implementation process. Initially when associates discussed their new role in this support service they were somewhat apprehensive. They were setting out to locate interested biology teachers and were planning to develop the creativity of the group and ensure that design team meetings were more teacher-driven than provider-driven. The associate had to 'hold back' and allow creativity and learning to develop. The associate had to provide safety, affirmation, space for blue skies thinking and challenge.

The biology associates were uncertain how this might work in practice, and they had to embrace this uncertainty in their quest to develop ownership of the biology reform. There was an element of risk involved. They were, however, agreed that committed teachers had a lot to offer and armed with their action-research journals, they embarked on their journey.

Reported challenges in the implementation of the biology curriculum

The experience of offering three months of in-service support in the regions, by the six biology associates, was evaluated in December 2005 (in Kilkenny Education Centre) through a focus-group semi-structured interview. The associates recounted their varying degrees of success and shared their insights in their quest to find interested biology teachers to join TDTs to build capacity in their regions.

School visits, while very time-consuming, were found to be worthwhile and kept the associates in close contact with the needs of teachers in their schools. One associate recalled how she met five biology teachers in one school totally overwhelmed with the demands of the new junior science course and the difficulty they found with concentrating on senior biology:

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I found that teachers were very happy to have an opportunity to speak to someone, you know, somebody that they have a personal link with. And in one particular school there were five teachers and they have been totally overworked because of the new junior cycle science syllabus.

275 This particular support service had a more formal brief with regard to meeting with the directors of the education centres and working with them on devising a joint needs analysis. One biology associate noted:

They were delighted to have some person they could relate to in relation to Biology.

280 Early preliminary findings in the needs analysis suggested that teachers wanted more training and support using information and communications technology (ICT) in the teaching of biology. ICT in the teaching of biology, as suggested in the NCCA
AQ7 Guidelines for Teachers (2002, p. 82), involved using ICT as a pedagogical tool to enhance better methods of teaching and learning through, for example, visual and graphical software and the use of data logging methods to capture results on
285 computer during experiments.

Local ISTA branches varied in their level of activity: some branches were quite dormant while others were active and very involved in the support of the associate, especially in their quest for interested teachers to join the TDT. At various stages during the interview, several associates mentioned the discrepancy in resources between teachers in their regions. One associate explained the wide gap that exists
290 between schools and between teachers in terms of resources, as follows:

It was like a twenty year gap in terms of technology for some of my teachers.

Another associate said:

295 I still think that one of the biggest problems teachers have is lack of IT resources and laboratories and access to the laboratory with their science class.

The associates learned of the willingness of third-level educational institutes to offer support to schools in many ways—from providing guest speakers to running workshops in schools. However, a word of caution was offered by one associate, who said:

300 [some are] running all the practicals, in perhaps a one day slot, and I would be very concerned that teachers would take this instead of doing the practicals in class . . . [they are doing them] . . . totally out of context of what they are learning at the time. More or less, cram it into them, and then the teachers feel that they have all the practicals done and the university feels like it's doing something great. Whereas everything that's been
305 done in that context is totally against the ethos of the new syllabus.

It had been agreed that each associate would seek out interested biology teachers in their regions, as part of a capacity-building exercise, to form a TDT. The associates had varying degrees of success in their regions, as these comments indicate:

310 I found in Dublin especially that they were reluctant to come out in the evenings once they had gone home. You know the thought of coming out and facing traffic in Dublin again was just too much for them, they just didn't want to do it.

I found the completely opposite experience. I found people more than willing to come on board. I stopped asking more people after I had twenty. I am sure I could have doubled that [number].

315 In addition to school visits and local ISTA branch meetings, the directors of the education centres helped locate interested biology teachers:

In one area the Education Centre Director suggested people I might phone and they would give me names of other people who might be interested.

320 Once begun, the TDT in each region generated creative ideas and strategies and from this process a number of classroom resources were developed:

There's one's appreciation of that, there are a hundred and three biology teachers on a voluntary capacity involved in teacher design teams over three months. I mean that in itself is fantastic.

