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**Northern Grid for Learning**  
**Independent Evaluation of A+LS**  
**Final Report**  
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## 1. This report

This report is concerned with offering evidence and outcomes from a trial of an ILS in a range of primary schools within the North of England. The ILS involved is a product from Learning Pathways Ltd. called A+LS. It is designed for use in primary schools, and has been trialled in a range of schools within the north-eastern region.

Learning Pathways Ltd. established a trial of the A+LS (A+dvanced Learning Systems) in two schools in each LEA in the north-eastern region of the UK, within the Northern Grid for Learning Regional Broadband Consortium. This initial trial, begun in October 1999, worked at the outset with original software used in US schools.

After the trial had started, the software was further developed for a UK market - material was aligned to both the National Curriculum, and to the National Literacy and Numeracy Strategies. A+LS claims to offer 'complete coverage of national curriculum in English, mathematics, and science from Key Stages 1-4'.

From September 2000, Key Stage 2 Literacy from the A+LS was trialled in Northern Grid for Learning schools. This report offers the evidence and outcomes arising from the evaluation undertaken between October 2000 and February 2002. The report does not focus solely upon the literacy material developed and trialled, but also considers the impact that the numeracy and science resources also had.

The report which follows is structured into sections as follows:

- Section 2 discusses the background to this report, particularly in terms of the prior evaluation studies undertaken and recent literature on this topic.
- Section 3 outlines the context of the software being used, A+LS.
- Section 4 outlines the context in which the evaluation is set.
- Section 5 summarises the overall conclusions and recommendations.
- Section 6 details the outcomes concerned with classroom environment.
- Section 7 details the outcomes concerned with classroom management and ethos.
- Section 8 details the outcomes concerned with teacher practice and teacher beliefs.
- Section 9 details the outcomes concerned with pedagogy.
- Section 10 details the outcomes concerned with structural aspects of the program.
- Section 11 details the measurable outcomes identified.

## 2. The background to this report

This evaluation is concerned with the factors which affect uses and outcomes of integrated learning systems (ILSs), particularly those associated with classroom-based effects and with regard to structural features. The report focuses on evidence which takes a different approach from that undertaken in the main UK NCET/BECTa ILS evaluation studies (see NCET, 1994; 1996; Wood, 1998), which were undertaken largely as studies from a quantitative viewpoint without interventionist approach. However, those studies do highlight the impact of factors that are the major focus of the study reported here:

- classroom environmental factors;
- classroom management and ethos factors;
- teacher related factors;
- pedagogical factors; and
- structural factors.

### Summary of key points from previous evaluation studies

Two features which shape some of the dimensions of the previous research evidence in which this present study is set are that:

- technology will lead or necessitate shifts in teaching roles;
- evidence on qualitative factors affecting uses and outcomes of ICT have tended to follow, arise out of, or be related to, quantitative studies rather than leading investigation and informing practice.

Yet the literature highlights some clearly important features which should be considered prior to any quantitative investigation, since the outcomes are clearly dependent upon factors concerned with classroom environment, classroom management and ethos, teacher beliefs and approaches, pedagogy, and structural dimensions.

Some key features concerned with classroom environment that impact upon ILS effectiveness are:

- social, emotional and behavioural development of pupils is paralleling cognitive development in classrooms;
- different age or year groups are at different stages of social, emotional, and behavioural development, which can determine patterns of use as much as does the stage of cognitive development reached;
- understanding behavioural, affective and cognitive characteristics of pupils at each age or year group may well influence an 'ideal' or 'useable' structure for an ILS, or its pattern or mode of use.

Some key features concerned with classroom management that impact upon ILS effectiveness are:

- optimal time of use on ILS may alter by age, but also by mode of operation, and shifts in mode;
- teachers need to understand the basis of suggested times of use;
- times of use need to be considered inside, and outside, class or school days;
- teachers need training in the scope of material covered, its intentions and its mode of use;
- teachers should be offered mechanisms to self-evaluate the degree of integration of use they are achieving;
- consideration should be given to extents of use of ILS with groups or pairs of pupils, as well as with individuals;
- levels of knowledge processing need to be considered in relation to classroom management;
- forms and levels of interaction between outcomes of ILS and with the teacher, or other pupils, needs to be considered;
- teachers need to be able to start pupils at appropriate places in an ILS;
- teachers need access to the problems which pupils encounter;
- teachers need to be able to resource whole-class or part-class activities to address common problems;
- the use of ILS within a lesson plan, or scheme of work, needs to be considered;

- class size and groupings is a key factor of use;
- giving teachers access to diagnostic facilities, and how they can interpret and address these, is a key need;
- expectations of pupils need to be high;
- community and parent involvement can support uses and outcomes.

Some key features concerned with teacher practice and teacher beliefs that impact upon ILS effectiveness are:

- positive teacher beliefs are important to uses and outcomes;
- perceptions of teacher-pupil relationship are important;
- perceptions that pupils are learning to ‘get the right answer’ is likely to be true for some pupils, and may require teacher support to reinforce ‘understanding’;
- the purpose of ILS in indicating necessary learning support may be a worthwhile avenue to pursue.

Some key features concerned with structural factors that impact upon ILS effectiveness are:

- the management program in an ILS can be a key factor in integration potential;
- diagnostic use of management programs should be accessible to teachers;
- print-outs for pupils should support reinforcement of learning, to take learning on further beyond the use on the system directly;
- checklists to consider key features of factors affecting use and outcomes are now being generated by the research community;
- integration factors should be built into, and considered in the development of ILS, to greater extents than they are currently.

### **Change needs for the teacher**

Some studies point to the need for teachers to change their approaches when they adopt ILS use. However, some authors have indicated how they believe technologies such as ILS will lead to changes in learning and lead to effects on teaching. For example, Longstaffe (1996) stated that: “These changes [increased use of learning technology] will place greater emphasis on student activity rather than teacher activity... Access for students to well-designed CAL material and networked resources will lessen the need for the teacher to present or provide information. This in turn will give the teacher more time to spend with individuals and groups. The teacher will be able to diagnose individual learning problems and help students with their solution. This in turn will allow the balance of teaching to shift from direction towards facilitation.”

To assess how teachers react to these forms of demand placed upon them by the software, and to gather evidence to inform those who are either developing ILS, or using ILS in practice, research evidence ideally needs to be based on a platform which is strongly qualitative in nature. Much research evidence on ILS is of a strongly quantitative nature (which covers the focus largely of many studies conducted in the US, Israel, and the UK). There could be an assumption being made, to greater or to lesser extents – that if the quantitative evidence is strong enough, that teachers will integrate use and maximise impacts and effects. However, if the strength of quantitative outcome depends upon underlying qualitative interactions, then it follows that qualitative understanding of those interactions is a necessary pre-requisite to quantitative evidence being gathered (from both the point of view of contextual understanding, and from the point of view of maximising learning outcomes). The study reported here adopts a research approach to ILS that initially is focused on gathering qualitative contextual evidence, followed by a focus on understanding the pedagogical factors leading to learning benefits, and then a focus on quantitative studies when such factors are recognised. This approach was adopted in order to generate outcomes of more direct use to teachers and schools, who could be informed through the evaluation in an interventionist way.

## Factors concerned with classroom environment

An ILS is used in a social as well as an educational context. Classrooms differ, not only because of the types of learning being undertaken, but because of the ways in which that learning can be undertaken. Ways of undertaking learning depend on social, emotional, and behavioural development characteristics rather than just upon cognitive development characteristics. Passey (1999) considered these effects in a study on ILS in classrooms with pupils aged 6 to 9 years.

“The use of the RM Maths Learning System in year 2, 3 and 4 classrooms is happening at a significant period in overall learning terms. This period is a time which has been recognised as a transition from Key Stage 1 to Key Stage 2, and, in some areas and local education authorities (LEAs) is characterised by a radical shift from an infant to a junior school. It is recognised that this period is associated with a shift in learning ethos, with a shift in the way that the pupil relates to the teacher, and to the learning environment. Pupils become more confident socially over this time period, and become more determined in terms of their own interests; they are more willing to pursue their individual interests than to follow the lead of others. This shift in autonomy, independence, and interdependence, can cause radical behaviour shifts. Teachers in some schools, for example, relate how disaffected pupils begin to emerge in year 3 and year 4 classes, but not prior to this stage in general. Over this period of time shifts are likely to be noted in terms of:

- the value placed on autonomy of action;
- the forms of interdependence valued by pupils; and
- the qualities of independence in terms of pupil and teacher roles.

In summary, pupils in different years might be expected to be involved in a wider social classroom ethos in the following ways:

Year	Form of pupil interaction with the social classroom environment
1	pupils are concerned with engaging actively into classroom environments
2	teachers are nurturing pupil interests in a largely passive acceptance culture
3	pupils and teachers are involved in negotiating values and interests as pupil personalities rise
4	pupils and teachers explore ways to work with rising pupil expectations driven by the pupils' own values and beliefs to increasing extents

**Table 1: Summary of classroom ethos by year group**

The use of the RM Maths Learning System has been involved, during this year of trial in being integrated with this shifting ethos. The shifting ethos has implications for both the teacher, and for the pupil; both are concerned with the shifting roles and responsibilities that arise. The use of the RM Maths Learning System could be viewed as a means that is independent of this shifting ethos, but clearly it is not. Just the same as any resource in schools, the RM Maths Learning System works in context, not out of context, and the degree of integration of the system into that context would be likely to be measured by its recognition of the context, and how it addresses the needs of that context.

In terms of the ethos of the RM Maths Learning System, it is clear that it supports engagement in a classroom environment concerned with learning activities, and that it supports the developing of growing pupil interests in a more passive acceptance culture. However, the system offers less opportunity for pupils and teachers to negotiate values and interests, or for them to explore ways driven by their own beliefs, values and needs. The ethos of the system is much more related to year 1 and year 2 classroom environments, therefore, than it is to year 3 and year 4 classroom environments.”

Previously, Hativa (1994) had identified a range of characteristics which are likely to shift as pupils move from one year group to another. She suggested that differences in gain when pupils use ILS can arise from the behavioural, affective and cognitive characteristics of the pupils, particularly:

- motivation for success in the work;
- concentration on task;
- competitiveness;
- persistence when facing difficulties;
- responsibility for self-learning;
- mindful work;
- initiative in obtaining external help when needed (e.g. from teacher, parent, friend);

- flexibility in adjusting to the computer environment;
- deductive ability;
- the ability to generalise;
- good memory;
- good “mathematical memory”; and
- the development of helpful cognitive strategies.

### **Factors concerned with classroom management**

Other authors have identified classroom management factors as being of significance to outcomes when pupils use ILSs. Van Dusen and Worthen (1994) discuss some of the possible reasons why only small gains in learning might arise from uses of ILS, and suggest that an important factor may be the way in which schools are implementing the use of ILSs. They found that in many studies that ILSs were used for what may have been an insufficient time for them to make a significant impact on achievement (in one school, they were used for as little as 10 minutes a week). They also found that the ILS was often not integrated into the classroom curriculum and that many teachers saw the ILS as an extra, like art or music, rather than as an integral part of their teaching strategy.

“When one considers that the ILS is but one small aspect of the total learning environment in most schools, it would seem unreasonable to expect it to have an impact on overall learning unless it were used at its full intensity.” (p.14)

The authors then go on to report the findings of their own research which was designed to test the impact of under-utilisation of ILSs. The carefully controlled study compared control groups with ‘strong’ and ‘weak’ implementation groups. The ‘strong’ implementation groups used the ILS for more than 30 minutes per week, completed more than three lessons per week in a subject area (reading or mathematics), and had a teacher who was a good integrator (this was defined as monitoring the overlap between the ILS and the classroom curriculum and making modifications either to the latter or to the presentation of the ILS so as to achieve a good ‘fit’ between the two). The ‘weak’ implementation groups used the ILS for between 10 and 30 minutes per week, completed two or three lessons per week, and had teachers who did not actively integrate the ILS into the classroom. The control groups did not use the ILS. This study was able to demonstrate that pupils performed better when they spent more time on the ILS and had a teacher who integrated the ILS well.

