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Chapter 5

Findings: collegial and professional interactions and their effect on teachers' practice

5.1 Introduction

The previous chapter introduced the school and the teachers that form the participant sample of this study, outlined the main themes identified in teacher responses to Sub-question 1 and described the findings that relate to this question. The interactions between mandated change and teacher's ability to innovate in their classroom practice were described using evidence of convergent and disconvergent factors.

The second sub-question that investigates the effect of context on teachers' ability to innovate is:

How do collegial and professional interactions influence teachers' ability to innovate and to sustain innovation in practice?

In order to answer this question, this chapter will, using the data from the interviews, describe the collegial and professional interactions at Wilding College and their effect on teachers' ability to innovate, seeking evidence of mutuality. The chapter will provide a brief overview of schools as professional learning communities; describe the formal networking structures to which the school is linked; describe collegial and professional relationships as a theme that emerged from the data; and then describe and discuss the findings of each interview in turn.

To provide the background to professional learning the following section will provide an overview of professional learning communities in schools.

5.2 Schools as professional learning communities

A school as a professional learning community (Wenger, 2008 p.2) emphasises collaborative opportunities amongst professional teachers and focuses on teaching and learning (Giles & Hargreaves 2006 p. 126). Professional learning communities as communities of practice have their practice at the heart of their existence, develop around things that matter to their members and reflect their members own understanding of what is important. Communities of practice can be influenced from outside, including by external mandates, but community members will develop their own practices in response i.e. they are self-organising systems (Wenger 2008 p.2).

Professional learning communities are essential to schools in the complex knowledge society (Senge 1990 p.308) but are difficult to establish in secondary schools because of hierarchical administration and the strong subject-based structure that counters collaboration (Giles & Hargreaves 2006 p.127). This is evidenced in the fact that almost a decade after Roschelle *et al.* (2000, p.76) called for professional learning communities that would enable teachers to innovate with ICTs; there are still calls for this to happen (see Ch. 2 Section 2.3.4, p.44). The Draft White Paper recognises ICTs as “*the means of communication, collaboration and engagement that enable the processing, management and exchange of data*” (DoE 2003 p.16) but, as Peck, Cuban and Kirkpatrick point out (2002 p.53) school structures often limit collaborative cross-pollination of innovative ideas.

Communication is essential to the diffusion of innovation and clusters or networks are key to the communication of creative ideas in learning organisations. Clusters and networks function as “*social technologies*” and a means of co-operative knowledge creation (Steiner 2004, p.4). Whilst interaction in networks is mostly informal, it is part of an organisation's larger knowledge management strategy for knowledge creation. As learning organisations, schools need to optimise professional learning within clusters or networks to encourage the diffusion of innovative ideas. For innovation to

succeed schools require supportive leadership, lateral networks rather than strong hierarchies, effective group processes, clearly outlined organisational objectives and decision-making processes that involve all members of a group (Sharma 2005, p.54-56).

Collegial and professional interactions between individuals and within and across departments of a school, as well as externally with networking groups and other professional entities are essential to a professional learning community. Such interactions have significant positive or negative effects on individual teachers' ability to innovate. Where there is positive convergence, mutuality needs also to occur for change to become institutionalised. Mutuality characterises reciprocal and empowering interactions with mutual benefits accruing to those affected by an innovation (Sherry & Gibson 2005, p.86). If an individual teacher exhibits innovative excellence and, in turn, disseminates their skills to colleagues within a common department or beyond, there is likely to be a mutual benefit to all. For this to happen, teachers need to collaborate or be able to work together. Informal as well as formal networking structures support such professional relationships.

5.3 Formal networking structures

Professional relationship or networking groups exist within the IEB¹ group of schools. The IEB has two structures that provide opportunities for teacher networking: User Groups and Cluster Groups. These groups exist in a national and regional structure. The objectives of the User Groups are to:

- advise and consult with the IEB
- involve teachers in all aspects of the assessment process to ensure that learning goals and assessment criteria are clearly defined

¹ IEB = Independent Examinations Board. The IEB is primarily an assessment agency. Many, but not all independent schools write the final examinations set by this board and therefore adhere to its standards. However, the IEB is not limited to independent schools. Some public schools write the IEB examination.

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- promote the professional development of teachers in relation to curriculum, assessment and teaching methodology
- create a network facility for teachers of the same subject to share experience, methodology, tasks, concerns etc.
- create opportunities for school-based action research, development and continuous assessment practices to inform IEB decision-making (IEB 2005 p.4)

Cluster Groups are formal, prescribed structures for HODs or their nominees. They usually convene three times per year. Their function is described as follows:

“Clusters, usually defined by geographical proximity, normally from within regions ... Clusters of five or so schools are important in the moderation process. They concentrate on implementing SBA policy. They primarily hold meetings working to an agenda to accomplish their function. Their resources are normally limited to the members of the group. They nevertheless play a vital role in the professional support of teachers with regard to the assessment of school based assessment (SBA)” (IEB 2006).

Attendance at User Group activities such as meetings, workshops and conferences is limited only by financial constraints and operational requirements (HOD minutes).

At Wilding College teachers work together in the ways described in the next section.

5.4 Collegial and professional relationships at Wilding College

This section will describe and discuss the findings of collegial and professional interactions provided in answer to the interview questions of how teachers share ideas and collaborate within and beyond the school. To establish the extent of mutual benefit from innovations, apart from what was revealed in the preceding chapter, teachers were asked how they had worked together as a department to foster innovation and how they worked or networked with

others beyond their department or beyond the school. In order to establish mutuality between individual teachers and the school as an organisation, they were also asked about the role of the school leadership in fostering innovation. Their answers are not dealt with separately for each of these issues as many of the factors are interrelated; instead they remain interlinked in the interpretation.

Collegiality is “*an essential element of the spirit of community*” in a school and requires co-operation in an atmosphere of “*mutual understanding, respect, and trust*” among colleagues for the common good of the school (Chung 2006, p.3). At Wilding College collegiality as a spirit of community amongst the staff is openly acknowledged in meetings by the principal and deputies. From observation, collegiality in the sense of supportive camaraderie between teachers is palpable. There is an open sense of teachers being united and supportive of the common goals of empowering boys through the broader curriculum and striving for high levels of academic, sporting and cultural achievement. Collegial relationships were raised specifically by some teachers as central to their practice.

Collegial relationships with the staff of the partner schools are less positive than within Wilding College itself. The partnership is recognised by some teachers as a factor in the interviews, but unless raised in such a way, the partnership itself is beyond the scope of this study.

5.4.1 Working together: the case of Bronwyn and Ineke

For Bronwyn and Ineke, working together within their department is paramount. As Life Sciences teachers they have experienced inter-departmental collaboration with their Physical Science colleagues in the delivery of the combined Natural Science subject to Grades 8 and 9. Their collaboration beyond the school is important, but limited. They have a good relationship with the school leadership, but expect more from it.

5.4.1.1 *Intra-departmental relationships*

Bronwyn and Ineke are very clearly in agreement about how they work together as a department: they state up front that they get on with each other and the evidence of this positive relationship echoes throughout the interview. Their good relationship is important to them and manifest in the openness and comfort of their interaction as demonstrated in these extracts:

BK43: *I think, as Ineke always says, the bottom line is we get on with each other.*

IG44: *Mmm [affirmative]. And we share stuff ...*

IG46: *... verbally and on paper. And if I'm running off something for my class I'll do it for the other classes as well. If Bronwyn finds an article she thinks we can use for a test, she'll give it to me. We always make ... look out for things for each other to use. Because Bronwyn champions the G11s. I champion the G10s. So we are always, you know, interacting with each other and swapping information.*

BK59: *I think, also, we do share a lot of our stuff. We're not people who [breath intake, gesture: holding onto table] ... this is only ... [for me]. I've said to Ineke "you're allowed [to] help yourself to my files".*

IG60: *And, I mean, I do. I use Bronwyn's files all the time because I've got nothing. So, I had to start from scratch.*

BK61: *And I think that is the relationship ... it's very open, supportive. We support each other. And I mean as Ineke says "You're not allowed to use old books". Now we have to get on track. And it's good to ... I needed to hear that because I'd got too comfortable. It's very easy to sink into that ... comfort zone. I mean we used to laugh about that. Ineke thinks I'm anal because if the staples not in the right place, I get cross! [laughter]*

BK62: *But that you see ... I think that's where our strength comes from. We don't allow anybody else to pull us down.*

Their relationship is reciprocal and empowering. In continually seeking new things they rely on resources as a source of their inspiration for new

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information and innovative ideas. Bronwyn shares her work openly and implies with her words and body language that she is unlike other teachers who keep their work to themselves. For Ineke, coming back into teaching from the corporate world, it was imperative for her to have access to Bronwyn's wealth of accumulated resources. Ineke reciprocates with her corporate expertise. Need and benefit complement each other to mutual advantage.

The evident good relationship between Bronwyn and Ineke extends across their department. Recent staff turnover has changed the balance of their relationship dynamics but with time they overcome the effects through their positive mindset and high morale:

IG63: *Yes. We set high standards for ourselves and we, we work together ... as a team.*

BK64: *I think that's what [a colleague is] enjoying ... he said "it is such a pleasure being back". You know, we have this ... the relationship. I think that's why it's affected us so badly with [another colleague] being taken out of it. But, we're coping with that a bit better. We didn't at first.*

IG65: *But he's in it but he's out of it.*

BK66/68: *He's actually more out than in and we struggled with that at first. Hugely, and, I mean, I'm being very honest now. [...] And now we've actually moved ... we had to move ... we had to move through the situation and past it, which I think we've done, because, I mean, I blew up [...] one day when asked to substitute. And I said, "But don't you know that I'm substituting for [a colleague] when he's always ... when he's away?" He said "I didn't know that". And then I did apologise. But, I said, it's my frustration.*

BK70: *But anyway, we haven't allowed him to pull us down.*

IG71: *No.*

5.4.1.2 Relationship with the school leadership

For Bronwyn and Ineke, the relationship with the leadership is different, in that a member of the leadership team is a member of their department. His change of role has affected his input into the department and both interviewees express personal disappointment at the absence of his influential presence. The relationship balance appears to have shifted, but his influence is sustained. His role as an IEB examiner and access to his expertise and guidance is valued by his departmental colleagues. Due to the nature of his promotional post, department colleagues find themselves covering his classes quite regularly, impinging on their free periods. The impact is from systemic factors, not a diminished relationship. This adds to their workload and is the single negative point of frustration that does creep through in the interview, although it is dismissed by Bronwyn and Ineke in their usual positive way. Although they rationalise the effect of his changed status they still miss the stimulation he provided to their innovative thinking, indicating the value they place on the professional relationship:

BK80: *And I also think he ... he also started our ... thinking.*

IG81: *Ja, yes. He's been a big pioneer in changing our way of thinking and questioning and He often challenges us, pushes us out of our comfort zone, which is good.*

IG83/89: *That's what we miss. That's what we've missed, in that he hasn't done it as much now, this year, as he did last year when he was HOD. [...] not being there to question me, to push me out of my comfort zone.*

BK90: *You know if you look at it from the boys' perspective because he's very much 'look at it from the boys' perspective'.*

The department receives good support in the provision of up-to-date resources essential to their innovations partly as an outcome of their departmental link in the leadership and specifically his IEB role, implying that without that link, the level of support might not be there. As an examiner, he needs to be well-informed on all aspects of his subject and his expertise is

reciprocated by the provision of the up-to-date resources. Nevertheless, Bronwyn and Ineke doubt that the rest of the leadership has much knowledge of what they do in their department, a pattern of support similar under the previous leadership. Albeit they acknowledge awareness by the leadership of their good departmental status, seeming disinterest is hinted at through the lack of response to invitations to observe developments in their department. Bronwyn and Ineke attribute this to the load they perceive principals to carry rather than disinterest. Bronwyn's use of the word 'haul' qualifies the effort that is required to try and gain acknowledgement from the leadership. There is a need for affirmation by the leadership which is perceived to be lacking:

IG75/77: I don't think [the leadership] even know what we're doing. Except [the deputy]. [He] knows obviously. And [he's] always been ... if you go to him and you have a problem and you need help he will make time and sit and listen to you and he will help you. He's got a good biological brain and he's an examiner so we often do pick his brain. But I don't think the others really [...] Well the others, the other leadership, the other deputies, [the head], I don't think they really are ...

