

## **Transition into post-compulsory (mathematics) education**

Julian Williams, Paul Hernandez-Martinez, Laura Black, Pauline Davis, Maria Pampaka and Geoff Wake (2008)

### **Abstract**

Previous work on transition between institutions suggests transitional problems can be dangerous for individual learners' progress. Drawing on the literature, and on our CHAT perspective, we anticipated that transition points would be significant to students narrative construction of their (mathematical) subjectivity/identity, i.e. that they would offer troubling moments. In this working paper we draw on and analyse cross-sectionally the interviews of project students regarding their (post hoc) experience of transition into 6<sup>th</sup> form or FE College programmes (and some teachers data from case study interviews and observations). We find that for many students transition is recalled as a key moment, when trouble with the 'step up' in demand was experienced at the same time as social, intellectual and emotional challenges were being posed (by the need to re-construct a peer group, be the increased autonomy of the expected work, and by demands to be 'grown up'). However, we draw attention to significant positive features of students' accounts: most students tell of this as being an important learning and growing experience. Even in their learning of mathematics, a significant number of students tell of the new experience as being an improvement on secondary school: they tend to say they understand more and that the work is better. Thus the 'transition' is widely seen as a growth point rather than a problem (at least after the event). We discuss some general implications for conceptualising 'transition' and identity

### **Background**

The aim of the paper is to better understand the transition for GCSE/compulsory schooling and post-compulsory 6<sup>th</sup> Form FE College (6fFEC) programmes from the students' perspective: we draw mainly on the students' interview data in which they were asked to tell a narrative of their education (particularly their mathematics education) from year dot to the first year 6<sup>th</sup> form study (AS mathematics studies). By way of an advanced organiser: we will claim that our students' stories of transition as troubled or problematic were largely balanced by a more positive discourse of challenge, growth and achievement. We will therefore conclude that the literature on transition should be re-read from this more positive light: the CHAT perspective suggests that transition can be viewed as a point of growth of identity, where the chance to become a new person can be exploited by many learners.

### **Theoretical (CHAT) perspectives on subjective experience of identity in transition**

Our framework for analysing transitional practices draws conceptually on Cultural-Historical Activity Theory (CHAT) and in particular, developments in third generation CHAT that point to boundary, i.e. interfacing, objects and systems as important sources of contradictions and hence system dynamics, and offers us particular insight into transitions between systems such as school and college (Roth et al, 2005, Tuomi-Grohn & Engerstrom, 2003).

Recent developments within social practice and CHAT perspectives provide for a CHAT analysis on ‘identity in practice’: these help us to understand how subjective engagement in practices may constitute, or at least mediate, the learner’s formation of social identities. In this view, when a student engages or disengages they also thereby construct the self in practice (Holland et al, 1998, Stetsenko & Arievitch, 2004). This self-identity may also be authored and told to others in a biographical narrative, typically mediated by ‘troubles’, obstacles and canonical stories (Bruner, 1996)

Our own perspective, to some extent developed in our edited special issue of the International Journal of Educational Research (Williams et al., 2007), then suggests that a distinction needs to be drawn between ‘subjectivity’ (the image within the subject engaged in the subject-object dialectic) and ‘identity’: subjectivity is necessarily constructed in the momentary engagement in an activity situated in place and time, whereas ‘identity’ is a longer term project, and to some degree is the ‘same’ across space and time.

The point here is that in this view we can see ‘transition’ and ‘transitional practices’ from the subjectivities of the boundary-crossers as they tell of their experience of themselves, that is their identities, on either side of the transition. An obvious weakness in our data set is the fact that the data all comes from students after the transition from secondary school to College (a problem to be rectified in a new project).

### **Literature on institutional transition**

The research literature (see Ryan & Williams, appendix A: this needs a bit of broadening and updating, before journal submission, but don’t think the non-P/S transition literature is deep – check Yvette’s book) mostly refers to Primary - Secondary school transition, which suggests that there are 3 broad areas of concern:

1. Pastoral and social: students becoming comfortable in the new institution, finding their way round, making new friends etc. (this is the one most successfully achieved in Primary – Secondary transition);
2. Continuity of curriculum and pedagogy: awareness of the ‘gap’ between practices on either side of the transition, with implications for action to minimise the consequences on both sides of the transition/divide between the practices in the two institutions; and
3. individual progression: the receiving institution being aware of and taking account of the individual progression of each learner, the exporting institution providing adequate and timely information that the receiving institution can trust and use.

