

## Promoting action research in Singapore schools

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**Background:** In 2005, the North Zone Clusters of Schools made action research their niche development project with the aim of equipping the teachers with conceptual understanding and skills in conducting action research. Training workshops were mounted in seven centres. This is the first time action research is promoted en masse among Singapore as a form of professional up-grading. After the workshops, teachers were encouraged to conduct their own action research projects. More than 70 such projects were selected for presentation at the North Zone Action Research Symposium held in November 2005. The proceedings were published as Celebrating Learning through Action Research.

**Aims or focus of discussion:** This paper aims to describe the process of conducting the workshops, including the approach chosen, the examples used, and the principles of measuring the outcomes, and the techniques of data analysis. The paper highlights the common administrative concerns and the conceptual and methodological needs of teachers in the context of action research (as contrasted with academic research).

**Arguments / comments / suggestions:** The writer believes that such a concerted effort in promoting action research is worthy of documentation. The information of the experiences and the problems encountered are useful to alert other action research trainers in planning and preparing.

**Conclusion:** Teachers need to be equipped with the conceptual understanding and methodological skills in conducting action research. There are some 'blind spots' needing attention.

**Keywords:** (3 keywords): Action Research, in-service training, teaching effectiveness.

## 在新加坡學校推行行動研究

蘇啟禎

**背景：**2005年，新加坡北區校群以行動研究作為發展計劃要項之一，目的在加強教師在這方面的了解和能力，並在七個中心舉辦培訓。這是新加坡大規模訓練教師從事行動研究的第一次。培訓後，教師受鼓勵進行個別的研究工作。11月，各校聯合舉辦北區校群行動研究發布會，共有論文70多篇。事後，論文匯集成冊，印行《同過行動研究歡慶教學》。

**目的或討論焦點：** 本文描述培訓過程，包括所選用的方式、所舉的例證、所建議的測量、以及分析的技巧等。本文更進探討教師培訓時提出的行政顧慮、觀念理解、和研究技術，並與學術研究比照。

**論點/評論/建議：**作者相信像這樣群策群力的嘗試，值得記錄在案。有關經驗面對的問題對從事行動研究培訓的同行能有所提示，從而避免面對相同問題並在概念能夠未雨綢繆。

**總結：**教師需要訓練，以加強她們對行動研究的理解和技能。這方面的一些「盲點」有必要加以處理。

**關鍵詞：**行動研究，在職訓練，教學效果

## Introduction

Action research, in the educational context, is not a unitary concept. There are a variety of research studies conducted by teachers coming under this rubric, hence the range of names such as Teacher Research, Classroom Enquiries and the like and, of course Action Research (with or without using this as a brand name by a particular school of thought). However, the South Florida Center for Educational Leaders website quotes a few definitions that are succinct yet telling:

*Action Research is a three-step spiral process of (1) planning which involves reconnaissance; (2) taking actions; and (3) fact-finding about the results of the action (Kurt Lewin).*

*Action Research is the process by which practitioners attempt to study their problems scientifically in order to guide, correct, and evaluate their decisions and actions (Stephen Corey).*

*Action Research in education is study conducted by colleagues in a school setting of the results of their activities to improve instruction (Carl Glickman) .*

*Action Research is a fancy way of saying let's study what's happening at our school and decide how to make it a better place (Emily Calhoun).*

<http://www.coe.fau.edu/sfcel/define.htm>

Teachers are employed not as researchers and why should they involved themselves in conducting research? This is a question that comes readily to the teachers' mind when they are invited to take part in action research or nominated to prepare themselves for such a seemingly esoteric professional activity. Shouldn't research belong to the realm of the privileged people in the teachers' colleges and university departments of education (who have nothing better to do but to do research)? For an

answer to this question, one may have to go back to Donald Schon' (1987) presentation of "Educating the Reflective Practitioner" at the American Educational Research Association annual conference in which he hoped that "*the ghost of John Dewey is circling just over his head*".