325 It is clear from the comments of the associates that the motivation for being involved in the design team was twofold: the biology teacher would have an opportunity to *meet and work with other teachers* and many would also have an opportunity to develop *a resource that would be of immediate use in the classroom*. The advantage of this way of learning and working together is expressed in the comment of one associate, who said:

330 as time went on they [the biology teachers] got more and more involved and you are able to see how their resources were going. It was really exciting, you know what I mean, to see it develop like that . . . this was something they learned through working together.

Resources produced by the TDTs

335 Mixed-ability teaching calls for a wealth of indigenous learner-centred classroom materials; these have traditionally been difficult to source in Ireland. The eighteen resources produced by the biology TDTs were categorized by the extent to which they could be used to promote differentiated learning.

340 As was to be expected, a number of resources were examination-focused and were clearly designed to assist with rote learning. However, in addition to these, at least thirteen of the resources could be described as learner-centred. They included innovative games for activity-based learning, playing cards for learning Mendelian genetics, a range of crosswords and word-searches; a model-making kit for understanding the difficult biochemical processes in protein synthesis; visual aids and posters to assist the visual learner and worksheets as stimulus for discussion to accompany two frequently used biology videos. One thought-provoking booklet was aimed at uplifting experiments from merely recipe-style assignments while a genetic engineering resource had plenty of material for debate of ethical issues.

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Over thirty useful biology websites were identified and a number of 3-D animations, showing complex biochemical processes at molecular level—difficult to visualize using two-dimensional drawings—were found on the Internet. The end result was that, in addition to material sourced on the Internet, many resources produced were original and innovative; made for biology teachers and students by biology teachers. This level of productivity and creativity within a three-month time frame gives a clear indication of what could be accomplished over a longer period of research and development.

Insights, discussion and critical questions

An important outcome of the three months' work was that over 100 biology teachers became involved with the six biology associates, in TDTs, and eighteen classroom resources were produced to assist the teaching and learning of biology at national level. The teachers were self-selecting and easily located by the support service—103 from a total of 1,800 senior-cycle biology teachers. They increased capacity in each region, became identifiable, and eventually became a national resource for other biology teachers. Could this approach be further extended to have a multiplier effect and eventually reach a critical mass of innovative biology teachers?

There were a number of important differences between this Biology Support Service and the previous intensive phase of curriculum implementation. First, the role of the associate was somewhat different: What term could adequately describe it? Was it merely facilitation? Was it something more than that? Was it a multiplicity of roles? The best description for the role appeared to be that of mentor and agent of change. Second, biology teachers, working in the TDTs, engaged in professional dialogue of teaching and learning and worked together on developing aspects of the new biology curriculum. The good school, as defined by a number of projects, including the Teaching and Learning for the 21st century (TL21) project in the National University of Ireland, Maynooth, is the school where teachers are willing to talk about teaching and learning and plan and work together on aspects of curriculum. The necessity for teachers to feel involved in the curriculum implementation process has been highlighted in the OECD Report, *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (OECD, 2005, p. 214):

Experience from a number of countries indicates that unless teachers and their representatives are actively involved in policy formulation, and feel a sense of 'ownership' of reform, it is unlikely that substantial changes will be successfully implemented.

Third, the suggestions, ideas and resources developed by teachers were published and made available to all biology teachers.

The TDT concept, in this initiative, aimed to provide a secure space where teachers' creativity could flourish and where dialogue on teaching and learning biology could be reconsidered and reflected upon. The model assisted professional development through the advancement of the teacher as a *team player* and *curriculum maker*. The need of teachers to develop their critical capacity and creativity in

390 collaboration with other teachers is often underestimated by policy-makers and
researchers, as observed by McDermott (2004), p. 70):

In a situation in which a group of colleagues comes together to form a team with
substantial decision-making responsibility, in relation to the design, implementation and
evaluation of a curriculum initiative, then the potential for enhanced professional well-
being and peer validation is great.

395 The process can also play a large part in the self-actualisation of experienced
teachers, identified by Fletcher (1998), including the need to leave a legacy.