The authors also discuss in their report some of the reasons for failures of implementation, including:

- lack of awareness of the implementation standards (particularly in relation to the length of time which students should spend using the ILS) recommended by the developer of the ILS;
- difficulties in fitting the recommended standards into school organisation;
- lack of commitment on the part of the teaching staff;
- inadequate training for teachers in the use of ILS; and
- shortage of equipment in relation to issues of equity, so that no student is given *sufficient* time on the ILS because the teacher attempts to give every student *equal* time on it.

For better learning gains to be achieved, they recommend:

- increased student time on the ILS (based on consultation with the vendors of the system if necessary);
- increased curriculum coverage (i.e. concentration in one or more particular subject areas); and
- better integration of the ILS with the classroom curriculum.

Integration of ILS use into classroom practice has been a focus not only for policy makers and LEA advisers, for example, but also within some studies. Passey (1998), in a report on the use of ILS in Year 1 and Year 2 classrooms, identified a range of categories of extents or types of integration and their characteristics, regarding ILS uses in classroom practice.

“Observations in the four trial schools, (six trial classrooms), suggest that different models of use exist, which lead to different types of integration and different patterns of expectation of what the ILS can offer. It is possible to identify at least three major models, each characterised in the particular ways described below.

<b>Model</b>	<b>Characteristics</b>
'non-supported' use	it is anticipated by teachers that the ILS will be a sufficient motivator in itself, so use is not supported, and pupils are not encouraged to participate if they find reasons not to do so
'parallel' use	the ILS resource is considered by teachers very much like any other resource in the classroom, so pupils are encouraged to use it, but its use remains a parallel use to that happening elsewhere
'influential' use	it is recognised by teachers that the ILS has some particular benefits to offer to other curriculum planning and involvement, and the teacher program is used to plan other activities which support and influence the wider curriculum

**Table 2: Characteristics of distinct implementation models**

The choice of these models can be determined by particular circumstances, or constraints, perhaps. Certainly the efforts required, and types of involvement implied, are quite different in each of these cases. The type of efforts required in each case by teachers are explored below.

<b>Model</b>	<b>Types of efforts required</b>
'non-supported' use	the least effort is required in this case, since use is dependent upon pupil decisions and intentions, with the teacher supporting those pupil decisions
'parallel' use	encouragement and support of pupil use is maintained, so pupils with difficulties are supported, and access is ensured as far as is possible
'influential' use	regular analyses of pupil use are used to plan future activities, perhaps weekly, so that pupils' mathematical problems are considered as they arise

**Table 3: Teacher efforts involved in distinct implementation models**

In essence, teacher involvement is focused at three different levels, according to the model adopted, as shown in the table below.”

<b>Model</b>	<b>Teacher focus</b>
'non-supported' use	pupil choice
'parallel' use	classroom management
'influential' use	curriculum management

**Table 4: Teacher focus related to distinct implementation models**

Implementation within classrooms, of course, depends upon the organisational approach adopted by the teacher. Classrooms often operate in terms of co-operative or group work efforts, rather than efforts always being undertaken in isolation. Mevarech (1994) discussed the possibilities of the co-operative use of ILS as a response to criticisms levelled at ILSs, defining co-operative use as that in which a pair of pupils of similar attainment levels work together jointly on a task at one machine. She concluded that the research literature suggested that such co-operative groups perform better or at the same level as individualised users, and that the lower ability pupils show the greatest gains from co-operative use.

Mevarech then suggested, drawing on the work of Vygotsky and others, that the ability to solve complex cognitive problems involves mental processes which are facilitated through interaction with others. She hypothesised therefore that higher cognitive processes (for example, comprehension of numerical systems) will show a greater gain than lower cognitive processes (for example, basic arithmetic skills) in a co-operative learning situation and went on to report the results of her experimental research. She found that using ILS co-operatively (where students were instructed to collaborate on each problem, to decide together on the solution, and to take turns at the keyboard) facilitates mathematics learning more than using the system individually. Gains were found on the acquisition of both basic skills and of complex cognitive processing.

However, she reported that there were some advantages to individualised use:

- most of the time (90%) children were on task;
- children could manage their own learning;
- teachers were free to provide individual help to those who needed it; and
- some children benefited from the quieter learning atmosphere generated.

However, children failing to solve problems often felt helpless in the individualised setting. In the co-operative situation learning was more often seen to be 'fun' and lower achievers did significantly better. She suggested that higher achievers already have meta-cognitive skills (the ability to diagnose their learning, monitor their progress and seek external help when needed) which lower achievers lack and that lower achievers are therefore more vulnerable in individualised situations.

Becker (1994) discussed the considerable management problems for the teacher when each pupil is working at an individualised task.

“The larger problem faced by ILSs is that individualisation makes it extraordinarily difficult for teachers to integrate computer practice with teacher-led didactic and remedial lessons taught in a whole class mode. For students who are doing computer work that happens to mesh with the whole-class activity, classroom support is present from teacher presentation and review. For those whose computer work is at a different point, they must largely depend upon their own talents to follow the computer’s “tutorial” and learn the concepts related to their computer tasks.” (p.78)

He concluded that the effectiveness of an ILS program depends upon the *mindfulness* with which it is used and that vigilant attention to how the system is running is needed if the potential benefits of the ILS are to be realised. The teacher, he suggested, needs to take specific steps to improve the program’s functioning rather than allowing the programs to run with little intervention.

He identified four attributes in the teacher who was most successful in the use of ILSs:

- was knowledgeable about the content of the software and the way it functioned;
- used that knowledge to over-ride the automated choice of assignments for individual students when appropriate;
- was able to identify the common problems which students were having in using the programs; and
- orchestrated whole-class or part-class time to provide help with these common problems.

He also pointed to the value of identifying relevant computer-based activities which the whole class can work on simultaneously, preceded by a teacher-led lesson and followed up by a whole class review.

Scott, Hurry, Hey and Smith (1998) examined the National Literacy Association Dockland Learning Acceleration Project, a two-year project aimed at improving literacy and other basic skills among Year 3 and Year 4 children in London’s Docklands. The authors discussed the ways in which the ILS was used in the different schools and drew some conclusions about the most effective conditions for the use of ILSs and some of the barriers which may be encountered:

- small classes allowed teachers to integrate the ILS more easily into existing classroom practice than did large classes;
- some teachers were more successful than others at using the ILS to diagnose individual literacy needs and integrate these into the programme of work;
- teachers in inner-city schools need to have high expectations of children if they are to succeed in teaching literacy;
- Ofsted inspections carried out during the project failed to appreciate either the purpose or the implications of the ILS;
- teachers have to be convinced that the new initiative will work before they begin the task of changing their existing practice;
- teachers need training, so that they have competence and confidence in using the ILS;

- consideration must be given to the ‘fit’ of the ILS with existing literacy programmes in the school, the National Curriculum, teachers’ rationales for their present programmes of work, management structures and levels of resourcing in the school;
- community and parental involvement is needed if the ILS is to be successful at raising standards of achievement;
- external support (in this case, for the project teams) is an important factor in successful implementation of the ILS.

### **Factors related to teacher practice and teacher beliefs**

Baturo, Cooper, McRobbie and Kidman (undated) examined relationships between a range of influential factors and implementation of ILSs in classrooms.

“The four cases show a relationship between endorsement, student computer knowledge, teacher computer experience, and teachers’ beliefs (pedagogy, delivery, inservice and benefit) about the ILS. Differences in teachers’ beliefs about the pedagogy of the ILS appeared to be very significant. The Years 4 and 5 teachers (who endorsed the ILS) approved of how the ILS operated in relation to their students. The Years 6 and 7 teachers (who did not endorse the ILS) had concerns with the ILS even at the start of the trial. As the Year 5 coordinating teacher stated, commenting on what was happening in the school, “The first thing is, it won’t work if teachers do not believe in it!”

Teachers’ beliefs in relation to the benefit of the ILS to their students appeared to be related to their knowledge of the educational uses of computers in classrooms, and not necessarily to knowledge of what their students believed. The Years 6 and 7 teachers had more extensive computer knowledge than the Years 4 and 5 teachers had. The Years 6 and 7 teachers believed that students should not be passive with respect to computers and mathematics teaching, and they wanted to provide their students with more creative, active and problem-solving computer experiences than that provided by the ILS. They believed that their students were not happy with the ILS and were not benefiting from it. However, teachers’ perceptions of their students’ feelings about the ILS were not always in harmony with their students’ responses to a survey with respect to their likes and dislikes about the ILS. However, this error in perception did not stop the Year 7 teachers deciding not to use the ILS in the future. On the other hand, the Years 4 and 5 teachers, with more limited computer knowledge, liked the ILS because it required little from them in terms of organising what to do with the software. For students in Years 4 and 5, whose computer experience had been limited, the ILS appeared to be an exciting experience with its varied displays and use of mouse and earphones.

Teachers’ beliefs about the appropriateness of the ILS’s interactions with their students appeared to be related to their beliefs about how mathematics should be effectively taught. The ILS in this study places students in a passive role in the learning process, providing practice worksheets in random order. As Baturo, Cooper and McRobbie (1998) argued, this tended to result in learning that is limited to syntactic knowledge. Thus, the ILS does not place students in an environment which the literature argues should be effective in teaching students mathematics (e.g., Kennedy & Tipps, 1997). The Years 6 and 7 teachers agreed with this, but the Years 4 and 5 did not. In fact, the Years 4 and 5 teachers argued in support of mathematics teaching approaches that reflected the ILS; that is, approaches based on instrumental learning (Skemp, 1977) and transmission models of teaching. As well, their attitude to computing, through preference or lack of knowledge, also appeared to reflect the approach embedded in the ILS, that is, a tutor-tutee relationship where students are passive and the computer is in control. The impression was that the mathematics classroom practices of the Years 4 and 5 teachers reflected the ILS; that is, involved repetitive practice on exercises with the teacher in control and the students in a passive role. "

Baturo, Cooper and McRobbie (undated) identified a key pedagogic issue relating to use of ILS – that learning outcomes can be related to ‘getting answers right’ rather than ‘developing understanding’.

“Karen, who had made the highest knowledge gains (according to the ILS) of all the Year 6 students using the system at that school, revealed that she had an impoverished understanding of comparison of fractions, tasks which were based on those undertaken in the ILS. Moreover, Karen had developed syntactic fractional knowledge and therefore her solutions for isomorphic tasks were highly dependent on the numbers given. It also led to confusion as Karen had developed “rules” to accommodate particular tasks.”

As the authors went on to say:

“In the time (15 ½ hours) that Karen had spent on the ILS, a teacher trained in remediation should have been able to overcome the deficits in Karen’s elementary fraction knowledge. However, for Karen, neither traditional teaching (including the years leading up to Year 6) nor the ILS had facilitated construction of appropriate fraction knowledge.”

This study indicates the need for timely and appropriate intervention to remediate from ‘trial and error derived understanding’ to ‘concept related understanding’. The roles of teachers, classroom support assistants, and outputs from the management systems of ILS, are all clearly highlighted as ways to initiative appropriate support for learning in these circumstances. This suggests that the purpose of an ILS needs to be clarified – is it to produce learning outcomes, or to offer indications of likely or targeted learning support?