As is evident from these categories, transition is generally viewed as a ‘problem’ rather than an opportunity. This notion is amplified by the view that transition is a policy problem- caused mainly by the stubborn statistics that continue to show very little progress in year 7 after the crucial KS2 SATs.

Drawing on our case study data, we can say that our case study teachers' perceptions of the problems of transition at year 11-12 mirror this literature: the GCSE course (especially intermediate) does not prepare many students with pass grades (especially grade C) for AS level study: algebra is the topic usually mentioned.

.Additionally, many students are not always well prepared to be autonomous learners, and it can be very difficult to get students to hand in work, especially this was mentioned in regard to coursework. In one College 'homework' clubs were laid on at lunch times for students, and those on EMA grants were expected to attend regularly in order to keep their grant. On the other hand it is sometimes said that the advent of the EMA grant has led to some students attending for other than 'educational' motives.

Quite a few students have very bad experiences of mathematics teaching in GCSE with many different teachers, supply covers etc. Discipline in GCSE classes is often said to be poor, and students may not expect to be well-disciplined.

### **Literature on difficulties in progression with mathematics**

There is a body of literature in PME that is relevant to our context which should be briefly summed up. One could adopt several (not necessarily commensurate) theoretical perspectives on concept development (Piagetian stages, process-object reification, procept-formation, threshold concepts). However, these all lead to the same broad conclusions as follows:

- (i) there are some key moments in concept development that learners find difficult, when a certain characteristic shift in perception of mathematical objects take place: these signal dangerous moments that challenge students confidence and cognition;
- (ii) all agree that these include at least the following: rational numbers/multiplicative field (approx 10-16); variable/algebra (approx 13-16+); infinitessimals/calculus, and proof (16-20).

Therefore, there are cognitive shifts in mathematical perspective that may be associated with transitions at 11, 16 and 18, and which are likely to add to learners' perception of troubles.

In addition to this literature, there is some evidence related to mathematics options, and choice to study mathematics at 16: in particular, Brown et al (2008) report reasons for NOT studying mathematics post-16 (students say maths is too hard, not relevant, disliked or boring.) and 'enjoyment' of mathematics is the main factor explaining higher than average participation rates (when achievement and gender are accounted for). Brown et al.'s (ibid) review of literature (citing Holton et al., 2001; Nardi & Steward, 2003; Kyriacou & Goulding, 2006; Dick & Rallis, 1991; Johnston, 1994; Osborne et al., 1997; Mendick, 2006; Mathews & pepper, 2007; Stobart et al., 2005) also suggests:

- (i) falling post-compulsory participation trends in other countries also;

- (ii) the correlation of participation with achievement, attitudes, and the continuing residual under-participation of girls.

Our own literature review led us in this study to work with ‘self-efficacy’ as the most important attitudinal subjective factor likely to influence intentions to further study (see Graeme Hutcheson’s TLRP Working Paper on disposition to study mathematics in HE, this website): but we do not know of any literature in the UK pre/post compulsory education relevant to this.

### **The students’ data**

The students taking part in the project were selected from 5 different colleges across the UK and they were mainly students considered ‘at risk’ in terms of their GCSE mathematics grades (C or below) or their socio-economic background (coming from neighbourhoods where participation in Higher Education is typically low). All students were taking a course in mathematics at the time when the project started.

For the purpose of this paper, we considered the data coming from interviews with these students (n=47) at 3 different times: the first time when they came into College, the second time at the end of their AS year and the third time during their second year when most of them had already applied to university (although some of them had dropped out or were repeating a year). During their first interview, we asked these students about their educational background, their experiences from school to college, particularly with mathematics, and their expectations for the future. During the second and third interviews, we asked again about their experiences with mathematics and how these have influenced their dispositions and choices for the future.

The analysis of these interviews was done using the software Atlas.ti, coding for statements on identity (self identity and identity in practice) and these statements were then coded for particular themes in which we were interested, for example: aspirations, influences on aspirations, views about mathematics (e.g. maths as enjoyable, maths as useful, etc.), experiences with transition, etc.

For this paper, we took into account the students’ statements about their experiences with transition. In this category, we considered three different codes: 1) Transition to college in general, 2) Transition from maths GCSE to traditional maths AS course, 3) Transition from maths GCSE to AS Use of Mathematics course.