BK78: But in the old management as well, that happened. We used to try and include them. 'Come and look to see what we're doing in the prac', but we just [shrugs] could ... we could never haul them in. I first of all think that they're too busy. They know that we run a good department so, they leave us. [...] But I must say [the deputy] ... like with that CD we wanted to get the new questions on, which we do need. He says no, you must buy it. It's expensive, but go ahead and buy it. So, in that role he's very supportive. He does like us to have the latest. Because, I mean, it's also for him, because with his reputation, teaching in this department, he can't just allow it to go into nothing, which I don't think will ever happen.

IG79: It's good for him as an examiner to be up to date with the latest trends, you know, the latest things. So it's to his benefit.

5.4.1.3 Inter-departmental relationships

The school has followed the national mandate to combine Life Sciences and Physical Science into the subject, Natural Science in Grades 8 and 9, with beneficial effects on curriculum development and student thinking in both

departments. There is a good working relationship between the HODs of the two departments. The teaching load is shared across staff in both departments and Bronwyn and Ineke work in the same way with the Physical Science teachers, with each teacher developing one or more modules of work. Unlike the Physical Science teachers who raise certain doubts about the implementation of the module system (AS28/30, p.221), neither Bronwyn nor Ineke raise this point.

IG54: *That's Natural Science, that's not really the Biology² department as such.*

BK55: *But, I've still ... I've developed four out the six ... Biology units.*

BK57: *It's the same thing [in Natural Science]. I ask ... I write it and then I ask Arthur to go through it and he makes a few suggestions which I change. Then everybody has access to it.*

IG58: *And everyone uses the same module.*

5.4.1.4 Relationships beyond the school

Apart from this systemic affiliation, there are three other potential sources of external influences: the partner schools, the regional Cluster Group and the Life Sciences teachers' network mailing list associated with their User Group. The mailing list is an innovation on the part of a colleague elsewhere and its impact is through the stimulus that the shared resources provide:

IG92/96: *Well, we meet with our Cluster Group and then we exchange ideas quite a lot. We have meetings with the [partner school] every now and then and we swap stuff. We don't always use their stuff, but we do talk about things and share ideas. And we've got a Biology teachers' network ... that is a nation-wide network and people can send stuff: questions, articles, whatever to [...] and we send it to one person and he sends it out to the whole group that's on the network.*

BK97: *It's very powerful.*

² Biology is the former name of Life Sciences and is still used informally.

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IG98: We've got loads of stuff. I mean, [one HOD] finds tons and tons of websites and animations and she sends all of those through so that's really been a really good source of information.

Occasional meetings are held with partner school colleagues, but their impact does not appear to be as significant as that of the mailing list, which they describe as having a powerful impact. Content is the issue that divides the approaches to curriculum between the partner schools. However, the nature of the schools allows teachers to work with content that is honed to their students' interests:

BK114: You know, I think, Mary, I think that's a time constraint. You know, we've given the [partner school] our modules like for Grade 8 and 9 and then I don't know if they use them, but they teach very differently in Grade 8 and 9. But I do know that they've got it. But we never ... to get together ... we tried that once ... oh!

IG115: It's hard enough to get just us to get together within our department and get stuff out and ready on time. To still do it with outside people ... we're just too busy. I can barely open all those emails that come from the user group and download everything and remember where I've stored everything, you know. But I do keep everything ... I'm anal [???] like that.

Neither Bronwyn nor Ineke have been involved in any other form of partnership beyond the school in developing units of work. Bronwyn mentions one attempt at unit development with the partner school, but qualifies the attempt with a despairing 'oh', whilst Ineke attributes a lack of collaboration beyond the school to a lack of time and in particular, finding common time.

5.4.1.5 Summary and preliminary conclusions

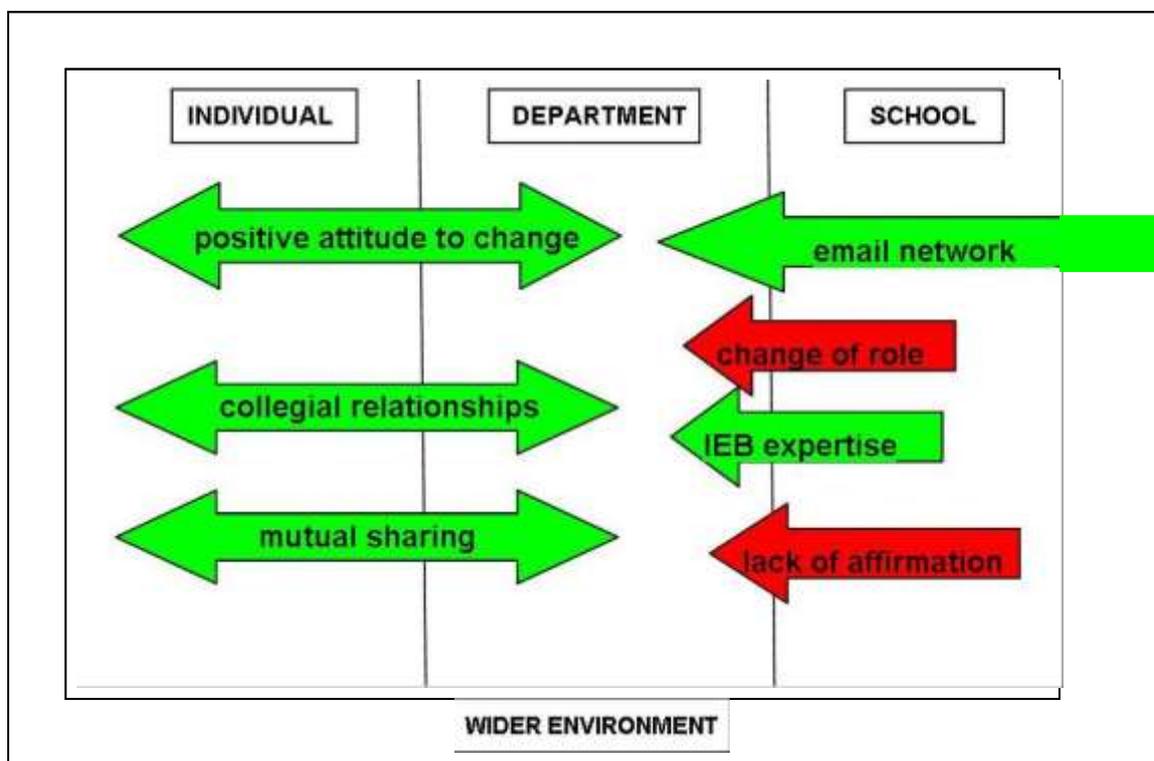
The pattern of factors that affect mutuality in the case of Bronwyn and Ineke is illustrated in Figure 5.1.

Despite time constraints, Bronwyn, Ineke and their colleagues collaborate extensively within their department. Mutuality is evidenced in their good relationships, including personal friendships and their reciprocal relationship

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through a colleague with the leadership, although his diminished role in the department is regretted. However, both Bronwyn and Ineke appear to be disappointed at the level of acknowledgement they receive from the remainder of the school leadership, although this does not constrain them. Collaboration with their Natural Science colleagues helped develop their thinking and curriculum for grades 8 and 9. Whilst they appear to have little in common with the partner schools, the monastic nature of the schools has enabled each to develop their curriculum content to the advantage of their own gender group. There is little perceived benefit from their relationship with their Cluster Group. On the other hand, the Life Sciences network is a critical enabler in their access to online resources and is a powerful tool for reciprocal sharing across the participating schools, with mutual benefit accruing to all active members of the network. Networking is facilitated by their access to ICTs, although ICTs have not been fully exploited for the purpose in the same way that they use the IEB website.

Figure 5.1: Collegial & professional interactions: Bronwyn & Ineke



The power of good relationships comes through clearly in this interview. Where the benefits of sharing and openness with each other are mutual, creative processes are easily sustained. A positive mindset, apparent from both interviewees and that appears to extend across the department, is also crucial.

5.4.2 Working together: the cases of Arthur and Hennie, Magriet and Thabo

Two pairs of teachers from the Physical Sciences department were interviewed. Each pair gave a different perspective, depending on their relative roles in the department. Whilst the relationships between each pair of teachers were clearly good, in contrast to Bronwyn and Ineke, relationships were not raised specifically as an enabling factor. On the contrary, certain difficulties were raised with regard to coherence of practice across the department, diminished collaboration with the partner school and limited impact of the leadership and external influences.

AS48: We've worked quite hard at [fostering innovation]. I mean ... we've taken about half a dozen days off over the last two years ... to workshop things. So we've done a lot of work ... in addition to our individual stuff and so on. And we need to do that again for electronics.

AS50: Most of [our workshops] have been very successful. We sat down with a specific task and the first couple were just 'unpack this curriculum'. Some would take this strand and some would ... some group take that strand in a group of two or three ... flesh them out and organise the thought processes. And then we've been through some of them ... some of those strands a bit more closely and tried to pull out some of the nitty-gritty. And we need to do that for electronics now because most of us are from a physics background [???] nervous about it [???]. I think that's going to work quite well. [???] ... which is the project for the Grade 10 and 11s.

5.4.2.1 Intra-departmental relationships

Arthur has arranged days off to workshop the new curriculum together with his department staff, the only mention of formalised intra-departmental workshops. A module-based curriculum developed from these workshops

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with each teacher, on average, responsible for designing one module per term per grade. Arthur and Hennie provide insight on how they worked together as a large department of eight teachers to develop the modules. With the mutual goal of the Grade 12 curriculum in mind, they distributed the workload. As the new curriculum has moved up through the grades, the process of developing the new units of work has been adapted by the teachers, with a stronger focus on the senior curriculum. Both pairs of Physical Science teachers describe the effect of the modular system:

***HJ24:** We sat down as a department first and [...] we looked at what was required in Grade 12 and then worked backwards. [...] It's my responsibility, but it's a collective thought process that goes into it. But, ultimately, I set the test, I'm doing the pracs, and I'm responsible for that module.*

***AS28/30:** [...] But there are problems, so ... the problem is that there is not continuous development by the same person, so we ... it is a bit bits and pieces ... um ... and someone might have worked on developing an overall sort-of mind map of the section ... Grade 10, 11 and 12 ... and somebody else might do those notes ... for the Grade 11s ... and then they can't always [???] the thinking process that is there. We've also used our standard resources as much as possible: textbooks, instruments, Multimedia Science, stuff like that. [...] [Teamwork is] a default situation, but it's the only thing that we can do. The teamwork has been good, but not always as good as it should have been.*

***HJ31/33:** But also, if I were responsible for this one section, I think the idea was it's my responsibility, but it still required of all the others to actually be on top of this module, because it's new. And I think, what we did not do so well, with time constraints - and what have you - is to go and come back again and say "right, I've designed this module now and this is how it works. What's your input?" ... before we went out to teach it. I think that's a big lack. We just ... it's a time issue, really no excuse, but it's really a problem. So, yes ... it's a ... It's a ... we would split it, and it works well, I'm doing this, but then it's my ideas, but Arthur still has to go and ... or the other way round and make that his own, my own if it's his work. You see, and that is not really happening.*

***AS36:** But I think the reality is also that people don't ... people don't make it their own before they start to teach. You read the document and it makes sense, but when*

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you start to teach it you then realise, oh well, well done, I don't really understand what you're talking about here. I don't understand this ... what's going on here?