### Structural factors of programs

Becker (1994) and Steeg (1998) both point for a need for teachers to be able to understand and to use outcomes from the management program of an ILS, to inform at both a curriculum, and at an individual pupil, level. Clearly the structural features of an ILS can either enable, or not enable, these processes. Passey (1999) reported on aspects of use of a teachers’ program in an ILS designed for Key Stage 1 and Key Stage 2 use in mathematics.

“Each of the elements available in the Teacher’s Program offers a diagnostic view of how pupils are using the system. When looking at individual pupil profiles, it is possible to identify criteria appropriate to each element, and issues to consider if these criteria are not met. The table below summarises the author’s view of criteria which may be used to consider the ways in which individual pupils are using the system.

Program element	Criteria used	Issues to consider
Time on system	Compare pupil hours on the system against the maximum possible	If pupils fall below this, have they been absent from school, or are they avoiding use?
SAT shown on progress graph	Identify the actual SAT level shown	Does the graph show that progress is still occurring at a rate that is expected? Is the SAT level at that expected by the teacher?
Number of problems	Identify number of problems at any one time	If pupils have more than 5 or 6 problems, are they grouped into topics? Do numbers of problems increase, decrease, or remain the same?
First-time-right score	Identify the percentage of exercises that a pupil gets right first time	If pupils have a high score rate, are they being challenged sufficiently? If the score rate is too low, are they being supported sufficiently?
Fast track	Identify whether a pupil is on fast track	If pupils are not on fast track, are they being stimulated sufficiently?

**Table 5: Criteria to apply to the Teacher’s Program to judge pupil performance**

It is possible, using pupil profiles of these program elements to draw diagnostic conclusions about pupils.

#### Example 1

Time on system	8 hours	(maximum is 13 hours)
SAT level	1.6	(average for all pupils in class)
Number of problems	3	
First-time-right score	85%	
Fast track	on	

This pupil has a low time on system, and the teacher indicates that he is reluctant to use the system at times. He has an average SAT level, but a low number of problems, and a high first-time-right score, even though he is on fast track. It is unlikely that he is being challenged sufficiently, and could well achieve more by being given positive support to engage with the system.

**Example 2**

Time on system	13 hours	(maximum is 13 hours)
SAT level	0.5	(average is about 1.5)
Number of problems	11	
First-time-right score	60%	
Fast track	off	

This pupil is clearly being challenged. His SAT level is low, there are a large number of registered problems, and the first-time-right score rate is low. This pupil would be likely to benefit from support provided additional and outside that of the system.

Diagnostic use of the Teacher’s Program is not widely used or apparent by teachers. Some of this lack of application is likely to be due to a lack of understanding of how to undertake such diagnosis. The Teacher’s Program itself could also provide more specific support for teachers by indicating, for example:

- numbers of hours below the maximum that a pupil has spent on the system, and asking whether the reason for this is known;
- the actual SAT level reached, and also the current rate of SAT level increase (e.g. 0.2 of a level in one week);
- the numbers of problem exercises encountered, and whether these group into particular topics or have root mathematical causes;
- percentage of first-time-right scores.

The percentage of first-time-right scores which each pupil gains are particularly significant indicators. In general, observations across this and other trials have shown that there are key scores which are indicators:

>80%	indicates pupils are encountering relatively easy material, and might well be on fast track
70-75%	indicates pupils are being challenged to a reasonable extent, but should be making reasonable SAT level progress of at least 0.1 level per week
60%	indicates that pupils are being challenged particularly, and may not be making substantive SAT level progress

**Table 6: Key first-time-right scores as indicators**

The teacher would be likely to benefit from being able to view and understand these critical score levels.”

Hativa (1994) made some specific suggestions of use to developers and to teachers which relate to structural, or possible structural features of ILS programs, for example:

- the use of weekly computerised class reports can be used as a tool by teachers to help them adapt to individualised teaching methods;
- a weekly personal letter ‘from the computer’ to each student can act as an important motivational device;
- changing the unit of evaluation from progress between levels to gains-in-level can be beneficial, particularly for weaker students;
- paper and pencil tests should be administered sporadically and the students’ level of work with the computer adjusted accordingly, rather than the teacher relying on the computer-based system as the sole decision maker for students’ progress;
- teachers should get training before starting work with ILS, and support during it;
- teachers need to integrate the ILS work into classroom learning, as well as to offer help to individual low-achieving students when using the ILS; and
- social interaction among students using ILS should be anticipated and utilised.

It is argued by some authors that the structure of an ILS is strongly related to how content is conceptualised for learning. The structure of subject content itself, for example, is contended in one ILS by Baturo, Cooper, McRobbie and Kidman (undated), who state that:

“The ILS does not meet any of the five criteria put forward by National Council of Teachers of Mathematics (Kennedy & Tipps, 1997) for the effective teaching of mathematics. For example, the ILS: (a) requires students to work individually and thus does not build mathematical communities; (b) is the sole authority for correct answers and therefore does not encourage logic and mathematical evidence as verification; (c) encourages memorisation of facts and procedures rather than mathematical reasoning; (d) emphasises mechanistic answer-finding (precise answers in a precise order) rather than conjecturing, inventing, and problems solving; and (e) treats mathematics as a body of isolated concepts and procedures rather than as a connected schema.”

In terms of a means to identify and consider the classroom-based and structurally-based factors which can affect uses and outcomes, Jamieson-Proctor (undated) has developed a wide-ranging checklist. The instruments she has created enable schools and others to gather feedback on use of computers (including ILS) in classroom and curriculum situations. The instruments enable structured observation and subsequent analysis of ILS-related interactions in classrooms. The definition of indicators she has produced could be considered just as easily as a list of key influencing factors for developers of ILS. The indicators she lists as those worthy of consideration when computer-based activities are developed, are that such activities:

- “provide equitable access, participation and outcomes for **all** students;
- are adapted to meet individual student needs, special abilities and interests;
- are flexible and cater for the student as an individual as well as a member of a group;
- are responsive to individual student learning styles and abilities;
- allow students to develop knowledge in collaboration with others;
- encourage students to develop intrinsic satisfaction from the learning process/environment;
- facilitate the development of a repertoire of thinking/learning strategies for/in students;
- involve the student in the setting of goals, choice of learning tasks and the development of assessment tasks, as well as independent learning;
- support concept-based or process-based instruction, higher-order thinking skills and provide opportunities for students to reflect on their learning experiences;
- present students with authentic, real-world tasks and problems to solve;
- facilitate the active construction of knowledge by students, rather than the passive receipt of information by students from computers and teachers;
- support **all** elements of the learning process: perception, processing and (re)presentation;
- provide a seamless medium for information queries, problem solving, and product development that transcend traditional discipline boundaries;
- afford students the opportunity to develop functional competencies and skills in specific Key Learning Areas;
- will afford students continuity in their learning with computers, across all year levels and for a lifetime;
- allow **all** students to develop their capacities for critical, lateral and creative thinking;
- foster collaborative interactions and feedback;
- foster communication using text, sound, images, numbers and a combination of these;
- encourage students to process information in a variety of ways: store, locate, retrieve, organise, manipulate, interpret, analyse, synthesise and evaluate;
- provide students with the opportunities to monitor, measure and control the environment;
- encourage students to structure and present their knowledge in a meaningful way;
- encourage students to investigate, design, create and appraise models or products in response to real or imaginary processes or events;
- sustain a warm, supportive classroom environment where students are encouraged to take risks;
- provide students with the opportunity to develop the basic skills they require to operate computer hardware and software in order to meet their learning needs;
- extend the learning environment beyond the four walls of the student's own classroom to the global classroom;
- encourage students to accomplish a variety of open-ended tasks and to solve open-ended problems;
- sustain student interest, but are not frustrating;
- afford students the knowledge, skills, abilities and attitudes to deal with on-going technological change;

- provide students with access to education at a time, place and pace of their own choosing;
- provide students with the opportunity to work with different people to fulfil different instructional purposes;
- facilitate peer tutoring and co-operative learning processes;
- facilitate the formation of groups of students with different ability levels who are working co-operatively on a mutual task;
- encourage students to value the diversity, multiple perspectives and strengths exhibited by their learning partners;
- support and facilitate the development of a community of learners, within the classroom and beyond it into the global classroom;
- situate the learner as a cognitive apprentice with a mentor (peer or adult) who coaches the learner in order to develop ideas and skills.;
- encourage students to participate in a variety of formal and informal social and cultural groups;
- will help students develop confident, responsible and ethical attitudes to the use of computers in their school and society generally;
- will help students develop an understanding of the role and importance of computers in the learning process and in society generally;
- will help students share their perceptions of the role of technology with others;
- will help students reflect on the impact of technology on their learning and on society generally;
- will help students critically interpret computer-generated information;
- will help students evaluate the worth of computer-generated information.”

Certainly different forms of ILS currently offer different opportunities for:

- linking to other material and resources;
- creating target setting by the teacher or by the pupil;
- printing out resources for use beyond the ICT medium;
- using study guides alongside the ICT material; and
- printing of outcomes or summaries of learning gains.

Some forms of ILS do not link to other materials and resources, do not have in-built target setting, do not print out resources for use, do not have associated study guides, and print out only success rates. By contrast, other forms of ILS link to other resources, enable the teacher to set desirable targets, print out resources for use in the classroom or elsewhere, have study guides for use alongside the ICT medium, and print out those learning gains achieved in any session or period.

An example of an open ILS which offers features in the latter category is the Systems Integrated Resources (SiR) Global Maths curriculum. Curriculum support materials give overviews of lesson plans, and indicate how specific ILS elements can be integrated into a wider pedagogic framework, where the teaching and learning style is considered in relation to the use of ICT and other classroom activities. For example, one lesson plan exemplar indicates that an introduction is offered using a didactic style, computer work is offered through resource based learning, worksheets enable individual activity, and homework is completed through individual research.

Some ILS-based resources are being considered increasingly in terms of how they integrate into wider resource bases offered for teachers or pupils. Some evidence of outcomes in some studies and observed practice suggests that a focus on ILS use for up to some 10 weeks, supported by resource-based interactions which enable learning outcomes to be developed in other ways (using ICT) or in other modes (not using ICT) may be of particular benefit to at least some pupils. ILS systems in the future might be designed to become more sensitive to such approaches, so that they can:

- identify a useful starting point for pupil learning;
- offer ILS-based material through fairly closed system operations for 6 to 10 weeks;
- identify when pupils’ learning gains are maximised and when they are not increasing consistently at a maximal rate;
- offer other forms of resource-based learning which reinforce those gains, and take aspects of learning forward in other ways.

A hypothetical example might be the use of an ILS to, successively:

- find a starting literacy level;
- work through structured material on spelling, punctuation, and grammatical aspects of literacy;
- identify when learning gains have reached an optimum in these respects;
- generate and link to material which enables a different approach, such as creative writing aspects, analysis of texts, or synthesis of ideas from a variety of sources into written material.

In this way an ILS is concerned, under these latter circumstances, with a continuity of learning progression, as well as with sustainability of commitment, and a continuity of involvement towards longer term goals.

### **3. The context of A+LS**

A+LS is a 'learning system'. It aims to support learning, but it is only likely to do so if the appropriate teaching approaches are used before, during, and after its use with pupils. If this is the case, then what are they?

The Learning Pathways Ltd. trial of the 'learning system', the A+LS (Advanced Plus Learning System), has been undertaken in two schools in each LEA in the north-eastern region of the UK, supported by the Northern Grid for Learning Regional Broadband Consortium (RBC). This initial trial, begun in October 1999, worked at the outset with software which was originally designed for and used in US schools.