### **Results: categories of troubles/problems in transition**

In sorting all the comments that students made that relate to transition (n=90), we begin with the three categories: (i) social-pastoral; (ii) curriculum/pedagogic continuity; and (iii) individual-progression/differences.

In this we exclude references to more complex transitions, e.g. immigrants coming from overseas for whom English was an issue to begin with, or who found the English culture very ‘laissez-faire’ with regard to discipline, etc.

- (i) **The social-pastoral dimension**

The social aspects of transition were mentioned by many as being important, both in the choice of the College, and in the process of settling in.

Thus P27 says she went to X College because her friends were going there and ‘they would say – ‘you have to come to X, it’s going to be brilliant’ and stuff’

P7 said that College was not as good as school, where he had known ‘all the people in my class, some for ten years, it was like family kind of thing, but here I don’t know people... it’s just not as good, it’s not as fun, I’m unable to work and laugh at the same time... I think it has slowed me down a little bit.’

Choosing to study at a College close to home was commonly mentioned, though not always clear if this was a social issue or one of convenience, or finance; and in many cases there was virtually no choice of College to consider.

P61 is an unusual case as for her going to College is said to be largely about the College social life, having nothing better to do, and getting talked into coming to College despite not seeing the point at the time.

For P65 going to College is seen as being about ‘working harder’ but also about expanding the social horizons: “my social life got better as well...”.

P67 says that as the year went on “you start to know other people (not just those from your school) and you relate with other people, and it just improves you”.

P95 too recalls that “I used to be quite shy, so I think I’ve got a lot more confident over the year. I think that probably changed the most... just talking to new people, like new ideas.”

P101 reports that what he enjoyed most about the transition was “mostly friendships ... Because I mostly hang around with people older than me so I have to act older as well.”

This social sense of growing up is not confined to the purely ‘social’, but applies to the approach to work and study as well (see below).

## **(ii) Coherence of curriculum and pedagogy (in mathematics)**

Subjects chosen at College may be different, and not what you anticipated, in some cases students quite ignorant of what College subjects were on offer or would be like: For example, P11 says that Biology turned out to be about ‘small scale cells and stuff like that’, and P12 says that she hadn’t ‘a clue’ what she could do or that she could do science. P54 wants to be an accountant, but says he “picked the wrong lessons really” thinking he should do maths to get into accountancy – later he dropped maths after he found out maths wasn’t needed.

Additionally, the teaching is perceived to be different. Different demands may be made of students.

Thus, P27 said “you have to adjust, to teaching method as well”. P76 says that she expected AS to be just like GCSE but turned out to be harder ‘unfortunately’. In fact ‘it was a bit of a shock compared to GCSEs... we were learning things I’d never seen before, it was all new.’”

For some this is told as being ‘hard’ but for P60 “here is the best place I’ve been” (this said despite having failed the maths course last year because he’d been a bit immature).

P67 for instance says that College is more difficult, ‘it makes you more independent, because you don’t get as much help, so you... have to work for yourself as well. You’ve got to work for everything you get.’”

Being autonomous and independent is a recurring theme: e.g. P81 implicitly sees this as part of growing up: “it’s made me more responsible and stuff... etc”

P89 similarly says “It helped me to grow up a lot... GCSE was very, very, well, simple for some, where you could just blag a few grades... ”

P25 reflected that he’d been in a ‘bottom set’ for GCSE “So a lot of things that we are supposed to know here I have never even heard of! So I have bought myself books and things- proper GCSE ones to look at”.

For P110 the difference between school and College classrooms is that “everything changes when they get to College... because like at school everyone messes about and everything, but here ... everyone just sits .. quiet and everything’.

P104 too expressed the view that “you think it’ll be the same as school and you can just slide your way through it, but now you have to put in more, it’s more individual and at home you have to do all the coursework and you basically did it in class but here you have to do it yourself and achieve your grade.”

Others suggested a grade A at GCSE would be the same as a grade D at AS. P13 says: “I got an E... really bad but I knew that was gonna happen. I just wanted to pass cause the boundaries as well was so high like getting an E is 40% but in GCSE that would have been like a B or an A and so... sometimes is just like... you don’t realise the jump from GCSE is so like so big because an A\* cause I did the high paper and got an A, an A was like 50% but in AS level that’s a D and so... they don’t really tell you this stuff when you are going to AS level.”