Schon was resounding Dewey's belief that people learn by doing and the same principle goes for teachers, too. The disillusion teachers have with theories and practices propounded in teacher preparation programmes is more real than real. This does not mean teacher educators are wrong or impractical. It simply means that theories (being the most practical thing, as someone once said) remain as theories which are abstractions of a great variety of situations, but a teacher does not deal with generality but has to handle a concrete, practical, and particular situation. This has lead people like Dewey and, especially, Schon to advocate that teachers need to generate their own personal knowledge (theories about teaching) by conducting inquiries in their own classrooms and reflect on the results as a means to professional development. The benefits of teachers doing action research in their own classroom are succinctly stated by the quote below:

*Action research has the potential to generate genuine and sustained improvements in schools. It gives educators new opportunities to reflect on and assess their teaching; to explore and test new ideas, methods, and materials; to assess how effective the new approaches were; to share feedback with fellow team members; and to make decisions about which new approaches to include in the team's curriculum, instruction, and assessment plans.*

<http://www.ncrel.org/sdrs/areas/issues/envrnmnt/drugfree/sa3act.htm>

In the past few years, some Singapore schools have shown an interest in action research as a means to school improvement and teacher

professional development. However, these sporadic efforts are located in a few schools where the principals had an interest. Interest in action research at a higher level beyond the school is yet to come (and has come as this paper shows).

## Participants

In Singapore, schools are grouped into four Zones based on their locations. Each zone has seven clusters and each cluster has nine to 13 primary and secondary schools and junior colleges. Each cluster is lead by a Superintendent. This organizational arrangement is to enable schools of a cluster to work together as a team under the leadership of the superintendents who form a zonal committee to plan, conduct, and evaluate the instructional programmes. Moreover, the cluster organization also facilitates personnel and financial matters. For each year, the zones will identify a niche to develop and special efforts are put in to achieve the goal. For the year 2005, the North Zone intended to take capacity building in action research as its development niche. And, the present writer was approached to conduction a series of workshop to prepare the teachers for subsequent involvement in action research projects.

The series of workshop on research methodology was organized by seven primary and secondary schools and the principals or vice-principals as the Action Research Champions, responsible for the administrative aspects of the workshops. Participants came from the neighbouring schools and each sent one or more teachers to participate depending on the interest, concerns, and needs of the individual schools. As each cluster has a combination of primary and secondary schools and junior colleges, the participants of each workshop formed a heterogeneous group in terms of level of teaching and subject specialization. Such heterogeneity can be expected to create some problems concerning examples to use and level of methodological sophistication. Besides, as a general practice of in-service training, the participants were expected to later serve as 'multipliers' to share what

they learned at the workshop with their colleagues in their respective schools.

A few schools took a pedestrian stance and sent only observes with no particular project in mind; in the words of such a participant, "*We have no project in mind at the moment, but my principal asked me to come and see what is happening.*" Another said, "*My principal in interested (in action research) but we have no experience. So, I am sent here to learn and will share with my fellow-teachers to come up with projects later on.*"

Most of the participants, as shown in later hands-on sessions, had already some ideas and needed to learn "*how to go about it.*" They needed guidance in conceptualization and conduct of action research projects relevant to their interest. The present writer believes that this group of teachers benefited most from participating in the workshop as they would have gone through every steps of doing action research in their respective schools and classroom, right from the beginning (deciding on a research idea) to the end (reporting).

A few other schools had already done or in the process of doing the action part of a project but needed help in the research part of it. In other words, on their own, they had started implementing some instructional programmes or behaviour-correction schemes and even collecting data to serve as evidence for subsequent evaluation of the effectiveness of their project. They, however, were aware that they had little or no ideas as to how the data should be organized and analyzed. In the words of one such participant, "*We have done the project and gathered test scores, but we just do not know how to analyze them. We need your help.*"

As indicated above, the participants on the whole were rather heterogeneous not only in terms of methodology, as the above description shows. They were heterogeneous also in their specific interests varying from improving their students' reading skills, promoting interest in reading, different ways of learning to remember Chinese characters, improving mathematical understanding, using nursery rhymes to learn number concepts, developing critical

thinking in social studies, reporting on chemistry experiments, enhancing physical fitness, reducing number late comers, encouraging proper language, and (even) proper position of the belt of school uniform (for girls only)! It goes without saying that these research interests cover from the lower primary to the junior college years.

In addition to the workshops organized at the zonal level, one primary and secondary schools requested the workshop to be conducted for teachers within the schools. Moreover, one schools organized an additional workshop for heads of departments of its neighbouring schools.

## The Workshop

The workshop began with a brief reference to history of action research and the now-subsided “paradigm war” between the quantitative and qualitative approaches and the emergence of mixed methodologies. From here on, the emphasis was more on the quantitative approach than the other way round. This was done with two purposes in mind. First, in the Singapore context, numbers play an important role in socio-educational discussions, sometimes to the extent of being obsessive. Secondly, and related to the first reason, reporting project outcome (be it positive, negative, or neutral) is more convincing to the audience (be it officials, colleagues, or parents) when numbers are there to support the conclusion. With this social context in view, the following five sessions of a total of 15 hours were conducted.