After the trial started, the software has been under development for a UK market. Material has been aligned to both the National Curriculum and to the National Literacy and Numeracy Strategies, and material has been specifically developed to address the needs of the National Literacy Strategy at Key Stage 2. A+LS currently claims to offer 'complete coverage of the national curriculum in English, mathematics, and science from Key Stages 1-4'.

From September 2000, use of Key Stage 2 Literacy material from the A+LS was trialled in a range of Northern Grid for Learning schools. The full range of literacy material in a UK version was made accessible to these schools since June 2001.

This evaluation has looked at the use of the A+LS software, particularly in literacy, but also in mathematics and in science. Throughout the trial the schools have been supported by Learning Pathways Ltd. support staff, and through the support of the Northern Grid for Learning. Evaluation feedback has also been provided for all schools involved throughout the study period.

#### 4. The context of the evaluation

The aims of the evaluation of the integration of A+LS resources in school and classroom contexts were originally summarised as follows:

- to gather evidence of effectiveness of use of A+LS in school contexts;
- to gather evidence of outcomes of use of A+LS in school contexts;
- to gather illuminative evidence to inform ongoing development of the product range;
- to gather illuminative evidence for the Northern Grid for Learning of developmental and school approaches; and
- to gather illuminative evidence to inform effectiveness of practice in trial schools.

The evaluation has taken an interventionist approach. Evaluative outcomes identified from existing practice have been fed back to the schools involved, and to a wider school audience. This deliberate interventionist approach has been adopted on the basis that outcomes of use should be identified in cases where schools and teachers are involved in effective and focused practice, where possible. The evaluation design has involved head teachers as well as classroom teachers, on the basis that the management of a school can positively influence positive classroom practice, which in turn can influence positive educational outcomes. A part of this evaluation study is to identify, therefore, the means of support that can be used within schools, and how this support can be put into practice for other schools beyond the evaluation.

In order to meet the aims of the evaluation, (given in the top paragraph above), the evaluation study focussed on six main aspects. The intention was to gather evidence about the impacts and effects of factors that influence positive outcomes of A+LS use, concerned with these six aspects:

- classroom environment.
- classroom management and ethos.
- teacher practice and teacher beliefs.
- pedagogy.
- structural issues concerned with the program itself.
- measurable outcomes.

Key features which were identified and highlighted for investigation within each of these aspects are shown in the table which follows.

Factor		Key features for investigation	
A	classroom environment	1	match of A+LS use with the social, emotional and behavioural contexts of pupils
		2	match of pattern of A+LS use with the social, emotional and behavioural contexts of pupils
		3	the behavioural, effective and cognitive characteristics that lead to recognisable effective use
B	classroom management and ethos	1	optimal time for use by age
		2	teacher understanding of times of use
		3	times of use in relation to school days
		4	teacher training outcomes
		5	teacher evaluations of degrees of integration of use
		6	use with individuals, pairs, and groups of pupils
		7	use of A+LS with lesson plans and schemes of work
		8	class size and grouping used
		9	identification of pupil expectations
		10	community or parent involvement
C	teacher practice and teacher beliefs	1	levels of teacher beliefs
		2	identification of perceptions of teacher-pupil relationship
		3	use of reinforcement and review beyond use of A+LS
		4	identification of learning support for individuals and groups
D	pedagogy	1	levels of knowledge processing being undertaken
		2	integration of outcomes with teacher and pupil use
		3	means to find effective starting points for pupils
		4	identification of pupil problems
		5	creating activities to address problems
		6	diagnostic mechanisms available for teachers
E	structural aspects of the program	1	use of the management and assessment programs in A+LS
		2	diagnostic accessibility of the management and assessment programs
		3	use of print-outs to extend learning beyond immediate A+LS use
F	measurable outcomes	1	teacher perceptions of benefits of use and outcomes
		2	pupil perceptions of benefits of use and outcomes
		3	pre- and post-tests to measure extents of perceived outcomes in literacy and other specific curriculum areas

**Table 7: Factors and key features identified for study during the evaluation**

The evaluation was undertaken by using direct observational means in classrooms, together with structured and non-structured discussions with teachers and pupils, to gather the data needed to inform about these features. The remainder of this report details the evidence gathered, together with overall conclusions and recommendations.

## 5. Overall conclusions and recommendations

### Summary of outcomes

- From a total of eight schools which were involved initially in the evaluation study, three have integrated the use of the A+LS fully within a school-based approach where positive outcomes are identifiable.
- In all three cases, the model of adoption is different and specific, but the use of the A+LS suits the school context and curriculum requirements in all cases. The three models are described below.

### Model 1: a whole school approach

In one pilot school A+LS has been integrated in terms of use across all Year 3 to 6 classes. The introduction of this integrated use was completed within a school term, and beyond that time the school has taken a range of approaches to embed use further into assessment and target setting methods at a school level.

Each class within the school has an allotted time for the use of A+LS. Teachers use the allocated time within the computer suite, which allows access to A+LS and A+ssess. Teachers are, after two terms of use, beginning to integrate A+LS use within wider classroom and curriculum needs. For example, a teacher in one Year 4 class went over what had been covered in the lesson the previous day, then did a range of mental oral starters before pupils started to use A+LS (some 6 minutes after the start of the lesson). The A+LS use covered the same topic as the mental oral starter (the topic was on time and time-tables). The teacher undertook a plenary session at the end of the lesson. Within this lesson the A+LS was used for 23 minutes out of a total of 55 minutes. In some lessons the teacher may now see a common problem that a number of pupils are finding, and will stop the group, and alert them to strategies to tackle these common problems. The use of other resources within the time allocated for A+LS is common also. In some lessons number fans are being used, for example, in order to increase the range of means to tackle problems in particular topics.

In this model, all teachers use A+LS, and all pupils experience use on at least a weekly basis. Additionally, booster classes who are due to take end of Key Stage 2 SATs use the resources at other times.

The key person responsible for developing this model is the ICT co-ordinator. Support from the head teacher and deputy head teacher has also been a positive influence upon the ease of integration of use of A+LS in this school.

### Model 2: classroom assistants developing a whole school approach

In one pilot school A+LS has been used by an increasing range of classes. The head teacher has taken a positive developmental stance, and has encouraged teachers to consider the potential of A+LS. He has, at the same time, looked at how classroom assistants can be supported and trained in order to be key agents within the use of A+LS in classrooms. Classroom assistants take a half class into the computer suite to use A+LS and A+ssess, while the teacher takes the remainder of the class.

Classroom assistants take a major role in the implementation and integration of A+LS. It is the classroom assistant who provides the link between the curriculum designed by the teacher, and the outcomes of A+LS from pupils. Classroom assistants, on the basis of targets identified by teachers for individual pupils, identify lessons within A+LS which are appropriate for the attainment level of each pupil. Classroom assistants select lessons on the basis of their wanting to ensure that pupils are gaining about 70% correctness in responses to exercises.

When pupils complete lessons, records are kept by classroom assistants, and these results are then shown to and discussed with the classroom teacher. Classroom assistants are finding that they need to keep, or would value easy ways to keep, details about each A+LS lesson, to show the subject areas,

what is covered, the attainment level of pupils estimated as being most appropriate for use of that exercise, and whether sound is available for that lesson (as SEN pupils or those with low level reading abilities often do not have the reading abilities to read exercise texts).

### **Model 3: targeted use to support literacy attainment**

In one pilot school A+LS has been used as one of a range of strategies to support a focus on enhancing literacy attainment. The pupil group who are targeted are ‘middle ability’ pupils, who are felt to be likely not to tire of use of A+LS as much as others might.

The pupils chosen are called ‘wobbly 4s’ – they are not certain to gain a level 4 in their end of Key Stage 4 SATs. This group are supported through a range of targeted approaches. Their SATs attainment is focused on particularly, a focus is placed on the learning culture, and on achievement as well as on attainment. Pupils also have additional and extended literacy time.

The target group have access to A+LS for 20 minutes per day. They have additional literacy time, and 20 minutes of reading time is undertaken every morning before the literacy lesson. There is also an extension of guided reading for this group, and they sit a monthly reading test. Records of reading ability are undertaken regularly, and assessments of reading objective outcomes are done on a weekly basis. Pupils themselves are involved in undertaking assessment and levelling of work through self-analysis and self-evaluation. Pupils are encouraged to record their limitations as their targets.

### **Summary of outcomes concerned with the classroom environment**

- Teachers have found that A+LS can be used in all year groups in primary schools. There tends to be a reported trend which suggests that ‘higher ability’ pupils are supported more up to and including Year 3, that pupils of all abilities may be supported in Year 4, but that in Year 6 ‘lower ability’ or ‘those working up to level 4’ are those who can benefit most from A+LS use. It should be noted, however, that this trend can be determined largely by types of appropriate teacher support or intervention.
- One school considers how pupils moving from class to class can be involved in elements of appropriate progression - both in terms of the focus of A+LS use on specific curriculum aspects, and in terms of the use of the A+LS by pupils in ways which foster increased independence as pupils become older.
- Pupil independence is a feature of use which is considered differently in different schools. Schools are generally concerned with the need to develop growing independence with regard to learning, but few schools have adopted particular strategies with regard to this issue when they are using A+LS. Who takes the responsibility for learning is a key factor concerned with independence, which is addressed more readily and sometimes more actively by those schools or classes who identify targeted groups for A+LS use than by those who seek to offer access for all pupils equally.
- Use across one school has involved a policy approach to curriculum content across year groups, but also policy regarding development of independence of use across year groups.
- Year 1 pupils need support in becoming familiar with the operational system of A+LS. Pupils may not have experienced ICT use either at home or in school to any great extent previously, so they will initially take time in becoming familiar with operations such as logging on. Pupils in Year 1 also need to be given details about what to do when they use the system. Pupils require very clear instructions on how to handle the responses they are getting, and need to know their purpose in using the resource.
- In Year 2 incentive measures work effectively. Teachers at this stage can support individuals more than the whole class or groups.
- In Year 3 teachers can use the system to introduce new topics as well as to reinforce existing work.
- Independent work with A+LS increases from Year 4 onwards. Pupils of this age are able to use all types of exercise, including essays.

## **Summary of outcomes concerned with classroom management and ethos**

- Patterns of use vary from school to school. In some schools in the pilot, all pupils in a range of classes are involved, in two cases involvement is on a half class basis, and in another case the school arranges working on the A+LS in pupil pairs. In two schools, groups are selected for targeted use of A+LS. In the case of targeted use, intentions are clearer, and the focus of the resources and monitoring of outcomes is more strictly undertaken. In these schools the targeted use matches whole school concerns about the use of assessment data to target the enhancement of learning achievement.
- Targeted use and target setting approaches in school appear to generate more focused use and outcomes, and pupils are clearer about their goals and intentions.
- Specific and appropriate teacher intervention to support pupils before, during and after A+LS use tends to have been addressed most fully in the cases of schools where targeted groups are involved. This may be due to the fact that attention is being given to the individual pupil already, or that the A+LS resources enable this focus to be followed through readily, or both.
- Access patterns have varied from school to school. In the case of whole class use, access is generally provided at the level of one session per week (somewhere in the region of half an hour being available per pupil per week). In the case of targeted groups, schools use time more flexibly, offering access before school and in lunch times, and considering more the level of access on an individual pupil need basis, rather than on an average pupil time level basis.
- Restrictions placed upon use have tended to be from demands of the literacy and numeracy hours (and non-integration of A+LS use into this time), and from the competing demands of other activities during afternoon sessions.
- Pupils have been able to gain from access to A+LS resources whether they have had access during the morning sessions or the afternoon sessions. Effective timetabled uses of A+LS have resulted from involvement of senior management, and a concern for integration of A+LS with curriculum needs such as the literacy and numeracy hours.
- Some schools have managed to integrate use of A+LS across the school within a year after only a few hours of formal training, initially for specific staff, and then for all staff within the school.
- Initial training has enabled use of the A+LS in all schools. However, training on the use of the assessment resources has been recognised as a necessity in order to enable some schools to move forward.
- Some schools have reported that they have identified classroom management issues, while others have solved these same issues. There is clearly a potential for the sharing of practices used by schools who have successfully addressed classroom management issues and problems.
- Schools and teachers generally have found a useful match between the content of A+LS and the needs of QCA Schemes of Work, the National Literacy Strategy, and the National Numeracy Strategy. Some teachers and classroom assistants would have liked more detail about attainment levels covered in individual exercises, and times involved, however.
- Looking at appropriate pupil groupings was a classroom management issue faced initially by most schools. Few schools used the A+ssess package at an early stage, and training was necessary in order to ensure that teachers could use this element.
- In all cases observed, A+LS has been integrated into use after schemes of work and lesson plans have been created.
- Exemplary practice of A+LS lessons requires teachers to adopt strategies which would be found in any exemplary practice situation, such as the introduction of the lesson with its objectives, and a discussion of lesson achievements and outcomes in a plenary session. In one exemplary lesson in one school the teacher identified a school, class and subject weakness as an aspect to cover within the lesson.
- A range of approaches has been taken by schools in the pilot to the grouping of pupils. In one school closely matched pairs of pupils in terms of their subject abilities were chosen.

