

## CONTENTS PAGE

	Page no.
Members of the evaluation team	i
Acknowledgements	i
Executive summary	ii
1. Introduction	1
Background and aims	1
Evaluation aims	2
Design of the evaluation	3
2. Impact of the project on pupils	7
3. Impact of the project on Newly Qualified Teachers (probationers)	14
4. Impact of the project on Feuerstein Instrumental Enrichment (FIE) trained teachers and on schools: Teacher and SMT perceptions	19
5. Conclusions and discussion	26
Introduction	26
Wider implications of findings relating to evaluation aims 1, 2 and 3	28
Comparison of findings with those in other evaluations	30
Conclusion	
References	32
Appendices (in separate document)	
Appendix 1 Evaluation instruments	
Appendix 2 Questionnaire and task performance evidence from pupils	
Appendix 3 Questionnaire evidence from Newly Qualified Teachers (probationers)	
Appendix 4 Questionnaire evidence from Feuerstein trained teachers	

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## **Acknowledgements**

The evaluation team would like to thank everyone who invested their time in making valued contributions to the evaluation. Members of Senior Management Teams in schools, teachers (including probationers) and pupils from nursery to S4 were enthusiastic and informative contributors. We particularly appreciated their openness in responding in questionnaires and in-depth interviews.

Anne-Theresa Lawrie, Scottish Borders Development Officer, orchestrated communications with schools with commendable efficiency and provided valuable insights. We are grateful to Anne-Theresa for everything she did so willingly to enable the evaluation to proceed effectively, to Colin Easton, Integration Manager, for chairing initial consultations and to Fiona Hume, Principal Teacher (SEBN) at the Wilton Centre for her insights.

## Executive summary

In the light of decades of worldwide research that implies that the Feuerstein Instrumental Enrichment (FIE) programme has potential to enhance learning and attainment (Romney and Samuels, 2001) a pilot programme was launched in Scottish Borders Council schools in September 2005. Since the programme includes activities to help pupils to control impulsive behaviour, most pupils selected for the programme had a history of underachieving due to social, emotional or behavioural problems. The FIE programme is described in Section 1.

There are two strands to the pilot project: one is equipping teachers to deliver the FIE programme to the most vulnerable pupils, the other is the adoption of the Feuerstein approach to mediating learning across schools. While the first strand is very resource intensive, the second strand can operate with more modest investment. In 2005-2006, 32 primary and secondary teachers, including members of school Senior Management Teams, volunteered for the Feuerstein accredited training and began to deliver the FIE programme with the selected pupils for around 80 minutes per week.

Scottish Borders Newly Qualified Teachers (probationers) also participated for three days in the area of the Feuerstein training that deals specifically with mediated learning. Since there is extensive research evidence that the quality of the teacher's mediation is a major influence on learning, early career training in mediation was thought likely to yield long-term dividends.

This evaluation is one of many of FIE programmes. The Scottish Borders programme is a pilot project that had been operational for around six months (excluding school holiday weeks) when the evaluation began. Typically, published evaluations are of FIE programmes that have been running for at least two years and often these programmes provided more lessons than in the Borders pilot project.

## Project and evaluation aims

The broad aims of the pilot project relate to the following areas:

- training and support of teachers, including all Newly Qualified Teachers (probationers)
- establishing baseline data to enable longer term impact on pupils to be assessed
- impacting on pupils in ways likely to lead to attainment gains
- involving parents in using the Feuerstein approach at home
- extending the approach through partner agencies such as social work and health visiting
- ensuring the approach would be active in the project schools.

The above project aims were translated into evaluation aims in the tender submitted to SEED. These evaluation aims, with minor amendments agreed at a Steering Group meeting, are as follows:

*Aim 1* Assess the overall impact of the training on the teachers involved, particularly in relation to changes in:

- the confidence of staff in their ability to deal with pupil behaviour
- attitudes (defined as beliefs and values) towards learning and learners
- ability to design and implement effective learning environments.

*Aim 2* Identify any emerging impact on pupils whose teachers have been involved in the training, particularly in relation to any improvements in:

- confidence and self-esteem of pupils participating in the project
- progress with cognitive functioning
- changes in pupil perceptions of themselves as learners.

*Aim 3* Assess the impact of the project on probationer teachers.

*Aim 4* Make recommendations for the further improvement and development of the project (including suggestions about how gains might be sustained).

## Evaluation phases

The evaluation comprised three phases, beginning in May and ending in December 2006:

- Phase 1 looked at what has been happening
- Phase 2 involved data gathering and analyses
- Phase 3 focused on integration and comparison of findings with those in other evaluations.

The research method is described in Section 1 and details of the evaluation instruments and data analyses appear in Appendices 1-4.

### *Phase 1*

During this phase the evaluation team built up a picture of what was happening in the project through discussion with the Development Officer and other key informants (such as members of Senior Management Teams in schools and of the Scottish Borders Feuerstein Steering Group). Important documentary sources included the full set of Feuerstein 'instruments' (pupil activities) used in the project, the Continuing Professional Development materials prepared by the Scottish Borders Feuerstein Steering Group and the Project Monitor's reports. The picture of the project was enriched through the observation of an FIE lesson. Revisions were agreed to the data gathering plans in the tender: in particular, the evaluation team agreed to analyse additional data described below that had been gathered by the Development Officer.

### *Phase 2*

The qualitative and quantitative data specified in the tender were analysed by the evaluation team to judge the impact of the pilot project on pupils and teachers. Thus, **interview** data were analysed from P5-S3 FIE pupils, from FIE trained teachers, probationers and members of Senior Management Teams in schools. **Questionnaire** and FIE related task data from FIE and control group pupils were analysed. FIE related task data from a small sample of nursery-P4 pupils were also analysed. In addition to the data specified in the tender, the following evidence was analysed:

- Project Monitor interview and reports
- Responses to FIE trained teacher questionnaires administered by the Development Officer
- Three sets of data gathered by the Development Officer which included pupils' perceptions of themselves as learners, perceptions of their own task completion competences and teachers' perceptions of pupils' progress with Feuerstein related cognitive functions.

### Phase 3

The findings from all sets of data were integrated, compared with each other and with findings from other evaluations.

## Key findings

### Aim 1: Impact of the training on the teachers involved

The **FIE trained teachers** evidenced a significant shift in attitudes towards learning and learners and reported that they were acting in accordance with their changed understandings. These shifts relate to a belief in and an ability to engage in a more open and powerful type of dialogue that is likely to develop young people's ability to learn for themselves. These teachers support the continuance of the programme and the implementation of a mediated learning approach throughout the schools. They believe that the Feuerstein version of mediated learning is likely to enhance the aims of other initiatives (e.g. *A Curriculum for Excellence; Assessment is for Learning*) and contribute to National Priorities. They also believe that the Feuerstein approach offers a coherent framework for accommodating ideas presented in other CPD programmes and, in particular, provides tools for enhancing the abilities of all pupils. The FIE trained teachers were more enthusiastic about the training than the Newly Qualified Teachers, possibly because they were able to locate the ideas in their richer classroom experience.

Overall, the findings from the various sources of data indicate that the **FIE trained teachers** were generally very positive about the impact of their training on professional practice. The effectiveness of the programme was reflected in positive outcomes including raised awareness and reflective practice, particularly in relation to cognitive functions and tackling deficiencies. The FIE instruments (learner activities) were typically found to be useful and effective in facilitating relationship building and enhancing focus on teaching objectives. Basic FIE trained teachers (those teaching Nursery-P4) wanted a more detailed understanding of cognitive functions, guidance on assessing targeted pupils and a more comprehensive review of the FIE instruments (i.e. learner activities). These points have now been addressed.

### Aim 2: Impact on pupils

One of the most significant findings is that teachers reported progress over six months for over three-quarters of the sample of 67 pupils that they rated on 6 aspects of cognitive functioning targeted by the FIE programme, all of which are connected with school attainment. It is impressive that teachers reported that 98 per cent improved on one particular and important aspect: 'correction of deficient cognitive functions'.

The younger FIE pupils (nursery-P4) had higher scores than their control group on a FIE related task. The older FIE group pupils (P5-S3) achieved higher scores on FIE related tasks than the control group pupils and the differences were statistically significant. It appears that the FIE pupils, with a history of social, emotional or behavioural needs, not only retained what they learned, but also generalised their learning to a new task. Work is ongoing to ensure optimal 'bridging' from the Feuerstein activities to mainstream classroom work. Many pupils talked about improving their behaviour "a wee bit".

Secondary but not P5-P7 pupils reported that they were better learners after six months in the FIE programme and reported improvements in their task completion ability over the same period. The youngest (Nursery-P4) seemed to understand better what was involved in task completion.

The responses by the Feuerstein pupils to questionnaire items about motivation towards learning were more positive than those of the control pupils. Although this motivation was towards FIE lessons rather than school lessons in general, this finding indicates that the FIE pupils can be motivated towards intellectually challenging content and opens up the possibility that they could be similarly engaged with everyday lessons.

The pupils in the Feuerstein group were also more likely to agree that they had learned to analyse problems and that they tried out different things when they were stuck than the pupils in the control group. They were also more likely to agree that they had learned to work systematically. Compared with the control group, the pupils in the FIE group were also more likely to agree that they found it easy to learn, that their work was good and that their schoolwork gave them a sense of confidence. Again, while these positive findings relate to FIE lessons, they suggest that the FIE pupils can become confident and capable learners.

### **Aim 3: Impact of the project on probationers**

**Probationers** who participated in the introductory course on mediated learning were broadly positive about the approach and intended to continue trying out the approach to mediating learning in their next post. While they have started to make changes in their teaching (e.g. more talking about ideas, more sharing of objectives with pupils), they believe that this approach to mediated learning will work better within *A Curriculum for Excellence*.

Probationers believed that they gained a great deal from the 3-day training on mediated learning but suggested changes towards more practical activities, which are now being implemented.

Both the experienced FIE trained teachers and the probationers believed that senior management support was essential to the success of the project.

**Senior Management Teams** in the project schools also mentioned links between the Feuerstein approach and existing initiatives and expressed strong support for its wider implementation.