HJ39: *And also, the resources ... creating resources, finding resources ... that was ultimately ... I think ... the whole thing is that not everybody goes and (shweee!) spends endless time in finding things to do, but actually, that would be brilliant if we were all just so committed to this whole thing. Because I can set this module, but you, you just can't get to the lesson. I had to do the principles of waves. Goodness, how do I do this? I wasn't told how to? What do I need? You see, that's what he's talking about. There's no individual; well, not 'no', but not optimum individual responsibility or ownership of this new curriculum.*

TL62: *... We sort of divided that curriculum into different units and then each group take over things ... that and that. But the problem which we had last year was that we then did not meet again such that each group [could] present to the larger group about that particular topic which we're doing. So we all went there and did different things and that's where it ended up.*

MD63 & 67: *[...] We did bring it all together. But, even though you do, like you did, for example, section A and I did section B. I still have to present section A to my class, which means that even though you prepared the notes and everything and everything and everything I still had to study it. Not study it, but it's exactly the same amount of work for section A as section B, even though I did not make the notes. So that does not make my work less. [...] You have to be perfectly familiar with something before you can present it. And some of the sections [...] haven't been done in high school for seven years. [...] we have to go and study again, take the knowledge we have, work [in] the new knowledge [...] So it takes the same amount of time even though I did not make the notes.*

MD75: *[The modular curriculum] does help. For example ... because ... lets take inter-molecular forces ... I made the notes. OK. So, because I made the notes, I've got to sort of bear the background of where we need to go. So now, [a colleague] for example or you [to TL] come to me and say: "all right, what do you want from me here?" And then it works because then I can tell her ... I assume or I ... we're going here and you need to know this and this and this. That helps. So ... that helps but ... I don't know ...*

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TL76/78/80: *Ja, I think it helps because, at the end of the day, it shares the load. [...] It's best that. I mean, we divide the work. We do the work and then we present the notes and then [...] we circulate those amongst ourselves. We shorten the prep time for all of our lessons.*

MD77/79/82: *Yes, it shares the load. [...] Ja. No. It definitely shares the load. [...] We try to [understand each other].*

While the team work is evident from the above extracts, in that each teacher is assigned a share of the load, there is no evidence of collaboration evaluation. There is a benefit in that the modules are prepared, but not a sense of common purpose in following through with the design. This is evident in references to for example: the lack of continuous development (AS 28/30); reservations about the teamwork (HJ31/33); the lack of understanding of intention (AS36); variable quality of resources and lack of preparation (HJ39); lack of feedback (TL62); and lack of familiarity with the content and the material (MD63/67). Hennie's views on professional learning (HJ31/33) amongst his colleagues corroborate precisely the concerns that Magriet and Thabo raised about the time and effort needed for a teacher to take ownership of a module. Whilst one teacher is responsible for the design, the others still need to embrace and deliver the product in the classroom. Once designed, the designer needs the opportunity to give feedback to colleagues who, in turn need to come to terms with and personalise the module before they start to teach. While the content is developed in the form of notes, it appears that the underlying learning strategies to be applied lack sufficient development as the teachers arrive in class and are unsure of what to do. It is precisely this process that Beetham and Sharpe (2007 p.2-3) refer to: the change of focus from an emphasis on teaching content to passive recipients to one of active participation by unique learners in the learning process arguing that pedagogy embraces the active learning process; the preparation, scaffolding and facilitation of that process and reflective practice.

Arthur (AS28/30) expresses some doubts regarding professional responsibility in that the team work did not meet his expectations. This brings to mind the

point made in the previous chapter between busyness and effectiveness (p.31-32). Whereas prior to the modular system, a teacher was entirely responsible for the development of every unit for their own delivery, in the modular system there is *collaborative* responsibility. Although not stated categorically, an undercurrent of lack of trust is intimated (AS28/30 p.220, HJ39 p.220 and AS57 p.229). Arthur concedes time as a significant factor impacting on delivery and inhibiting the teachers' ability to meet expectations.

There is also concern about the ongoing development of the modules for which teachers need to take individual responsibility. Although the school is well-endowed with resources, including ICT-based resources, Arthur doubts whether the expected development is happening. There is mutual benefit overall for the group, but it is not necessarily an even reciprocal process within the team.

5.4.2.2 Inter-departmental relationships

For the Grade 8 and 9 Natural Science modules, Physical Science teachers collaborated successfully with colleagues in the Life Sciences department, attributed to continuity of content from the old curriculum and detailed structuring and mutual benefit was derived. Hennie describes the process as co-teaching, but in fact, it is not co-teaching in the sense of two teachers present in the classroom at a single time or one teacher facilitating a double class whilst the other prepares. Rather, he is describing collaborative planning of the modules:

HJ52: We share with Biology because it's Natural Science so we've got more teachers and what we tend to do there is ... is pretty much the same, but its not as new because the curriculum changed a little bit but it's the same core concepts. [...] And the way we do it is pretty much the same. We would ... I would take one section, a Biologist would take that and we co-teach. One person would develop the notes and everybody would sit around and go through the notes beforehand ... that we did very well "and these are the pracs that we all have to do and this is the rubric and the mark scheme. It's very structured I think but again we're going on we are adapting to the new curriculum and I find it much more [??]. And I think it's because we've got

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this mindset ... this mindset that it's not following the curriculum but if [the students] leave Grade 9, what can we achieve?

AS53: *And we also went through this whole process five years ago. And we've changed and adapted it since then. So in the last two years we haven't really changed our modules much in Grade 8 and 9. We just want to focus on the Grade 10, 11s and 12s and I think in 2009 we'll probably revamp and change our modules quite a bit.*

The new curriculum also include aspects of Earth Science, for which inter-departmental collaboration with the Geography department was initiated, but discontinued after one year due to a combination of factors. This component was brought into the Natural Science curriculum and designed by a Geography colleague to incorporate a pre-determined methodology. Although this opportunity exposed the Physical Science teachers to the new methodology, the module was dropped after the first year. Arthur acknowledges that there were methodological problems and is able to pinpoint this to insufficient design:

AS119-129: *We ... we tried some of those [question] approaches [...] but we found we weren't focused enough in the questions that were asked and we've never gone back and ... and revived it. [...] We weren't focused enough [i]n our overall parameters that ... that we gave them. So we found that they ... they wasted too much time and wandered round too much. [...] Whether that's it ... its probably not just – you know – a global design problem ... um, but it's also a fault in the way that we implemented it in the classroom. We [???] which we probably should have, but we think [???] [...] I don't think we scaffolded sufficiently well for both the teachers and the kids.*

5.4.2.3 Relationship with the school leadership

All four teachers concur that the school leadership is very supportive of their needs and believe they have high expectations of everyone, although the provision of resources is deemed to be inadequate in terms of such expectations. The leadership has also provided a buffer to the impact of contradictory mandated changes.

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AS70a: *I think we've been given quite a free hand and been given a great deal of trust. They trust us to do the job and to do it well and that's good because it shifts the responsibility and we try to pass that on to the rest of the department. Um ... [long pause] ... I think they have tried to shield some of the blows that comes from official government declarations every now and again which are silly and then get reversed six weeks later and there you know a lot of people are very apt to ... to ... they under-react. I don't think they have with ... with this new LO. They've over-reacted a bit. That's my opinion. [wry smile, laughter]. I think generally they've been fairly supportive in an indirect fashion. Just provided the background and some of the resources, but not all of the resources we need. But the main resource we need actually is time ... and that's the one that's got the most stretch on ... [chuckles]*

Arthur's last comment is noteworthy: the leadership cannot provide what is really needed and that is time. If teachers are overloaded and cannot find the time to do what they need to do properly, where does the responsibility lie for solving this conundrum? Human capacity is a finite resource and words such as 'struggling' and 'survive' (MD89) indicate how close teachers are to their limits. Magriet leaves a number of her sentences hanging giving the impression of despair: 'it's just that ...' (MD85) and 'but I don't think any of us can' (MD89). Teachers are sent on self-improvement courses for which they are grateful, but still battle to find the time to improve their practice, although the Assessor's course that Thabo refers to is directly relevant to the curriculum:

MD85: *I think so. For example, I went on the Investment in Excellence course. That helped me in my classroom. To bring it all together. That helped me amazingly. I must say, that helped me a lot and it was ... [The principal] and those guys that sent me ... that allowed me to go. I'd say that ... ja. We do get help ... ja ... it's just that ...*

TL88: *Actually during the first term when I was on long leave, I heard that there was some course in assessment and I went and spoke to [the principal] and then he said, OK, the school is busy trying to find whoever the facilitator is to come to the Boys' College and everyone will sort of be expected to do that course, that course in assessment. So, I think the management, the school is actually supportive. If you come up with things, ideas which you feel that they will uplift you ... the knowledge that you can apply that in the classroom. I think they will support that.*

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MD89: I think all of us ... we're struggling as best as we can with what we have at the moment. And I mean, the leadership ... have changed. I mean [the principal] was newly appointed so he's got a helluva lot on. Same with our deputies – they're all new. So they've got a whole new load on them that's different. So at the moment, I think, all of us are just trying to survive. I mean, it's very hard for me to encourage you while I'm still trying to keep on top of everything. So, I think they're doing as much as they can, like the Investment in Excellence, but I don't think any of us can ...
[sighs]

5.4.2.4 Relationships beyond the school

For the four Physical Science teachers, the dynamics of interactions beyond their own department are varied. There is a difference between the outside influences that have a bearing on the HODs and those that have a bearing on Magriet and Thabo. Also, collaboration with the partner school, in which there was little reciprocation, fell away five years ago and has not been revived:

AS89a: [...] Ja, um ... The [partner] school we haven't ... which has been a disaster because we used to work very closely with them and tried to work more closely with [???] department.

AS91/93: There was a clash of personalities in the department [???] and they've struggled. We've actually helped them more with their struggles than what they have helped us. [...] Yes ... and it's been um ... trouble ... [???]

HJ94: For me it's a little bit different. I can't think in all my time being here that we have had contact with them. I only see them at Cluster meetings. But I believe that before when Linda was there – Linda – it used to be very different. That's what I've been told and I'm sure that's correct ... lots of interaction. But there's been none of that. And again ... its time ... I don't know if we ... so ... OK [voice tails off; chuckles].

In the last few phrases Hennie gives an indication that something should be done about amending the situation ('... *it's time* ...') but then seems to have second thoughts ('*I don't know if we* ...').

There have been numerous changes in the structures of the Physical Science department. At one stage a single Physical Science faculty director was appointed to oversee curriculum development in the partner schools but this post soon disappeared. Although the relationship with the partner school flourished when a colleague transferred to head the partner department, once that incumbent left, the relationship disintegrated. Arthur describes this as 'a *disaster*' attributed to personality clashes, while Hennie cannot recall any contact over the previous four years of his tenure. There have also been numerous changes in HODs within the department as well as changes in the hierarchical structure with first one, then two and, subsequent to the interviews, a reversion to one HOD. Such lack of continuity with concomitant changes in dynamics throughout a period of major curriculum change may well have undermined potentially collaborative relationships.