In another school a ‘higher ability’ pupil was asked to play the role of supporter, while the ‘lower ability’ pupil played the role of leader. The purpose and roles of the pupils in each case clearly differs markedly.

- Pupil expectations have been identified far more in cases where target setting is an approach adopted by the whole school or within that class.
- There has been no recognised community or parent use of the A+LS in the trial schools, but A+LS has supported an active Breakfast Club in one school. In this school A+LS is used as one activity in a range of activities available from 8.00 a.m. daily. Various programs could be chosen during this time, yet five pupils out of nineteen in one session observed had selected A+LS. One girl who was using A+LS wrote notes, without any prompting, about the material she had accessed.

### **Summary of outcomes concerned with teacher practice and teacher beliefs**

- Positive teacher beliefs have been shown to be important in the trials. Teachers with positive beliefs about use of A+LS look to refine practice; those without such belief continuously question whether use is leading to noticeable improvements and as a consequence whether it is important.
- Positive uses and outcomes have been associated with shifts towards, or approaches to, pupil-centred use. In these circumstances pupils are becoming increasingly independent, and more aware of their own learning needs.

### **Summary of outcomes concerned with pedagogy**

- Different teachers in the pilot have used the A+LS resources to support classes and pupils in different ways. As older pupils are involved, and as the stage of use develops, schools tend to move from use of the A+LS for reinforcement purpose alone, to increased use for introducing topics, and subsequently for targeted use by selected pupils.
- Reinforcement of existing curriculum topics has been a common starting point for many schools. Review of topics beyond use of A+LS has tended to occur largely only when the school is using A+LS to support a target setting approach.
- Pupils have largely been involved in completion exercises when observations have been undertaken. Although the completion exercises themselves have involved a range of knowledge processes, most have been concerned with knowledge acquisition and comprehension. In Years 4 to 6, pupils have been involved in some application and analysis.
- The A+LS resources are organised into five types of activity: study; practice; test; essay; and games. Observations have shown that pupils often need to be given guidance or clear instructions from teachers as to which type of activities they should work on in any particular session. Essay forms appear to be of a lower value to pupils in Years 1 to 3, and some pupils of this age and older will tend to focus on doing tests when the incentive to complete these is to give them access to a range of games.
- Pupils often need clear instructions and guidelines on how to approach the positive use of study exercises, as well as practice and test exercises. Some pupils tend to want to work quickly on tests in order to accumulate games, without being asked to stop to think about the learning they have undertaken (or that which they need to undertake as a consequence of their results). Use of essay exercises has been minimal in the trial.
- The shift in pupil attention on particular types of activity at certain times in a lesson across a class can provide a particular challenge for the teacher. The teacher may need to decide in advance which types of activity to monitor in order to support individuals. Alternatively, the teacher may decide to let most pupils work through the activities in their own way, in order to focus their support on particular individuals within the class. The shift in focus from one type of activity to another can be used by the teacher as an indicator of how well the pupils are progressing. It might under other circumstances be used to identify the need to refocus the attention of pupils, however.

### **Summary of outcomes concerned with structural aspects of the program**

- Effective starting points for pupils often relies upon pupils being given exercises based on teacher or classroom assistant judgment, in turn based on the familiarity with the resources in the system of those teachers or classroom assistants. Use of A+ssess to place pupils appropriately has occurred in some schools.
- A+LS has not tended to be used to identify pupil problems beyond those identified prior to its use. This appears to be concerned with teacher perceptions of the role of A+LS as much as to do with lack of focus upon this aspect.
- Identification of individual pupil support has been less commonly seen than the identification of group support needs. In the latter instance, however, teachers have still needed to use mechanisms of their own in order to collate evidence about pupil attainments generated from the A+ssess system.
- The A+LS system does not suggest further activities for teachers to use with pupils, and uses have not tended to generate further ideas by teachers.
- Diagnostic mechanisms used by teachers to identify pupil weaknesses have been limited to those available in A+ssess, and this has largely meant that printed-out results from pre-tests have been the basis for any subsequent diagnostic information.
- Use of A+ssess coupled with teacher selection of subsequent lessons has appeared to be more effective than subsequent use of automatic system selection of lessons.
- A+ssess pre-tests have been found to contain large numbers of questions, taking up long periods of class time, and this has led to limited pupil enjoyment.
- While the current A+ssess offers teachers a means to aid diagnosis of pupil problems, these have been found to be time consuming, not only for pupils to complete, but also for teachers to collate and manage.
- Other than use of pupil results from use of pre-tests in A+ssess, no use of print outs has been noted from the system.

### **Summary of measurable outcomes**

- Use of target setting has been a common feature of classes where successful outcomes have been identified.
- Teachers have reported positively on benefits arising from use of A+LS, and in two schools teachers report that external attainment evidence supports their views.
- Pupils who are using A+LS often can identify where it is supporting their learning. However, this only occurs in cases where teachers support effective use (which includes, for example, ways to prevent pupils completing tests rapidly in order to accumulate games as a primary purpose for use of the system).
- Individual pupil benefits are reported in schools where teacher intervention supports pupil involvement, and pupil outcomes. In two schools SAT results at the end of Key Stage 2 indicate that A+LS is supporting learning outcomes. In these two schools the higher levels of attainment of pupils are being partly put down to the combination of A+LS with other forms of support and intervention.
- In one trial school pupils who were believed to be likely to gain less than another group, and whose use of A+LS was targeted, were able to achieve at the same levels as the group predicted to achieve more highly.
- In another trial school pupil outcomes for pupils who used A+LS as part of a package of target setting gained more highly in the targeted subject than they did in a non-targeted subject.

### **Recommendations**

- A+LS should be introduced as a part of a whole-school approach and target setting approach.
- The purpose of the use of A+LS in all lessons should be made clear to pupils as well as to teachers.
- If Year 1 pupils are involved in use, they need to be given time and support in how to be as familiar with the use of the system as are other classes.

- Use of the A+LS could be linked in sessions to a priority or weakness arising from other lessons, or to the introduction of a new topic, or to a need for practice of certain specific techniques, for example.
- The targets that pupils should achieve in A+LS sessions need to be considered, perhaps, in terms of the importance of total or partial correctness of answering at any particular stage. Setting targets for tests might be varied between 70% right, and 100% right, dependent upon the need for total accuracy. If pupils cannot achieve 100% correct answers, they could be directed to practise or tutorial material, or be asked to seek teacher help.
- Not all lessons have the speaking facility option available. For SEN and pupils with low reading levels, spoken instructions are almost a total necessity. Teachers and classroom assistants need to be able to see easily when this facility is not available.
- Some questions within exercises enable guesswork to be used as a means for pupils to answer quickly. Guesswork should be minimised by the use of appropriate questions, or by the system identifying pupil response times and guesswork patterns.
- Some answers to questions are marked incorrect when certain protocols are not adhered to. These protocols are not made known to pupils tackling these questions. For example, pupils who miss out 'pm' when a time is included, or when they write '1 hour 30 minutes' rather than '1:30', or not entering a book title with a specific use of capital letters, can lead to confusion.
- Pupils sometimes spend a great deal of time on certain questions. Guidance for teachers on how long pupils should spend on questions before moving on to another question should be offered.
- Use of the assessment system should be explored more with schools at this time, in order to see how this facility can aid the target setting process, whereby pupils can identify their own targets more and more, and use the assessment system with the teacher to look at their achievements perhaps.
- Uses of the assessment package to support target setting and achievement could help to focus on purpose and effectiveness to far greater extents, but the length of tests and the nature of tests within A+ssess is currently a major weakness.
- Case studies of schools where use of A+LS has been reported by teachers to have led to pupil improvements should be made available as soon as possible to support and develop appropriate involvement and interventions in other schools. Mechanisms to share these practices should be considered by both the Northern Grid for Learning and Learning Pathways Ltd.
- Patterns of integration and use are likely to be supported by two levels of advice or case studies – models of integrating A+LS into whole school practice; and guidance about integrating A+LS into curriculum and lesson practice.
- Some pilot schools have considerable experience of identifying the appropriateness of each lesson for their match to existing pupil attainment. The recording and sharing of this experience would be likely to be of value.

## 6. Outcomes concerned with classroom environment

### Match of A+LS use with the social, emotional and behavioural contexts of pupils

The match of the A+LS with the social, emotional and behavioural contexts of pupils is reported positively in all schools involved in the evaluation. Teachers have found that A+LS can be used in all year groups in primary schools. There tends to be a reported trend which suggests that ‘higher ability’ pupils are supported more up to and including Year 3, that pupils of all abilities may be supported in Year 4, but that in Year 6 ‘lower ability’ or ‘those working up to level 4’ are those who can benefit most from A+LS use. It should be noted, however, that this trend can be determined largely by types of appropriate teacher support or intervention.

The ways in which five schools considered the match of the A+LS to their different year groups is given in the table below.

School A	Considered more useful for pupils with special needs and for ‘average ability’ children in Year 3. Some pupils need to use sound as they have limited reading capacity. In Year 4 more able pupils are reported to gain more. In Year 5 the amount of text can put off ‘lower ability’ pupils.
School C	Pupils can talk about their ideas with other pupils and with adults before writing, supporting their strengths in terms of verbalisation.
School D	Tends to fit well with social and emotional needs of ‘lower ability’ pupils.
School E	Visual and instant feedback supports the emotional and behavioural needs of all pupils of all ages.
School F	In Year 3 it is felt to match average and high attainers, but in Year 4 it is felt in one class to match high attainers, but low attainers in another class. It is felt to match low attainers in Year 6.

**Table 8: Match of A+LS use to social, emotional and behavioural contexts of pupils in 5 schools**

A case study in one school shows that the use of A+LS does meet the different social, emotional and behavioural contexts of pupils in different year groups. The school involved was able to integrate the use of A+LS across all classes in the school in a very short length of time. Not only is A+LS used in all classes in the school, but the approach adopted in the classes considers how pupils moving from class to class can be involved in elements of appropriate progression - both in terms of the focus of A+LS use on specific curriculum aspects, and in terms of the use of the A+LS by pupils in ways which foster increased independence as pupils become older.