### **Evaluation of Aims 1, 2 and 3 – wider implications of findings**

1. The main project impacts on teaching staff and on pupils suggest that the Feuerstein approach to mediating learning has potential for preparing teachers and pupils to work effectively towards realizing the main aims of *A Curriculum for Excellence* and that pupils respond well to this approach.
2. Experienced teachers can benefit from extended, in-depth initiation into the FIE programme and into the educational psychology framework in which the approach is located.
3. Probationers would benefit more from structured observation of applications by FIE trained teachers, followed by opportunities for reading and discussion, than from an input driven course.
4. The Feuerstein approach to mediated learning offers a coherent whole school approach to raising ability and attainment.

**Aim 4: Make recommendations for the further improvement and development of the project (including suggestions about how gains might be sustained).**

**Pupils**

There is enough evidence to support the teachers' and senior managers' view that the majority of young people who began the FIE programme in 2005 should remain on it. Continuance is likely to consolidate and increase the gains they have made. Current attainment, attendance and exclusion data for these pupils should be compared with similar data available when these pupils reach the end of their schooling.

The primary school pupils who participated in the FIE programme as a whole class have made significant gains which might act as a booster to future attainment, although continuation of the programme with this class is a lower priority if funding is tight. However, it is important that this class is followed up to find out if their apparent cognitive gains feed through to higher than expected attainment. Their secondary school attainment should be compared with that of a similar non-FIE pupil group in order to assess programme benefits for young people who do not have social, emotional or behavioural needs.

**FIE trained teachers and Senior Management Teams**

The teachers and senior management should build on their significant progress towards realising the Feuerstein approach to mediated learning across their schools as well as continuing to ensure that the FIE pupils reap the intended benefits from participation in the programme. In particular:

- deliberations should continue to determine criteria for the selection of pupils for the FIE programme and to agree on tools to be used to ensure accurate selection
- Senior Management Teams in schools, supported by the Development Officer, should continue the Continuing Professional Development activities that are designed to cascade the Feuerstein approach to mediated learning across whole schools. They should also continue to try to identify which areas would benefit most from the infusion of FIE activities.

**Parents**

The schools should continue their efforts to persuade more parents to attend workshops on mediated learning and to use this approach at home. Schools might consider running a series of workshops that encourage parents to report on their experience of trying to mediate their children's functioning in their homes.

**Support at the local authority level**

Senior Management Teams would benefit from support in expanding the training of school Homelink workers in mediated learning so that they can help parents and carers to mediate their children's learning effectively. Support in extending the three-day training in mediated learning to more teachers and to develop support materials would also be useful.

**Conclusion**

Feuerstein's Instrumental Enrichment programme seems to make sense to Scottish Borders teachers, and that is a particularly sound research base. The evaluation evidence suggests that the pilot project had a positive impact on pupils and staff, particularly in equipping teachers to help some of the most vulnerable young people in society. The evidence to date suggests that further financial support would enable staff and pupils to build on what has been achieved and to extend the approach to other Scottish Borders schools.

## Section 1 Introduction

This is the final report of the evaluation of the Scottish Borders Feuerstein Instrumental Enrichment Pilot Project, conducted by the Quality in Education Centre (QIE) at the University of Strathclyde. This introduction explains the background to the Project and outlines the evaluation aims and design.

### Background and aims

In the light of decades of worldwide research that implies that the Feuerstein Instrumental Enrichment (FIE) programme has potential to enhance learning and attainment, a pilot programme was launched in Scottish Borders Council schools in September 2005. According to a review of research (Romney and Samuels, 2001), FIE is associated with larger academic improvements than those resulting from remedial classes. By providing a systematic approach to remedying 'deficient cognitive functions', the FIE programme claims to equip young people with the cognitive wherewithal to cope with school curricula and to succeed in post-school education and training. A detailed technical description of these matters appears in Appendix 2. The evidence also suggests that the approach can reverse links between disadvantaged circumstances and difficulties with fundamental cognitive functions.

The FIE programme consists of paper-and-pencil exercises that have been grouped into 14 'instruments' (sets of activities) designed to enable learners to practise cognitive functions that are connected with achieving success in school, in the workplace and in everyday life. These cognitive functions underlie competences important in schooling and elsewhere, such as control of impulsivity, development of intrinsic (self) motivation, working systematically with and imposing structure on strands of information, looking for evidence, making comparisons and forming and testing hypothesis. Deliberately free of school curricula content, each of the FIE instruments provides learner activities aimed at developing cognitive functions underlying not only school tasks but also everyday or workplace tasks such as assembling flat pack furniture, diagnosing machinery faults, parking a car, map reading or co-ordinating food preparation.

There are two strands to the pilot project. One is equipping teachers to deliver the FIE programme to the most vulnerable learners, and this involves 10 days' participation in Feuerstein accredited training. The other strand is the adoption of the Feuerstein approach to mediating learning across schools. While the first strand is very resource intensive, the second strand can operate with more modest investment in training. In 2005-2006, 32 primary and secondary teachers, including members of school Senior Management Teams, volunteered for the Feuerstein accredited training. There were two forms of FIE training – Basic and Standard. Basic is designed for working with younger children and Standard equips teachers to work with older primary and secondary pupils. The teachers began to mediate the Feuerstein activities with the selected pupils as they engaged in the training.

Mediation is a specific and highly skilled type of dialogue designed to provoke development of cognitive functions and to encourage the transfer of what has been learned to other situations. Evidence from many studies suggests that the quality of the teacher's mediation constitutes the major factor determining the success of the FIE programme (Romney and Samuels, 2001). In the light of this evidence of the power of mediation, Scottish Borders probationers also participated for three days in the area of the Feuerstein training that deals specifically with mediated learning. Mediation is a key plank in the Feuerstein approach and connects

closely with practices that are likely to promote aims expressed in *A Curriculum for Excellence*. Thus, Feuerstein-style mediation is likely to enable all young people to become:

- q *successful learners*
  - q *effective contributors*
  - q *responsible citizens*
  - q *confident individuals*
- (SEED, 2004)

Since the programme includes measures to help pupils to control impulsive behaviour, pupils selected for the programme included those who seemed to underachieve due to social, emotional or behavioural needs, as evidenced by their lack of engagement with learning and low self-esteem. At least 30 per cent of the group included looked after children. Pupils practised the targeted abilities systematically, for around 80 minutes per week, with a Feuerstein trained teacher.

It is important to set the evaluation in the wider research context relating to Feuerstein programmes. The Scottish Borders programme is a pilot project that had been operational for around six months (excluding school holiday weeks) when the evaluation began. Typically, evaluations reported in the literature are of Feuerstein programmes that ran for at least two years, and often provided more lessons per week than in the Borders pilot project (Romney and Samuels, 2001).

### **Evaluation aims**

The evaluation aims set out in the tender to SEED incorporated the aims of the pilot project, which were outlined in the Invitation to Tender and were as follows:

1. Assess the overall impact of the training on the teachers involved, particularly in relation to changes in:
  - the confidence of staff in their ability to deal with difficult pupil behaviour
  - attitudes (defined as beliefs and values) towards learning and learners
  - ability to design and implement effective learning environments
2. Identify any emerging impact on pupils whose teachers have been involved in the training, particularly in relation to any improvements in:
  - attainment and attendance, with a focus on the 20 per cent of pupils currently underachieving
  - confidence and self-esteem of pupils participating in the projectand in relation to:
  - decreases in short-term and long-term exclusions
3. Assess the impact of the project on probationer teachers, particularly in relation to their approach to dealing with difficult pupil behaviour
4. Make recommendations for the further improvement and development of the project (including suggestions about how gains might be sustained).

At a meeting in May 2006 of the Feuerstein Steering Committee, the evaluation team and a member of the SEED FLAT team, it was agreed that there should be minor refinements of the aims along the following lines:

- Aims 1 and 3 merited a strong focus – i.e. aims that refer to impact on teachers
- in Aims 1 and 3, 'ability/approach to deal(ing) with difficult behaviour', the word 'difficult' should be dropped, and connections emphasized with 'attitudes towards learning and learners' and 'ability to design and implement effective learning environments'
- in Aim 2, in judging 'any emerging impact on pupils', the focus would be on:
  - teachers' ratings of changes in pupils' cognitive activities practised in the FIE programme
  - pupils' ratings of their own task completion competences
  - pupils' perceptions of themselves as learners.

It emerged that fairly extensive data had been gathered by the Development Officer on teacher and pupil perceptions of pupil progress with cognitive functions that enable effective learning. It was decided that this data would be used rather than data on formal levels of attainment, because the Feuerstein premise is that changes in cognitive functioning emerge earlier than formal attainment gains. This data on progress with cognitive abilities underlying learning was also considered likely to yield more useful information than attendance and exclusion data. As key informants pointed out, many factors other than the Feuerstein programme influence attendance and exclusion.

In relation to Aim 1 above, it was clarified that the 'teachers involved' were those who had participated in the Feuerstein accredited training and who engaged targeted pupils in Feuerstein activities. These people are referred to throughout the report as FIE trained teachers. In relation to Aim 2 above, the focus was clarified as pupils who were enrolled in the pilot Feuerstein programme.

## **Design of the evaluation**

The evaluation comprised three phases, beginning in May and ending in December 2006. The evaluation instruments appear in Appendix 1. A feature of the design is not only triangulation of the evaluation team data but also comparison with data provided by the Development Officer.