Arthur and Hennie belong to the IEB User Group as well as to their local Cluster Group. There is good reciprocity within the User Group which has recently set up a Physical Science teachers' blog in order for members to share ideas. The links are proving worthwhile and deep conversations are happening, although contributors are limited to a few regulars. On the other hand, Hennie is frustrated that their contributions to the Cluster Group are a matter of one-way traffic:

HJ96/100: In the Clusters, the Cluster meetings we would sort of ... sort of try to ... to get the thing going and people sharing resources and so, but it didn't happen. It's very strange how, how people perceive us. And I don't think it's just me or the [school]. [...] Because I think we ... I'll ... I'll send them our exams and mark schemes and "this is what we do" ... and ... and there's been nothing in return. [...] Well, at one cluster I actually made copies of what we'd done when we'd just started. We'd designed practicals in Grade 10 because it's new and wah-wah... so we've been very good at that in creating our own resources in terms of the fun and practicals. And I copied for everyone and it's fine and we sat and talked about it, but it's a one-man conversation this Cluster.

AS101: But the User Group's been better. There is a blog.

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HJ102/104: Yes. There is a blog. Yes, it's for the whole country.

AS111: But it's produced some quite good stuff.

HJ112: Yes. But again it's the same people: [Another school] ... and we've submitted some stuff and ... and that's basically it. But the conversations that are going on about fundamental issues ... in the group ... brilliant.

AS113: And they go out and criticise quite a few things.

Despite the HODs attempts to establish the practice of sharing ideas and resources in the Cluster Group mutual reciprocity failed. According to Arthur the school provides far more support and influence to the other schools in the Cluster than what it receives, which he attributes to outside perceptions of the school. Given that the school aspires to be 'a leading school'³ the fact that it has more to share than what it receives is likely. However, there is also a possibility that the HODs are not as open to the ideas of others or that lack of reciprocity might be their impression. Magriet and Thabo give their view on the Cluster Group, providing an example of their differing realities:

MD110/112: So it's not ... it doesn't involve us. No. I think ... he normally writes a report back, but ... frankly, I can't remember ... [loses focus]

TL113: Another issue is that when ... when [either HOD] go[es] to the ... to this Cluster Groups, when they report back to us, it's more of what we've... those are the teachers ... we'll take what we've done, you know. Like ... they'll be commenting about what we're doing here [...] than what they are doing. So, it's like we give them whatever they need at the cluster, Cluster Groups. They will say, "Oh, this exam, this prac and this what, what, what". We are doing this and everybody wants to copy us. You know ... things like that. It's like we are ... we are ... we are like ... on top there and everybody wants to ... to reach there and copy what we are doing.

MD114: I'm sure it's not always like that.

TL116: No, it's not always like that, but mostly.

³ Reference is made to this on the school website.

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MD117: *No, but that's the impression they leave and I'm sure it's not that way. The thing is if I go there I might get [a] different perspective.*

MD121/123: *They send us their perspective. Which is only fair ... I mean ... they go. But, I mean, if I go, I will definitely maybe get a different view because for me, outside of [this school], I never knew this school existed, until I got here, until I was accepted. And a lot of people here think that we are the cream of the crop [...] which, I'm afraid, not everyone else will think. So, I think it's different. It's different.*

MD125: *I think there might, I think there might be some stuff from the other schools. I just don't think it comes through.*

TL126: *Ja, ja. I'm sure there might be. I mean, the way we are like, for example, now struggling with the Grade 11s. I'm sure they are. And if maybe we ... we were to share those problems ... we were to share the solutions ...*

MD127/129: *No one wants to admit that they're struggling, because it makes you seem weak. [...] It makes you ... it makes you look that [as though] you don't know what's going on when actually no one knows.*

Although they have no evidence of mutual sharing within the Cluster, both Magriet and Thabo suspect that it might occur. In sharing problems, solutions are more likely to be forthcoming and Magriet speculates that it may be a matter of pride, of not being able to admit to struggling that closes minds to possible solutions from others.

Arthur raises two significant influences that emanate from the educational research of Michael Shayer and David Hestenes. Shayer's CASE⁴ methodology was introduced to the school by the previous principal and strongly influenced Arthur's thinking and practice. CASE was initially a voluntary strategy for teachers to employ, but it was found that not all teachers were incorporating its methods. By making CASE examinable, teachers were obliged to incorporate it:

⁴ CASE = Cognitive Acceleration in Science Education. This programme is evaluated in: Adey, P. & M.Shayer (2006) Accelerating the development of formal thinking in middle and high school students *in Journal of Research in Science Teaching* 27(3) pp.267-285

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AS75: Ja, [the principal] brought CASE in first and then it sort of died out. I think there is a Michael Shayer influence through [the principal], and quite a strong one.

AS57/59/61: [A]ll [teachers are] supposed to be [teaching CASE]. We found that when we left it as an option ... as a compulsory thing but not examinable ... people were taking short cuts and leaving it out so we put it into the exams ... [shrugs] [...] Yes, but ... [sighs] ... its both [a methodology and a programme], but it does address specific skills, thinking skills. And so it addresses understanding of numeracy and [...] probability and so on ... or scientific methods or whatever. Everyone's quite comfortable with the scientific method ones and we've done those. But some of the harder ones towards the end of the CASE, people aren't very good at doing them, so we've pushed those in, in terms of [???] and ... and then we examine those skills: [???], scaling up and scaling down, ratio etcetera.

HJ63: [laughs] It's very hard to say now ... [what the impact is of CASE]

AS66: I think [the influence on student thinking is] more year-based. So one year's weak, another year's strong.

HJ67: But whether that's the influence of CASE ... the influence of CASE ... it's hard to say.

AS68: Another thing ... I think CASE has been taught with various degrees of skill: another problem. So, it's too simplistic to say a straight cause and effect – unfortunately.

AS77: There's quite a bit of David Hestenes [???] and his modelling influence⁵. [...] ... modelling [???] modelling physics. His stuff is on the Intranet.

AS80/83: Do you remember that modelling motion stuff we did at the end of last year ... with the ramp? [...] That tried to be a condensed snap shot of some of his [Hestenes'] stuff, where, where ... instead of saying “this is what a force is, this is what motion is” we give the boys a concrete experiment to do, but an open-ended one ... “measure the motion”. Or, “consider this, consider what could happen” and they then design the experimentation, do the experiment, wrap it up and ... and defend their work.

AS87: We've had quite a bit ... a little bit of work with [another school].

⁵ See, for example, D. Hestenes (1987) Toward a Modeling Theory of Physics Instruction, *Am. J. Phys.* 55, 440-454.

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HJ88: [Another school], ja. Some guidelines in terms of how they are going to assess their work, which helped us a lot in getting the assessment standards right. How do you report results? How do you set a paper in terms of making sure that you are assessing each outcome? So there's that. But in terms of content there's not much.

Arthur has not formally determined the effects of the introduction of CASE, but it is apparent that there is inequitable and inconsistent delivery. The CASE example raises the question of how new methods are introduced and the amount of training time required for teachers to familiarise themselves with the materials and the methodologies to be comfortable enough to make the required changes to their practice. Clearly, current time allocation and processes are insufficient.

Arthur explains that Hestenes' influence included an example on which we had collaborated in filming students' experiments, the only example of creating with multi-media mentioned. This investigative example confirms Arthur's earlier reference (AS9/11 Ch. 4 Section 4.5.2.2, p.167) to his change to more student-centred learning.

In response to the question of external influences, Magriet gives an instant unequivocal 'no', whilst TL ponders the question long and hard. Thereafter Magriet qualifies her response, and provides a reason:

MD96: No.

TL99: Hmmm ... [long pause]

MD100: No ... I'm so caught up here. I don't think I get out that much.

TL101: I ... I've been ... like, for example, I've applied for this position. Now, [...] they need me to write a report on some exam which is available, so I have actually started to learn ... and to try to ... how to write a report on an exam and stuff like that and I can see that that is helping me, not only for me to probably do the best in that report, but also here at school. I see it in different ways. Also, it will help now when we are setting the exams, for example. I can see how the boys will actually interpret the

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question, how will they answer it, so try to accommodate them as well. So, it has actually helped me a lot. And, I think, that [???] at least it has helped.

In contrast to Magriet, Thabo has been exposed to two significant external opportunities which have influenced his thinking. Firstly, he has had interaction with the IEB which, besides the intended outcome, had a significant influence on his understanding and view of the assessment process and student responses: a professional learning opportunity in two different senses. Secondly, he had exposure to postgraduate studies. However, although Thabo provided the university with requested information regarding CASE, he was disappointed that dialogue did not continue and that reciprocal information was not forthcoming. His experience echoes that of Henry (HN41b Ch. 4 Section 4.5.3, p.177) regarding the disparities between 'university professors and industry people' and the thinking of practicing teachers:

TL132/134/136: Actually, I had some ideas when I was doing my M.Sc. [...] I turned in an assignment about CASE ... how, how we do it here at school and stuff like that, and how I do it and how I see it as a sort of a tool [...] to make learner's think and stuff like that ... and after marking the assignment – it was for marks, of course – but they then wrote to me, separately, that I should actually tell them more and give them more information about CASE and where I got my sources. They can see ... Apparently they tried to look and they couldn't find and so I tried to look and give them more information [...] but I mean now, I did not like get some others one's, you know, back. Like, they could have said "Oh ... there is this other one and this other one which other students, you know, brought about", but that didn't happen. So it was sort of a ... a one way process. [...] I gave them information and nothing happened to me. I didn't get any other information, you know. So that's, that's what happened. Ja.

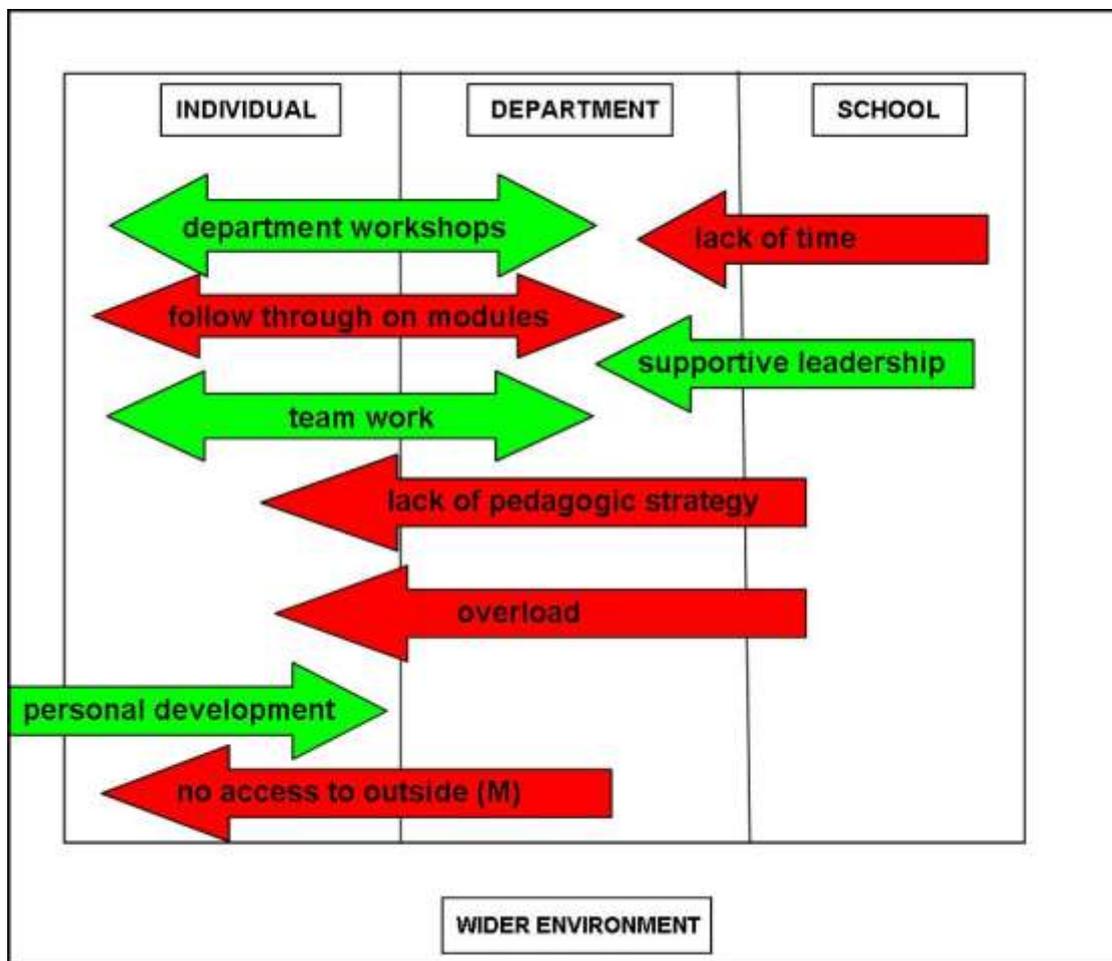
5.4.2.5 Summary and preliminary conclusions: Arthur, Hennie, Thabo and Magriet