Session 1 introduced research for improvements in teaching and learning in school. Suitable examples were used to illustrate what research is in educational action research, differences and similarities of quantitative and qualitative research, and how to scale down of research to a manageable size to fit into the classroom reality.

Session 2 focused on the selection of research topics, sources of research topics, crafting and defining research topics, specifying objectives for research study, designing intervention, and formulating hypotheses. Reference was made to the

given examples when experimental designs were discussed. The session ended with a discussion on setting parameters and managing limitations

Session 3 dealt with ways of collecting meaningful data. Sampling procedures were briefly explained with reference to the cited examples which involved a few individuals to the whole level of a school. Discussing what to measure led to a discussion on instrumentation and scale construction and observation. Methods of assessing reliability and

validity were briefly discussed in the practical classroom context.

Session 4 introduced ways of organizing and managing data for statistical analysis. During the hands-on session, the participants learned to use some relevant procedures in Excel for data analysis. In addition, they used the chi-square calculator on the Georgetown University website. At appropriate time, the importance of correct interpretation of the obtained results was stressed.

Session 5 suggested ways of writing a cogent report or paper, looking at the structures of formal (scientific) and informal (narrative) reporting, including the judicious use of supporting and illustrative quotes. Presenting data using tables, graphs, charts and plots was covered and the session ended on a note on language and style in report writing.

With the belief that it would be easier to grasp the principles and procedures of action research when suitable examples were used for illustration, four articles from the literature were presented in summarized form followed by discussion on possible adaptation, adaptation, and expansion within the local context. In the presentation, consideration was given to the aims, method, data, and outcome of a cited example. A discussion on the possibility of modeling on the cited example to deal with instructional or behavioural problems in the same or a different subject area in the local reality ensued.

The first example was an experiment by Drew, Evans, Bostow, Geiger, and Drash (1982) study of effect of using daily report cards to improve

mathematics learning of two Fourth Graders. There are two purposes of using this example. First, not completing assignments is a common class problem, especially in primary schools and the example shows a way the problem was solved. Secondary, Drew et al.'s study is a N=1 experimental which is popular for correcting undesirable student behaviours. Thus, the example illustrates not only an approach to student behaviour but also exemplifies a research method that can be used in the reality of the classroom.

The second example is Bracken's (1982) experiment on the use of personalized texts to improve reading comprehension of fourth graders. This study was used to illustrate (1) the effect of using personalized reading materials in place of the standard impersonal reading materials; (2) a more complex experimental design (that of the full factorial design); and (3) interaction effect, in the sense of aptitude-treatment interaction which the teachers need be aware of.

The third example was used to illustrate a large-scale school-wide action research project. Martin (2002) reported a four-year study investigating the impact of single sex English Language classes in a mixed comprehensive school in Cambridgeshire, United Kingdom. As the teachers planning to do an action research always ask about the scope and duration of a project, this study is used to illustrate the implementation of a large scale project involving all students at one level and for a long period of time. Besides, the research team uses interviews extensively to collect information, this study shows how qualitative information can be gathered and used, as a complement to the quantitative data in terms of examination performance.

The fourth example dealt with improving narrative writing of 10-year-olds (Heatley and Stronach, 2000). This study illustrates how a commonly encountered problem in language teaching is overcome at the primary school level by teachers' concerted effort through the use of more interesting materials and more engaging learning with suitable guidance. It is interesting that the project team set a target of 5% improvement when they in fact found

a 77% improvement at the end of the project period. This, in a way, indirectly suggests to the participants that goal-setting need be realistic and even bold – as a way of encouraging them.

In short, the examples are carefully selected to illustrate substantive as well as methodological aspects of action research such that participants can build up their capacity in conducting research project meaningful to their professional development.

During the sessions, every now and then, some conceptual and methodological questions keep coming up and the common ones are:

1. Do I always need a comparison (control) group? I was told that for action research, there is no need to have a comparison group.
2. How big should my sample be?
3. How do I measure the effects of my action research projects?
4. Do I have to use statistics?
5. Is pretest always necessary?
6. The results seem commonsensical, why do I need to do action research?
7. Do I have to look for new topics to do action research, if someone has done it before?
8. What if the project fails?

