

Steps for developing a small research project for trainees.

Points to consider:-

1. A clear and achievable question / aim for the research project. Trainees need to be helped to choose a question that can be answered within the time allocated. In the same way as lesson objectives are important, a tightly focused research question at the start of the project helps to guide all other decisions about how to carry out the project and with whom. Projects carried out by trainees include:
 - Do play activities improve learning of ideas about forces in a foundation class?
 - What do pupils gain in a lunchtime club?
 - Do pre-investigation activities improve Year 6 pupils' independent investigations?
 - Evaluation of an intervention to address misconceptions in floating and sinking in 4 children.
2. It helps to give the trainees a few examples of good papers to start their literature review on the topic. Ideally they should include professional and research journals, books and online material. The Internet provides a variety of information but the trainee needs to recognise where this may not have been through a review process so will not always be valid.
3. Using a variety of papers with different ideas can be difficult to deal with at first. Some trainees want to talk / write about each paper they have read separately rather than provide an overview which incorporates all their reading. Asking them to give a talk about their reading to peers can help. It can be pointed out that this is the same process they will use with children. If children 'draft' their work orally first, their writing will be more coherent.
4. The trainees will have to choose a method to test their ideas / question. There is a wide range of methods including:-
 - Observing children / teachers;
 - Giving questionnaires or interviews to teachers, parents and/or children which might have open-ended, multi choice or closed questions; and
 - Examining children's work.

The method chosen should depend on the original question. Trainees easily forget their original aim and collect irrelevant information or ignore important data.

All these are rather 'specialised' skills and will need to be developed over a period of time and may be developed alongside some of the tutor's own research.

5. The sample should also reflect the original question. For example, if the trainee wants to find out whether there is better participation and learning if

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there are mixed ability groups compared to ability groups, he/she will need to choose a group of able, less able, average and mixed ability to observe. A project that is focused on strategies for supporting children with special educational needs and science will need a sample of SEN pupils only. Some trainees quite rightly worry that their samples are too small to make definite statements about their findings. Others need help to recognise this limitation.

6. As samples are usually very small, it would be unusual for complex quantitative analysis to be needed. Many trainees try to analyse small samples in over complicated ways. They also need to consider how they present their data. Line graphs are often incorrectly used for discrete data. Trainees should expect to use correct literacy and numeracy in all science work. (This is what they should be expecting from their pupils too.)
7. Once the data have been collected and presented, trainees may need help to evaluate it and to link their findings to existing research that they have read about. Ideally they should relate their background reading to all their work throughout their research, not just in the literature review. This encourages them to integrate practice and research. Hopefully significant contact with the literature and existing studies will have been made *before* instruments were designed and data collected. This will thus *inform* the processes of data collation and interpretation – although should not constrain it.
8. Once their evaluation has been completed, they should consider whether / how their classroom practice should change to reflect their work. Should the ideas be applied to other aspects or topics of science education? How could they share their work with others? Trainees might be enabled to share their work with their peers or with the teachers in their placement school during a staff meeting. Some pieces could be sent for consideration for publication in a journal like those supported by the ASE. This final stage is important as there is little point in carrying out research unless it informs practice.

T. Jarvis: University of Leicester