The patterns of factors that affect mutuality between the two pairs of teachers are illustrated in Figure 5.1 (Magriet and Thabo) and Figure 5.2 (Arthur and Hennie).

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Development of modular units was adopted in the science departments because it was perceived to ease the workload of the teachers. The experiences of these four teachers in developing their modules and teaching those designed by others provide varied perspectives on the difference between assigning work to teams and achieving a purpose through collaboration within a community of practice. Unless true collaboration is applied to achieving a specific pedagogic goal then, while the mechanics of the process occurs, the ultimate goal remains unattained.

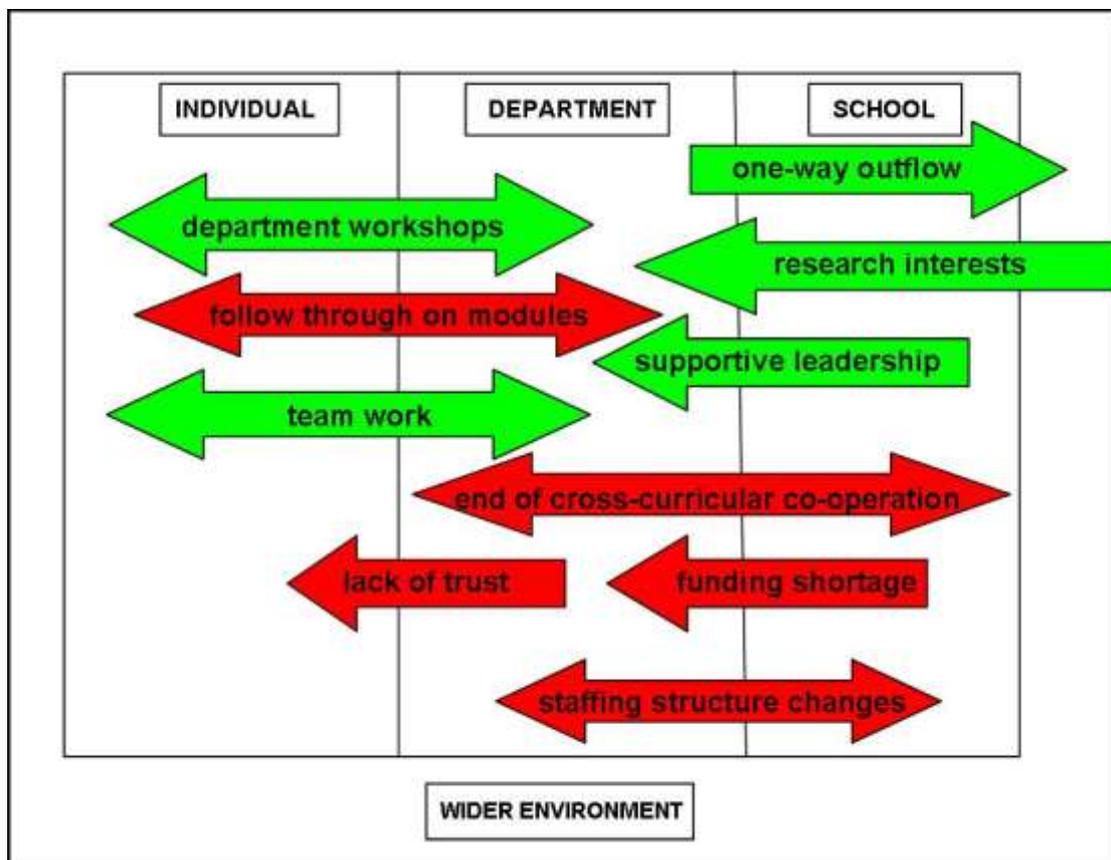
Figure 5.1: Collegial & professional interactions: Magriet & Thabo



Face-to-face encouragement from leadership is lacking but is attributed to the huge workload and the multiple changes of heads and deputies over the immediately preceding period. The leadership places professional trust in the HODs which, in turn, is passed on to teachers. The intermediary role the

leadership has played in deflecting some of the blows of conflicting curriculum changes is acknowledged. However, in Arthur's opinion, the biggest challenge for the leadership is to provide teachers with the time they need to meet their own as well as the school's expectations. Also, whilst many resources are provided, the reality is that the resources are still insufficient to meet expectations of what the teachers are encouraged to achieve. Whilst access to resources is an enabler, given what the leadership expects of the teachers, such access to resources still remains a constraint.

Figure 5.3: Collegial & professional interactions: Arthur & Hennie



Magriet is grateful for the opportunity of attending a personal development course and acknowledges the positive influence it has had on her classroom practice and the role of the leadership in this respect. Nevertheless, in many contributions that she makes in the interview there is an indication of her sense of frustration in her body language (such as sighing) and her words. Thabo emphasises that the initiative needs to come from within in order to

obtain support for professional development i.e. he advocates a bottom-up approach.

From observation, the fact that teachers are expected to attend personal development courses usually held over a combination of weekdays and weekends is pertinent. Attendance at such courses increases the workload for colleagues who need to cover classes left without a teacher as well as diminishing time on the core business of preparation and teaching. Teachers are short of time to develop their curriculum, but are unable to build in that time. There is thus an imbalance between sanctioned personal development time and desired professional learning and planning time. However, time had been taken out of the teaching schedule for the original development of the modules, the only reference to such time given by any of the teachers.

The introduction of CASE methodology across the department was less successful and to ensure equitable implementation, the HODs had to make it examinable. It would appear that teachers in this department remain more focused on content, rather than the cognitive skills that CASE supports. While the process of familiarisation with the CASE materials was not explained, it needs to be questioned why such methodology was not embraced voluntarily by all the teachers and secondly, if there were reservations, why a full evaluation of the innovation did not occur. Lack of thorough preparation and evaluation may lead to the demise of an innovation rather than a problem with the innovation itself.

Collaboration with the partner school has disintegrated. Whilst its demise is attributed to personality clashes, the role of school leadership in this matter should be questioned. Is the school leadership aware of the problem and what means does it have to facilitate resolution of problems in professional relationships? The fact that the situation has deteriorated at the same time as the school has endeavoured to heighten the benefits of partnership would appear to place responsibility with the school leadership. The situation does

not augur well for collaborative practice, yet provides evidence of how overload might inhibit such practices. Whilst there is opportunity for collaboration and physical network connectivity and capacity, such collaboration has not been encouraged.

External influences on the Physical Science teachers are limited and recalled with hesitation. Those that have occurred are significant although implementation difficulties are ongoing. In contrast, the outward flow of influence is deemed to be much greater.

5.4.3 Working together: the case of Henry

[For ethical reasons, as mentioned in Chapter 3 (Section 3.6., p.134), the findings on this section of Henry's case are confined to a limited access Appendix.]

5.4.4 Working together: the case of Richard

Richard works in a mutually beneficial relationship with his departmental colleague and is significantly influenced by his professional relationships beyond the school, although he has some reservations about his relationship with the leadership.

5.4.4.1 Intra-departmental relationships

The communication benefits are immediately evident in a two-person department. Richard describes how he introduced team-teaching, how his team-work with his colleague developed out of the nature of the subject and why the professional relationship has been able to grow to the benefit of all. In answer to the question of how he works together with his colleagues Richard responds in detail:

RL24/26: Ja, definitely, team teaching I suppose one would call it. [...] that's been essential. And prior to ... to that I didn't really do any team teaching as such. So you can say the last six years, probably the last five years because in the first year we didn't. So it's over the last five years, ja, we've been team teaching.

RL28a: Well, basically, I think in Art, because you're not lecturing or ... um ... chalk and talk kind of teaching ... and also because, particularly in a practical, because it's not content driven ... um ... then one's able to bring in other methods. So, it allows you the freedom to do that. And fortunately [...] Alena's quite self-motivated, motivated. As a person, I mean she's part-time, but she's here all the time. So she wants to be involved. It's got to come from the person. It wasn't like an instruction. [...]

RL28b: Its quite interesting ... today ... Megan came in and I was doing some work for her and she was just watching what was going on and she said "Does Alena say the same things as I say to them? Because they ask advice from both of us." And I was explaining to her "yes, 'cause she's now learnt. She's well trained. She's also got a very sensitive eye. She's got the same ... and its ... people think Art is just pure subjectivity. In one sense it is, but a lot of it is objective and you can make it more objective and I think that's where I have trained Alena to be objective. And particularly if one knows the standard, like this is secondary education, what is expected, this is what the outcomes are. Here's the outcomes, now follow it. That's

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where we're going. We're not trying to go anywhere else. Um ... and so, she says normally exactly what I say and we don't even have to pre-prepare answers to questions.

RL30: Ja we both ... I think it comes from training as I've basically been very open with her. I've always said to her "Say what you feel, but for the first year come around with me and see what I'm saying". Ok, so she's seen what I've said and what I think and how I think and then she will then come along and, as I've said, they can now ask her what she thinks and she'll say exactly the same. [...].

In Richard's case, the nature of the subject, personal motivation, the nature of boys and the desire to teach to the individual are factors that allow experimentation with different ideas and methods. All of these factors have converged to allow optimum support for each individual student according to their needs. Megan's informal, unannounced visit to the classroom leads to an interaction and observation by a colleague from a different department that provides rare feedback. Richard details how the way in which he and Alena have built their team-teaching approach has aligned their thinking. A common understanding of the required outcomes as well as empathy for the creative process underlie this approach to their students' practical work and mutual benefits accrue to the teachers and students alike.