### ***Phase 1 (May 2006)***

This phase looked at what had been happening in the project schools. From the following activities a picture of what was happening in the project was built up:

- four face-to-face meetings and phone calls, and weekly electronic communication with Anne-Theresa Lawrie, the Development Officer
- electronic communication with other key informants (e.g. Depute Head Teachers)
- observation of one Feuerstein lesson with P4-P7 pupils
- analysis of documentary sources, including the full set of Feuerstein 'instruments' (pupil activities) used in the project
- meeting with the Feuerstein Steering Committee members (plus a member of the SEED FLAT team)
- documents showing that a total of 117 pupils (34 in Nursery-P4, 34 in P5-P7 and 49 in S1-S4) were enrolled in the FIE programme in 2006-2007. The Nursery-P4 pupils followed the Basic FIE programme and the older pupils followed the Standard FIE

programme. (The secondary numbers included 3 S4 pupils but they were not present during administration of questionnaires and tasks)

In the light of the picture constructed the original data gathering plan was refined as follows:

**In addition to the data gathering specified in the tender**, the evaluation team agreed to undertake analyses of the following data gathered by the Development Officer. This additional data related to impact of the project on pupils and teachers:

- pupils' perceptions of themselves as learners at the beginning of the Feuerstein programme and six months into the programme (using a standardised instrument developed by the National Foundation for Educational Research, *Myself as Learner*, Burden, 2000); (usable sample = **21** per cent of P5-P7 pupils and **47** per cent of secondary FIE pupils)
- pupils' ratings of their own task completion competences (usable sample = **52** per cent of nursery-P4, **30** per cent of P5-P7 and **91** per cent of S1-S3 pupils)
- teachers' ratings of changes in pupils' cognitive activities practised in the FIE programme (**91** per cent of nursery-P4, **32** per cent of P5-P7 and **51** per cent of S1-S3 pupils)
- Feuerstein-participating teachers' reports (quantitative and qualitative data) of the impact of the Feuerstein training on their practice outside Feuerstein lessons (a total of **28** teachers).

It was also agreed that the evaluation team would interview the Project Monitor, who had visited all the project schools – this interview is **in addition to** the qualitative data specified in the tender.

It was established during this phase that school staff involvement was much more advanced than the involvement of representatives from partner agencies. Therefore, it was agreed that an in-depth interview with the Project Monitor should replace interviews with partner agency staff.

### ***Phase 2 (June – October 2006) – data gathering and analysis***

The data gathered and analysed during the second phase enabled a description to be built of the project's impact on Feuerstein-participating staff and pupils.

Since there were no formal pre-project measures connected with the project aims, as outlined in the tender submitted to SEED, the design included:

- the use of a pupil control group
- questions to Feuerstein-participating teachers to establish what (if any) changes had occurred in their understanding or practice
- questions to the older Feuerstein-participating pupils to establish what (if any) changes in perceptions of learning had occurred.

As noted above, **in addition** to the above measures outlined in the tender, the evaluation team also made use of data gathered by the Development Officer that reported teachers' perceptions of changes in pupils' cognitive functioning, pupils' ratings of themselves as learners and of their task completion competence at early and later stages of the project.

**Qualitative data (sample sizes as stated in the tender)**

Using a semi-structured schedule, interview data were gathered from the following groups and analysed:

- seven teachers who had gone through the full Feuerstein training programme
- ten probationer teachers who had gone through a three-day training programme on the Feuerstein concept of mediated learning
- two secondary Head Teachers
- two primary Head Teachers
- pupil focus groups in six schools
  - secondary schools
  - primary schools
  - the SEBD unit

As explained above, an additional interview with the Project Monitor was conducted and analysed, as were his reports.

*Focus group interviews with pupils*

The in-depth group interview data included responses to questions about behaviour, motivation and the most and least helpful aspects of the Project activities.

*Interviews with Head Teachers/teachers*

The semi-structured interviews encouraged in-depth responses to questions about conditions that support the Project, practice pre- and post-Project and the contribution of the Project to promoting National Priorities and the aims of *A Curriculum for Excellence*.

The interview data provide a valuable insight into how interventions actually work in practice and complement the questionnaire data by adding depth and uncovering underlying processes.

**Quantitative data (staff and pupil questionnaires and pupil tasks)**

During Phase 1, Feuerstein Project participant samples for the quantitative measures were agreed with Scottish Borders personnel and SEED. As explained above, Scottish Borders personnel provided three sets of data on pupil learning additional to those specified in the tender, for analyses by the evaluation team. These data were gathered early in the intervention and approximately six months later (i.e. approximately pre- and post-intervention data). The usable sample sizes are noted above. Table 1 shows the pupil quantitative measures that were analysed by the evaluation team and whether these measures were originated by Scottish Borders or by the evaluation team.

**Table 1 FIE Pupil Quantitative Measures: samples on each measure as a percentage of total FIE pupils in each age level**

Measure	Nursery to P4	P5-P7	S1-S3
Pupils perceptions of themselves As learners ('Myself as Learner')*	0	21	47
Pupils' ratings of own task competency*	52	30	91
Teachers' ratings of change in pupils' cognitive Abilities*	91	32	51
Questionnaires (originated by evaluation team)	27	73	43
FIE related tasks (originated by evaluation team)	27	73	35

\*Data supplied by Scottish Borders Development Officer

The evaluation team gathered a 43 per cent sample of secondary pupil questionnaire data. This sample was considered adequate because Scottish Borders provided the team with three sets of data, which extended the sample in relation to the most central evaluation issue - changes in pupils' capabilities. The Scottish Borders' data included a 91 per cent sample of pupils' responses to a scale measuring their perceptions of one set of changes, a 47 per cent sample of their responses to a longer scale measuring a second set, and teachers' responses to searching questions about ability changes (concerning 51 per cent of pupils). A 27 per cent sample of nursery to Primary 4 pupils was considered adequate since teacher evaluation data was available for 91 per cent of these children, and 52 per cent of them had rated themselves on task completion. The evaluation team wanted to minimize any unsettling influence on the children of further data gathering by strangers.

Thus, the evaluation team analysed data from the FIE pupil samples described above and from a pupil control group. Both FIE and control group pupils also completed two Feuerstein related tasks. In addition to analysing the teacher data provided by Scottish Borders, questionnaires to the following groups were administered and analysed:

- the 32 teachers who had gone through the full training programme
- the 42 probationer teachers who had received three days' training.

#### The FIE related tasks

The younger FIE programme and control group pupils (nursery-P4) completed an FIE related task which required them to generate ideas about how a soft toy might be made more fun for other children. This task was intended to sample some of the FIE cognitive functions, such as controlling impulsivity and overcoming passivity, and was adapted from a standardised test (Torrance Test of Creative Thinking).

The older FIE pupils (P5-S4) and control group pupils completed two FIE related tasks. Like the task for the younger children, these tasks were intended to sample the cognitive functions targeted in the FIE programme. One task (organisation of a cloud of dots) was drawn from FIE materials, and did not involve transfer of learning, whereas the other task, adapted from the Torrance Test of Creative Thinking, required considerable transfer of cognitive operations such as imposing structure on and generating sensible hypothesis about what is happening from ambiguous data in a picture. The FIE task was included to test the idea that pupils who underachieve due to social, emotional or behavioural needs are capable of retaining what they learn, while the other task was chosen to test how well the FIE pupils could generalise their learning.

#### ***Phase 3 (November – December 2006)***

A snapshot of the data at 30 September was submitted to SEED and to the Development Officer. The evaluation team continued to integrate and interpret data analysed during the other phases, compared the findings with other FIE programme evaluations and constructed the final report.

## Section 2 Impact of the project on pupils

### Introduction

The main focus of this section is the evidence relating to the second evaluation aim. As outlined in Section 1, a minor amendment was agreed at the Steering Group meeting in May 2006 to the wording of this aim as it appeared in the tender submitted to SEED. The revised aim was to:

Identify any emerging impact on pupils whose teachers have been involved in the training, particularly in relation to any improvements in:

- confidence and self-esteem of pupils participating in the project
- progress with cognitive functioning
- changes in pupil perceptions of themselves as learners.

The pupil data is presented in full in Appendix 2, with details of sample sizes.

A total of 117 pupils (34 in nursery-P4, 34 in P5-P7 and 49 in S1-S4) were enrolled in the FIE programme in 2006-2007 (S4 pupils were absent during evaluation activities). The nursery-P4 pupils followed the Basic FIE programme and the older pupils followed the Standard FIE programme.

The presence of any impact was investigated through the use of the following quantitative sources of evidence (sample sizes as stated in Table 1 on p5):

- FIE pupils' perceptions of themselves as learners ('Myself as Learner')\*
- FIE pupils' ratings of own task competency\*
- teachers' ratings of change in FIE pupils' cognitive abilities\*
- questionnaires (originated by evaluation team)
- FIE related tasks (originated by evaluation team)

\*Data supplied by Scottish Borders Development Officer

FIE pupils' views, expressed in questionnaires designed by the evaluation team and compared with views of a control group, were about the following:

- perceptions of confidence and self-esteem
- perceptions of thinking skills
- perceptions of enthusiasm and motivation for learning.

FIE pupils' scores on thinking tasks were also compared with those of a control group.

The control group and the FIE group were matched on the following variables: level of attainment, living with parents/'looked after', social, emotional or behavioural difficulties.

In addition to the above measures, the evaluation team gathered and analysed FIE pupils' views expressed in focus groups and analysed FIE trained teachers' views about the project's impact on pupils in a questionnaire devised and administered by the Development Officer.

## **Pupils' perceptions of themselves as learners and pupils' ratings of their own task completion competences**

The Development Officer provided data from two types of pupil self-evaluation questionnaires for analysis by the evaluation team. One questionnaire asked pupils to rate their own task completion competencies and the other asked about their perceptions of themselves as learners. (This second type of questionnaire was administered only to the older primary and to the secondary pupils.) These questionnaires were completed before the commencement of the Feuerstein programme around October/November 2005 and approximately 6 months later between March and May 2006. It is important to remember that the responses reported here are children's self-perceptions. The method used for this part of the evaluation is therefore a comparison of pre- and post programme scores rather than a comparison with control group data (which was not available).

