

**Research Methods in Education Assignment**  
**Assessment for learning in Science at RH Primary School.**

**Introduction.**

This assignment explores the development of a small scale research project based on assessment procedures in science at RH Primary School. It summarises current literature in the area and its relevance to practices at the school. Research methods and the suitability and validity of these are also discussed as well as ethical issues surrounding research of this type. RH is a mixed primary school with approximately 250 children on role. It serves an urban area in the South West.

The assignment and the subsequent research project are intended to form a basis for a review and if necessary remodelling of the school's science assessment policies. It is intended that the literature review will provide a summary of what, in theory, effective assessment procedures entail and how these can be compared to those at RH using suitable research methods. The subsequent research is then intended to provide an insight into the assessment that is going on in the school with a view to improving procedures in line with the conclusions of the literature review. This is of particular relevance to me in my current post as science co-ordinator as, in conjunction with the assessment co-ordinator, I have responsibility for this area of the curriculum across the school.

**Context**

As Harlen et al (2003 p72) states, 'There is no doubt that the importance of assessment in education has grown enormously since the beginning of the 1990's.' and this trend can clearly be seen within the school. An increasing emphasis has been placed on the need for an assessment of children's learning and subsequently, a school assessment policy was introduced in 2001. In addition to this the assessment co-ordinator devised a timetable for assessments with the help of subject co-ordinators. This ensured teachers had a clear indication of when assessment should take place and in which subjects.

This structure ensured that some assessment was taking place within the school and improvements were becoming clear. In addition to the statutory national tests, after teaching a topic or block of work, teachers were now provided with a method allowing them to ascertain the grasp of the work the children had developed. In an OFSTED inspection in October 2002, inspectors noted that 'There has been good improvement in the effectiveness of the school's assessment and monitoring of pupil's performance since the last inspection.' (2002 p18) However issues were now raised over the quality of the assessment which was taking place.

The OFSTED inspection team looked closely at the schools assessment policy and the real assessment which was going on in the school. Although there was no doubt that assessment of a sort was taking place, the value that this held was brought into question. The subsequent OFSTED report commented that, 'The school has not yet fully addressed the issue of teachers' use of assessment information to inform the next steps in learning.' and that 'There are no coherent whole school assessment procedures that are linked to the units of work in each subject to enable teachers to identify pupils who need extra support or challenge.' So although progress had been made in the assessment of children's learning, it was made clear that there was still improvements to be made using assessment which informed future learning

OFSTED cited assessment as one the areas the school needed to focus on to improve and emphasised the fact that effective assessment should inform planning and the next steps in pupils learning (2002 p22). As a result of this, subject co-ordinators were encouraged to review assessment in their subjects and work towards making the necessary improvements.

**What is assessment?**

Despite it being a widely used term in education, the meaning and purpose of assessment is widely misunderstood. As Harlen (2001 p2) states, it can be described as 'something that many regard as essential to good teaching and learning,' and 'something that many others consider is destroying good teaching and

learning.’ Despite this, current thinking backed up by current government initiatives suggest that good assessment can have real effects on pupil achievement. (Black et al 2001 p3, Neesom 2000). This in turn suggests that in the constant drive to improve standards assessment must play an important part.

Assessment is described by Lambert and Lines (2000) as ‘the process of gathering, interpreting, recording and using information about pupil’s responses to educational tasks’. They suggest that assessment is broadly split into two main categories described as the ‘two cultures of assessment’ and refer to ‘assessment of education’ and ‘assessment for education.’ Similar ideas are presented by other authors and researchers in the field. Pollard (2002) suggests two main forms of assessment, summative assessment, assessment which takes place to grade performance against expected levels such as in national tests, and formative assessment, assessment which provides information to be used as feedback by pupils and teachers in order to ascertain the next steps for learning.

It is a widely held view that both types of assessment have their place within the classroom and wider educational field, (Lambert and Lines 2000, Pollard 2002, Swain 2000, Harlen 2001) however, each assessment type serves a very particular and different purpose.