5.4.4.2 Relationship with the school leadership

Richard insists that it is important to be able to describe the history of his relationships with school leadership in order to contextualise his current relationship. Support from the leadership has always existed, but for different reasons. Serving under different principals in different schools, Richard has found that the leadership's acceptance of Art has oscillated between extremes from its marketing potential to its intrinsic worth. Rather than a personal or professional relationship, in the case of Art it is the principal's personal belief that is identified as a factor having a significant effect on the Art teacher's creative leeway. With each change of leadership, the teacher needs to adapt to the change in appreciation for the subject i.e. the principal's beliefs affect the subject, much like they do with ICTs (Breuleux 2002 p.10; Otto & Albion

2002, p.3; Staples et al 2005, p.301; Sharma 2005 p.53). Richard explains the principal's influence in this way:

RL41/43/47: Well, I'm just trying to give you the background, because you need to understand like how one thinks ... in the context. The first management style I didn't really notice it, I missed it. The second one ... um ... the manager, the main management was based on accountancy and stuff. And ... he approached me and said he knows nothing about Art ... um ... and therefore just go for it which is quite nice in one way but you didn't really feel ... um ... appreciated. You sort of felt this now is really good and basically the person trusts you to do whatever you're going to do. But he didn't really see any benefit in it really. But the nice thing was it was quite open. It was like "I don't understand this, but, you know, it's like Greek to me, basically, but obviously something's happening". And I think that over the years he eventually saw some ... what do you call it ... a sort of way of selling the school through [...] [m]arketing ... he saw some marketing potential eventually actually and that's what he liked. And, so that was quite nice. And then, when I came here, it was really nice that the management people seemed to relate to Art and understand it and be excited about it. There was a like "this is beneficial not only because it's a subject that we're going to offer in the school, but because like it actually contributes and it has something to offer people and its significant to life and the world" and management had ... a ... sort of ... ja, much deeper appreciation and you felt more appreciated therefore in a way. So I found that quite exciting. But now there's been another change again, so now obviously ... now I think there's not that big depth so I think I'm almost now between the first place and the second place. [...] But ... so my perception could be slightly wrong as well, because there hasn't been much change really ... between the two management styles. I mean the two just changed over fairly smoothly. [...]

5.4.4.3 Relationships beyond the school

In response to the question of external influences on his innovation processes Richard explains how his own creative involvement is a much greater source of inspiration than other schools. Even though he runs his Cluster Group, it is not beneficial. Richard explains these different involvements:

RL50: Ja, basically as I was saying right ... start in terms of no, just working in art and making art continually. That's basically where I get inspiration from ... um that's basically what drives my changes, so anything I do I try and feed it into the

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classroom. So you know because I ... even while I've been teaching I've been doing quite a few other jobs for other people which I find interesting and I think beneficial to teaching. [...] So obviously I do that and then I'm learning. I've got to sit down and I've got to learn. Because often I'm dealing with stuff that I haven't tackled. With my fine art background ... it's now like I'm dealing with something that I've ignored say like animations in computer art which is something I've limited in my fine art. I've rarely used it. So I've taken on those sort of jobs and I've fed them into my fine art and I've fed them into my teaching because ... I try and see what's the value of it first. Is there a value in it? And I think those are the kind of jobs I could take on and think "This would have a value that I could feed into teaching". [...]

RL52: Ja, I suppose I haven't really had much influence from other schools. But I think that's my own choice. I also find ... I haven't found really other teachers are that helpful [chuckles]. I run also ... our Cluster Group and I don't find it helpful at all. The teachers take from me, but I never get anything back. That's how I feel.

RL54: Well I mean with the artists I think it's ... its sort of much ... everybody's a little bit too busy, I find. Um ... obviously ... ja, the ideas I share are with the artists, people who I have around and I talk to but not always, not frequently. It's not formal. I'd say its informal exchanges.

Most importantly, mutual benefit derives to Richards' students. From his description, it is clearly evident that he is comfortable with encouraging complex cognitive challenges with his students, although there is a twist to his logic at the end in that he has not achieved his ambition with computer art (RL77 Ch.6, Section 6.4.4.1, p.322):

RL65a: Basically, what I find is what I'm excited about is what a group of students will get excited about. So if I decide this ... like next year now ... I suddenly decide I'm really excited about sculpture and I go out and I don't know at this point if any of them need sculpture or if that'll extend them but I can bet that by the end of the year there will be whole bunch of them doing it and have chosen to and be learning and being extended [laughs]. You see, so sometimes I ... if I push something I think I can persuade the students to like that, but not in every case. Like for example, I have been pushing computer art because of the value, I think, as a thinking tool and [that] has been used as a tool at the moment, but might not last for very long with all the

power shortages⁶ [laughs], the lack of power in the world. But I think it's a way of thinking and it's a way I can extend them and it's a complex way of thinking. You've got to think in a whole different way. There, I know my statistics are quite poor in a way, but if I get two or three just to take up that tool as a way of communication and as a way of thinking and a process of being creative, then I'm lucky. And there I'm pushing it, but it's not working. Whereas I said to you just now that I could take something and I'd get something out of it ... doing sculpture with a passion.

The issue of computer art is discussed further in Ch.6 Section 6.4.4.1., p.322.

5.4.4.4 Summary and preliminary findings: Richard

The pattern of factors that affect mutuality in the case of Richard is illustrated in Figure 5.6. Innovation and innovative thinking are inherent in practical art: it is not inhibited by content and, on the contrary, focuses on creativity. The product of the creative process is conceived as a public work inviting dialogue.

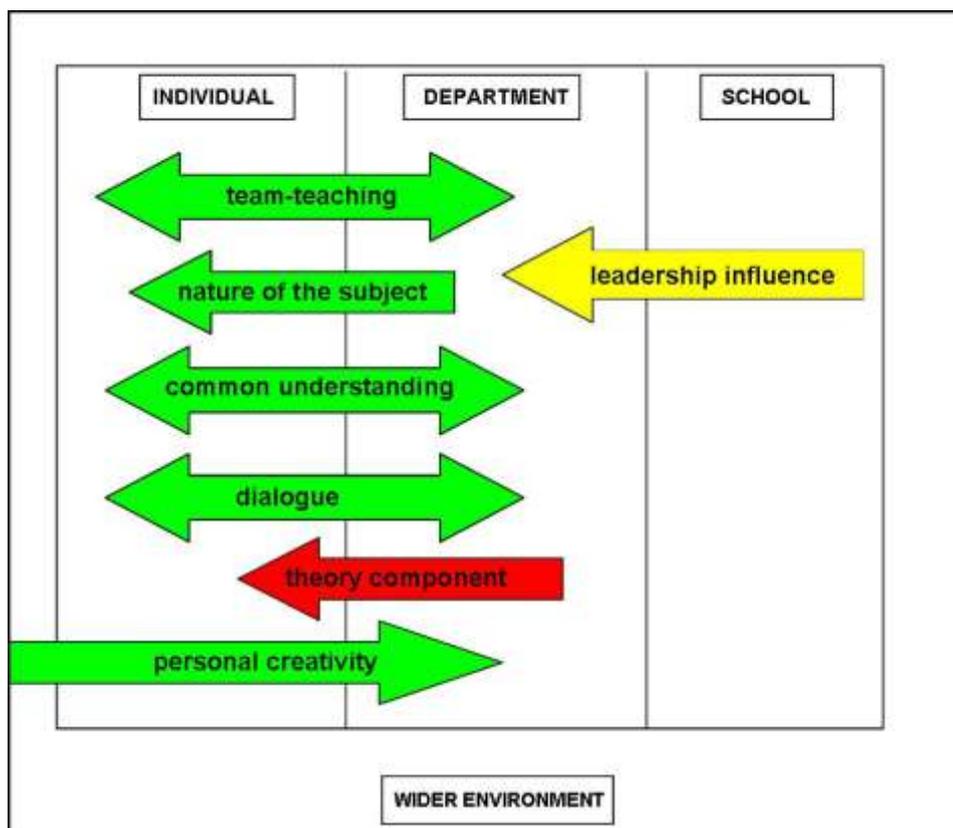
Dialogue is essential to the creative process: dialogue between the co-teachers as well as their dialogue with the students. In order for team-teachers to be objective, mutual understanding has to be in place prior to their interaction with a student. What appears to be an instinctive chemistry is actually a carefully orchestrated relationship built around supporting the creative process. Good communication and complete trust ensue. The question arises to what extent students that are not exposed to a creative subject are exposed to such critical thinking processes.

The outside influences that Richard brings to his teaching are those from his own experience and professional learning beyond the classroom as a practicing artist with mutual benefit to both his art and his teaching practice. Richard takes on outside jobs specifically for the opportunity they provide to enhance his teaching. He deliberately sources innovative ideas from outside, masters different techniques and then applies what is appropriate in the classroom. Similar to Arthur and Henry, Richard feels that the Cluster is of

⁶ This interview was conducted at a time when South Africa was suffering extreme disruptive power shortages nationally.

little benefit even though he runs it himself: his is a one way process of outward influence. The Cluster Group thus emerges as an obligatory waste of time. However, Richard does have informal contact with other practicing artists with whom he shares ideas to mutual benefit. The effect of the principal's attitude towards Art is neutral and is therefore indicated in the figure by a yellow arrow.

Figure 5.6: Collegial & professional interactions: Richard



5.4.5 Working together: the case of Maria

In Maria's case, the nature of her subject and systemic factors result in an intertwining of intra-departmental and leadership relationships. She is also reliant on relationships beyond the school.

5.4.5.1 Intra-departmental and leadership relationships

Given the immensity of the task that Maria faces in implementing her new subject across the whole school, delivery of the LO curriculum poses particular challenges for her. The school found itself in a dilemma. Although

the extra learning area was mandated nationally as a compulsory subject across all grades, it was the school's responsibility to find a logistical solution, adapting both schedules and teaching resources to comply with requirements. Additionally, Physical Education was incorporated as part of LO and needed to be assessed similarly to content subjects, whereas it was previously considered part of the outdoor sports programme. Maria thus had two colleagues seconded in from the sports staff who now assist in teaching the LO theory side in grades 8 and 9. To accommodate LO without dropping other optional subjects, every teacher has had to take on responsibility for at least one LO class in Grades 10-12 (see Ch.4 Section 4.5.5, p.195). Maria describes the learning curve that all have experienced:

***MW84:** At the Grade 8 and 9 level, my two colleagues have, I think ... I want to say they've grown as well. I don't think they want to take the responsibility because they ... but if I ask them to do something, they do it. It might sometimes be a bit late or whatever, but I think they've also grown to a certain extent and I ... but they're very willing, they're very willing and I'm quite happy. I know we've still got a way to go, but we're making progress. At the Grade 10 and 11 level it's been ... I don't know what the right word is, I ... because now I'm asking all the staff to ... to help me with Life Orientation. And some of the people have been absolutely phenomenal and they're working hard and they're meeting deadlines etcetera, etcetera and some obviously, you know ... we're all doing I think, too much; we're all stretched to the limit most of the time ... and they just can't.*

***MW86:** So, I think I've had the whole range from very good to [chuckle] ... not so very good. But, I understand. We dropped this on them ... I think ... although [the principal] said from the beginning that every teacher is an LO teacher, it was still an additional thing that we asked of them. So I understand that as well. I do understand that. But it's been an interesting year so far, I must say. But, you know, everybody ... and I must ... everybody tries ... some maybe more than others but in the end, and that I can say that with an open heart, everybody tries to.*

***MW88:** Well, [I communicate] by email. That's the only way, because it involves, literally, every staff member so it's done by email or in the staff briefing on a Monday.*

***MW95:** They have really been phenomenal. Really. Ja. You know, when I approached [the deputy principal] with this ... because to me it was quite a shock*

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when I realised that we need to have certain things in place and we met with [the principal] and [his] reaction was then “we must get it in place immediately”. And that’s why I got the Wednesday Chapel Service time. I think that was a huge sacrifice on the school’s part, you know. So their support has been absolutely fantastic, ja.