For the younger children (nursery and early primary) in the Basic programme, their perceptions of their task completion competence was assessed by recording children's oral responses to a set of statements such as:

*When given a task do you...*

- *listen to instructions carefully?*
- *settle down to work/play when you come into class/nursery?*
- *look after your pencils/books?*

The older primary and the secondary pupils on the Standard programme completed a longer questionnaire about their task completion competence, responding to questions such as:

*When given a task do you...*

- *plan your work on your own?*
- *read the instructions carefully?*
- *make use of sources of information and reference materials without being told by the teacher?*
- *check your work?*
- *look after books and equipment in a proper manner?*

For these pupils, the Development Officer also provided data about how they see themselves as learners and problem-solvers (the pupils' responses to the Myself As a Learner Scale, Burden, 2000). When completing the 'Myself As a Learner' or 'how I see myself' questionnaire the young people responded to 20 statements, such as:

- *I'm good at doing tests*
- *I like having problems to solve*
- *When I get stuck with my work I can usually work out what to do next*
- *I know the meaning of lots of words*
- *Learning is easy.*

As can be seen from the change in the scores from pre- to post test for both types of questionnaire in the tables in Appendix 2, the older primary and the secondary pupils reported improvements in their *task completion* competence over six months (approximately) on the programme but the younger pupils perceived their task competence more negatively than at the beginning of the programme. A reasonable interpretation of the younger children's scores is that they became more aware of shortcomings in their task completion behaviour as a result of the FIE programme and might be expected to work on remedying these shortcomings.

The secondary pupils (but not the older primary) had higher scores on the *Myself As a Learner scale* over six months (approximately) on the programme. It is possible that the older primary children, like their younger peers, became more aware of what was entailed in being a good learner and perceived that they had not yet achieved effective learning behaviours.

### **Teachers' ratings of changes in pupils' cognitive activities practised in the FIE programme (67 usable ratings)**

Teachers completed evaluation grids for 67 pupils involved in the programme (approximately two-thirds of all participants) by responding to questions related to the development of cognitive functions addressed in the FIE programme over a six-month period. Although six months is a short period over which to observe progress with fundamental cognitive functioning, progress was recorded across the 6 aspects of cognitive functioning targeted by the FIE programme for over three quarters of the pupils who were evaluated. Improvements included gains in important contributors to school success such as intrinsic (self) motivation, reflective thinking and insight. Teachers also responded to a question about attendance but no clear cut impact emerged.

### **Feuerstein pupils' views expressed in questionnaires compared with views of a control group** (These data are presented in full in Appendix 2)

FIE pupils and pupils in a control group were invited to express their views. The analyses of the pupils' responses are presented in Appendix 2 in terms of three key themes:

- pupils' perceptions of enthusiasm and motivation for learning
- perceptions of thinking skills
- perceptions of confidence and self-esteem.

Since the control group could not be asked questions about FIE lessons, the matching questions for non-FIE pupils were about everyday lessons. The point of the comparison was to establish if FIE pupils, who were recruited because they were underachievers due to social, emotional or behavioural difficulties could be motivated towards and benefit from intellectually challenging lessons, albeit in very small FIE groups and through content that is not subject-specific. The findings below are for the FIE sample as a whole but, as shown in Appendix 2, only minor differences between primary and secondary pupils arise when the sample is broken down.

#### ***Perceptions of enthusiasm and motivation for learning***

The responses by the Feuerstein pupils to all questions in this area were more positive than those of the control pupils, with differences more marked in the primary than in the secondary pupil sample. The most notable differences between the FIE and the control group pupils were as follows:

- the desire of the FIE pupils to work longer on tasks
- the number of FIE pupils who reported looking forward to lessons
- the FIE pupils' desire for more FIE lessons
- the pupils in the FIE group perceived that their class were better behaved.

These findings indicate that the FIE pupils can be motivated towards intellectually challenging content, albeit under rather special conditions.

### ***Perceptions of thinking skills***

The pupils in the Feuerstein group were more likely to agree that they had learned to analyse problems and that they tried out different things when they were stuck than the pupils in the control group. They were also more likely to agree that they had learned to work systematically. In fact, only 4% of the Feuerstein pupils disagreed with that statement compared with 24% of the control group. In terms of the pupils' perceptions of their thinking skills, the pilot intervention appears to have had the expected benefits.

### ***Perceptions of confidence and self esteem***

Compared with the control group, the pupils in the FIE group were more likely to agree that they find it easy to learn, that their work is good and that their schoolwork gives them a sense of confidence. Thus, there appear to have been some benefits of the intervention on the pupils' perceptions of confidence and self esteem.

The young people's responses during interviews, summarised below and reported more fully in Appendix 2, provide some expansion of the views they expressed in the questionnaires.

### **Feuerstein pupils' views expressed in group interviews**

Focus group interviews were conducted at six schools in order to investigate pupils' perceptions of the Feuerstein teaching method. In particular, the informal setting of the focus groups, with only a research assistant present, allowed the pupils to speak freely about their likes and dislikes, and about what they believed they had learned. Although pupils with challenging behaviour were included in the groups, most young people were willing to participate fully. In general, the pupils were fairly positive about their experience, an impression that is confirmed by the questionnaire data.

### ***Pupils' satisfaction with FIE teaching***

The pupils were asked if they were glad that they had been given the opportunity to attend Feuerstein lessons. Some were resigned to attending FIE lessons, believing that they were being used as an alternative to punishment. And, inevitably, one or two pupils were less than complimentary. However, in general, most pupils displayed a positive attitude:

*Yes, they are good. I enjoy them.  
I liked all the bits of Feuerstein.*

They were asked whether they found the Feuerstein lessons more enjoyable than their standard lessons, or less enjoyable. Some pupils raised the issue of having to miss other lessons in order to attend FIE:

*I miss Computers to go to Feuerstein, but I'd rather have a bit of both.*

Again, although one or two thought the lessons were "just the same", most pupils seemed more enthusiastic about the FIE lessons, and spoke in positive tones. But their motives were often mixed:

*Sometimes it was better.  
It's better than going to German.*

### ***Pupils' perceptions of what they learned in the FIE lessons***

The pupils were asked what they learned in the Feuerstein lessons. Many simply listed the lesson content, while others realised that there were underlying concepts to be learned. Pupils in the latter group emphasized a methodical approach to their work:

*It helps you not to be impulsive. Think before you work.  
How to think about stuff before you actually write it.  
Be patient, and all that. Don't rush.*

Several pupils mentioned the key Feuerstein concepts of system and strategy, either directly or by implication:

*Lots of ideas how to handle different things.*

Besides mentioning educational concepts, many pupils talked about improving their behaviour:

*How to behave.  
Control your temper.  
No shouting out.  
Getting along with the teachers.*

### ***Pupils' perceptions of the transference of FIE concepts***

The pupils were asked if, when they returned to their usual classes, they found that they could use the things they had learned in the Feuerstein lessons. Many pupils were confused by this, and apparently assumed that FIE was a discrete subject that had no impact on other lessons. Others were able to identify the use of strategy as a key transferable skill:

*It can help you in other classes, changing strategies: stop and think before you do it.  
It helped me concentrate in other lessons, and work systematically.  
If you're doing work, do it in order. Sometimes, if there's ten questions and I do the easy ones first, and jump from 1 to 4 and 6, I get told not to do that.  
I passed my maths test because I was practising my strategies.*

When prompted, some realised that they had been using Feuerstein concepts, not only in other classes, but outside school as well. These chiefly centred on behavioural issues:

*It helped in school, but more outside school. Keeps you out of trouble. If someone's shouting at you, it makes you think instead of just jumping to conclusions. You count to five.  
It helps me remember my jotter. It helps you to not get into trouble.  
Also, other stuff, like doing your homework.  
Helps me calm down and settle down.*

A supplementary question asked whether there was anything different about the pupils' behaviour in school since they had started the Feuerstein lessons. There was a mixed response, with many claiming (perhaps out of bravado) that there was no difference:

*If it's nice outside and I've been outside, and I dinna want to come in, so I hit people.*

Others took a more mature attitude:

*Depends who you are with. If you're with your friends, you'll be bad.  
I've been a bit better in other classes. It has a lot to do with the teacher.  
Some teachers are interested in you.  
A wee bit. Some teachers would say yes, I'm better behaved.*

### **Feuerstein pupils' performance on thinking tasks compared with the performance of a control group** (The relevant data are presented in full in Appendix 2)

The younger FIE programme pupils (nursery-P4) and 10 control group pupils completed an FIE related task which required them to generate ideas about how a soft toy might be made more fun for other children. This task was intended to sample some of the FIE cognitive functions, such as controlling impulsivity and overcoming passivity, and was adapted from a standardised test (Torrance Test of Creative Thinking). Forty-six older FIE pupils (P5-S3) and 45 control group pupils completed two FIE related tasks. Like the task for the younger children, these tasks were intended to sample the cognitive functions targeted in the FIE programme. One task was adapted from FIE materials, and therefore involved little transfer of learning, whereas the other task required considerable generalisation of learning.

The FIE group pupils achieved higher scores on all these tasks than the control group pupils. The differences in scores between the older FIE pupils on the two tasks and the control group pupils were statistically significant. The effect is more marked in the primary than in the secondary school sample. It appears that the FIE pupils, with their history of social, emotional or behavioural needs, are capable not only of retaining what they learn but also of generalising their learning to a new task. Although the younger FIE pupils had higher scores than their control group, the differences between the two groups were not statistically significant.

### **Feuerstein trained teachers' views expressed in questionnaires of the impact on pupils**

There were two questionnaires, one that was devised by the Development Officer and analysed by the evaluation team and one devised and analysed by the team. Very similar findings emerged from these two questionnaires. Appendix 4 presents details of the analysis of questionnaires from Feuerstein trained teachers. These data include teachers' views about the project's impact on pupils.

Almost all teachers reported either 'considerable' or 'some' evidence for high engagement and persistence with FIE tasks (items a and b), and this level of evidence was reported by between 62 and 90 per cent of teachers for all the other items describing impact on pupils, with the exception of 'almost all pupils tried different ways of thinking about problems'. However, many teachers noted that it was too early to comment. Some teachers also highlighted the difficulties the pupils faced in transferring the Feuerstein strategies to other situations. One teacher raised the point that it is difficult to separate out the effects of other intensive support that the children receive and another teacher indicated that outside influences, such as family problems, may block progress with behaviour.

The majority of teachers reported that pupils had developed a more precise vocabulary, although some commented that the use of the language does not guarantee corresponding behaviour:

*The pupils are using basic Feuerstein language – impulsivity, systematic, strategy, cue, hypothesise – they are also more aware of the need for more precise labelling.*

All the FIE trained teachers reported that pupils had developed learning strategies that they were able to verbalise. Teachers were generally very enthusiastic about bridging (encouraging children to apply learning strategies to real life situations) and numerous examples that had come from pupils were given. For example:

*One boy told me that during a football match in the playground he was tackled badly and instead of reacting by kicking that boy back, he walked away and let the referee give the free kick. Kids always want to bridge to football, we're trying to expand.*

Whilst responses clearly indicated that pupils were able to bridge learning strategies to real life situations and that they 'got to grips with it' fairly quickly, some teachers commented that bridging was especially difficult for young children.