It was found that in Year 1 pupils need support in becoming familiar with the operational system of A+LS. Pupils may not have experienced ICT use either at home or in school to any great extent previously, so they will initially take time in becoming familiar with operations such as logging on. Pupils in Year 1 also need to be given details about what to do when they use the system. For example, if pupils get 5 out of 10 for a practice or for a test, what should they do? Teachers need to set expectations about use appropriately so that pupils can react and behave appropriately. At this age and stage of literacy development, pupils also need to access and use the sound system in order to be able to listen to the written text.

By Year 2 pupils are gaining incentives from the use of game tickets which are helping them to address the tasks they are presented with successfully. This facility they appreciate particularly. In this year group the teacher can circulate and help individual pupils, rather than guiding the whole class. At early stages in the use observed in classrooms, some pupils were confused by American words and phrases, so the English version is appreciated particularly for this reason at this age. At this age pupils appear to work well on their own, and pupils are focused on task throughout sessions.

In Year 3 use of the A+LS can shift from a focus on reinforcement to a focus on introduction of new topics and materials. In the case study school, the teacher began to use the A+LS to introduce a topic, rather than using it to reinforce existing work already covered. Pupils when involved in this way were attentive throughout the length of the sessions.

Independent use could be seen to be increasing as pupils of older ages were observed in classroom situations. In a Year 4/5 class, pupils were able to work entirely on their own. Pupils did not necessarily need to be given explicit instructions about the progression of types of activity to be tackled. Pupils worked from study exercises, then moved to practice exercises, and then to text exercises. Essay questions at this stage did not appear to always be of direct value, however.

By Year 5, pupils work quietly, quickly and easily on the material and the resources offered, and these are clearly challenging pupils. At this age pupils work readily on all types of exercise, including essays.

It is interesting to consider how a further month of use and child development in this case study school affected the match of A+LS use to the social, emotional and behavioural contexts of the pupils. After a further month of A+LS use, the pattern of use and match to social, emotional and behavioural contexts of pupils had not shifted significantly.

In Year 1, pupils were still gaining familiarity in ways to operate the system – they clearly needed quite a lot of focus on this aspect from an early stage. They also clearly required very clear instructions on how to handle the responses they were getting, and needed to know their purpose in using the resource.

In Year 2, pupils used the system with ease, and appeared to know what was expected of them. A+LS was used in this year group to look at specific curriculum areas, such as literacy need.

In a Year 4/5 class, pupils worked easily on the material. They appeared to see purpose in using it, and to be gaining interest from use of the material. Pupils were well engaged throughout lessons, and the teacher appreciated the new UK-versions of the activities. To gain even more from the activities used in sessions, use of outcomes beyond the lessons could be focused upon to greater extents, perhaps.

In Year 5, pupils engaged with the activities and worked quietly on them. The teacher was able to circulate to monitor progress, and pupils were clearly gaining a reasonable level of success.

Using lessons as the means of providing access to and use of A+LS resources is not the only way used by schools in this pilot. Other ways have been observed in which a match of A+LS use to the social, emotional and behavioural contexts of pupils has been gained. In one school A+LS is used as one activity in a range of activities available during a Breakfast Club, which operates from 8.00 a.m. daily. In one session, 19 pupils were in the computer room in the breakfast club session. They had free access to ICT use, with 14 machines being used at any one time. Various programs could be chosen, yet five pupils had selected A+LS, three pupils were using an RM Window Box program, three pupils were accessing the internet (the top 40 chart or a pop video), and three pupils were accessing an Espresso video about shopping or word games. Children came into and went out of the session at will, but most pupils who came into the session stayed and remained on task. One girl who was using A+LS work wrote notes, without any prompting, about the material she had accessed. Pupils worked easily and happily on the resources, without disruption, without behaviour problems, without pushing, and without hassle (even though behavioural and emotional problems can arise in the school - which caters for a catchment with severe social deprivation). Children accommodated each other within this environment, and when the bell went at the end of the session, they logged off and left the room and facilities in a tidy state. The pupils clearly appreciated the use of the resource.

### **Match of pattern of A+LS use with the social, emotional and behavioural contexts of pupils**

Patterns of use varied from school to school across the pilot. In three schools in the pilot, all pupils in a range of classes were involved, in two cases involvement was on a half class basis, and in another case the school arranged working on the A+LS in pupil pairs. In two schools, groups were selected for

targeted use of A+LS. In the case of targeted use, intentions were clearer, and the focus of the resources and monitoring of outcomes was more strictly undertaken. In these schools the targeted use matched whole school concerns about the use of assessment data to target the enhancement of learning achievement. Patterns of use in six schools in the pilot are summarised in the table below.

School A	Year 3 is divided into groups, and in one lesson two groups (12 pupils) went on the computers to access A+LS, then the groups changed halfway through the lesson.
School B	Pupils working to level 4 are targeted, and use the A+LS between 8.30 and 9.00 each morning.
School C	Pupils in the middle band of Year 6 are targeted to use A+LS.
School D	Teachers can only use A+LS in literacy or numeracy time, but can gain access in classrooms as well as in the ICT suite.
School E	Use tends to be in the morning when literacy work is undertaken, with pupils working in pairs. Half classes have been found to be too demanding to manage, but there is a recognised need to match pupil pairs carefully.
School F	Use of A+LS is in the breakfast club run every morning, and each class accesses the suite for one session each week. A half class uses the system at any one time, supported in some cases by a parent helper.

**Table 9: Patterns of A+LS use in 6 schools**

### **The behavioural, effective and cognitive characteristics that lead to recognisable effective use**

Pupil independence is a feature of use which is considered differently in different schools. Schools are generally concerned with the need to develop growing independence with regard to learning, but few schools have adopted particular strategies with regard to this issue when they are using A+LS. Who takes the responsibility for learning is a key factor concerned with independence, which is addressed more readily and sometimes more actively by those schools or classes who identify targeted groups for A+LS use than by those who seek to offer access for all pupils equally. The approaches of three schools involved in the pilot in this respect are given in the table below. It will be seen in the table that pupil independence is concerned with factors such as choice of activities to undertake from the A+LS menu, identification and discussion of individual learning targets, the philosophy of the school assessment system and ways in which it operates, and school expectations.

School A	Pupils can choose items from the list of lessons available in their program, but some try to start by choosing a practice session instead of a study session.
School D	Targets are set for each individual pupil, and these are discussed with pupils and parents.
School E	Patterns of activities work well, and after two sessions the pupils worked independently on the system. It is felt that pupil expectations should be in line with the school assessment system.

**Table 10: Features of pupil independence reported by 3 schools**

## 7. Outcomes concerned with classroom management and ethos

### Optimal time for use by age

Access patterns have varied from school to school. In the case of whole class use, access is generally provided at the level of one session per week (somewhere in the region of half an hour being available per pupil per week). In the case of targeted groups, schools use time more flexibly, offering access before school and in lunch times, and considering more the level of access on an individual pupil need basis, rather than on an average pupil time level basis. Approaches of five schools in the pilot in this respect are shown in the table below.

School A	One session for each class each week.
School B	Use of time before school starts.
School C	Try to provide 20 minutes each day for each pupil, and the target group access the A+LS each day (on four days for literacy work and on one day for more general work).
School D	Used once a week for reinforcement.
School E	Used for one session each week.

**Table 11: Access patterns to A+LS in 5 schools**

### Teacher understanding of times of use

Times of use have largely been determined by pragmatic issues rather than use of guidance based upon existing practice. Schools have tended to consider the extent of access available, and the timetable potential as leading factors to determine times of use. This has sometimes meant that resource areas have been underused, and that classes have had limited periods of access to the A+LS resources. In some schools, however, maximum access and use has been achieved, but this has sometimes meant that classes have spent up to an hour on A+LS resources (not always fully effectively).

### Times of use in relation to school days

Some schools have found that times of use for A+LS resources have competed with what they have seen as times for undertaking the literacy or numeracy hour. Sometimes this has meant that A+LS use has either been a secondary resource to classroom teaching of the literacy or numeracy hour, or that the use of the resources has tended to be left until the afternoon (when other activities compete just as much). For these reasons the only effective uses and outcomes have been observed when two features have been common: a whole school approach at a senior management level has been adopted; and an integrated approach involving the interaction between the A+LS resources and numeracy and literacy needs has been developed.

### Teacher training outcomes

Initial training has enabled use of the A+LS in all schools. However, training on the use of the assessment resources was recognised as a necessity in order to enable some schools to move forward positively at a fairly early stage. The initial amounts of training involved in three schools in the pilot are given in the table below.

School A	One hour of training was sufficient to enable the system to be used, but nothing was covered on the use of the assessment system.
School C	One initial meeting and a twilight session was used only.
School E	A one and a half hour training session for one member of staff was provided, but other staff would like more training generally. The system in use is neither used to track or monitor progress, or to engage pupils in self targeting.

**Table 12: Initial training involved in 3 schools**

One ICT co-ordinator in one school gained training from Northern Grid for Learning personnel on how to use the A+LS system, including how to access assessment records. The Northern Grid for Learning training included looking at how to print off pupil reports. Following the training with Northern Grid for Learning personnel, the ICT co-ordinator input all group names into the system, ready for all staff to use the system. She also wrote in 'Idiot's Guide' on how to use the A+LS system,

for all staff to use. A staff INSET session was run, and in just over an hour all staff entered their lists onto the A+LS in readiness to start to use it.

Exemplary practice of A+LS lessons requires teachers to adopt strategies which would be found in any exemplary practice situation, such as the introduction of the lesson with its objectives, and a discussion of lesson achievements and outcomes in a plenary session. In one exemplary lesson in one school the teacher identified a school, class and subject weakness as an aspect to cover within the lesson. The teacher told the Year 4 pupils about the problems on that day which were associated with temperamental logging on. He introduced the lesson and said the purpose of the lesson was to look at division – a weakness of the class and the school. He said that pupils should look at the program, and find out what certain terms meant – quotient, divisor, and the relationship of multiplication and division. The teacher said to go through the lessons on the clipboard, but not to do a game until at least two tests had been done. After 19 minutes the teacher asked pupils to log off, and to turn to the board. The teacher asked pupils for the names of the parts of the equation. One boy answered, and the teacher asked who agreed. The teacher derived definitions for divisor and quotient, by discussion with the class. There were no notes created for use for revision or referral purposes subsequently.

### Teacher evaluations of degrees of integration of use

Generally schools report that the A+LS materials offer a useful degree of coverage of and integration with QCA Schemes of Work, with the National Literacy Strategy, and with the National Numeracy Strategy. The degree of curriculum integration as reported by four schools in the pilot is given in the table below.

School A	Some things are not felt to be relevant, but it is felt that it is fitted to lesson objectives.
School B	Initially pre-tests were used to select sessions for pupils, then as time went on the teacher identified sessions relating to lesson work.
School D	Curriculum constraints create difficulties in terms of fit.
School E	It is reported to fit into the literacy strategy well, and is easy to pick out objectives. It is possible to pick out pieces to fit QCA Schemes of Work, the NLS, and the NNS.

**Table 13: Degree of curriculum integration of A+LS reported by 4 schools**

Specific and appropriate teacher intervention to support pupils before, during and after A+LS use tends to have been addressed most fully in the cases of schools where targeted groups are involved. This may be due to the fact that attention is being given to the individual pupil already, or that the A+LS resources enable this focus to be followed through readily, or both. This is shown by how support was given in the two schools in the pilot where targeted use was involved, as indicated in the table below.

School A	During a Year 3 lesson with half the class using A+LS the teacher had spent the vast majority of the time with the half group.
School C	A deputy head teacher provides support for a targeted group of pupils.