### **Summative Assessment – Assessment of Learning**

Summative assessment is defined by Harlen et al (2003 p73) as ‘assessment to summarise learning achieved at a certain time.’ It appears throughout the education system across all age ranges in the form of national testing, such as Key Stage one and Two SATs and GCSEs. It clearly has its benefits as it provides standardised assessment of progress children have made at certain points in their education and gives pupils and subsequently teachers or even employers a grade from which their achievement can be measured. In addition to this, and perhaps more controversially, it provides teachers, Local Education Authorities and the government with a basis for comparing classes and schools in the form of league tables (Sorensen 2000). Summative assessment also forms the basis for measuring performance against local and national targets and as Lambert and Lines (2000) suggest, it attempts to be fair to all pupils despite the issues with validity and reliability which are consistently raised (Williams and Ryan 2000). Clearly this suggests that summative assessment is an essential part of education, the reliance upon which is likely to mean that this will be the case for the foreseeable future. However as Harlen et al (2003 p82) suggest, current research concludes that this alone has little effect on raising standards as although ‘summative assessment is needed for reporting what children have achieved, it does not change that achievement.’

### **Formative assessment – Assessment for Learning.**

Broadfoot et al (2002) define formative assessment as ‘the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there.’ This in essence involves pupils having a real insight as to where they are in their learning and where they need to go next to move on. This type of assessment has recently been subject to a wide range of research projects stemming mainly from the seminal work of Black and Wiliam (2002) and the benefits of this type of assessment have become widely recognised and accepted. It is widely acknowledged that ‘improving formative assessment raises standards’ (Pollard 2002 p312) and initiatives such as that advocated by the Assessment Reform Group (2002) are encouraging teachers to move towards this method of assessment. The research conducted by Black and Wiliam (2002) based on the implementation of formative assessment in 19 classes run concurrently with control classes for one year, concluded that the rise in attainment was just under half a level at Key Stage 2, just over half a level at Key Stage 3 and just over half a grade at GCSE. These significant results suggest that real improvements can be made in the results of summative assessments by using formative assessment throughout the year.

The question arises then, what does formative assessment really involve in a classroom setting and how can the mass of research be applied to the real teacher and the real class? Harlen et al. (2003 p82) provide some answer to this question and suggest that in summary, what Black and Wiliam found was that classrooms which were associated with the gains in learning outlined above, demonstrated the following characteristics.

- a) *assessment is used by teachers to adapt teaching;*

- b) teachers give feedback to children in terms of how to improve their work, not in terms of judgemental comments, grades or marks;*
- c) children are actively engaged in learning – meaning that they are active in developing their understanding, not passively receiving information;*
- d) children are engaged in self-assessment and in helping to decide their next steps;*
- e) teachers regard all children as being capable of learning.*

### **Creating a balance**

The literature clearly demonstrates that assessment can be used for a number of reasons and can have a variety of effects in the classroom. Whilst formative assessment has been shown to make real improvements in achievement (Broadfoot et al 2002, Black and Wiliam 2002, Pollard 2002, Harlen 2003), summative assessment also forms an essential part of the education system as it attempts to provide a fair and standardised assessment of progress which children have made (Sorensen 2000, Lambert and Lines 2000, Williams and Ryan 2000). It becomes clear then, that for assessment procedures in a school to really be effective both in terms of final achievement and in terms of assessing to identify children's next steps, both types of assessment must be embraced. This then raises the question of where the room for improvement, noted by OFSTED, lies in assessment at RH Primary School.

### **The scope of the research.**

The observations of the recent OFSTED report and the results of the review of current literature make it clear that some changes need to be made in assessment procedures at RH. Whilst it is undoubtedly true of most or even all academic subjects within the school, in my role as science co-ordinator, this is the subject which, coming from a whole school perspective, currently involves me most significantly. However, the findings of this research project, if useful, may be of use to other subject co-ordinators facing similar problems. In addition to this, the results will undoubtedly be of interest to the assessment co-ordinator who holds overall responsibility for making the improvements deemed necessary by the OFSTED inspection team.

It is intended that on completion of the research and taking into account its findings, the assessment policy for science will, if necessary be adjusted to ensure assessment which is taking place is effective and useful. This will impact on all class teachers within the school who are required to carry out assessment in line with this policy.