Answers to these questions are addressed on the spot and they are to be found in the appendix.

## Practice

During the workshop, at appropriate points of time, the participants were organized as groups for practice. Grouping criteria varied. Some groups consisted of teachers from the same schools where specific projects were already in progress or were going to be so. As would be expected, these groups were more interested in how data could be collected, organized, and statistically analyzed.

Some other groups was made up by teachers from different schools but had common interests or concerns. They considered the possibility of using

the same approach and procedures with students at the same class level to do parallel projects independently. These groups went through the whole spectrum of project planning, from analyzing the research ideas and specific focusing, problem statement and hypothesis formulation, to data collection and analysis and, of course, to reporting.

The groups then presented their plans for comments and suggestions. This afforded another opportunity for all participants to review and apply what had been expounded during the sessions on the various aspect of action research methodology.

As a final mental exercise, the groups were asked to *drop* the project they had earlier planned! They were requested to come up with a new topic and go through the planning exercise once more. From the participants' viewpoint, this was just another exercise to consolidate what they might have learned. From the present writer's, this was to enable abstracting methodological principles that would be general and transferable and not anchored in a specific project. It is, of course, not known to what extent this hidden agenda was effective, unless further evaluation was done.

Subsequent to the workshop, the participants would have to discuss with their respective school administration on the specifics such as the nature and purpose of the proposed research, the involvement of

students and other teachers, and the resources need to make the projects possible. These could be those topics discussed and planned during the workshop and they could be new ones the schools like to see done.

The series of five-session workshop began in July and the last one was conducted in September and the zonal committee had earlier on planned to hold an action research symposium open to all schools in the North Zone in late November. This means some participants had more time than others to plan and conduct their projects endorsed by the school authorities.

## Symposium

As planned, a symposium on action research was convened in the later part of November. The committee went through the papers submitted by the various participating North Zone schools and selected papers for presentation at the one-day symposium. The 'harvest' is a total of 73 papers includes contributed by two junior colleges, 19 secondary schools and 31 primary schools. Topics of the papers cover almost the whole spectrum of subjects in the school curriculum and a few papers are on improving student behaviours (Table 1).

**Table 1. Papers presented at the Action Research Symposium 2005**

	Primary schools	Secondary schools	Junior college	Total
General Paper			1	1
English Language	14	7	1	22
Mathematics	11	2		13
Sciences	7	6		13
Geography		1		1
Aesthetics, Technology, IPW	1	2		3
Physical Education		1		1
Mother Tongues	4			4
Student behaviours		3		3
Cross-discipline	4	4		8
Others	3	1		4
Total	44	26	3	73

Notes: (1) IPW refers to Individual Project Work; (2) Mother Tongues refer to Chinese Language, Malay Language, and Tamil Language in the Singapore education system.

These papers are accessible from the website of the North Zone School Cluster, search words: n7cluster>North Zone AR Symposium 2005, or URL

[http://www.iproed.com/AR/paper/AR\\_website.htm](http://www.iproed.com/AR/paper/AR_website.htm)

The symposium afforded an opportunity for teachers in the North Zone to share experiences and ideas in both substantive and methodological aspects of doing school- and classroom-based action projects. The proceedings of the symposium have been compiled and published as Celebrating Learning through Action Research (Ministry of Education, North Zone Schools, 2005).

At the time of writing, the second round of the workshops has begun with the view of another symposium in September 2006. The intention is to equip as many teachers with the basic understanding and skills of action research so that they are able to conduct projects in their classroom, individually or collaboratively, and reflect on the findings with the view of continuous improvement in teaching. In other words, this is a form of in-service education that enhances professionalism among the North Zone teachers.

## Reflections

**Professional reading.** One benefit of the Symposium, as the present writer sees it (and as reflected in the literature reviews of papers presented), is that it 'forced' the teachers to search and read professional journal articles and other publications related to their action research projects. This, frankly speaking, is not likely to be done had they not been involved in action research, due partly to the time that they 'don't have', partly to lack of training in reading professional literature, and partly to the perception of their role as teachers rather than teacher-researcher. Thus, by getting involved in

action research, the teachers broke away from the conventional idea that 'the teacher's job is to teach' and went through a metamorphosis that transformed them into *thinking* professionals (as contrasted with *unthinking* craftsmen).