In summary, teachers reported positive outcomes among pupils with regard to use of language, bridging and cognitive functions, especially in relation to concentration and impulsivity. Nevertheless, at the time of questionnaire completion, evidence for the transferability of skills to real life situations was still weak. This, however, may have been due to the timing of the evaluation, which was viewed by many to be "too early to tell."

## Section 3 Evidence from Newly Qualified Teachers (probationers)

### Introduction

The main focus of this section is the evidence relating to the following evaluation aim:

Aim 3: Assess the impact of the project on probationer teachers.

This was investigated through questionnaires returned by 25 of the 40 probationers and through the use of 10 in-depth interviews, following a semi-structured interview schedule, with 10 of the probationer teachers who had completed the 3-day training in the theory and practice of mediated learning.

A fuller account of the interviews appears in Appendix 3.

Two types of questionnaire data were analysed:

- data gathered and analysed by the evaluation team
- data gathered by the Development Officer and analysed by the evaluation team.

Overall, the training in mediated learning appears to have developed probationers' ability to use approaches likely to promote aims expressed in *A Curriculum for Excellence*.

### Perceptions of training and support

There is a marked difference between probationers' perceptions of the training and those of the teachers who completed the Basic or Standard training in that the latter, more experienced teachers were much more positive about the training. The Feuerstein accredited teachers were almost entirely enthusiastic about the training, whereas the probationers had some reservations and suggested more changes to the programme. The Development Officer reported that changes in the programmes suggested by all participants are already planned. These suggestions are mainly about improving connections between theory and practice.

Although many of the concepts were familiar from other contexts, the Feuerstein training connected ideas like cognitive functions, formative assessment and assertive discipline. Probationer no. 7 saw this as a benefit: while suggesting that many teachers were already implementing 75% of Feuerstein, he conceded that 'what it gave to me was actually to see the process from beginning to end, and gave it in a structured way'.

*Looking into it in so much depth definitely made me more aware of how children think and what I could implement in the classroom to help that.*

### **Probationers' perceptions of the benefits of the Feuerstein training**

The probationers were asked to name the greatest benefits that they had drawn from their three days of Feuerstein training. Many had used the time to reflect on their own teaching. Probationer no. 2 commented that 'the training made me more conscious of the dialogue you have with the children'. Others cited the overview effect (mentioned above): for example, probationer no. 4 said that 'definitely one of the benefits is making the connections, making the links, and seeing how they all add up together'. These views are endorsed in the questionnaires by the vast majority of probationers.

### **Probationers' ideas for changing the Feuerstein training**

The probationers were asked whether they would welcome changes to the Feuerstein training.

Many probationers would have appreciated the opportunity to have an open discussion, partly to clarify points of terminology, and partly to relate the training to their own teaching. 'It was so interesting', commented probationer no. 3, 'but there's a lot of terminology used, and it did get very complicated to try and understand'. Probationer no. 7 recommended that the trainer should 'give people time to think about it and work with it, so that they can understand it'.

### ***Probationers' perceptions of support in applying the Feuerstein approach***

The probationers were asked about any support they had been offered, to help in the implementation of Feuerstein's ideas. Probationer no. 3 was content to discuss theories with the Feuerstein-trained teachers in her school. As probationer no. 5 commented, 'we've just taken it upon ourselves, I think, to go into the classroom and try it out for ourselves'.

*There's nothing really put in place. Nothing has been formalised at all.*

The probationers were then asked what support they believed would help them to implement the Feuerstein approach in their classrooms. There were many different responses, including the establishment of formalised links with trained teachers already using Feuerstein's ideas. Many found the new concepts difficult to master in intensive day-long sessions, and probationer no. 6 advocated extra 'time out' to discuss the theories. Another common response was the provision of materials: 'some sort of resource pack which you can take with you and introduce to all your colleagues', explained probationer no. 7, because 'with the theory that I've got and the paperwork that I've got, I don't feel that I'm very well equipped to show it to [my colleagues]'. Probationer no. 3 had a similar idea: 'definitely what would help would be a pack, with suggestions, and lesson plans and worksheets that we could use'.

It should be noted that the probationers received very strong encouragement from the Development Officer to use time allocated for development to do just what they advocated: visiting schools to see the FIE programme in action.

### ***Enhanced understandings of aims for learners***

Understanding of cognitive development aims for learners was investigated through several questions. One of these was a question about what the probationers believed the main aims of the Feuerstein approach to be. The wide range of answers covered four broad themes. First, encouraging children to think about what they're doing. Probationer no. 1 commented that 'it's more about teaching people the thinking behind the learning processes'. Others emphasized thinking skills, to help children to understand what learning is. Many advocated explaining to children precisely *why* they are being asked to do certain things, because, in the words of probationer no. 4, 'some children need to be told the thinking behind it'.

*When I'm teaching, I'm very much more aware of trying to give the children a reason behind why they're learning, and always give them an explanation of why it's important that you do this thing or that thing.*

Alongside cognitive development, many identified a second theme of controlling impulsivity. Probationer no. 5 explained, 'I think it's also aimed at trying to slow down any impulsive reaction and behaviour'. Or, as probationer no. 4 put it, 'to think about it before they act'. Several probationers mentioned a third important theme: teaching children how to impose structure in a potentially chaotic situation. 'Being able to think things through', as probationer no. 4 put it, 'and seeing that there's more than one option'. This theme of developing strategies to deal with situations recurred in the interviews. 'Really putting their thought

processes into action', commented probationer no. 5, 'and looking for logic, to reason with their problems'. Or, in the words of probationer no. 8, children should 'be able to learn from previous experience, and be able to use strategies to improve their learning'.

*It is also a way of making the children more aware of using a systematic approach.*

Finally, many probationers mentioned a fourth theme that lies at the heart of the Feuerstein approach: teaching and learning. Probationer no. 9 thought that 'it's the way you enhance the learning ability of a child who's disadvantaged'. Probationer no. 7 summed this up: 'It breaks down the whole process of learning into different steps, and identifies for each step issues that stop people from learning'. Following this approach, the teacher mediates the learning in order to address each pupil's difficulties. For this reason, as probationer no. 2 observed, 'it seems to be for the less able, but I can see advantages for ordinary pupils'. Probationer no. 4 went further, claiming that 'everyone needs support in some way, even the most able child ... the whole idea behind [Feuerstein] is the same for any child'.

*I think it can be beneficial to a lot of children.*

Several of the interviewees saw wider applications for the Feuerstein approach. For probationer no. 3, it was all about teaching children 'to think about their actions ... in different situations, maybe where problems could arise, and about how they're going to tackle those problems'. Probationer no. 5 was more explicit: 'it allows the children to use the skills that they're learning in the classroom in the outside world'. There was a consensus that, by working systematically and thinking things through, children should be able to transfer their Feuerstein training to real-life situations, beyond the classroom and beyond the school.

*I think it's to get them to think about their thinking, think about their actions, not just in the classroom but in their life.*

Another question that was designed to judge the impact of the project on probationers involved asking them to make comparisons between the Feuerstein approach and their current practice. Most chose to answer by identifying the changes they have made to their own practice in the light of the 3-day training. Several highlighted the theme of shared objectives, whereby every instruction to pupils is accompanied by some explanation. Probationer no. 1 found that, following her exposure to Feuerstein, she explained tasks more fully to her pupils: 'they are more willing, and actually understand why they've been asked something'. A similar observation was made by probationer no. 5: 'I think they're more likely to follow their instructions if they're given the reasons behind it... they become aware of what's expected of them'.

*We need to tell children exactly what we're asking of them.*

Many singled out the concept of mediated learning, whereby the teacher interacts dynamically with the pupils. Probationer no. 3 pointed out that 'many effective, experienced teachers do it anyway, but it is something that all teachers would want to strive towards'. Probationer no. 6 mentioned 'a greater awareness of actually making links for the children, and the mediated aspect of discussion and talking about ideas'. For probationer no. 2, it was 'thinking about the process and the skills rather than the outcome'. Probationer no. 10 explained that 'it has made me think more about the kind of language that I might use with the children'. Similarly, probationer no. 2 felt that Feuerstein 'made me think just that little bit more about what I was actually saying'.

The questionnaire data confirm the views expressed in the interviews, showing that the majority of probationers believed that they had achieved all the improvements in pedagogical understanding described in the items. It is interesting that 84 per cent agreed that 'pupils will make progress in developing the cognitive processes that Feuerstein work targets' and that 88 per cent wanted to 'put far more emphasis on developing pupils' cognitive abilities'.

The vast majority of probationers believed that their training in Feuerstein principles would help them to contribute towards 3 of the aims of *A Curriculum for Excellence* and 68 per cent responded positively with reference to the aim relating to citizenship.

### ***Probationers' perceptions of obstacles to implementing the Feuerstein approach***

The probationers were asked to identify what, if anything, might help or hinder teachers who wished to use Feuerstein's ideas. Most concentrated on the hindrances. 'Simply lack of time', was the response from probationer no. 6. Probationer no. 4 concurred: 'the main difference is the time element'. Others referred to the needs of an already cluttered curriculum, and the difficulties of squeezing more tasks into the tight schedule. Probationer no. 1 summed it up as 'paperwork and an overcrowded curriculum'. 'Because of the curriculum', said probationer no. 6, 'it will be difficult for a lot of teachers to take it on board'.

*The curriculum is overloaded as it is, for a class teacher to try and fit Feuerstein in as well.*

However, in the questionnaires, less than half of the probationers endorsed such pessimism.

### ***Probationers' willingness to be involved in the Feuerstein approach***

The probationers were asked if they would welcome some involvement in implementing the Feuerstein approach in their next school. All of the interviewees expressed some enthusiasm, although probationer no. 4 had slight reservations: Several interviewees had noticed similarities with other approaches, and probationer no. 5 felt that, 'with *A Curriculum for Excellence* coming into play, I think it would coincide nicely with Feuerstein'.

