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Action Research - systematic reflective action to improve practice

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Chapter Twelve - Action Research – systematic reflective action to improve practice

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Throughout your career as a teacher you will encounter issues or problems in your practice which cannot be solved simply or immediately. You might need to find a way to engage certain members of a class, want to apply an idea that you have seen or read about, or aspire to understand something that you have noticed happening in your classroom. As an example, suppose that you notice in your lessons that when your pupils have a chance to discuss the mathematics that they are learning, they seem to enjoy the lesson more. You become curious about this: is it just your perception, or does talking about mathematics really enhance the pupils' enjoyment of the lesson? Is your observation true for all of the class, or do some pupils not mind one way or the other? Could you investigate this further, and use what you have noticed to enhance your teaching?

This type of curiosity is an important part of being a reflective practitioner. Right from the start of becoming a teacher part of your professional role is to identify issues or problems in your teaching, to try different approaches which might solve these concerns, to evaluate these approaches and then use your findings to inform and develop continually your practice. This process can be described as *action research*. Action research is a systematic, iterative and cyclic exploration designed to solve a problem or improve a situation in your professional practice.

It may seem strange to talk about conducting research from early on in your teaching career, but the process of reflecting on your own practice and trying to improve outcomes is a natural and important part of becoming a more confident and effective teacher. Action research emphasises reflection on your current practice and developing personal or 'living theories' (Whitehead, 2008) from an analysis of that practice. The outcomes of action research are personal and have practical implications, and the research is intended to lead to a change within the practice of the teacher-researcher (Kemmis et al., 2014). This chapter will introduce you to some of the ideas and reasoning that underpin action research, outline the action research cycle and show you how you can carry out action research for yourself.

Why carry out action research?

There are many valid reasons to carry out action research. The first and perhaps most obvious is that action research can help you become a better teacher. Engaging in an action research project usually involves exploring a discrete and often small aspect of teaching and learning that matters to you. Such research entails becoming more reflective about your own practice and it can help you to make dramatic improvements in your teaching. An important aspect of action research is that teachers decide their own research focus related to some real practical concern, so action research questions take the form of 'the commonplace, fundamentally crucial questions of, ….. How am I going to improve the process of education for myself and my children?' (McNiff, 1988, p. xvi).

Another reason for doing action research yourself is that it is a proactive way of dealing with problems. You will almost certainly find that teaching has downs as well as ups, and challenges as well as successes. Carrying out your own classroom based research gives you more agency over problems; it provides opportunity for both in-depth analysis and true ownership of the outcomes. By being a producer of the research, rather than a consumer (Nixon, 1981) you are more in control; not only are you deliberately working towards a solution but you can use the research to serve your purposes, and to fit your own context and teaching. Action research can help you remain tenacious when things get difficult, because it is focused on solutions. We have found ourselves that action research has been one factor that has helped us come up with workable solutions to problems, as well as helping us stay enthusiastic about teaching.

A third motivation for building action research into your teaching is that it can help your professional relationships and continuing professional development. Not only might your pupils notice another way in which you are working to do your best for them, but if you find out something worthwhile, you may have opportunity to share this with your department or with teachers from other subjects. This can form part of your CPD (continuing professional development) and help you build professional relationships.

Ultimately, you may even choose to share your findings with a wider audience, and you will encounter other teachers sharing their experiences, innovations and discoveries in in-school magazines or teaching journals, for example Mathematics Teaching (ATM) or Mathematics in School (MA). In this way the ideas that are

generated can be made available for other practitioners to think about incorporating in their practice.

You might even choose to embark on an action research project with one or more colleagues; action research is often performed collaboratively (Burgess, 1985), and collaborative working can enhance each phase. It is often easier to ask and answer more challenging questions when working with a colleague or in a small group. If you work in a group of two or three you can plan together and come up with compelling solutions. You can also help one another collect data and reflect on that data. Discussion can help establish the full meaning of a situation, improve plans and provide motivation to look in-depth at the evidence. In sharing research, teachers create a 'thinking culture', exploring more fully the complexities of teaching and learning. It can be easier to see the effective practice when looking at someone else's lesson than when considering your own.

TASK

- Think of at least one small change that has made a big difference to you or your teaching. Do all meaningful changes to practice have to be big?
- Identify one issue or problem in your current teaching which might be appropriate to tackle using action research.