In the case of LO, the whole school from the principal downwards has been involved in trying to find a solution to the challenges that the new subject brought. Essentially therefore, the whole teaching staff comprises the LO department. As HOD, Maria recognises that each teacher is stretched to the limit most of the time with each having to play multiple roles. Some have the capacity to cope with the demands of LO while others simply do not, although Maria insists that everyone is trying their best to cope with the extra load.

Communication in this disparate department is a particular challenge. Apart from one special general staff meeting when the logistics of LO delivery was explained to all teachers, the complexity of the timetable provides no opportunity to hold a department meeting. Maria therefore uses different methods to communicate with her Grade 8/9 and Grade 10/11/12 teams of teachers. In Grade 8/9 she relies on good relationships with her two colleagues to implement the curriculum requirements according to her instructions. Other than that, the only face-to-face opportunity for teachers to communicate is during the staff briefing, a thirty minute public notice session during tea-break on a Monday that covers every aspect of day-to-day management of the entire school for the forthcoming week. There is no opportunity whatsoever for LO teachers to meet, discuss or workshop ideas and approaches to either the curriculum materials and resources or classroom strategies. The fact that each teacher has access to email is a critical benefit in communicating information in the latter case. Although the ICT capacity at the school goes well beyond email, it appears that no other ICT opportunities have been explored to enhance asynchronous communication or collaboration in this disparate department. New problems are addressed from a traditional point of view although the potential exists to deliver in innovative ways i.e.

there is convergence of opportunity and technology, but it is not implemented as a management solution and potential mutual benefits are inhibited⁷.

5.4.5.2 Relationships beyond the school

In her situation Maria is totally reliant on the goodwill of others, having drawn benefit from the User Group conference as well as the Cluster Group. She also inherited materials from a colleague that have been used as an important resource:

MW97/99/105: But, she bought those files before she was Grade 8 and 9 Director. I don't know why she bought them ... I think she bought them ... she [...] I don't know ... she came across it ... I honestly don't know why she bought them, but that was ... that saved my life, it did. And I must also mention, you know, Rowena [in the partner school]. She's so clued with the Life Orientation, she really is. [...] She's also been quite helpful. [...] She's been doing this for many, many years ... since she arrived in South Africa she's been doing Life Orientation or whatever it was called then ... Life Skills or whatever. I think there's a whole wealth of information.

MW111: They don't. You subscribe to [Teen Active] on an annual basis. They get people to write articles on health, on career, on keeping fit etcetera, so it's quite an interesting website. So that's one [resource].

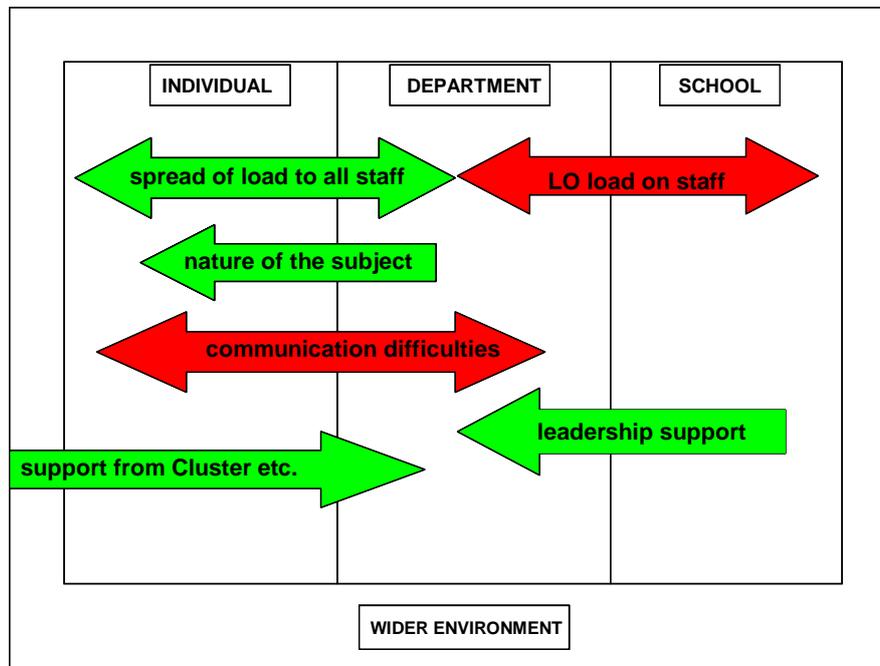
Maria openly reveals her vulnerability and reliance on the ideas of others. She has already mentioned the influence of individuals in the school and how reliant she has been on their ideas. Availability of resources is also critical. The school subscribes to the *Teen-Active* website which students can use interactively and from which she receives communications by email. However, it is non-contributory site in that it does not provide a forum for LO teachers to communicate with each other.

⁷ As at Feb 2009 the first module of the LO curriculum has been added to Moodle, the school's learning management system that is being implemented. However, the module has been added as a website resource developed by Grade 11 IT learners rather than as a result of collaborative planning by teachers, albeit collaborative refinement may ensue.

5.4.5.3 Summary and preliminary findings: Maria

The pattern of factors that effect mutuality in the case of Maria is illustrated in Figure 5.7:

Figure 5.7: Collegial & professional interactions: Maria



Maria meets the challenge of delivery of the LO curriculum with remarkable fortitude despite her disparate team and their lack of any training. She acknowledges the full support of the school leadership in finding and facilitating a solution, but nevertheless, has to contend with variations in delivery due to the general teacher overload. On a more personal level, she feels vulnerable due to her lack of experience, but overcomes this through networking with individuals, relying on colleagues in her Cluster Group and depending on access to both printed and online resources. Online and email access is critical to her ability to function.

5.4.6 Working together: the case of Francois

Francois, like Richard, also works in a mutually beneficial relationship with his departmental colleague and, like Maria, is dependent on the school leadership and his professional relationships beyond the school.

5.4.6.1 *Intra-departmental relationships*

The new circumstances that Francois faces have been explained (Ch.4, Section 4.5.6, p.201). He openly acknowledges personal shortcomings arising from these circumstances, but is also limited by the small size of his department. Francois and his colleague share the load, each taking responsibility for different grades and he is reliant on his colleague's expertise:

FP33: [chuckles] With Patrick coming in and I mean ... he's picked up Grade 10 and 11 which is great. So, I mean he's got a wealth of knowledge. He's taught the subject for so long and [has] so much experience, so that's helped a lot so I'm not on my own trying to fight fires and you know, put things out ... you know, try and put all the tests together myself and all of that stuff. So that ... that helps. Um ... but it is difficult being such a small department and also, I must be honest, my teaching experience as far as Accounting is also very limited.

In his new situation, Francois feels vulnerable without a mentor familiar with the IEB system who can help him, as Patrick is also new to the system. Francois meets regularly and informally with his colleague to discuss practical matters, but they have no time to discuss or develop classroom strategies. Francois' time is limited by his workload and his colleague's time by his leadership duties. Instead he is totally reliant on the partner school and the Cluster Group for such support.

FP37: I was teaching EMS⁸. And I'm ... I was teaching prep school. So, the whole high school is very new to me. So, it's ... it's been a huge challenge to get on top of things. There's no doubt that I prefer this to where I was before. But it is difficult with a new subject, changing syllabus ... um ... that there's no sort of ... somebody in the system that's done it for so many years and has an understanding and can say, "Look, forget about that, let's do it this way" ... or, you know, knows the ins and outs. As much as I am trying to find out [???] what works, what doesn't work what are "they" requiring from us now ... namely the IEB ... what they're not and that sort of thing. So it's been very difficult trying to sort of get your head around certain things and keep on top of it.

⁸ EMS = Economic and Management Sciences

5.4.6.2 Relationship with the school leadership

Ultimately, Francois is overwhelmed by the unconditional collegial and professional support that he has received. His openly expressed self-doubt is answered with encouragement and affirmation:

FP57/59: My experience here has been ... fantastic is putting it mildly. You know, I've been dumbfounded by how supportive and helpful people are. So that's been very encouraging. Um ... you know I've often had conversations with [the deputy head]. I say "Look, you know, I have no idea what they want or this is happening. Can't you find someone else to ... HODs for example ... [laughter] who knows what they're doing? That would just help you know ... take a bit of pressure off the system". And he says he's not interested in ... in taking ... in doing that ... um ... because he thinks I'm doing fine etcetera, etcetera and I'm representing my subject and looking out for the best interests for it etcetera, etcetera which is fine. So I must say he's been very supportive as far as any requirements for the IEB etcetera. If I don't understand I bounce it off of him and he's been very accommodating as far as that's concerned. [...] So that ... that helps a lot. And ach, in general, I mean, not just academically, in general the management have been unbelievably supportive. Fantastic ... so I can't complain at all ... at all.

5.4.6.3 Relationships beyond the school

Francois benefits from extensiveness on the part of a colleague from a partner school and those from the cluster, but it is an incoming rather than an outgoing influence. The Cluster Group provides a critical need for Francois and is therefore highly valued by him. Email is the medium that facilitates such communication. Whereas most teachers (HN56b; TL113; AS/HJ96; RL52; BK291) who refer to cluster groups mention mono-directional outward influences, Francois, like Maria, acknowledges his dependence on inward influences from his group, which he hopes to be able to reciprocate in the future.

FP39: We have ... we have a meeting sort of once every two weeks where we see where we are, what assessments we want to do. Um ... that sort of thing ... touch base. More than that we pretty much chat once a week, twice a week informally.

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“How’s it going? Have you done this? Where are you with this? Have you covered this? This seems to be a problem” and that sort of thing.

FP49b: *[...] I do communicate with one of the others ... one of the teachers in the [partner school]. And then with our Cluster Group. The lady who heads that up is very helpful and I often bounce things off her and send her emails and that sort of thing.*

FP51: *Well, the Cluster Group is, you know, basically, you know we ... we chat about the syllabus ... where we’re going, work load, you know exams and all of that. Um ... but also, I ... you know I must say, I’ve been very fortunate where ... the people in the cluster have been very accommodating. As I say, I’ve made it very apparent to them I’m new to the IEB system so I’m totally naïve as to their requirements etcetera, etcetera so they basically hold my hand and help me through it.*

FP53: *[The Cluster Group is] [a]n email away ... pretty much so. So they’ve all sort of said, you know, I ... take project pieces for portfolios. I send them an email saying “Look, do you have any recommendations. Do you have a good project I can use?” Two days later I get a response with the project. Bang ... that’s what I use ... with their memos etcetera, etcetera. So that’s helped a lot. So you get an idea of what ... they’ve done it for the last so many years. They know what the guidelines are etcetera. So they’ve been very helpful as far as that’s concerned. So that’s been fantastic.*

FP55: *Absolutely. Yes. You know, obviously it’s a give-and-take situation so, you know, once ... you know next year’ll be our first official Matric group. So, I think, once that group’s through then, I think, I’ll be in a position where I can say to them, “Well, here’s my suggestions. This is what I’ve done”. Now that I’ve sort of got the run of the mill ... got the syllabus sort of, I won’t say totally covered, but I’ve covered some of it. But I have an understanding of what their expectations are ... workload, content etcetera.*