400 Despite recommendations of the Task Force Report on the Physical Sciences
(2001) and a number of initiatives by the DES and the National Council for
Technology Education (NCTE), this study appears to suggest, albeit drawing on a
small data set, that there is considerable variation in the confidence and competence
of science teachers in managing their laboratories and using ICT as a pedagogical
405 tool. Is there an urgent need for a national research database to identify the extent of
this lacuna in science teaching? Was the incident, in just one school, of five science
teachers overwhelmed with the new junior-cycle science syllabus a once-off
aberration or was it an indication of a serious fault line in recent efforts to enhance
science teaching? Is there a danger that in their willingness to become involved, third-
level educational institutions may hinder rather than help, as appears to be the tone
of the warning from one biology associate? Further research is clearly needed in these
crucial areas if constructivist science teaching and learning is to become a reality.

410 The constraints in this study included the short time-scale of the in-service
support and the degree of energy and commitment it took, as reported by the
associates, to finalise resources. Innovation in teaching and learning, it appears, does
not happen by chance. The study would have benefited from an action-research
component with the biology teachers and from testing resources in the classroom.
415 While this study had a number of limitations it was, nonetheless, an organic exemplar
of bottom-up and top-down curriculum reform working together for the benefit of
the subject and the continuing professional development of teachers. The teachers
felt empowered and supported and there was much satisfaction derived from the
successes of the programme.

420 Models of state-run in-service support have evolved in Ireland, in the last twenty
years, from predominantly information-giving and syllabus-led presentations to a
combination of presentation and facilitation. Teachers meeting, in teacher profes-
sional networks, to pool and share ideas—as recently supported by the DES—will
arguably lead to the removal of a sense of insulation and isolation (Lortie, 1975), yet
425 there is little guarantee that anything significant will change in the classroom.

430 It may be contested that moving from presenting to facilitating also evades
responsibility for developing new ways of teaching that are inclusive, learner-centred
and innovative. We are reminded by Cochran Smith & Paris (1995) that teachers
need to reconceptualise teaching and learning and not simply to reproduce the status
quo. Does this not call for a model of in-service where teachers not only collaborate
but are also challenged and informed of research findings? Could the TDT concept

be retained for this purpose and even extended to in-school professional development?

While the time-scale of this support service was very short, progress was made in the mind-set change of the support service personnel, capacity building in the regions and development of TDTs. After the three-month period, the biology associates, with the exception of the Coordinator and RDO, were all returned to their schools and a two-member Biology Support Service—a skeletal service—remained. Thus while science in general had come to the forefront of national economic policy, the continuous professional development of science teachers appeared to have receded into the background. By June 2006 a total of 29 science teachers seconded from their schools from 2000 to 2005, to assist with implementation of new senior-cycle science syllabus changes, had—with the exception of four science teachers—all been returned to their classrooms.

This research, coupled with the down-sizing of the Biology Support Service, from eight personnel to two, has prompted a number of critical questions: Who is responsible for the development of teaching and learning among experienced biology teachers? How might enquiry-based biology teaching proceed if it is not supported by a strong team of innovative biology teachers driving it? Are the policy-makers aware of the deep cultural changes that are involved in the biology reform? Who is responsible for the continuous professional development of in-career teachers? Is it the schools, the teachers themselves, the Teaching Council or the Department of Education and Science? Or is it an amalgam of all of these?

Whatever the answer, it is clear that the policy-making process needs to address some futuristic thinking if school science in Ireland is to light the fires of curiosity, creativity and innovation in the minds of teachers as well as students. As Fullan (2000) reminds us, there may even be a vicious cycle at work undermining this type of professional development:

The current investment in professional development is not enough, nor is it guaranteed to stay. There is a vicious cycle at work. Most professional development activities do not lead to changes in practice. If improvement in practice is not seen as an outcome, policy-makers, the public, and senior administrators will be more likely to reduce resources for staff development in favour of other priorities. Diminished resources in turn reduce opportunity and incentive to become involved. Without continuous professional development, improvement, let alone reform, will not happen. (p. 331)

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