**Table 14: Teacher support for A+LS reported in 2 schools**

### Use with individuals, pairs, and groups of pupils

Schools have reported fairly commonly on issues they face initially when making decisions about pupil groupings for use of A+LS. Some schools have reported that they have identified classroom management issues, while others have solved these same issues. There is clearly a potential for the sharing of practices used by schools who have successfully addressed classroom management issues and problems. Some classroom management issues are concerned with how the use of the A+LS will help teachers save time when considering assessment of pupil learning in specific respects. Few schools used the assessment resources within A+LS in the initial phase. Some management issues in two schools in the pilot are given in the table below.

School A	Some groups are more demanding than others, and while this may create an immediate challenge, it is the use of pairing, the focus that pupils are given, feedback, subsequent teacher actions, and future learning that all need to be given particular attention if outcomes of use are to be enhanced further.
School E	No use has been made of the A+LS assessment package.

**Table 15: Management issues arising in 2 schools**

### **Use of A+LS with lesson plans and schemes of work**

In all schools observed the use of A+LS has been considered after development of lesson plans and schemes of work for subjects or topics. Even when timetable considerations have given some level of priority to use of A+LS, teachers have needed to work out how to integrate use into existing lesson plans and schemes of work. This has meant that sometimes A+LS has been a secondary or support activity. In other cases, however, teachers have used the A+LS as a resource to use with other resources within lesson plans and schemes of work successfully and effectively. In some cases teachers have achieved this alone, while in one case use of classroom assistants has enhanced this integrative approach to a considerable extent.

### **Class size and grouping used**

A range of approaches has been taken by schools in the pilot to the grouping of pupils. In one school the ICT co-ordinator was not sure how to best arrange pupil grouping on the system, but she indicated that she had used closely matched pairs of pupils in terms of their subject abilities (matched in pairs from a class of 35). One pupil could do a section of work in one name, the other pupil could do a section in another name, or both pupils could complete the work in another name. Using this form of grouping, whether pupils would benefit from being able to see and discuss assessment outcomes of their work was not clear.

Another method suggested, and used by another school, was to select a pairing of pupils with widely separated ability, in terms of a specific subject area (it could be science, ICT, mathematics, literacy, etc.). One pupil of higher ability would be a designated ‘supporter’, and the other pupil would be a ‘leader’. The roles of each pupil would be identified – the ‘leader’ would be encouraged to talk about their work, to take actions, to make decisions, and to complete assignments; the ‘supporter’ would be briefed to listen to what the other pupil had to say, to guide ideas, but not to complete any assignments. In this case the value of assessment outcomes to the teacher would be likely to be of particular interest.

### **Identification of pupil expectations**

Use of target setting has been a common feature of classes where successful outcomes have been identified. In one school, for example, the ICT co-ordinator started to use the system with her class, and focused on resources concerned with Compound Verbs. In thinking about target setting by pupils themselves, she encouraged pupils to select the level of work on Compound Words which they felt they were capable of tackling. She found that pupils as a result discussed these choices afterwards. Some pupils indicated that they should perhaps have chosen material which they had missed out and not included, while others felt they wanted to go on to use material beyond the scope of that which they had used.

Using target setting strategies in classes can mean that uses of A+LS covered in lessons are discussed or used in non-A+LS based lessons subsequently. In this case target setting practice is providing the vehicle for linking A+LS outcomes with other learning experiences and outcomes in other situations.

### **Community or parent involvement**

No use of A+LS within the schools has involved community or parent use directly. However, in one school, use of A+LS has been a fundamental feature of a Breakfast Club which has involved parent helpers.

## **8. Outcomes concerned with teacher practice and teacher beliefs**

### **Levels of teacher beliefs**

Teacher beliefs in the A+LS have been an important factor in terms of both use and outcomes. Teachers and head teachers that have been positive about the potential of the system have integrated use most effectively. It has been a matter of 'fine tuning' for these teachers, rather than 'proof of use'. In at least three schools observed, there have been sufficiently high levels of belief of use and outcomes to markedly affect the impact that A+LS has had upon pupils.

### **Identification of perceptions of teacher-pupil relationship**

There has been a stark contrast between the perceptions of teachers who have approached use of A+LS as a means of teaching, and those who have approached its use as a means of learning. Undoubtedly the most effective outcomes have arisen from the latter approach, and this has led to the development of more pupil-centred approaches where pupils have gained more independence and responsibilities for learning. In one school there has been a marked shift in the approach that pupils have taken within A+LS sessions when teachers and classroom assistants have moved from a teacher-centred to a pupil-centred approach. Pupils who were previously engaged on task at quite low levels (even when using A+LS), and who displayed little responsibility for their work, showed, within a matter of two school terms, marked improvements in their engagement levels, and marked improvements with regard to their involvement with the work and the responsibilities they were taking for it.

### **Use of reinforcement and review beyond use of A+LS**

Reinforcement and review beyond the use of the A+LS has largely been observed where target setting approaches have been put into place within schools. With target setting practices, the use of the A+LS becomes an integral part of the identification of targets and a means to move towards those target outcomes. Reinforcement in this form of system is a reinforcement of aspects of learning that are recognised as being weaknesses or strengths, and review becomes a means to identify whether a target or targets have been reached or achieved.

### **Identification of learning support for individuals and groups**

The use of A+LS and A+ssess have both helped to identify specific areas of learning support for individuals and for groups of pupils. In most cases schools have been concerned with its use in the support of groups rather than individuals, and schools have used a range of ways to monitor and to track this need. In some cases senior teachers have taken responsibility for this area, while in other cases classroom assistants in association with teachers have taken this responsibility.

## 9. Outcomes concerned with pedagogy

### Levels of knowledge processing being undertaken

The A+LS resources are organised into five types of activity: study; practice; test; essay; and games. Observations have shown that pupils often need to be given guidance or clear instructions from teachers as to which type of activities they should work on in any particular session. Essay forms appear to be of a lower value to pupils in Years 1 to 3, and some pupils of this age and older will tend to focus on doing tests when the incentive to complete these is to give them access to a range of games.

The interest generated and the learning potential of tests and practice sessions is recognised by pupils. The potential for the use of essays and study sessions is not so clear to pupils, especially when teachers do not focus pupils on appropriate use of these, and on the purpose of these before, during, or after sessions. Ways in which certain activities were considered in two schools in the pilot in this respect are given in the table below.

School A	Tests and practice sessions appear to have more potential than do essays and study sessions.
School E	More able pupils tend to only want to do the test, and not the lessons.

**Table 16: Experiences of 2 schools with the types of activities available**

It is clear from observational evidence that the numbers of pupils working on any type of activity at any given time is determined by a range of factors: teacher guidelines and guidance; pupil interest; and the stage in the lesson reached. For example, in one school, a Year 2 class, when part of the way through the lesson, were mainly involved in use of study, practice and test activities (as shown in the table below).

Type of activity	No. of pupils working on these
a study	4
a practice	4
a test	5
an essay	0
a game	1

**Table 17: Numbers of Year 2 pupils working on specific activities**

In a Year 3 class, it was clear that the pattern of use regarding type of activity could change within a matter of a few minutes. Six minutes into a lesson the number of pupils working on specific types of activity is shown in the table below.

Type of activity	No. of pupils working on these
a study	4
a practice	9
a test	2
an essay	0
a game	0

**Table 18: Numbers of Year 3 pupils working on specific activities 6 minutes from the lesson start**

Fourteen minutes into the lesson the number of pupils working on specific types of activity is shown in the table following.

Type of activity	No. of pupils working on these
a study	3
a practice	3
a test	7
an essay	0
a game	0

**Table 19: Numbers of Year 3 pupils working on specific activities 14 minutes from the lesson start**

This shift in attention across the class can provide a particular challenge for the teacher. The teacher may need to decide in advance which types of activity to monitor in order to support individuals. Alternatively, the teacher may decide to let most pupils work through the activities in their own way, in order to focus their support on particular individuals within the class.

Teachers can ask pupils to focus on particular types of activity to serve particular purposes. In a Year 4 class pupils were asked to use the study activities to check their knowledge of a particular aspect they were addressing. The effect of this was clear when observations of use were made. Eighteen minutes into the lesson the number of pupils working on specific types of activity is shown in the table following.

Type of activity	No. of pupils working on these
a study	11
a practice	1
a test	1
an essay	0
a game	1

**Table 20: Numbers of Year 4 pupils working on specific activities 18 minutes from the lesson start**

In a Year 4/5 class observations showed that pupils can quickly complete some activities, and that there can be a high level of use of games after less than 20 minutes from the start of the use of A+LS. Three minutes into the lesson the number of pupils working on specific types of activity is shown in the table following.

Type of activity	No. of pupils working on these
a study	11
a practice	0
a test	0
an essay	0
a game	0
not logged on	2

**Table 21: Numbers of Year 4/5 pupils working on specific activities 3 minutes from the lesson start**

Twelve minutes into the lesson the number of pupils working on specific types of activity is shown in the table following.

Type of activity	No. of pupils working on these
a study	7
a practice	3
a test	2
an essay	0
a game	1
administration	1

**Table 22: Numbers of Year 4/5 pupils working on specific activities 12 minutes from the lesson start**

Nineteen minutes into the lesson the number of pupils working on specific types of activity is shown in the table following.

Type of activity	No. of pupils working on these
a study	4
a practice	0
a test	0
an essay	2
a game	8

**Table 23: Numbers of Year 4/5 pupils working on specific activities 19 minutes from the lesson start**

The shift in focus from one type of activity to another can be used by the teacher as an indicator of how well pupils might be progressing. It might under other circumstances be used to identify the need to refocus the attention of pupils, however.

The low incidence of essay use is highlighted in the table above, and specifically this is shown by details from a Year 5 observation. Sixteen minutes into the lesson the number of Year 5 pupils working on specific types of activity is shown in the table below.

Type of activity	No. of pupils working on these
a study	2
a practice	3
a test	3
an essay	0
a game	5

**Table 24: Numbers of Year 5 pupils working on specific activities 16 minutes from the lesson start**

When pupils are focused on targeted use, high levels of test use are sometimes observed. In one Year 6 class observed the high incidence of test use was highlighted. Fifteen minutes into the lesson the number of pupils working on specific types of activity is shown in the table below.

Type of activity	No. of pupils working on these
a study	0
a practice	2
a test	6
an essay	0
a game	3

**Table 25: Numbers of Year 6 pupils working on specific activities 15 minutes from the lesson start**

### Integration of outcomes with teacher and pupil use

Different teachers in the pilot have used the A+LS resources to support classes and pupils in different ways. The table below shows different uses by six schools. As older pupils are involved, and as the stage of use develops, schools tend to move from use of the A+LS for reinforcement purpose alone, to increased use for introducing topics, and subsequently for targeted use by selected pupils.

School A	Used as a teaching support or enhancement.
School B	Teachers encourage pupils to consider how the system has supported their learning.
School C	Used to support specific learning needs, such as grammar, or use of paragraphs.
School D	Used to reinforce topics in class, but teachers select sessions for individual pupils.
School E	Used a lot for reinforcement and for review, but also used to introduce new ideas.
School F	Lessons are programmed according to ability group, and how the ICT co-ordinator perceives abilities of pupils in the class. No targeted use has been undertaken.

**Table 26: Uses of A+LS reported by 6 schools**

In situations where all pupils gain equal levels of access, reinforcement tends to be the major use of the A+LS. Where targeted groups are involved, the A+LS is often used to introduce ideas, as well as to reinforce existing work, and to help pupils monitor their own learning needs and their own learning outcomes.