The Action Research Cycle

Action research comprises identifying a problem, putting a potential solution into practice, investigating how well that idea answered the problem, and continually checking whether what is happening is in line with what you wish to happen. Seen in

this way, action research is a form of cyclical self-evaluation (Kemmis and Carr, 1986).
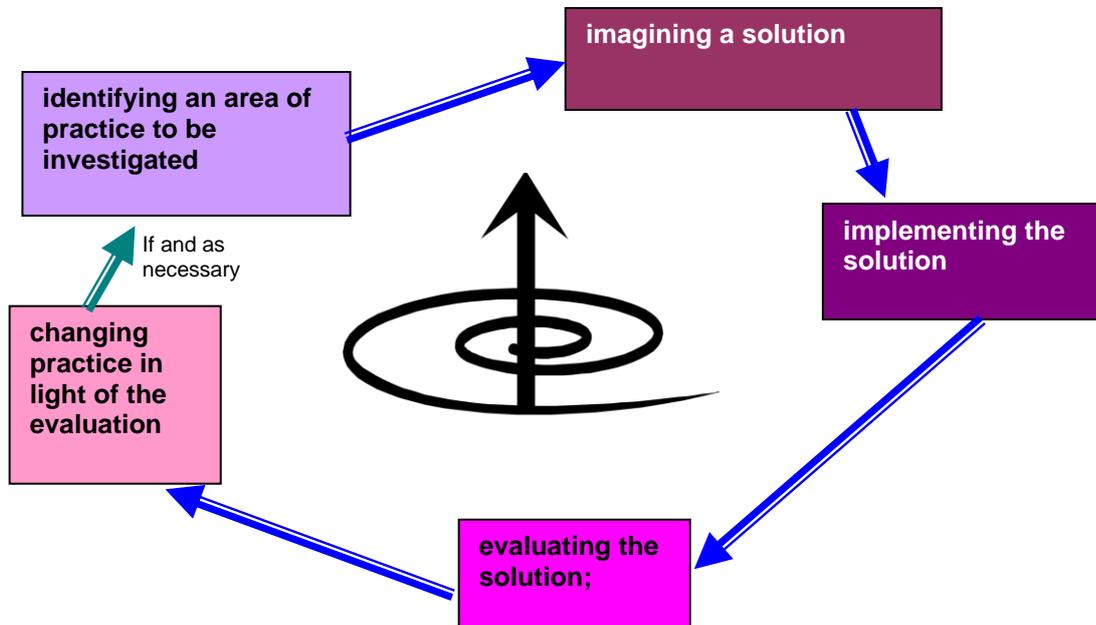

Figure 12.1 The Action Research Cycle adapted from (McNiff, 2002)

A teacher in an action research cycle:

- reviews their current practice, perhaps through their regular, day to day monitoring and evaluation of lessons;

- identifies an aspect that they want to investigate;

- imagines a way forward, possibly by reading teaching journals, looking for ideas on the internet and especially by working with others;

- forms the problem and the imagined solution into a research question;

- tries out the imagined solution;

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- evaluates what happens, seeking evidence to support what they see as happening, and potentially discussing the outcomes of their innovation with others;

- modifies their practice in the light of what they have found, continuing to work in this new way or trying another option if the innovation does not provide a complete answer;

- monitors their new idea;

- reviews and evaluates their modified actions, and so on… continuing along the action research cycle if and as necessary.

The rest of this chapter will discuss these steps in more detail, and help you to consider how you can perform action research for yourself.

Conducting Action Research

The Planning Stage

The initial step in the planning stage of action research is to identify what area of your practice you want to address in order to improve as a teacher. Perhaps you want to find an effective way to help low-attaining Year 7 pupils learn more mathematics, or explore the impact of allowing pupils to sit in friendship groups during lessons. However, the planning stage of an action research cycle is not just about specifying a problem or issue, but also about imagining and identifying actions which could conceivably help to improve your practice and address your concern.

There are lots of different ways to do this. For example, you might read about theoretical perspectives on mathematics education on the internet to identify the pedagogy that might relate to a problem, or to break down a more complex idea. You might browse teaching journals or relevant sites on the internet to find ideas, or even start creating a bank of resources which could be used as part of your innovation. You could also talk to your colleagues to find out how they have tackled similar issues in the past, and in what ways they were successful.