**Problem statement.** Throughout the series of workshop, participants tended to state their research interests in very broad and hence general terms. The talked about *improving children's reading ability*, *reducing classroom discipline problems*, *writing better science reports* and the like, always without considering possible ways of gathering data to check the effectiveness of actions. Teachers are trained to think in terms of teaching subjects (e.g., English) or students behaviour (e.g. punctuality, use of bad language) which are complex and general rather than be specific. This leads to the use of generic terms that cover a wide range of possible 'defining' components. For instance, *reading ability* could mean different skills to different teachers as it constitutes a host of specific skills. Even a seemingly simple concept like *punctuality* can have different operational definitions by different teachers with different margins of 'errors' or allowance. Thus, much time had to be spent on helping the participants to get at the specifics during the conceptualization stage of the workshop -- breaking down a broad and general concept into finer constituents and then focus on one or two for the action project. This seemed to be the most critical part of learning to do action projects and is the very first skill to learn in the workshop, yet some teachers resisted this approach and considered it simplistic and '*not comprehensive enough.*'

**Instrumentation.** The present writer advocated the use of daily exercises and the usual assessment as a source of data for action research project for two reasons. First, using the existing data collection instruments (such as class tests and daily exercises) avoids increasing the workloads of already very busy teachers. Secondly, such instruments are more contextually valid and the findings (one way or the other) will be relevant and convincing. There are, however, occasions that additional or new instruments are needed, for instance, assess-

ing critical thinking in a social studies project. Thus, participants needed some directions as to where to obtain the needed instruments, especially those for assessing attitudes as these are not a normal part of assessment in the classroom. Some relevant websites were introduced, giving examples of attitude toward learning English Language scale (Homerton College, n.d.), attitude toward computer scale (Nickell and Pinto, 1986) and computer ethics scale (Ho and Soh, 2002). Since the interests of the participants varied widely, it was not possible to bring in many examples. Nonetheless, drawing the participants' attention to possible approaches like going onto the Net and journals should be sufficient to set them on the right track. It was also felt that the participants needed be cautioned regarding copyrights issues when using or adapting existing instruments. They were advised to write to the original authors for the necessary permission. Three participants were also assured, on the present writer's personal experience, that researchers who appended instruments to their journal articles are usually very generous and helpful and permission is almost automatically granted.

**Project designs.** For some reasons unknown to the present writer, the single-group-pre-and-post-test (SGPPT) design has been rather popular among Singapore schools where action research is concerned. Some participants said they were told that an action research project does not need a control group. Of course, they were unaware that when the same group of students is pre-tested, they serve as their own control; in other words, there is no escape of having a control group, however the project is done. To drive home the message of needing a control group for valid comparison and conclusion, the present writer used the spontaneous recovery from common flu as an example. This seemed to be convincing enough as many heads nodded. To further strengthen the conceptual understanding of the design issue, the participants were asked to read Trochims' *Single-group Threats n the Net*.

In this regards, the present writer's effort was not very successful as the SGPPT design was still preferred by some groups when they presented

their proposed projects (as exercises) during the workshop. A few groups that sought help in data analysis after actually implemented their projects uses the SGPPT design, to the present writers' puzzlement. What might account for this? First of all, it might be a case of tradition dying hard, since the participants might have come across presentation of projects using this rather weak design without having it been questioned. Secondly, the participants had no training in research previous and did not realize the serious limitations of the design, especially in terms of valid interpretation of pre-post-test difference found, if any. Thirdly, perhaps more likely, the SGPPT design was easier to use in the school context where re-assigning students to project and control groups may be disruptive to the classroom routine. Besides, there is the ethical question of giving the 'benefit' to some but not other students. There is also the problem of parental objection to having their children receiving no benefit that is given to others'. These two questions were in fact raised by some participants during the workshop sessions.

**Data analysis.** One session of the workshop was devoted to introduce the participants to concepts and techniques of some commonly used statistical tests. *Excel* was recommended as the tool to do the analysis as it is readily available. This session went on smoothly and the participants obviously enjoyed the hands-on experience of getting the statistics from their data. However, as gathered from the requests from a few schools subsequent to completion of their projects, it was clear that participants of these schools were still rather hazy in conceptual understanding of the significance tests, especially the difference between correlated and uncorrelated t-tests and also one-or two-tails testing. In fact, the participants of one such school got the assistance of their mathematics colleague to help in working on the data, presumably assuming that a person well-versed in mathematics is also familiar with statistical concepts and techniques. It is obvious to the present writer that data analysis using even commonly used statistical techniques is a rather weak link in the whole process of action research. In this regards,



perhaps a simple table based on effect size with differences in the means or percentages might be more useful, although the tests and effect size serve different purposes, statistically speaking. Moreover, in a social context like that of Singapore, where numbers speak stronger, teachers who are expected and encouraged to do action research of a quantitative type need basic training in the use of statistics in their pre-service programme or as in-service training.