Many students find the College work significantly harder: P28 gave up part working when he found out ‘how hard the work was, and I thought – well, I need the time to do the work.’” He says “they don’t ease you in slowly, do they?” He says “when I first started I was really struggling with it... there was a big transition, but as I’ve got on with it, it’s easier and we’re not learning any new things, were just running over things we’ve already learnt.” The initial difficulty was “because it was all new and a lot more advanced...” The ‘new’ things are ‘hard to get the hang of.’ (He says later this was because he came from intermediate GCSE.)

Notice how, even when the students say they initially struggled, stories often turn this round, so that troubles become challenges to overcome: Later in the course P6 says that although he found work ‘too much’ at first... completely different to GCSE, .. but now I’m coping with it.”

P29 even relishes the ‘new’: “it’s going good, it’s a lot different the work we’re doing, its all completely new, but in the maths there is a lot of linking to GCSE work so far so it hasn’t been too big a step, and the method of teaching hasn’t changed dramatically so it’s been easy to settle in “

Similarly P9 “when I first came to it, I felt strange and distracted...” I really struggled. But then, I did core 1 and I got an E and my teacher said I could do better, so I resit it, just now with my core2. And I found it really easy, going back to it, because I’ve done core 2 now.”

But another perception is that at school, they “just tell you facts, and you just have to take them as they are, they don’t tell you why things are like that, so that, it’s harder to understand. If someone tells you why something works...” (P105)

P24 too: “I think it’s a lot better than when I was doing my GCSEs and it’s easier to understand... and then I know what I am doing and understand it more... In GCSE, I don’t think they explain it as much and it’s more just, do questions... I think here they go through it more and you understand easier.”

And P60 ‘found here has been the best place I’ve been’ in terms of teaching and understanding maths.

The theme of mathematics being difficult because a lot of it is ‘new’, and maybe more importantly when it seems disconnected from what they know (completely different from GCSE) seems highly relevant to perceptions of subject at the transition. P137 had done very well at GCSE but when he started College it was “my first lesson was surds... so I didn’t really know what was going on, and then I just struggled with the work and it sort of scared me in the first week .. ‘cos it’s your first week so you’re thinking ‘Oh, this is going to continue..’ straight away... and its probably going to get worse. Then a mate of mine who went to the same school, who got B overall and I got A, turned round to me and said ‘you’re smarter than me, I don’t see why you dropped it.’”

The ‘challenge’ – when it is achievable – is relished after the event however, as a change of identity: “I think it’s harder at L, but you can tell you are moving on.” (P32).

The mixture of social and work – everything being new at once – can sound potentially overwhelming. For P58 the change involved in transition involves “loads of new people and getting used to your new classes, getting used to your new teachers, and trying to understand the work and that is really hard at the minute, but I like it and I’m getting OK with it. I have student support ... which is another teacher (who ..) makes me understand.” As with many others P58 says GCSE to A level is a big “step” but she enjoys overcoming this challenge. NB several students from

relatively weak GCSEs had extra help and said they benefited greatly from the one to one help provided. (P74; also X College generally)

### (iii) **Individual information-progression in mathematics for AS**

The issue of individual difference and progression that has already come up several times in the above related principally to the students with weaker, intermediate GCSE backgrounds for whom everything seems ‘new’ and therefore hard. From what teachers told us, this happens when the teaching assumes a ‘higher’ GCSE background relevant to algebra in particular. The students usually talk of this as a ‘step up’.

Of course there is not problem with transition of information here – the Colleges know the GCSE background of their incoming students perfectly well, and are highly conscious of their diverse strengths and weaknesses. This is a curriculum pathways problem, and concomitantly a funding problem.

### **Conclusion**

The literature on transition (mainly Primary - Secondary) is reinforced in the sense that the categories are broadly supportable. However, the meaning of transition to post-compulsory is more radical in the sense that ‘going to College’ is often a more wholesale change in the social scene, and involves a quite radical change in mathematics curriculum (often mentioned) and classroom ambience more than in pedagogy, though expectations for independent working come to many as a shock. The discontinuity is felt particularly for students progressing from intermediate GCSE to AS, and this might explain the high ‘drop out’ rates we recorded in our survey sample (over 50% for intermediate grade Bs and Cs).