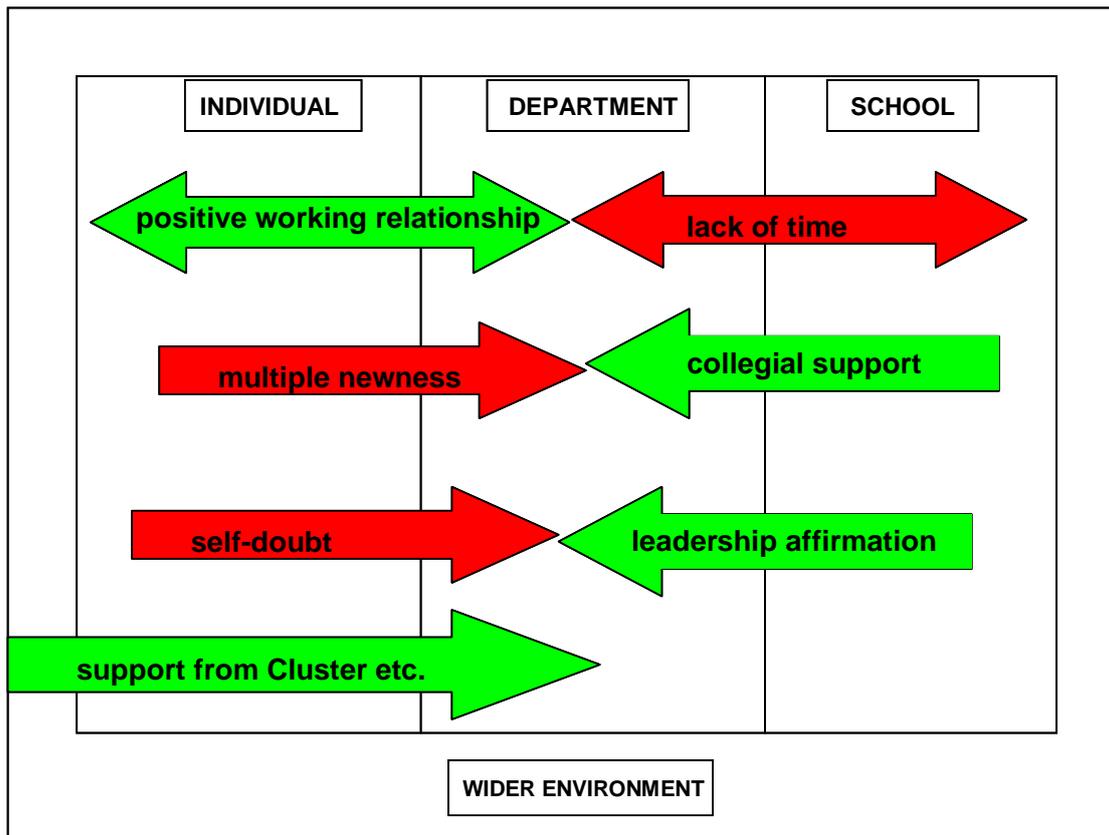
Beyond education circles, Francois also has friends that he can draw on for ideas, and is conscious of the opportunities in the wider environment. However, although he has the creative ideas and the motivation, he is constrained by time. It is the syllabus that he would like to enhance through his creative ideas that is itself the constraint that prevents him implementing the ideas:

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FP62/64: Um ...I'd like to get to [other partnerships], but again time constraints ... it's just ... it's a little difficult. Um ... ideally ... you know, I ... I have two or three friends that are ... are CA⁹s. So the idea is to get them more involved in ... maybe coming and doing a section, telling the boys. So I'm quite keen to do that. It's just that I haven't got around to that because, as I said to you, the syllabus is just so ... and to find time to do that. It's just the same as incorporating the computer software programme. There just hasn't been time to ... to bring that in. So its just ... eventually, I think we'll get to that where I'd like to say "Let's go on an Accounting outing and go to Ernest and Young or Price Waterhouse and go and have a look and see what accountants do all day ... what their involvement is". [...] You see we're lucky. I mean, there's ... there's massive firms literally just in Sandton, just down the road that you can go and accommodate.

5.4.6.4 Summary and preliminary findings: Francois

Figure 5.8: Collegial & professional interactions: Francois



⁹ CA = Chartered Accountant

The pattern of factors that effect mutuality in the case of Francois is illustrated in Figure 5.8. Under his particular circumstances, Francois openly concedes his vulnerability and reliance on the support of others and gratefully accepts any advice or help that he can source. He receives unconditional support and affirmation from the school leadership, but ideally would prefer to work more closely with a mentor. Francois would also like to collaborate with his more experienced colleague on developing their classroom practice, to mutual benefit, but lack of time limits their co-operation to the administrative aspects of teaching. Instead, Francois relies on support from the Cluster Group, facilitated by access to email. The benefit is mono-directional at this stage, but he hopes to reciprocate when circumstances permit. Lack of time inhibits the realisation of his creative ideas.

5.4.7 Preliminary findings: collegial and professional interactions and their effect on teachers' practice

Collegial and professional interactions at Wilding College are mostly supportive and congenial as conveyed through both the words and the interactions of the participating teachers. In the case of Bronwyn and Ineke they speak openly about their departmental relationships and the benefits they derive from their interactions. Similarly, Richard describes a carefully crafted professional relationship with his colleague, Alena. Maria and Francois are both in challenging new situations as a result of their new areas and new roles and are grateful for the support and affirmation they receive from within and beyond the school. Logistical problems and teacher overload mean that Maria does not always receive the required output from all teachers in her team. Her co-opted colleagues are willing to follow her lead. Francois has self-doubts about his ability to understand and meet the requirements of his new role, but is affirmed by supportive leadership.

The case of the Physical Science teachers demonstrates how different perspectives within one department can be. While there is agreement that the modular system has its faults, the reasons for it and the way in which the

HODs as opposed to the teachers view the problems differ considerably. The analysis indicates the difference between assigning work to teams and collaborative practice. Demands made on teachers to innovate in their practice are not met with the resources that are deemed to be required to meet expectations. Teacher's perspectives are often dependent on their ranking within the department and communications from external entities are subject to interpretation.

The lack of a like-minded colleague seriously inhibits Henry's ability to share his creative ideas in a way that ensures their full development and evaluation in practice. This case calls into question the means that are available to schools of managing discordant relationships and also of ensuring that the wider goals of the new curriculum are met. However, as his was a single interview, it is acknowledged that another point of view in this particular situation may well reveal a different reality.

Although the presence of ICTs enables national intra-school networking, such as through the Life Sciences teachers' network, Wilding's ICT infrastructure has not been used as a shared resource repository, nor has it been used for collaboration with the partner schools. There is no centralised web site containing the resource links nor has the Thutong Education website¹⁰ been exploited for such a purpose. Having a centralised resource would boost sustainability of the Life Sciences network and reduce the load of individual teachers in organising received links. Nevertheless, this network and the Physical Science blog are the only examples of electronic networking that were mentioned by any of the interviewees. It is ironic that the benefits of sharing are not capitalised on, probably due to the lack of time, whereas invoking the use of a shared site would save teachers time. In contrast, all teachers, in all departments have access to the centralised IEB website which provides exemplars of examination papers, regulations etc. However, no link

¹⁰ The Thutong Portal is the South African National education portal at <http://www.thutong.doe.gov.za/> designed for sharing resources. Wilding teachers have been invited to contribute to this portal.

is apparent between the benefits of this facility and the potential of the Life Sciences network.

Taken together with the evidence of lack of time and stress evident in the previous chapter (MD29: Ch.4 Section 4.5.2.1, p.165) it appears that although the modular planning system as used by the Physical Science teachers is designed to save time, this end is not being achieved, nor is the design of the modules being optimised. Due to time constraints, this process of design, development, refinement and eventual implementation of a module appears to be inadequate. Teachers' familiarise themselves with the content, but fail to grapple with the strategies for implementation until difficulties arise. With modular design, the eventual workload does not decrease due to the need for each teacher to familiarise themselves with each module. There is a time benefit to teachers in preparing the modules, but this benefit is countered by the time it takes to familiarise themselves with the materials and to develop their own implementation strategies. Certain sections of the curriculum are new so that even with someone else putting together the module and teachers' discipline knowledge intact, the teaching content is still unfamiliar. The load is only unmanageable in terms of time.

The development process for modules emerges as inadequate. Design for learning appears to be an ad hoc rather than a strategic process. Whereas instructional design relies on design systems such as ADDIE¹¹ there appears to be a lack of similar systems in this school¹². It is in taking ownership of a module for delivery in their own classroom that the challenges arise for the teachers as described above by Thabo and Magriet. There is no evidence of professional learning opportunities to deal with curriculum change other than the Assessors' course.

¹¹ The ADDIE model is a basis for instructional design: Analysis, Design, Development, Implementation, Evaluation <http://www.learning-theories.com/addie-model.html>

¹² The Intel format (<http://www.intel.com/education/teach/>) has been used in certain learning areas (e.g. in History and by Maria in LO), but the small number of teachers who completed the course, together with staff turnover has reduced its impact considerably.

Although Henry and his colleagues also spread the load by using a modular planning system, there seems to be even less effective collaboration than amongst the Physical Science teachers. Instead of mandated changes being implemented through collaborative planning and shared practice, divergent mindsets dominate and negatively influence the possibility of any mutual benefit other than for administrative tasks. The disconvergence is such that Henry has to con his colleagues into trying something new. Classroom innovation is left to the individual, but when mutual benefit is not realised, the development of any innovation is blocked. This example points to systemic faults with testing, negotiating, validating and agreement on innovative practices before implementation occurs.

There is no lack of facilities or resources in Henry's case, but the under-use of such facilities, provided at considerable cost, would appear to be a management problem. Either, the facilities were provided without appropriate justification or their provision was not accompanied by appropriate teacher development in using such facilities. The fact that one teacher makes use of and advocates use of the facilities whilst others ignore it, if this is indeed the case, justifies the presence of the facilities. If the facilities are not used with all classes, then equity of delivery is undermined. Without extension of the innovation across the department equity cannot be achieved.

Over a lifetime of teaching for any individual there will be many ideas and influences that come and go and Henry provides examples of this. However, little evidence emerges of trends that have led to the sustainability of the innovations and it needs to be asked why this should be so. It is common knowledge that little has changed in the grammar of schooling since the late 19th Century, but the lack of sustainability of Henry's creative ideas demonstrates the power of disconvergence and the persistence of traditional methods. It is not the purpose of this study to evaluate each innovation and the possibility of an innovation not withstanding a thorough evaluation cannot be discounted. However, as the school lacks defined innovative practice

implementation and evaluation processes, innovation implementation defaults to an ad hoc basis.

Henry's case raises the question of mediation in relationships between leadership and teachers when clashes interfere with both the teacher's ability to teach and the school's ability to determine direction. How should creativity be channelled and how is compliance maintained when neither collaborative approaches nor systemic evaluation of innovations are present?

In this department and for this individual teacher in particular, widely disparate factors impact his ability to sustain innovative practices and given the stage of his career, he has lost the will to persist.

The amalgamation of History and Geography into Social Science and its subsequent splitting illustrates the effect of mandated indecision on innovation. Teachers developed cross-curricular modules, only to have to pull them apart again and the loss of impetus on innovative methods led to their apparent demise. In the example provided by Henry (Section 5.7.1 p.240), the innovation itself was apparently successful, but its sustainability was countered by other factors. Pressure of timetables and curricula forced reversion to old practices. Curricular thinking had progressed, but was in conflict with organisational thinking in the management of change. Although Henry challenges fundamental norms in his department and in the IEB user group, traditional thinking counters his approach in both cases.

5.5 Summary of Chapter 5

This Chapter has described the collegial and professional relationships between teachers within their departments, between teachers and the leadership and relationships beyond their departments and the school. The mutual benefit derived from positive relationships as well as the inhibiting effects of poor relationships are described. Against the background of

contextual interactions provided by Chapters 4 and 5, the next Chapter will deal with teacher innovation and ICTs.