**Duration of projects.** When planning for their projects, some participants asked “*For how long should my project last?*” Obviously, this is an almost impossible question to answer. Of the examples used in the workshop, the shortest period of the project lasted for 20 days (Drew et al., 1982) and the longest two years (Martin, 2002). It is obvious that the duration of a project depends on its scope and the time needed for the intervention to take effect. But this answer is not helpful to the participants who have a time-frame to follow and a classroom reality to cope with. In the end, the only answer the present write could provide was, “*If your project deals with something very specific, a short period of one to two weeks will do, for instance, proper use of punctuations. On the other hand, if the project is about something general and takes long time to develop, you may need a much longer duration, for instance, thinking skills or reading comprehension.*” In connection with the question of duration, the participants were cautioned against hasty termination, as an alternative teaching method, for instance, which actually will show a positive effect may show no such effect when prematurely curtailed, leading to Type II Error in concluding no effect when there is actually one.

**Effectiveness of multiplier effect.** For some reasons, schools have been capitalizing on the probability of a “multiplier effect”. It makes common sense to send one teacher to attend a workshop and go back to the school to tell the other teachers what she has learned at it. This is analogous to sending someone to a foreign country and return to tell what

she has experienced. The reasons for so doing may be a question of the available financial and human resources, since funds and bodies are limited in the school context. But, the practice of having the so-called multiplier will bring a much watered down version of the training at best, leading to more confusion and frustration at worst.

**Instructional concepts.** During the workshops and at appropriate time, the participants were introduced to the three related concepts, namely *Opportunities to Learn, Time on Task, and Teacher Wait Time*. Although these concepts are not new, research on them is alive and has practical implications for class instruction and hence school effectiveness and improvement. There are sufficient research studies on them to show the effects on student learning. It is believed that these are specific instruction strategies that are within the control of the teachers and for which action research can be conveniently planned. The participants were encouraged to access relevant websites to get familiar with the concepts and techniques.

## Conclusion

Action research has been advocated as a means to professional development of teachers over more than half a century. Although there are different ‘species’ of action research, the common goal is to move teachers from merely doing to thinking, so that they are able to reflect on their own teaching with the view of continuous improvement. Nonetheless, due to various limiting conditions such as time available after discharging the plethora of teaching and managerial duties, lack of training in research skills in the pre-service programme, and even the teachers’ perception of their role as teachers, action research has been an exception and sporadic among practicing teachers.

The effort of the North Zone in training teachers in action research is a wise move to address this deficit in the teachers’ initial training. The training provides the participants an opportunity to learn

to think more critically and systematically through practice in the workshop and through actually carry out projects in the classroom reality. This, it is hoped, will help them overcome the barriers in thinking, reflecting, and discussing where professional matters are concerned.

Interaction with the participants convinced the writer that much can be done in action research with teachers and also much need be done in the future. The participants impressed the writer as a group of effective implementers who are able to get things done fast (sometimes faster than expected). They are also enthusiastic learners who are keen to acquire new concepts and skills related to their teaching and professional interests. But, the need guidance in planning, decision-making, and reflecting on what they have done or are going to do where action research is concerned. Training in action research will enrich the teachers' repertory as professionals such that they are not only able to teach but also reflecting on the effectiveness of their day-to-day teaching.

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## Appendix: Action Research FAQ

**1. *Do I always need a comparison (control) group? I was told that for action research, there is no need to have a comparison group.***

Yes, you do. Without a comparison group, you are most likely to use a *single group pre-and-post-test design*. You will then find the difference between the pretest and posttest means and attribute it to the action (treatment) as indication of project effect. This is commonsensical but commonsense can be wrong.

The mean difference may not be due to project effect but something else. There are six single-group threats which compete with your interpretation. For instance, taking a test is a learning experience and this may increase the posttest mean giving the impression that the action has an impact; this is the testing threat. To learn more about such and other threats, read W. Trochim's *Single-group Threats* on the Internet at

<http://www.socialresearchmethods.net/kb/intsing.htm>

Even if you use a single group pre-and-post-test design, you can't escape from having a comparison group; the group serves as its won control after taking the pretest and you already have, in fact, a comparison. Thus, to say you do not need a comparison group for action research is misleading.