Many mentioned the fact that it was a new initiative. For example, according to probationer no. 10, 'it's something totally different from what I've seen at university', and probationer no. 5 thought that 'Feuerstein was really good for me, because I hadn't come across it at university'.

*There's nothing I've seen that's better, and I think it fits in nicely with everything else.*

The above comment is consistent with the majority of responses in the probationer questionnaires.

### ***Probationers' suggestions for a whole-school approach***

The probationers were asked for their ideas about the best whole-school conditions for implementing the Feuerstein approach. Probationer no. 1 was in no doubt: 'you really need the management behind you. There's no point in just one or two people doing this'. Or, in the words of probationer no. 4, 'it needs to be whole-school with senior management backing it'. Several interviewees indicated that members of the management team were key players in the implementation of Feuerstein at their school, and this was felt to be beneficial. As probationer no. 3 explained, 'if there's a member of management who's interested in it and who knows about it, and is someone you can go and speak to about it, I think that's a good thing'.

*You need to have an integrated school approach.*



## Section 4 Impact of the project on Feuerstein Instrumental Enrichment (FIE) trained teachers and on schools: Teachers' and SMT perceptions

### Introduction

The main focus of this section is the evidence relating to the first evaluation aim. As outlined in Section 2, a minor amendment was agreed at the Steering Group meeting in May 2006 to the wording of this aim as it appeared in the tender submitted to SEED. The questionnaire data from FIE trained teachers appear in Appendix 4.

Aim 1: Assess the overall impact of the training on the teachers involved, particularly in relation to changes in:

- the confidence of staff in their ability to deal with pupil behaviour
- attitudes (defined as beliefs and values) towards learning and learners
- ability to design and implement effective learning environments.

Data from the following sources indicated that all the FIE trained teachers were broadly enthusiastic about the Feuerstein approach itself, and participation in the pilot project provoked transformation in the teachers' understanding of all of the above matters:

- Questionnaire data:
  - Gathered and analysed by the evaluation team (21 of the 32 teachers returned questionnaires)
  - Gathered by the Development Officer and analysed by the evaluation team (28 of the 32 teachers returned questionnaires)
- In-depth interviews with seven of the FIE trained teachers, following a semi-structured interview schedule.

A preliminary inspection of data indicated that there were only very minor differences in the responses of teachers who completed the Basic IE training and those who completed the Standard IE training. Basic IE activities are designed for younger primary school pupils, whereas the Standard activities are aimed at older primary and secondary pupils. For this reason, responses from these sub-groups were amalgamated.

The teachers reported that they are trying to act in accordance with their transformed understandings.

#### ***Teachers' perceptions of training and support***

There was a very strong consensus among the FIE trained teachers that the Development Officer (Anne-Theresa Lawrie) provided '*excellent*' support and most teachers would like her to deliver the Feuerstein training as well as support it. Particularly valued was her ability to relate the Feuerstein training to classroom teaching and to initiatives such as *A Curriculum for Excellence*.

The Feuerstein trainer was undoubtedly perceived as '*knowledgeable*' and '*passionate*' about the Feuerstein Instrumental Enrichment programme, and teachers said they gained a great deal from the training. However, they wanted more interpretation of theory into practice. It is commendable that the Feuerstein accredited trainer did not dilute the theory that needs to be

grasped in order to operate the FIE programme in a way that realizes its potential. However, the teachers wanted the theoretical basis to be more fully integrated with classroom applications. This suggestion has now been implemented. In 2006-2007 the Feuerstein trainer will deliver half of each day's training and the Development Officer and a teaching colleague will focus on applications during the second half of the day.

The FIE trained teachers rated the training overall more positively than their probationer peers. The difference might reflect the fact that the FIE Standard and Basic trained teachers volunteered to complete training in the theory and practice of enhancing young people's cognitive development and subsequently to deliver the programme. For the probationers, the introduction to the Feuerstein concept of mediated learning was just one component of their professional development programme. Differences in perceptions of the training appear to be related to the probationers' relative inexperience in classrooms.

Interview responses from the FIE trained teachers suggest that their classroom experience had equipped them with a richer picture than that of the probationers of the effects on learners of delayed development of cognitive functions. They also demonstrated more knowledge of the limitations of other approaches they had tried. The FIE teachers understood more clearly than their probationer colleagues that enhancing cognitive functions was likely to require teachers to grasp complex ideas, and this understanding seemed to promote a more positive evaluation of the theory in the training programme.

### ***Impact on teachers' understandings of learning, learners and learning environment***

Data from the two questionnaires and from the in-depth interviews point to the following gains for teachers and illustrate the wide ranging impact of the project:

- understanding of how cognitive functions (intellectual ability) can be developed and generalised across curricula through bridging activities
- understanding how the Feuerstein approach to mediated learning can contribute to realising aims of other initiatives (*Formative Assessment, A Curriculum for Excellence*)
- understanding how parents can be trained to support the Feuerstein approach.

### Understanding of how cognitive functions (intellectual ability) can be developed and generalised across curricula through bridging activities

The results from both the Scottish Borders' and the evaluation team's questionnaire results (see Appendix 4) show that all the teachers believed that knowledge of cognitive functions helped them towards a fuller understanding of learning, and that they used this knowledge to help pupils, with 81 per cent of teachers using the Standard and 100 per cent of those using the Basic programme (for nursery-P4) extending this help to non-FIE programme pupils. There was a growing awareness that abilities 'don't come naturally for every pupil'. The understanding that cognitive functions can be improved through systematic practice was well summed up by the teacher who acknowledged: 'My cognitive functions have improved as well' [from working with the Feuerstein approach].

The complexity of developing intellectual ability was well put by the teacher who said that he came away from training sessions 'realising how massive this thing is – I realized it [teaching] was about developing cognitive processes'.

Teachers recognized the difficulties and skill required to develop the targeted abilities, particularly with very young pupils:

*It might be easier at P4 or P5. My P1 are good at chuntering off the [Feuerstein] words: they can talk about situations where they should not be impulsive but not actually be able to behave in a non-impulsive way ... but there are little flashes of thinking.*

What is impressive is the teachers' grasp of the fundamental aspects of the theoretical position and its implications for practice with all pupils. Almost all the teachers mentioned that they now understood that pupils could not learn and perform well if they lacked particular components of mental ability and that priority had to be given to practising components that seemed underdeveloped in any pupil.

*I achieved a greater depth of understanding on the psychology of cognition.*

For example, a pupil who cannot identify differences between things needs to practise looking for differences before he or she can be expected to categorise anything, whether it is geometric shapes, trees or flowers.

### *Bridging*

All content-free thinking skills programmes intend that the cognitive processes learned in the programme will be generalized to school subjects, and to life in general. Particularly sophisticated understandings had developed in this group of teachers in relation to the transfer of what is learned in one situation to another. They understood the problematic nature of transfer and how important it was to manage transfer actively and systematically.

In the Feuerstein literature, such transfer is achieved through 'bridging' – dialogue with pupils that encourages them to exemplify how the learning in any Feuerstein lesson can be generalized to other school work and at home. These Feuerstein trained teachers had a very good grasp of 'bridging' and were trying to improve their practice in this area:

*The biggest challenge is bridging – trying to relate things to reality and school work; I tried map work for 'bridging' a Feuerstein lesson to orienteering and it fell flat. Bridging involves pupils in quite difficult thought.*

Some teachers had delivered well received professional development sessions in their own schools on central aspects of the approach, such as mediation of learning and 'bridging'. One had explained how the approach could be introduced in mathematics lessons in his school. Most had been active in their schools in suggesting how Feuerstein activities could be used with whole classes to enhance subject matter learning. In another school the approach is being built into the Personal and Social Development programme: 'we're bridging it into sexual health'. In other schools the Feuerstein accredited trainer or the Development Officer did twilight sessions. The teachers believed that 'all staff benefit through focused team meetings'

Understanding how the Feuerstein approach to mediated learning can contribute to realising aims of other initiatives (Formative Assessment, *A Curriculum for Excellence*)

The questionnaire data show that all the teachers saw links with other initiatives and believed that the Feuerstein approach should be a core part of the curriculum. Ninety per cent of the teachers believed that the potential contribution of the Feuerstein approach to *A Curriculum for Excellence* was 'very much' or 'much'. Almost all teachers believed that the potential contribution of the Feuerstein approach to all of the National Priorities targets was 'very much' or 'much'. The questionnaire results show that approximately two-thirds had used the principles of the Feuerstein approach to mediated learning and bridging. Although only 20 per cent of teachers using the Standard programme used the materials in whole class teaching, 55 per cent of those using the Basic programme (for younger children) had used the materials in this way. The most likely explanation is that the materials fit more easily into early primary school activities.

The vast majority of teachers believed that the Feuerstein approach had the potential to impact 'very much' or 'much' on positive relationships between teachers and pupils, on provision of opportunities for a wider range of pupil abilities to be developed and on existing behaviour policies. Over half of the teachers also believed that the approach had potential for encouraging openness and collaboration between teachers.

The Feuerstein teachers had identified (often with the help of the Development Officer) that greater skill in mediating learning enables them to engage learners more effectively in formative assessment: 'it pulled together a lot of what we knew'.

Most of the teachers pointed out that effective mediation of learning is central to achieving the aims of *A Curriculum for Excellence*. It is through engaging in skilled dialogue with pupils about their current understandings that teachers can help them to move forward in ways that enable them to become successful, independent, lifelong learners and effective contributors and citizens who are disposed and able to evaluate choices. One teacher who worked with pupils who needed to improve their social and emotional functioning commented:

*I hear them say "I'd better think about this" – even when they do it in a jokey way – or I hear them talking about why it helps to collect information and why it is needed and what would happen if you didn't.*

The Feuerstein teachers gave examples of how they had become more adept at engaging young people in dialogues about what they were learning and about how the pupils were approaching their learning.