Identify at the start of the process what you hope to achieve by implementing your ideas or what you want to find out and know. This has similarities to setting out success criteria or lesson objectives in mathematics classrooms. It will also assist you evaluating if and when you have been successful. Do remember though that a tenet of action research is that you do not necessarily know what the outcomes may be, and so your objective may change as you progress.

Once you have identified your issue, and decided what success will look like, it is useful to phrase the issue as a question. A good question can give your action research direction, lead you to look at your practice deeply, and encourage you engage in cycles of continuous learning about your everyday practice. Action research questions often turn a problem that you encounter into a question of the form 'How do I …?' or 'If I … then …?' For example:

- If I use a 'no hands up to answer a question' rule, how will it affect the number of my Year 8 pupils actively engaged in answering questions?

- How do I develop my Year 11 pupils' thinking skills, so that they are better able to answer harder examination questions?

TASK

Identify a concern or area in your own practice that you might want to investigate, possibly using the ideas you identified in the previous task, and write it down in no more than two sentences.

You could use the ideas in the rest of this book or the teaching standards to help you focus your attention. For example, does assessment for learning interest you? (TS6 and Chapter 2) Does differentiation, the practice of matching your teaching to the needs of learners hold a curiosity? (TS5 and Chapter 1) What about promoting a positive learning environment in the mathematics classroom? (Chapter 10)

Next, rewrite your focus as a question:

"If I [insert the action to be taken], how will it affect [describe one or more possible aspects of the classroom that could be influenced by the action]?"

Before moving on from the planning stage you will also need to consider how you are going to implement your innovations, and take care to pre-empt some of the practical problems which are likely to occur. You might be able to do this by reading and research alone, but you can always 'try out' an innovation and then return to the planning stage.

Take the example of investigating how a 'hands down' rule might impact on engagement in a Year 8 class. This is a relatively specific and straightforward innovation because it is one action with one class; however an initial 'try out' might help a teacher identify some questions that should be thought through in the planning stage:

- how do I react when pupils continue to put their hands up?
- how should I now choose who answers my questions?
- how can I make sure I am giving enough 'wait time' to allow pupils to think about their answers?
- how do I devise questions that are worth thinking about?

If you start with a more complex and less specific innovation, such as working in a way that encourages a class of Year 11 pupils to develop better thinking and problem solving skills, you might have to undertake more detailed planning before you start. For example, you might consider:

- what complex thinking skills do I want the class to cultivate?
- what ideas, methods and resources already exist to help learners develop these skills?
- how do I ensure that I still keep up with the syllabus and meet the demands of the mathematics curriculum whilst trying out my innovation?

Once you have identified a concern, imagined a solution and planned a change to your practice, you are ready to begin implementing your solution.

TASK

Return to the idea for action research and the question that you developed in the last task. Think about how you might implement this change in your classroom. Can you think of any problems that might occur if you were to try out your innovation?

If you have the opportunity, talk over your answers with a friend, colleague or mentor. They may be able to comment constructively on your ideas and identify additional difficulties in advance.

Collecting Evidence

Once you start carrying out your plan, you will want to know whether or not your changes are working. However, this can be difficult. You may be too busy or involved during a lesson to make an objective assessment. Therefore you need to collect and analyse data to evaluate properly the effectiveness of your innovation and move on in the action research cycle.

There are lots of different ways to collect data, but most action research projects will need to go beyond looking only at test scores and homework marks. You will need to choose an instrument that matches your action research project. The remainder of this section will look at some of the more common ways of collecting data which may be available to you.

Video is becoming increasingly popular as a research tool (Konecki, 2011) and many schools utilise video recordings of lessons as part of their continuing professional development. If you do not have a formal video recording set up available to you, you might take advantage of a smart phone to record lessons, perhaps borrowing a test tube holder from the science department to use as an improvised tripod.

Remember to always ask permission before you video, you will need permission from parents and authorisation from the head teacher, but it is also a good idea to seek permission from the pupils you are videoing and explain why you are videoing them. Consider also where you will store the video and who you will show it to, storing videos of your pupils on your personal phone is unlikely to be a good idea. Although video recordings of lessons are likely for your own use only, you must consider ethical concerns before videoing your lessons. Importantly you must find out and follow your school's protocols. Not all pupils will consent to being filmed, how will you ensure that you respect their choice?