However, a strong theme in the students’ stories that we had not anticipated is that they largely tell of stories of *overcoming* problems and troubles: this is not strongly reflected in the previous literature (if at all). We might almost claim that the more severe the troubles the more life-affirming the transition is as a record of growing up, in the students’ narratives.

Anecdotally at school-university transition (there is much less rigorous research here) it appears that the social side is often more to do with leaving home, and is more of a shock for those who have not experienced ‘leaving school at 16’. On the other hand the mathematics issue at university remains for many the ‘algebra’ and what university academics refer to as ‘basics’ for those with less than high A level grades (when this is relevant e.g. in STEM programmes). The story for university transition therefore we can anticipate as being not dissimilar to these findings, and to primary-secondary transition. (NB the limitation in our study re immigrant transitions, which adds to the university experience for many undergraduates coming from overseas.)

### **Discussion**

Revisiting the CHAT perspective on transition, it seems right to think of transition as a question of identity. The learner who transits from institution A to institution B in this case is moving onwards, growing up, where B makes demands for adult



behaviour that A did not. This growing up is in the first place social- everyone is older, the teachers talk differently, you are expected to be more autonomous, etc.

But it is also academic, the courses are more demanding in marked ways, that may in turn demand more grown up behaviour, and learners don't 'mess about in lessons' any more (so much).

The boundary crosser (learner) here sees the transition as growing up, and so as *consequential*, and therefore accepts the intellectual step changes as similarly changing, to grown-up maths. When the learner reflects on themselves and their experiences, they therefore want to tell of their troubles as troubles overcome in their rite of passage, as an affirmation of who they are now (i.e. as more adult).

The notion here then is of the boundary crosser as a person or identity-in-practice who is an object of reflection in narration: i.e. the person I was and the person I have become, (the person I am now). In this view transition as trouble is life affirming, an opportunity to become someone new.

It is apparently ironic that – for mathematics – the troubles seem largely to arise exactly from mathematics being 'all new' or at any rate too new (for some). This subjective experience of new-ness, though, we argue, is offering learners an identity-change, a new learner identity – an opportunity. The fact that it is offered at a time when 'everything is new' is likewise an opportunity as well as a risk.

On the other hand, students may say they managed it in the end because of support they were given, because they worked and persisted with resits etc, or because there were some things that stayed the same. In each case the 'new' is facilitated by connections.

It seems then the learner perspective on transition is somewhat different from expected – the transition is an opportunity, and given the right connected support students relish it. We hope to revisit the literature on other transitions to see if we can excavate similar findings and data supporting this general notion there.

**Appendix:** quote from Ryan & Williams (unpub paper)

#### “TRANSITION BETWEEN KEY STAGES

The problems associated with transition from primary to secondary school have been detailed in the extensive ORACLE studies - Observational Research and Classroom Learning Evaluation Research - (see for example, Delamont & Galton, 1986; Galton, 1995; Galton & Willcocks, 1983; Galton et al, 1999) and included both pastoral and curriculum concerns. Strategies developed by 73 LEAs for effecting improved transition are discussed in Mann, 1997. It appears that the pastoral and information gathering aspects detailed in such studies have mainly been addressed, but the curriculum issues of continuity of learning and progression have not (Schagen & Kerr, 1999).

Mann (1997) reported that many LEAs suggested that one of the main priorities for the future would be the

monitoring of pupil progress, particularly at Year 7, in order to ensure that individual pupils do receive their entitlement to a curriculum where there is continuity and progression between Key Stage 2 and Key Stage 3. (Mann, 1997, p. 21)

*Curriculum continuity and individual progression*

With the establishment of a National Curriculum in England and Wales in 1989 it was expected that the abiding curriculum continuity problems associated with children's transfer from primary to secondary school would be addressed more effectively than ever before. One of the five explicit aims of the National Curriculum was that it would provide "continuity and progression from one year to the next, and from one school to another" (National Curriculum Council (NCC), 1992, p. 4).

In 'looking ahead', the NCC also posed the question "How may continuity and progression between ... primary and secondary best be achieved, *given the different approaches to teaching?*" (National Curriculum Council, 1992, p. 65) (italics added)

A recent research project by NFER (Schagen & Kerr, 1999) focussed on the impact of the National Curriculum on *curriculum continuity and individual progression in learning* in relation to transfer from primary to secondary school at the age of 11. They surveyed a representative sample of 104 secondary schools across eleven LEAs and chose 10 schools for closer case-study scrutiny during the year 1996/7. For each of the case-study secondary schools, one or two of their primary feeder schools were also visited.