*I now take care to explain why I am asking the children to do something.*

*I have used Feuerstein ideas in quite a large number of whole class lessons. I've said that it can be used to good effect by all teachers.*

## Understanding how parents can be trained to support the Feuerstein approach

Most teachers mentioned that cognitive function development proceeds effectively when the Feuerstein approach is used by all the adults in a young person's life and that parental input offers possibilities for vastly increasing pupils' exposure to the approach. One example of what had been done illustrated the sorts of involvement that other teachers would like:

*We gave parents some of the [Feuerstein] activity sheets to try – one child came back and asked for more, saying “my mum couldn't do the dots but my auntie could, and she wants more”.*

In this school an open evening is being planned and: 'one of the lads has produced a presentation of helpful strategies'.

Other teachers described workshops for the parents of primary school pupils.

### **Issues raised in the interviews**

The issues raised related mainly to resource constraints. Most teachers mentioned the following constraints in applying the approach:

- planning Feuerstein lessons is time consuming
- budgets need to be extended to allow for more copies of the excellent books on 'bridging' that have been published
- where the approach is being used with the most disruptive pupils, it works best with very small groups of pupils
- the requirement that teachers who want to use the full set of Feuerstein activities must complete 10 days of training delivered by a Feuerstein accredited trainer.

All of these resource issues are being addressed by key personnel in the project. Examples include plans for allowing dedicated time for some Feuerstein trained teachers to develop alternatives to the Feuerstein materials for each of the cognitive functions that are to be developed and a website that enables teachers to share lesson plans. One of the teachers in the interview sample had already experimented with alternative materials that were readily to hand in her P1 classroom:

*I gave them cubes and string to work with on the floor to supplement the Feuerstein work sheets.*

One teacher reported that the original plan in his school had been that each Feuerstein trained teacher would share what he or she had learned with one other teacher who had not participated in the training, so that the approach could be cascaded and benefit more pupils. This plan turned out to be difficult to realize because of other demands on staff time, but another attempt to make it work was planned for 2006-2007.

In summary, the findings from both the questionnaire and in-depth interview analyses indicate that the FIE training was generally viewed very positively, with links being made with existing initiatives and strong support demonstrated for its wider implementation. The effectiveness of the programme was reflected in positive outcomes including raised awareness and reflective practice, particularly in relation to cognitive functions and tackling deficiencies. The pupil

support materials were typically found to be useful and effective in facilitating relationship building and enhancing focus on teaching objectives. Differences in responses between Standard and Basic IE trained teachers were minimal and concerned a perceived need among Basic IE trained teachers for a more detailed understanding of cognitive functions, guidance on assessing targeted pupils, and a more comprehensive review of the Feuerstein support materials.

### **SMT perceptions of impact of the project**

The Head Teachers and Depute Head Teachers interviewed had a clear understanding of the purpose and nature of the Feuerstein approach and of the strong evidence base that supports claims that the approach is effective in raising attainment. One Head Teacher commented: 'it's not touchy feely, like some others – the evidence is there'.

The broad themes that emerged from the teachers' interview data were echoed in the data from Senior Management Team interviews. There was agreement that the approach had 'powerful potential' for:

- developing intellectual ability through cognitive functions training and generalising that training through 'bridging' work
- contributing to realising aims of other initiatives (e.g. *A Curriculum for Excellence*)
- offering a way of training parents to support their children's education
- developing a whole school approach to raising ability and attainment.

An interviewee reported staff awareness activities which involved linking up members of staff whose pupils had been withdrawn for Feuerstein lessons with the Feuerstein trained teachers. A primary school Head Teacher reported that all staff in the school had attended an introductory session on the approach.

An interviewee compared the approach with other initiatives in the school such as early literacy and numeracy programmes and commented that these programmes are 'not as structured and detailed as the Feuerstein programme'. Other initiatives included nurture work and transition work, but these were judged to be 'nothing as detailed and in-depth and structured as the Feuerstein'.

All four interviewees described steps they had taken to involve parents, which included newsletters, workshops and a 'supportive parents' group. They also cited examples of attempts to cascade the approach across the school. Work had started on generalising the approach across the school. This work included matching the Feuerstein activities to parts of the common maths programme, introducing the approach into Religious and Moral Education and into Personal and Social Development programmes. One interviewee commented: 'we haven't had to do a huge amount of re-arranging' and another reported that 'bridging to different situations helps them to develop as citizens and believe in their values'.

The SMT staff also responded to the following two questions:

- To what extent do you think involvement in the Feuerstein Project will contribute towards your school's National Priorities targets?
- To what extent do you think involvement in the Feuerstein Project will contribute towards the aims of *A Curriculum for Excellence*?

All four interviewees were strongly convinced that the approach contributed to most of the National Priorities and, if continued, would have a strong impact on realising all the aims of *A Curriculum for Excellence*. The following comments are typical of interviewees' elaborations of their responses:

*The approach ties into ideas of open and constructive dialogue with students where not only youngsters hear constructive criticism but also the other way round.*

*We're giving them lots of strategies and suggestions to help them develop as successful learners... "to go back and check my work; is there stuff I need to ask about, or stuff I need to sort out before I go on". All this helps them to be confident learners.*

*What I've been talking about adds to learning for life.*

*It's too early to produce concrete evidence but it certainly addresses the social inclusion and citizenship agendas and it hits all the buttons for A Curriculum for Excellence.*

The four SMT staff were also asked about the project's contribution to school ethos. In general, their view was that, if the local authority and school supported the approach, dialogue about the approach would 'very much' encourage openness and collaboration between teachers. One interviewee summed up the potential impact on ethos:

*It could encourage relationships between staff and students as well as there being a positive impact on learning and youngsters' behaviour; it's about a specific type of dialogue that gives youngsters responsibility for their own learning. Teachers can sometimes find that difficult, they are used to control – telling, giving direction.*

*Teachers being asked to take on board what youngsters think, feel and need – for some staff this is a difficult concept.*

One interviewee pointed out that young people themselves could be trained to use mediated learning and to inform parents about what the school is doing and encourage parents to use this approach in the home. The approach avoids confrontation by discussing and evaluating alternatives, an involvement of young people that can lead to solving issues amicably.

One SMT interviewee summed up views expressed by peers:

*I'm sold on it – it's early days but the children are working and the teachers are enthusiastic. Properly resourced with commitment and support there could be great benefits.*

All the staff interviewed were realistic about the time scale required to produce a substantial impact on pupils, expressing their views in comments such as: 'if it could be more concentrated it might be possible to see an impact'; 'another year is needed'; and 'it's a drop in the ocean, but an effective drop'.

## Section 5 Conclusions and discussion

The project aims were translated into evaluation aims in the tender submitted to SEED: these evaluation aims, with minor amendments agreed at a Steering Group meeting, are as follows:

1. Assess the overall impact of the training on the teachers involved, particularly in relation to changes in:
  - the confidence of staff in their ability to deal with pupil behaviour
  - attitudes (defined as beliefs and values) towards learning and learners
  - ability to design and implement effective learning environments
2. Identify any emerging impact on pupils whose teachers have been involved in the training, particularly in relation to any improvements in:
  - confidence and self-esteem of pupils participating in the project
  - progress with cognitive functioning
  - changes in pupil perceptions of themselves as learners
3. Assess the impact of the project on probationer teachers
4. Make recommendations for the further improvement and development of the project (including suggestions about how gains might be sustained).

The evidence supports a conclusion that the broad aims of the pilot project relating to the training and support of teachers, including all probationers, were well achieved, thereby ensuring realisation of the project aims that the approach would be active in the project schools and that it would begin to impact on pupils in ways likely to lead to attainment gains. There was a very strong consensus among teachers that the Development Officer (Anne-Theresa Lawrie) provided 'excellent' support. The pilot project aim of establishing baseline data was also well achieved. Progress had been made towards the aim of involving parents.

The intention is that further progress will be made on the aim of extending the approach through partner agencies such as social work and health visiting, an aim that was perhaps over-ambitious for a pilot project. The Project Monitor's reports are broadly consistent with the evaluation team's data. The conclusions about the impact of the project are also broadly consistent with those in the extensive literature on FIE evaluations.

The remainder of this section discusses key findings in relation to each of the evaluation aims and finishes with recommendations.

### Aim 1: Impact of the training on the teachers involved

The **FIE trained teachers** evidenced a significant shift in attitudes towards learning and learners and reported that they were acting in accordance with their changed understandings. These shifts relate to a belief in and an ability to engage in a more open and powerful type of dialogue that is likely to develop young people's ability to learn for themselves. These teachers support the continuance of the programme and the implementation of a mediated learning approach throughout the schools. They believe that the Feuerstein version of mediated learning is likely to enhance the aims of other initiatives (e.g. *A Curriculum for Excellence; Assessment is for Learning*) and contribute to National Priorities. They also believe that the Feuerstein approach offers a coherent framework for accommodating ideas presented in other CPD programmes, and in particular provides tools for enhancing the

abilities of all pupils. The FIE trained teachers were more enthusiastic about the training than the probationers, possibly because they were able to locate the ideas in their richer classroom experience.

Overall, the findings from the various sources of data indicate that the FIE trained teachers were generally very positive about the impact of their training on professional practice. The effectiveness of the programme was reflected in positive outcomes including raised awareness and reflective practice, particularly in relation to cognitive functions and tackling deficiencies. The FIE instruments (learner activities) were typically found to be useful and effective in facilitating relationship building and enhancing focus on teaching objectives. Differences in responses between Standard and Basic IE trained teachers were minimal and concerned a perceived need among Basic IE trained teachers for a more detailed understanding of cognitive functions, guidance on assessing targeted pupils, and a more comprehensive review of the FIE instruments (i.e. learner activities).

### **Aim 2: Impact on pupils**

One of the most significant findings is that teachers reported progress over a six-month period for over three-quarters of the sample of 67 **pupils** that they rated on 6 aspects of cognitive functioning targeted by the FIE programme, all of which are connected with school attainment. It is impressive that teachers reported that 98 per cent improved on one particular and important aspect: 'correction of deficient cognitive functions'.