It does not mean, however, that the single-group pre-and-post-test design should not be used at all. Sometimes, the school/classroom reality demands this, for instance, when there is only a small group of students weak in Math need help. Then, use it but be cautious when interpreting the results with reference to probably single-group threats.

**2. *How big should my sample be?***

This is a reasonable question but not as important as it sounds. First, for action research, we more often than not take the classes as they are and the sample sizes are 'given'. The main purpose of action research is to enable teachers to reflect on the effects of teaching (treatment) and not so much for generalizing beyond the students involved. Thus, we need not be overly concerned with sample size.

Secondly, sample has to do with *precision*; statistics (say, the mean) fluctuate more with small samples than a big ones. But, for action research, how close are the obtained statistics to the parameters (theoretically, of all students of the same kind) is of greater interest' we want the estimate to be *accurate* enough to the imaginable real, say, mean. Thus, we should be more concerned with the composition of the sample rather than its size.

Thirdly, when dealing with small groups for action research, we can always use the non-parametric statistical techniques to evaluate group differences to get around the worry for small sample size.

**3. *How do I measure the effects of my action research projects?***

Action research is for teachers to reflect on the effects of teaching and seek ways to continuously enhance them, therefore, the measures need be as realistic as possible. Thus, use the daily exercises, usual tests, and occasional projects and do not create new ones just for the project.

There are two advantages in doing so. First, using the normal, routine assessments does not create new jobs for the teachers, and this is especially important to teachers who have already many tasks to do. Next, using such

measures has greater contextual validity, the obtained results (be they positive, neutral, or even negative) are more meaningful and convincing to the teacher-researcher and interested colleagues.

There may be occasions when custom tests are needed and these have to be specially crafted. For instance, a Social Studies project may aim at developing students' critical thinking in addition to knowledge learning. Then, a critical thinking test is needed as it is not the normal part of assessment. The same goes for creative thinking and attitudes toward various subjects.

Many such special assessment tools are available on the Internet. What we need to do is to identify the suitable ones and adapt them for our own students and check for language and cultural biases. One thing, though. Contact the authors for permission to use and, where necessary, modify. This is showing respect to intellectual property and copyrights laws. Normally, authors who post their instruments on the Internet welcome other researchers to use them and may even give further, helpful information.

#### 4. *Do I have to use statistics?*

It depends. For instance, when doing N=1 research such as correcting the problem behavior of a particular student, plotting the observations and eye-ball the movement of the curves suffices and no statistics are needed. If the project involved several students with the same behavioral problem, they can be treated as a group and curves are plotted for the group as a whole instead of the individuals. In a sense, this is also using statistics albeit in the most simple manner. The *Daily Report Card* project (Drew et al., 1982) is a simple example and there are many other more complex examples in the *Journal of Applied*

#### *Behavioral Analysis.*

More often than not, action research projects involved the whole class and comparisons are made with another class serving as the comparison group. Here, statistics are needed to assist in making decision or conclusion. For instance, when the percent passes of the project class is far greater than that of the comparison class, it may be too obvious to need statistics to arrive at a conclusion. Then, the question is: How much greater is greater? Is it 5%, 10%, 15%? Statistics helps here. The same goes for comparing group means.

Besides, teacher-researchers may also be interested in finding out whether there is a relationship between two sets of marks. For instance, a question can be asked: To what extent achievement in Math is related to that in language or home conditions. (By the way, the *Third International Mathematics and Science Studies*, TIMSS, ask the same questions.) A analysis of the correlation is needed, then.

The mention of "*statistics*" may raise the level of blood pressure or anxiety of some teacher-researchers and some may just switch off when facing numbers. This need not be the case. As action researchers, teachers need to understand the concepts of some of the commonly used statistical techniques without being worried by their theoretical underpinnings as consumers of numbers. As for calculation, the worrying days have passed and we ask the computer to do the tedious, mechanical job for us so that we can spend the precious time thinking rather than doing.

#### 5. *Is pretest always necessary?*

Often time, teacher-researchers ask: Without a pretest, how am I to tell whether the project group has improved? Again, it is commonsensical to have a pretest.

When there is a comparison group that is

equivalent to the project group, we can get around this by inference. Logically, the posttest mean for the comparison group should be more or less equal to its pretest mean since nothing is done to the group. And, the project group's pretest mean should also be more or less equal to that of the comparison group's, before anything is done to the former. Thus, by comparing the posttest mean of the two groups, we can come to a conclusion whether there is an increase in scores for the project group.