### **The research model**

The first question regarding research models and methods in this assignment is as to whether the research will follow a qualitative or quantitative route. As Scott and Usher (1996) suggest, 'the assumption that they represent two distinct and opposed approaches to the study of the social world is being challenged', however it is clear that although they may not necessarily come from two different paradigms, in a research project such as this where research is being carried out on a very small scale and there is neither the time nor resources available to carry out a large scale qualitative project, it is essential to choose a carefully selected and defined research model ensuring the data collected is relevant and sufficiently valid. Because of this, despite a wide range of methods being considered only three methods will be analysed in detail below.

### **Surveys**

As Denscombe (2003 p6) suggests, despite their association with quantitative data, 'surveys have emerged in recent times as one of the most popular and commonplace approaches to social research.' The intention of this type of research method is to develop a breadth of view from a large research population, which after analysis will then provide an insight into the research question. Denscombe (2003 p6) also suggests two other key characteristics of surveys. Firstly that they are carried out at one specific point in time, in essence providing a snapshot of the situation at that time, and that they involve empirical research

requiring the researcher to collect first hand data by methods such as interviews and observations (Wellington 2000 p196).

The advantages of research which encompasses these things are clearly evident. The use of empirical research where the researcher themselves has gone out to find the evidence from its original source means that there has been no opportunity for bias or manipulation to be introduced. Similarly the width of coverage and the size of the research population 'means that it is more likely that some other approaches to get data based on a representative sample' (Denscombe, 2003 p27). This would therefore mean that in the analysis of the data and in drawing up results and conclusions, it would be easier and more realistic to generalise what had been discovered. In addition to this it could be argued that this is a relatively cheap research strategy to employ both in terms of cost and time, as a survey can produce, within a relatively short time, a large amount of data.

Despite these advantages, there are, as with all strategies various drawbacks. Wellington (2000 p101) suggests that a survey 'is essentially a fact-finding mission and may contribute little to developing a hypothesis or shaping a theory.' which is essential in a research project with the aim of assessing a situation and finding ways to improve it if necessary. It is widely acknowledged that surveys are often associated with quantitative data, and although they have been used successfully in qualitative research, this emphasis on finding out the facts associated with the research question rather than developing an in-depth view, do not suit this type of study.

The width of the research involved in a survey has, as discussed above positive implications for the ability to generalise what has been found out but this must be considered within the limits of the research question asked here. Whilst it may be possible to look briefly at a wide population, a smaller population is in this case readily available for in depth study rather than skimming over a wider area and in fact the basis of the research question involves real issues in one particular school which are not necessarily applicable to other institutions. This suggests that whilst a survey would undoubtedly have great benefits for some types of research it may not prove to be the most suitable for this research project.

### **Action Research**

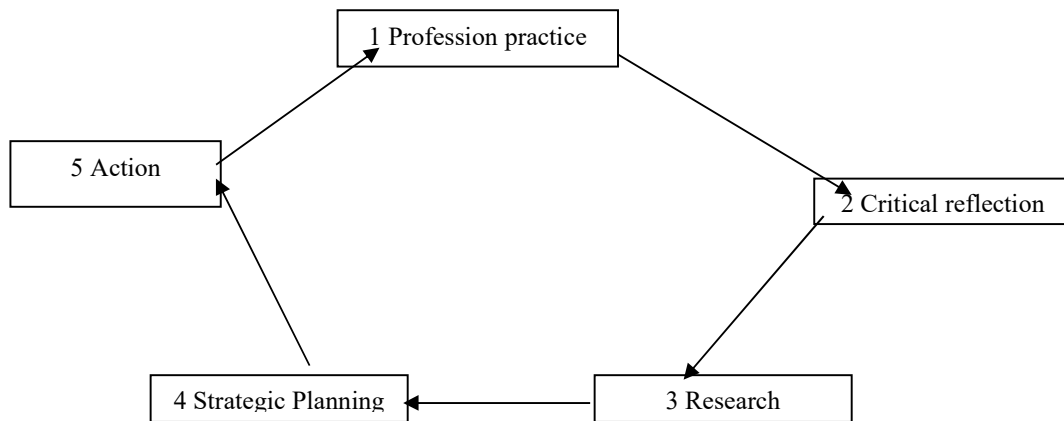
Action research is described by Macintyre (1991 cited in Macintyre 2000) as 'an investigation where, as a result of rigorous self-appraisal of current practice, the researcher focuses on a 'problem' (or a topic or an issue which needs to be explained), and on the basis of information (about the up-to-date state of the art, about the people who are involved and about the context), plans, implements, the evaluates an action then draws conclusions on the basis of findings.' It has become a widely used research strategy in education and forms the basis of an increasing number of research projects in this type of organisation. It is often initiated as the result of professionals wishing to improve their own practice or finding a problem with an aspect of their practice and seeking a way to improve it.