The younger FIE pupils (nursery-P4) had higher scores than their control group on an FIE related task, but the differences between the two groups were not statistically significant. The older FIE group pupils (P5-S3) achieved higher scores on Feuerstein related tasks than the control group pupils and the differences were statistically significant. It appears that the FIE pupils, with their history of social, emotional or behavioural needs, not only retained what they learned but also generalised their learning to a new task. Work is ongoing to ensure optimal 'bridging' from the Feuerstein activities to mainstream classroom work. Many pupils talked about improving their behaviour "a wee bit".

Secondary but not P5-P7 pupils reported that they were better learners after six months in the FIE programme and reported improvements in their task completion ability over the same period. The youngest (nursery-P4) children seemed to understand better what was involved in task completion.

The responses by the Feuerstein pupils to questionnaire items about motivation towards learning were more positive than those of the control pupils. Although this motivation was towards FIE lessons rather than school lessons in general, this finding indicates that the FIE pupils can be motivated towards intellectually challenging content.

The pupils in the Feuerstein group were also more likely to agree that they had learned to analyse problems and that they tried out different things when they were stuck than the pupils in the control group. They were also more likely to agree that they had learned to work systematically. Compared with the control group, the pupils in the FIE group were also more likely to agree that they found it easy to learn, that their work was good and that their schoolwork gave them a sense of confidence. Again, these positive findings relate to FIE lessons but suggest that the FIE pupils can become confident and capable learners.

### **Aim 3: Impact of the project on probationer teachers**

**Probationers** who participated in the introductory course on mediated learning were broadly positive about the approach and intended to continue trying out the approach to mediating learning in their next post. While probationers had started to make changes in their teaching (e.g. more talking about ideas, more sharing of objectives with pupils), they believed that this approach to mediated learning will work better within the aims of *A Curriculum for Excellence* than within the requirements of the 5-14 guidelines.

Probationers believed that they gained a great deal from the 3-day training on mediated learning but suggested changes towards more practical activities, which are now being implemented.

Both the experienced FIE trained teachers and the probationers believed that senior management support was essential to the success of the project.

**Senior Management Team staff** in the project schools also mentioned links between the Feuerstein approach and existing initiatives and expressed strong support for its wider implementation.

### **Wider implications of findings relating to evaluation aims 1, 2 and 3**

1. The main project impacts on teaching staff and on pupils suggest that the Feuerstein approach to mediating learning has potential for preparing teachers and pupils to work effectively towards realizing the main aims of *A Curriculum for Excellence*, and that pupils respond well to this approach. Mediation, a key plank in the Feuerstein approach, is a type of dialogue that is likely to promote aims expressed in *A Curriculum for Excellence*: for instance, the evaluation suggests that Feuerstein-style mediation can help pupils' understanding of how to learn actively, of the consequences of impulsive behaviour, and of strategies for achieving pro-social behaviour, thereby articulating with aims of enabling young people to become:

- |   |                               |   |                              |
|---|-------------------------------|---|------------------------------|
| q | <i>successful learners</i>    | q | <i>responsible citizens</i>  |
| q | <i>effective contributors</i> | q | <i>confident individuals</i> |
- (SEED, 2004)

2. Experienced teachers are likely to benefit from extended, in-depth initiation into the FIE programme and into the educational psychology framework in which the approach is located.
3. Probationers have insufficient experience to understand the principles of mediated learning through exposition. Structured observation of its application by FIE trained teachers, followed by opportunities for reading and discussion, would be more beneficial for this group.
4. The Feuerstein approach to mediated learning offers a coherent whole-school approach to raising ability and attainment.

**Aim 4: Make recommendations for the further improvement and development of the project (including suggestions about how gains might be sustained)**

## **Recommendations**

### ***Pupils***

There is enough evidence to support the view of the interviewees that the majority of young people who began the FIE programme in 2005 should remain on it. Continuance is likely to consolidate and increase the gains they have made. Current attainment, attendance and exclusion data for these pupils should be compared with similar data available when these pupils reach the end of their schooling.

The primary school pupils who participated in the FIE programme as a whole class have made significant gains which might act as a booster to future attainment, although continuation of the programme with this class is a lower priority if funding is tight. However, it is important that this class should be followed up to find out if their apparent cognitive gains feed through to higher than expected attainment. Their secondary school attainment should be compared with that of a similar non-FIE pupil group in order to assess programme benefits for young people who do not have social, emotional or behavioural needs.

### ***FIE trained teachers and Senior Management Teams***

Teachers and senior management should build on their significant progress towards realising the Feuerstein approach to mediated learning across school as well as continuing to ensure that the FIE pupils reap the intended benefits from participation in the programme. In particular:

- deliberations should continue to determine criteria for the selection of pupils for the FIE programme and to agree on tools to be used to ensure accurate selection
- Senior Management Teams in schools, supported by the Development Officer, should continue the Continuing Professional Development activities that are designed to cascade the Feuerstein approach to mediated learning across whole schools. They should also continue to try to identify which areas would benefit most from the infusion of FIE activities.

### ***Parents***

The schools should continue their efforts to persuade more parents to attend workshops on mediated learning and to use this approach at home. Schools might consider running a series of workshops that encouraged parents to report on their experience of trying to mediate their children's functioning in their homes.

### ***Support at the local authority level***

Senior Management Teams would benefit from support in expanding the training of school Homelink workers in mediated learning so that they can help parents and carers to mediate their children's learning effectively. Support in extending the 3-day training in mediated learning to more teachers and to develop support materials would also be useful.

### **Comparison of findings with those in other evaluations and future directions**

Feuerstein's Instrumental Enrichment programme (FIE) is one of several approaches to developing thinking skills that enhance learning. By comparing what has been achieved in the Scottish Borders pilot programme with evaluations of what has been achieved elsewhere, further benefits can be envisaged.

The EPPI-Centre at the University of London identified 23 studies that had assessed the impact of thinking skills approaches on pupils' attainment. The review concluded that evidence suggests that thinking skills programmes:

- have a positive impact on pupils' attainment
- enable pupils to translate their learning into other contexts.

In the Scottish Borders pilot project, there was some evidence of cognitive development that is connected with improved attainment, as well as evidence that pupils were beginning to translate their learning into other contexts.

The review also concluded that:

- the role of the teacher is important in establishing collaborative group work, effective patterns of talk and in eliciting pupils' responses.

The Scottish Borders pilot project invested heavily in training teachers to mediate learning and the evidence presented suggests that the FIE trained teachers are effective in meeting this condition for successful outcomes, and that the training provided for probationers had enhanced their understanding of effective patterns of talk and of eliciting pupils' responses.

The findings from the Scottish Borders pilot project can also be compared with syntheses of the results from other evaluations of FIE programmes. From a review of 40 different studies, Romney and Samuels (2001) reported that improvements were found in all three areas of achievement, behaviour and, most notably, ability. A further review of the effects of FIE on academic achievement drew the following five conclusions:

1. *FIE may facilitate academic achievement in every academic area*
2. *FIE produces statistically significant effects with various student populations*
3. *FIE is associated with larger academic improvements than those resulting from remedial classes*

Although the Scottish Borders pilot project has not been running long enough to produce statistically significant effects relating to the above matters, the progress so far suggests that such effects could be realised in the longer term.

4. *The more prolonged and comprehensive the programme, the more general the effects of FIE*

The most repeated belief in the FIE-trained teacher and Senior Management Team interviews was that the programme needed to be more prolonged and comprehensive.

5. *The best results in academic achievement are reported when teachers are trained to make the connection of specific academic curricula with FIE.* (Ben-Hur, 2006)

In the Scottish Borders project, mechanisms have been in place from the beginning of the project to 'make the connection of specific academic curricula with FIE'. The third conclusion above implies that a more prolonged programme would capitalise on the emerging evidence of pupil benefits from the pilot project.

Other studies have evaluated non-intellective indicators of FIE such as intrinsic motivation, self-confidence and task-persistence. Many of the pupil data provided by Scottish Borders, and gathered by the evaluation team, relate to these matters. While our findings of impacts on pupils are consistent with those identified by Sternberg and Bhana (1986) from various FIE evaluations, in the Scottish Borders project the benefits listed below were still in embryonic form. This is not surprising, given the short period of the pilot project. As in Sternberg's review, there was at least emerging evidence from the pilot project that learners became:

- more active classroom participants
- more inclined to listen to others
- more likely to defend their opinions based on logical evidence
- better able to articulate how they solve problems
- more likely to spontaneously read and follow written instructions
- better able to handle several sources of information simultaneously; and make links more effectively between ideas and principles in different curriculum areas.

In the Scottish Borders evaluation there was also evidence that was consistent with Skuy *et al's* (2001) study of teachers' experiences of using FIE with students with special needs. Common themes running through the descriptions included strengths of the programme such as its flexibility, relevance to all school subjects, ability to empower students and usefulness as a '*good place to start from in lesson preparation*'. Other themes in the Skuy study that also appeared in the Scottish Borders teacher data were opportunities for learning and a belief that the programme fostered creative and logical thinking and opportunities for students to contribute from their own experiences. Teachers in the Skuy study and in the Scottish Borders also commented that they had learned something new from the programme, such as appreciation of the methods of bridging, and that the principles of FIE can be applied across the curriculum.

Drawbacks of the programme reported in the Skuy study were also similar to those noted by Scottish Borders teachers and included:

- time constraints
- the extra workload associated with administration of the programme
- training teachers.

Feuerstein programmes can be delivered only by teachers who have completed 9 days' training by a Feuerstein accredited trainer. The Borders Development Officer will complete accreditation as a trainer in 2007 and there are plans to sponsor a Scottish Borders educational psychologist for this training. While this serious training requirement introduces a resource constraint, it also provides a quality assurance mechanism that is not present in many of the other available thinking skills programmes or interventions designed to enhance learning.

## **Conclusion**

While Feuerstein's Instrumental Enrichment programme (FIE) is one of many approaches to enhancing learning, all of them expensive if they are implemented properly, it is one that seems to make sense to Scottish Borders teachers, and one that has a particularly sound research base. The evaluation evidence suggests that the pilot project has had a positive impact on pupils and staff, particularly in equipping teachers to help some of the most vulnerable young people in society. The evidence to date suggests that further funding of the project would enable staff and pupils to build on what has been achieved and to extend the approach to other Scottish Borders schools.

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