In fact, this takes us to the elegant *posttest only equivalent group design* which is highly recommended by the evaluation high priest Lee J. Cronbach. Thus, it may not be an advantage of having a pretest as this may contribute to the testing effect mentioned above for the single group design.

**6. *The results seem commonsensical, why do I need to do action research?***

There is a subtle difference between research in science and in education. Science research aims at discovering new principles underlying science phenomena. For any new scientific discovery, there have been a very long line of trials, failures, more trials, more failure, and only then success. The trials and failures do not go to the press but only the final success. The newly discovered principle replaces the older one and this is not commonsensical. Often than not, the new principles discovered do not make sense even to the scientists specialized in the relevant fields, Albert Einstein's Theory of Relativity is a classic case.

Research in education has a rather different purpose, especially action research. Teachers have their own individual implicit theories for how things work or do not work. Such implicit theories emerge from personal teaching experience over a period of time working in a school context and serve as working

principles in a very personally manner. For instance, teacher A believes that modeling helps students solve math story problems and teacher B does not.

On this simple instruction issue, there are two opposing views, and which is correct? The two views are two common senses. To find out which is correct, action research is one way. The irony is that it is possible that both teachers are correct *within the context of their own classroom*. Then, no general principle (e.g., modeling helps math problem-solving) is available. This takes us to the concept of Aptitude-Treatment Interaction (ATI) which says that the effect of a treatment (teaching) depends on who the students are; modeling may be helpful to certain kind of students (right-brained?) but is a hinder to others. A project looking into this possibility may help to find out and teachers have to reflect on the teaching and its effect – that is the purpose of action research.

In this sense, education research is not used to discover new teaching principle. It helps teacher-research to verify their personal implicit theories so that they can be more confident about what they believe and change when the beliefs are not supported by the results of action projects. Thus, action research help teachers to make sense rather than following commonsense which may be wrong.

**7. *Do I have to look for new topics to do action research, if someone has done it before?***

Not necessarily so. In fact, it is good to repeat what other teacher-researchers have done (and achieved) in their classroom to see if it works in your own. Scientific principles need be verified through replications; what is found in one research lab must be found in others under the same conditions if they are to be adopted by the scientific community. In this sense, replications of other teacher-researchers'

projects contribute to better understanding of a teaching principle or method.

However, in the context of action research, such replications may *not* be needed. As long as you have not tried out other teacher-researchers' ideas in your own classroom, *it is new* and hence worthy your trying. This is because action research is trying to solve a (teaching) problem *in situ* and enables you to reflect on your own teaching with trustworthy information and data. The purpose is to improve.

#### 8. *What if the project fails?*

A group of secondary Chemistry teachers used cloze-like worksheets to improve students' skills in writing qualitative analysis report. After a two-month period of trial, they found no difference between the project and the comparison groups. The same was found for high-ability and lower students. Have they failed?

No. There is no failure in action research!

There is no guarantee that all treatment (teaching) works, however carefully it has been thought out and carried out, for the simple reason that there are many factors influencing the outcomes. A 'failed' project provides useful information about what does not work and such information prevents teacher-researchers from being dogmatic about a particular pet belief (an implicit theory) and thus save time for them. Thomas Edison tried hundred of materials to use as a filament of the incandescent lamp and there were hundred of 'failures' with only one final success.

Teacher-researchers need to learn to accept such 'failures' and learn from them. How? First of all, maintain intellectual honesty. When a project does not turn out as expected, it is naturally disappointing but such feeling has to stop here so that it will not affect subsequent efforts. Report the project as it

is, including the disappointing outcomes. While the feeling has to stop, thinking should continue and that is the next thing to do.

Think about the probable causes of such 'failures'. Perhaps, the treatment really does not work in the first place but we thought it would. At least we know now and let's give it up. But don't give up so easily. Perhaps, the time is too short for the treatment to show its effect. For instance, within two months, students might have used cloze-like worksheets only for two analyses and this need be increased for further trial. Perhaps, the cloze-like worksheets requires students to only fill in the blanks and this does not involve extensive writing needed in report-writing; let's modify the worksheet format and try again.

In short, a 'failed' project has many lessons to teach us and it may even be more valuable than a successful one, because it sets us thinking more systematically, objectively, and thoroughly. This is the true spirit of doing action research in education – to reflect on practices with the view of improving teaching.

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