Video recordings often provide information which you miss during the lesson as you are busy being the teacher. It is possible to watch salient parts of a recording several times and understand how your actions affected the pupils (and vice versa). This might be a particularly good instrument to use if you were looking at an issue such as whole class behaviour. However there can be disadvantages to using video. For example, watching and re-watching a recording takes time and effort. If you record in a noisy classroom, or the camera is pointing in the wrong direction, you might miss a

key contribution from a pupil or another piece of information that would tell you about how your innovation is working.

Audio recorders are less invasive than video cameras, although you will still need to attend to the same ethical permissions. You will no longer have a visual context for your data, but because learners often forget they are being recorded, it is increasingly possible to capture (and analyse) accurate transcripts of learners talking about mathematics. Audio is a particularly good instrument for researching pupils' conversations with each other and their use of mathematical language, and you could try putting an audio recording device such as a smartphone or tablet on each desk to capture your pupils' mathematical discussions.

Interviews with learners can be very useful, as they allow you to ask your pupils reflective questions about their experiences. This might be an appropriate tool to use if you wanted to explore issues to do with affect. There are lots of different ways to interview learners, and interviewing is a skill in itself. You might consider interviewing pupils in twos or threes, and you should certainly prepare your questions in advance.

Interviewing can be time consuming however. It is likely to be necessary for you to hold interviews outside of lesson time since pupils cannot always be released from other lessons. You will also need to find time to listen to your recordings and analyse your data. Finally, if you interview an individual student ensure you have considered safeguarding issues, such as leaving a classroom door open, or making certain other adults are present.

Stimulated recall is an enhanced way of interviewing where a video or audio recording of a lesson is played back to the learner(s) as a prompt. The learner(s) are asked to describe what they were doing and the interviewer asks questions to explore the reasons, context and narrative behind their actions. This method can generate some really informative reflective dialogue. However, this method generates even more data, as you will have to record the new conversations to be sure you capture what is really said.

Questionnaires can take time to design, and designing a good questionnaire that really tells you want you want to know can be difficult. Questionnaires are a way of obtaining information very quickly, particularly if the questions require tick box answers. In this format, a series of questions can easily be answered in the last few minutes of a lesson. The resulting data could be entered into spreadsheets and some quantitative analysis may be possible. Questionnaires are particularly useful when measuring feelings, perceptions and experiences, in which case the data is best captured as soon as possible after the event. This is because recollections of experiences tend to be over or under exaggerated dependent on how far away the event was (Hektner et al., 2007).

Pupil work can also function as data for action research as it can provide evidence of whether an innovation is working. With some forethought and planning, you can collect examples of class work or homework in the general course of your teaching. However, as with any other type of data, permission should be sought from both learners and guardians if you wish to share the results of your study with anyone

else. You might find it useful to collect evidence from a few contrasting students, such as a high attaining girl and a boy who needs re-assurance about everything he does, so that you have a range of responses but a manageable amount of data.

Another way of using pupil work as data is to give your learners a baseline pre-test at the start of the project and a second post-test at the end. However, your evaluation of such test data must be conducted with caution and criticality. For example if the two tests are different, are you sure they are of comparable difficulty? Even if you have used the same test, are you sure any improvement is directly attributable to the innovation?

TASK

Return again to your proposed action research project. Consider what type(s) of data you could collect to enable you to know how successful your innovation will be. What instruments or methods would help you collect the most relevant and helpful data?

Analysing and Reflecting on Your Data

Once you have tried out your innovation or solution and collected appropriate evidence about how well your actions addressed the specific problem, the next stage is to reflect on the evidence that you have. How far did you achieve your criteria? If you did observe changes in attainment, affect or behaviour, did everyone in the class demonstrate the same changes?

Reflection should aim to be systematic, relevant and pertinent. For example, if you consider that your idea was successful because the learners were engaged in the task; a pertinent reflection could be reviewing what mathematics was learnt and how (and why) your innovation contributed to that learning. Setting out your criteria for success carefully at the start of your project will assist in guiding your reflective thinking. Another useful reflection tool is to think about the innovation from different points of view. How did the innovation affect different types of learners? Do your findings make you want to change your success criteria or to collect another type of data? Often, when considering different viewpoints, ideas regarding success criteria change as well.