The structure of action research is often summarised in an ongoing cycle (see figure 1 Denscombe 2000 p8). It begins with the identification of a problem setting off a cycle of research into the problem, translation of research findings into action, the instigation of change then further research into the extent to which the action has helped to solve the original problem.

There are obvious advantages to this method as it clearly addresses real issues and problems facing a practitioner and the results are intended to have a real effect on the initial problem. In addition to this it provides a basis for professional development for the teacher or professional involved as well as a development of methods and practices used in the organisation within which it is based. It could also be argued that as it is a practitioner who is carrying out the research, they would probably already have an in-depth knowledge of the situation from which to base further research. However this could also be seen as a drawback.

This close involvement of the practitioner means that the scope of the research is limited to the organisation within which it takes place; this raises obvious issues for the generalisability of the results. In addition to this it means that the researcher may already have ideas around the research question and so the research

may be unlikely to be impartial and detached. Again basing the research within the practitioner's own organisation means that it will be constrained to what is ethical within the organisation and the researcher will still be employed in the organisation after the research is completed which may affect the questions they ask and the conclusion they draw. In addition to this, as the population and setting for the research already exists, it would be difficult, if it was required to change or manipulate variables. (Denscombe 2003 p81).



The cyclical process of action research - Denscombe (2000 p 76)

### Case Study

As Denscombe 2003 states, 'Case studies focus on one instance (or a few instances) of a particular phenomenon with a view to providing an in-depth account of events, relationships, experiences or processes occurring in that particular instance.' It focuses on studying one case in depth rather than aiming for the breadth of study of a survey approach and is interested in gaining a holistic view of the case chosen. The case population chosen, whether a whole school, a class, a group or even an individual, are studied in their natural environment using various research methods with an aim of finding out about the relationships and processes within the case in an in-depth and detailed way.

In following a case study as a research strategy, the selection of the case is crucial to the relevance and validity of the research and there are a number of reasons why a particular case may be selected. As Denscombe (2003 p33) states, the selection of a case may be justified because it is similar to other cases which exist and therefore the results are more likely to apply to other cases or because the case selected 'provides something of a contrast to the norm'. It may also be the case that the selection was chosen because it was relevant to existing theory or indeed as a test of the validity of theory which already exists. In choosing a case to study it also possible to justify the selection because the group or individual were easily accessible to the researcher or it was simply 'intrinsically interesting' (Denscombe 2003 p34).

The commonality of case study research in educational settings suggests that it does hold a wide range of advantages for this type of project. The study of a case in depth provides obvious benefits as it can be both 'illuminating and insightful' (Wellington 2000 p97) for the researcher and subsequent readers of the research project. In addition to this it is firmly grounded in reality and a successful case study project based within particular school would undoubtedly have a substantial value within that school. In addition to this, the possibility of using a variety of research methods increases the likelihood of a realistic understanding of the reality being captured and as Denscombe (2003 p38) states, 'this in turn, facilitates the validation of data through triangulation'.

There are of course also certain drawbacks to the method including access to a suitable case and how to minimise the potential effect an observer may have on a case. In addition to this, there may be issues with generalisability, validity and sampling which are cited by Wellington (2000 p97) as the 'Three Perennial Problems.' As Wellington describes it would be essential for a case study researcher to clearly define how a

case is similar or different to other cases in order for any generalisations to be made and this would first involve careful consideration of the case selected. In addition to this decisions would have to be made about the internal or external validity of the case which again is highly dependant on the sample chosen.