In one school the ICT co-ordinator reported that staff saw the potential for use of the A+LS after only a few weeks of use. However, they were reported to be seeing its use largely for reinforcement purposes. As a consequence, the ICT co-ordinator started to put ideas to staff about the use of the A+LS for introducing ideas and concepts, and then to reinforce these in class.

Across a school, uses of A+LS can also vary. Schools need to co-ordinate their variety of uses to ensure that the progression of use from year group to year group is desirable. An example of a progressive pattern across a school is shown in the table below.

Year	Subject Area	Topic	Purpose
1	Literacy	Spelling	Not clear.
2	Literacy	Capitalisation and linking words	Reinforcement of particular aspects of literacy.
3	Literacy	Spelling	Individual practice.
4	Numeracy	Division	To clarify the meaning of quotient and divisor, the relationship between division and multiplication, and to practise an area of recognised class and school weakness.
4/5	Literacy	Word endings and vowel sounds	Practise with specific aspects of literacy.
5	Literacy	Spellings and homophones	Practise with specific aspects of literacy.
6	Literacy	Prefixes	Practise with specific aspects of literacy.

**Table 27: Pattern of uses in each year in one school considered from a perspective of progression**

### Means to find effective starting points for pupils

Teachers and classroom assistants have needed to become familiar with the lessons covered within A+LS before using them in pupil sessions. However, in one school A+ssess was used to identify starting points for pupils, but it was found to be time consuming, and to lead to pupils being placed on resources that were too easy for them if lessons were selected automatically without teacher or classroom assistant review. In two schools teachers have trawled the resources within A+LS to find material that is suitable for pupils to work on. This has been a time consuming process, and it is suggested that the outcomes of this process should be captured for future use by other teachers if possible.

### **Identification of pupil problems**

Pupil problems have often been recognised by teachers prior to use of A+LS, and the use of A+LS has been a means to provide activities to attempt to redress these problems, rather than to identify more specific issues or other problem areas. Teachers have tended not to use A+LS to identify more specific or other problems. This appears to be at least in part a perceptual issue – teachers have tended to regard A+LS as a means to overcome problems, rather than as a means to identify problems.

### **Creating activities to address problems**

As a consequence of the perception of what A+LS can achieve in terms of addressing problems, teachers have tended not to create activities beyond the use of A+LS. In some ways A+LS has been considered as a ‘last resort’ or ‘other resort’, rather than as a stepping stone. A+LS itself neither has the capacity, nor is it used as a means to alert teachers to other potential activities beyond those within the system itself.

### **Diagnostic mechanisms available for teachers**

Other than the use of A+ssess, A+LS has not been used as a diagnostic mechanism or as a means to think further about diagnostic mechanisms. Target setting in some schools has been considered as both a means to target future goals and as a means to diagnose needs. In this respect the ways in which A+LS could have been used have been perhaps restricted, but teacher perceptions in this area have tended to indicate that they are not immediately struck by the potential of the system as a means to consider potential or available diagnostic mechanisms.

## **10. Outcomes concerned with structural aspects of the program**

### **Use of the management and assessment programs in A+LS**

A number of pilot schools have now used A+ssess. Outcomes of use suggest that whilst this method is recognised by teachers as offering value, that it needs to be refined further if it is to be used more widely and more effectively.

When A+ssess has been used, teachers have the option of either allowing the system to indicate lessons for pupils to tackle identified weak areas, or of selecting lessons themselves for pupils to use. It appears at this stage that A+ssess is certainly identifying the areas of weakness that teachers would identify, but that automatically selected lessons might be rather too easy for pupils under some circumstances.

Use of A+ssess has shown that pre-tests often have large numbers of questions (100 or more), which can be tedious for pupils to take. Some pre-tests have taken 4 lessons to be completed by pupils (some 4 hours of time). On one occasion, for example, it was observed that one pupil spent 30 minutes attempting to tackle a question which was difficult. Pupils seem to tackle about 24 questions on average in an hour. Teachers need to feel that 4 or more hours of a pre-test and post-test will be of more value than an alternative activity. It is not clear that this currently is the situation, especially as use of A+ssess has been shown in at least one pilot school to be reinforcing the ability of pupils to work more independently.

### **Diagnostic accessibility of the management and assessment programs**

The management system of both A+LS and A+ssess have been found to have had limited value in some respects. Teachers or classroom assistants have often had to create their own means to collate information in order to gain the diagnostic outcomes which they want. In terms of the potential use of the existing system, this appears to be a weakness. The computer management system should be able to collate outcomes, so that a teacher or classroom assistant can see easily, for example, the number of pupils who have failed to gain an understanding about a particular curriculum topic. In at least one school a senior teacher has taken considerable time in creating a tick sheet in order to gather this information together, which should ideally be given on a print-out.

### **Use of print-outs to extend learning beyond immediate A+LS use**

There has been no use of print-outs observed which extend learning beyond immediate A+LS use. In some respects this is a weakness of both the system itself, and of the use of the system by teachers. Some schools could manage to integrate the use of A+LS more effectively for large classes by using print-outs alongside computer access.

## 11. Measurable outcomes

### Teacher perceptions of benefits of use and outcomes

In two of the trial schools teachers report benefits of use and outcomes. In both of these schools there is an approach taken to use of A+LS which is in a wider whole school assessment and target setting context and practice. Benefits of use and outcomes tend to be reported in terms of enhanced time on task, enhanced enjoyment of learning activities, and in terms of improved understanding of certain concepts or learning areas. Benefits have been reported both in the areas of literacy and science. In both cases, teachers have indicated that external SAT results have, in their view, shown that their perceptions are backed up by this outcome evidence.

### Pupil perceptions of benefits of use and outcomes

Indications of pupil benefits arising in some schools in the pilot suggest that A+LS has impacts upon pupils and their learning. Indications from three schools in this respect are given in the table below.

School A	None noted.
School C	Pupils are all able to indicate what they believe A+LS has helped them with, such as similes, use of paragraphs, or the purpose of writing. Half termly tests show improvement of target groups, and A+LS is believed to be a factor involved.
School E	One child with behavioural difficulties works well when he can work independently, staying on task for 10 minutes longer than on anything else. Use last year was felt to have contributed to SAT achievements.

**Table 28: Pupil benefits reported by 3 schools at an early stage**

Individual pupil benefits are reported in schools where teacher intervention supports pupil involvement, and pupil outcomes. In two schools SAT results at the end of Key Stage 2 indicate that A+LS is supporting learning outcomes. In these two schools the higher levels of attainment of pupils are being partly put down to the combination of A+LS with other forms of support and intervention. Case studies of these instances should be made available as soon as possible to support and develop appropriate involvement and interventions in other schools. Mechanisms to share these practices should be considered by both the Northern Grid for Learning and Learning Pathways Ltd.

In one school a Year 6 class group had a poor start at the beginning of the year – but the teacher has taken them to level 5 in a year. The teacher says that at the beginning of the year only one pupil was at level 4 in all subjects. Pupils in the class are clear about how A+LS has helped them. One girl says she has benefited from the use of the A+LS. She says it helps understanding of things in class. She says some things she can use more as reinforcement of existing knowledge, while other things she finds are introduced for the first time. She says she uses the system two or three times a week, and has maintained interest in the resource throughout the year. One boy says he thinks it is ‘inspirational’ – and it has helped him in learning. Another girl says she thinks use of the resource has helped in terms of practice.

The teacher says that these pupils could be taken to the A+LS resources by any teacher and they would be able to use and focus on their learning needs with this material. The teacher says that the pupils now work very independently, and that this is partly due to the use of the A+LS resources.

### Pre- and post-tests to measure extents of perceived outcomes in literacy and other specific curriculum areas

In one pilot school, at the end of Year 6 in 2001, 10 pupils had not used A+LS. Their Year 6 SAT results, end of Year 5 optional SAT results, and added levels are shown in the table following.

Pupil	Year 5 SAT	End of Year 6 SAT	Added levels
1	3C	4	1
2	2, 2, 3B	3, 3, 4	3
3	3, 3, 3, 4, 4	3, 3, 3, 4, 4	0
4	2	3	1
5	2, 2B	4, 3	3
6	2	4	2
7	2B	2	0
8	2, 2, 4C	4, 5, 5	6
9	2, 2, 3	3, 3, 4	3
10	3B, 3, 3C	3, 3, 4	1
<b>No of results</b>		<b>23</b>	<b>20 added values</b>

**Table 28: Added levels of SATs across one year for one Year 6 class not using A+LS**

The difference between SAT levels at the end of Year 5 and the end of Year 6 have been identified and listed as ‘added levels’. Using this technique, the average added level per pupil is  $20/23 = 0.87$ .

In the same pilot school, at the end of Year 6 in 2001, 13 pupils had used A+LS. Their Year 6 SAT results, end of Year 5 optional SAT results, and added levels are shown below.

Pupil	Year 6 SAT	Year 5 SAT	Added levels
1	5, 4	4C, 4B	1
2	5, 4, 4	4A, 4, 3C	2
3	4, 4, 4, 4, 4	3B, 3C, 3, 3C, 2	6
4	4, 4, 4, 4	4, 3B, 4, 4C	1
5	4, 3, 4	3B, 3, 3C	2
6	4, 4, 5	3B, 3, 3A	4
7	5, 4, 5	5, 3, 4A	2
8	5, 5	4C, 4C	2
9	5, 4, 5	4C, 3, 4A	3
10	5, 4	3C, 3B	3
11	4, 4, 4	4A, 5, 3B	0
12	4, 4, 5	4C, 4, 4C	1
13	4, 4, 4	4A, 3, 3A	2
<b>No of results</b>		<b>39</b>	<b>29</b>

**Table 29: Added levels of SATs across one year for one Year 6 class using A+LS**

So the average added level per pupil for this group is  $29/39 = 0.74$ .

This form of analysis does not indicate an additional outcome of attainment from A+LS use since A+LS was one of a number of measures used to support pupils in terms of learning. The fact that there is little difference between the average ‘added value’ does not mean, of course, that no additional outcome has arisen, especially as the A+LS was used to support those pupils more likely to benefit (that is, less likely to achieve an additional SAT level). This being the case, the use of A+LS may well have meant that the target group has achieved at roughly the same level as that of the non-target group. These data indicate that those pupils less likely to have gained an additional SAT level have achieved at the same levels as the non-target group. In other words, the A+LS has been a contributory factor in enabling the target group to gain at levels similar to those of the non-target group.

In another pilot school, the target setting was focused on pupils with ‘wobbly 4s’ in literacy. In this case, all of 14 pupils achieved a level 4 or above in English at the end of Key Stage 2 in their SATs in 2001. The deputy head teacher thinks that without target setting, at least 12 pupils would have been unsuccessful (and at least one of these pupils is highly disruptive, and has been excluded by the school on 3 occasions).

In this school and in this year group in total there were 49 pupils, and they achieved a level 4 on average in English. Of the targeted pupils (who numbered 14), they achieved a level 4.5 on average in English. By comparison, in mathematics, the total group achieved on average a level 3.8, while the target group (who were not targeted for mathematics, but for English) achieved a level 3.7 on average. In English there has been a 38% improvement in end of Key Stage 2 SAT results in one year (38% gaining a level 4 or above in English in 2000, and 73% in 2001).

It appears from this evidence, therefore, that A+LS can contribute to enhancing attainment levels when used within an environment concerned with targeted learning. It appears that it can support attainment by helping to raise outcomes at least to that of an average level, and that with other supportive mechanisms could enhance at above-average levels of attainment.

This evidence ideally needs to be corroborated with evidence from subsequent years. If A+LS is able to be recognised as a constituent within a similar pattern within these schools in subsequent years, then the evidence is clearly strengthened and is supportive of the notion that A+LS is enhancing attainment in end of Key Stage 2 SATs.

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