To explore what use was made of key stage 2 assessments in secondary schools was one of this study's particular aims. They found that secondary schools had been relatively successful in dealing with *obtaining information* about pupils in transfer, and in quickly settling them in to the new school, but there were few accounts of curriculum-focused liaison or use of key stage 2 assessments.

Primary teachers in this study were generally positive about the planning benefits of the National Curriculum but referred to the dominant effect of national testing in year 6 that may encourage 'teaching to the test' practice (Schagen & Kerr, 1999, p.32). Secondary teachers however reported little real impact of the National Curriculum on planning for year 7 (Schagen & Kerr, 1999, p.37). A discontinuity in using the national curriculum seems apparent.

Primary and secondary teachers had stereotypical views of each other's teaching styles and the learning styles they promoted. The researchers reported that few had any up-to-date knowledge of the other's practice. It appears that continuity of teaching and learning styles experienced by children in transition is very difficult to address given the competing demands on teachers in both settings and the limited funds available for liaison. The discontinuity associated with the "different approaches to teaching" (National Curriculum Council, 1992, p. 65), referred to earlier by the NCC, appears to remain in place.

The *curriculum material covered* by year 6 pupils however appears to be known by the year 7 teachers and so knowledge of ‘content covered’ to date is seen as a specific benefit of the common National Curriculum. It appears however that transfer data on individual pupils continues to be idiosyncratically used (or not used) by secondary schools. When transfer information *was* used by secondary schools, it was found to be mainly useful to identify pupils of particularly low or high ability. “(F)or the majority of children who fell between these two extremes it appeared to have little impact” (Schagen & Kerr, 1999, p.56).

The Dearing review of the National Curriculum spoke of concern of “a loss of momentum in pupils’ progress between the end of Key Stage 2 and the beginning of Key Stage 3” (SCAA, 1996). It does appear that the secondary school system is still doing little more than *collecting information* about incoming year 7 pupils from their primary school (Schagen & Kerr, 1999, p. 57).

National key stage 2 assessments were reported as being rarely used by the secondary schools in this study. This was attributed mostly to beliefs of unreliability (eg. that levels vary from year to year; that teacher assessments are not standardised and tend to be overestimates; and that ‘cheating’ or non-legitimate help is given during the testing) but also on very practical grounds – the late arrival of test results. Another ground for non-use or scepticism of validity was that there was “no link between the key stage 2 levels and those at key stage 3” (Schagen & Kerr, 1999, p. 57). It is this link that we address in our work.

It appears that the introduction of key stage 2 tests has not fulfilled the anticipation that they would make other transfer testing unnecessary. Other standardised tests, including reading ability tests and cognitive ability tests (CATs), were seen by secondary schools as more accurate and reliable for immediate assessment and also for establishing a baseline for later value-added measures. 82% of the NFER sample used such alternative tests (Schagen & Kerr, 1999, p.71). “Far from being rendered obsolete by National Curriculum assessment, it seems that entry testing has increased in recent years” (Schagen & Kerr, 1999, p. 62).

Such re-testing could be seen to be undermining goodwill and the development of professional links between primary and secondary staff. The objections that a simple reported *level* of achievement does not provide enough detail can be met by a consideration of the *score* which gives a finer-grained indication of development (Schagen & Kerr, 1999, p. 64). The objection related to secondary schools’ perceptions that the key stage 2 results are unreliable is seen to be more difficult to overcome. However, the NFER authors suggest that *perceptions* could change if there was a willingness by secondary schools “to suspend their doubts and try using the data” (Schagen & Kerr, 1999, p. 64).

Current political interest in the perceived under-performance of year 7 children in mathematics (and English) seeks to highlight the “high level cognitive level (achieved) at the end of primary school” (Education Guardian, 2000, p.2) which is then dissipated in the secondary school where “teachers are wedded to a ‘fresh start’ approach” (ibid, p.3). *Building on* the knowledge and skills which primary pupils bring with them from their primary school has become a political imperative as well as a curriculum imperative.

The other major feature of our project was to produce diagnostic analysis of children's errors on the test items. Common errors were collected in our pre-testing and we are currently developing mechanisms for feedback to teachers on how errors can be used productively in classrooms. If such errors were coded to the children's test booklets we would have another

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