### **The Chosen Research Strategy .**

The analysis of the various research strategies clearly shows that each have their own drawbacks and benefits. However it is necessary to choose a strategy to work with which will be suitable to the research question asked here and will provide as useful, valid and reliable results as possible.

The use of a survey in this case does not do this. Although a survey would provide empirical research covering a wide population, a population of a suitable size is not available. The research question is also concerned with a single school which in itself suggests boundaries to the population which will be studied. As the research question is based on current practice within a school, an action research approach seems sensible. It would provide a method which would address the real problem and evaluate the methods of improvement employed, however this would have to involve the whole cycle of assessing the problem, coming up with a suitable solution, trying it out and then reviewing the results it had. This would be ideal however in this instance it would be difficult as the power to implement the changes, involved, and which would affect the whole school, is held not just by the researcher but also by the senior management team of the school. This would mean that if this type of research were embarked upon, it could not be guaranteed that the action research cycle could be completed.

It is for these reasons that a case study strategy has been chosen for this project. It is hoped that whilst the issues of generalisability, validity and sampling cited by Wellington (2000 p97) will have to be addressed; this method will provide an useful insight into the question posed.

### **The selection of a case.**

As Denscombe (2003 p33) states, the selection of a case for case study research must be justified and can cause some problems. However within the remit of this project, case selection is relatively simple. The case chosen will clearly be intrinsically interesting to the researcher and the results very real and valid for the school involved. The case is readily available for study and no special arrangements will have to be made for this. In addition to this and following the literature review, the case is clearly relevant to the wide amount of existing theory based around the subject. Issues may be raised about the generalisability and external validity of the research however, the literature review also suggests that other schools are in similar situations and so the research may apply to other institutions which are facing similar problems.

### **Research instruments.**

The research method chosen for this project will be based around, although not necessarily in the traditional sense, the use of documentary evidence. The assessment which goes on the school is recorded in a variety of ways, all of which are readily available to me as the Science Co-ordinator. End of topic assessments are placed in record books of achievement which are kept for each child by the class teacher and day to day assessment in the form of marking is written in each child's science book after each piece of work. In addition to this the national test results of the school are readily available and in the public domain. In terms of the authenticity and credibility of this evidence, it is reasonable to assume that the evidence is genuine as it is historical so no bias could have been introduced by teachers knowing that this research project were to take place. The purpose of the evidence in every case is to assess what the children have learnt and has been produced by each child's class teacher. The evidence will always be first hand and should not be affected by a social context or climate.

In choosing a sample of evidence, to ensure a breadth of coverage, the work of three children will be sampled from each of the classes in the school, ranging from Year One to Year Six. The sample will include their current science books, record books of achievement and test scores and an average, more able and less able child will be selected from each class on the basis of their previous achievement in science. I will also ensure that an equal amount of boys and girls work will be considered.

### **Ethical Issues.**

It is obviously essential that any research carried out is ethical and transparent both in data collection and analysis. Denscombe (2003 p134) suggests three things that a researcher would be expected to do in order to achieve this. Firstly he suggests that the researcher should 'respect the rights and dignity of those who are participating in the research.' and that they should 'avoid and harm to the participants arising from their involvement in the research.' He also states that researchers should 'operate with honesty and integrity.' In order to ensure these factors are observed in this project, permission from all teachers involved will be sought including the senior management team of the school. In addition to this and in the right up of the project, no teacher or child will be referred to by name.

### **Further implications of the research.**

This research project is designed to provide a basis for a review and if necessary remodelling of the schools assessment policy in science. It is intended that when the project is completed, the results and findings will be available for all the staff in the school to read and comment upon. In terms of external validity it is difficult to apply any finding from this school to other schools. However, it is reasonable to assume that the findings from the research may have some parallels with similar schools; in similar situations should research also be carried out there. In a similar way the reliability of the research will be focused in the institution involved although may apply to similar schools in similar situations.

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