We have already mentioned before that it is beneficial to include and collaborate with colleagues during action research, and this is particularly true in the reflection process. Their view on the data will probably be less intimate and subjective and therefore they can contribute another valid viewpoint. Ideas may also surface in conversation with others that do not occur to you when you view the data yourself. You could invite comments from friends and other teachers or perhaps from your mentor or head of department. It is the different perspective that is so valuable, not necessarily the level of experience.

TASK

Consider the data you proposed collecting in the last task. How would you analyse and reflect on this data? Whose viewpoint(s) will be vital to take into account? What aspect of the data will tell you the most about whether your change in practice has been a success?

Decide On Your Next Steps

The final part of each cycle of action research is deciding what you have learned by completing the process and considering what to do next. It may be that the next step is to continue with an identical or similar idea or practice. This can enable both the students and yourself to become more used to acting in a certain way, and over time your innovation will become embedded in your practice. Alternatively you could discover that your innovations and ideas need adjustment, so a further cycle of action research is needed.

It is unlikely that you will have completely solved the particular problem to which you were seeking a solution in the first cycle of research. Many action research projects require two or three cycles to provide robust answers. It is therefore worth being patient and allowing yourself time for more than one cycle when you begin.

Action research is not without its critics. Some suggest that all actions carried out by teachers, feed back into and have an influence on future performance, not just the specific results from an action research project (Hopkins, 2002). Teacher-researchers can sometimes feel pressured to use 'outsider' methodologies which are not focused towards practitioner research (Elliot, 1991) and research often evolves in a more organic, messy way, rather than in prescribed cycles (Kemmis et al., 2014). Action research generally requires taking a fluid approach; adapting and refining the methodology to your own context, school ethos and classroom environment.

Nonetheless, the principles and structures of action research can be valuable and powerful to you as you work to improve your teaching of mathematics. Action research can be an important part of your professional development which helps you be an innovative and forward looking teacher and take control over any issues or problems in your classroom. It is a tool to help you become a more effective and thoughtful teacher. It is now up to you to use the ideas of this chapter to solve a question, or to introduce an innovative way of working into your teaching practice, and to arrive at an approach that works for you.

Summary

In this chapter you have been introduced to the concept of action research as a means of solving problems that you will encounter in your teaching career. The discussion included the following:

- action research methodology and the reasons why many classroom practitioners use it;
- the action research cycle;
- designing a project and putting the ideas of action research into practice.

References

BURGESS, R. G. 1985. *Issues in Educational Research: Qualitative Methods,* London and Philadelphia, The Falmer Press.
ELLIOT, J. 1991. *Action Reserch for Educational Change,* Milton Keynes, Open University Press.
HEKTNER, J. M., SCHIMIDT, J. A. & CSÍKSZENTMIHÁLYI, M. 2007. *Experience Sampling Method, Measuring the Quality of Everyday Life,* Thousand Oaks, Sage.
HOPKINS, D. 2002 *A teacher's guide to classroom research,* Maidenhead, Open University Press.

KEMMIS, S. & CARR, W. 1986. *Becoming Critical: Education Knowledge and Action Research,* Oxon, Deakin University Press.

KEMMIS, S., TAGGERT, R. M. & NIXON, R. 2014. *The Action Research Planner, Doing Critical Particpatory Action Research,* Singapore, Springer.

KONECKI, K. T. 2011. Visual Grounded Theory: A Methodological Outline and Examples from Empirical Work. *Revija za sociologiju,* 41**,** 131-160.

MCNIFF, J. 1988. *Action Research, Principles and Practice,* London, Routledge Falmer.

MCNIFF, J. 2002. *Action Research For Professional Development, Concise advice for new action researchers* [Online]. [Accessed March 18 2018].

NIXON, J. (ed.) 1981. *Teachers Guide to Action Research,* London: Grant McIntyre Ltd.

WHITEHEAD, J. 2008. Using a living theory methodology in improving practice and generating educational knowledge in living theories. *Educational Journal of Living Theories,* 1**,** 103-126.