I. Introduction

Action research is known by many names, including participatory research, collaborative inquiry, emancipatory research, action learning, and contextual action research, but all are variations on a theme. Put simply, action research is “learning by doing” - a group of people identify a problem, do something to resolve it, see how successful their efforts were, and if not satisfied, try again.

Evolution of Action Research - Origins in late 1940s

Kurt Lewin is generally considered the ‘father’ of action research. A German social and experimental psychologist and one of the founders of the Gestalt school. Lewin first coined the term ‘action research’ in his 1946 paper “Action Research and Minority Problems.”

Eric Trist, another major contributor to the field, was a social psychiatrist whose group at the Tavistock Institute of Human Relations in London engaged in applied social research, initially for the civil repatriation of German prisoners of war.

Both Lewin and Trist applied their research to systemic change in and between organizations. They emphasized direct professional - client collaboration and affirmed the role of group relations as basis for problem-solving. Both were avid proponents of the principle that decisions are best implemented by those who help make them.

The Action Research Process
### Each cycle has four steps: plan, act, observe, reflect

- Identify problem & Collect data for detailed diagnosis
- Postulate several possible solutions
- Develop single plan of action and implement
- Collect and Analyze the data results of the intervention
- Interpret the findings on how successful the action was
- Re-assess and begin another process cycle
- Continue process until problem is resolved

### Principles of Action Research

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1) Reflexive critique</strong></td>
<td>Ensures people reflect on issues and processes and make explicit the interpretations, biases, assumptions and concerns upon which judgments are made.</td>
</tr>
<tr>
<td><strong>2) Dialectical critique</strong></td>
<td>Phenomena are conceptualized in dialogue; therefore a dialectical critique is required to understand the set of relationships both between the phenomenon and its context, and between the elements constituting the phenomenon.</td>
</tr>
<tr>
<td><strong>3) Collaborative Resource</strong></td>
<td>Participants in an action research project are co-researchers. The principle of collaborative resource presupposes that each person’s ideas are equally significant. It helps to create insights gleaned from finding contradictions between many viewpoints and within a single viewpoint.</td>
</tr>
<tr>
<td><strong>4) Risk</strong></td>
<td>Prominent fears among practitioners come from the risk of disclosure in open discussion of one’s interpretations, ideas, and judgments. Initiators of action research invite participation and will help allay this fear by emphasizing that the outcome will facilitate.</td>
</tr>
<tr>
<td><strong>5) Plural Structure</strong></td>
<td>Action Research embodies multiplicity of views, commentaries and critiques. It requires reporting in which many accounts are made explicit. Discussion includes commentaries on their contradictions, and presents a range of options for action.</td>
</tr>
<tr>
<td><strong>6) Theory, Practice, Transformation</strong></td>
<td>Theory informs practice and practice refines theory in a continuous transformation. The two are intertwined aspects of a single change process. It is up to the researchers to make explicit the theoretical justifications for the actions, and to question the bases of those justifications.</td>
</tr>
</tbody>
</table>
What is unique about action from general professional practices, consulting, or daily problem solving?

• Action research is set apart by its emphasis on scientific study, which is to say the researcher studies the problem systematically and ensures the intervention is informed by theoretical considerations.
• Much of the researcher’s time is spent on refining the methodological tools to suit the exigencies of the situation, and on collecting, analyzing, and presenting data on an ongoing, cyclical basis.

Interesting attributes separate action research

• The primary focus of action research is on turning the people involved into researchers with the underlying philosophy that people learn best, and more willingly apply what they have learned, when they do it themselves.
• Action research also has a social dimension. The research takes place in real-world situations, and aims to solve real problems.
• Finally, the initiating researcher, unlike in other disciplines, makes no attempt to remain objective, but openly acknowledges his or her bias to the other participants.

When is Action Research used?

• Action research is used in real situations where there are problems to resolve rather than in artificially constructed experimental studies. Schools, workplaces, and socially-oriented contexts (e.g. trade unions) use action research because its primary focus is on solving real problems.
• In accordance with its principles, action research is chosen when circumstances require flexibility, the involvement of the people impacted by the action research process and solutions, or a change that must take place quickly or holistically.
• It is often the case that those who apply this approach are practitioners who wish to improve understanding of their practice, social change activists trying to mount an action campaign, or, more likely, academics who have been invited into an organization (or other domain) by decision-makers aware of a problem requiring action research, but lacking the requisite methodological knowledge to deal with it.

Action Research Tools

Action Research is more of a holistic approach to problem-solving, rather than a single method for collecting and analyzing data. Thus, it allows for several different research tools to be used as the project is conducted. These various methods, which are generally common to the qualitative research paradigm, include: keeping a research journal, document collection and analysis, participant observation recordings, questionnaire surveys, structured and unstructured interviews, and case studies.
II. Landscape
Searching in Google Scholar: Action research search terms yielded 1,880,000 search results

- Limiting the article search only to the subject areas on *Engineering, Computer Science, Mathematics and Social Sciences, Arts, Humanities* and constraining the search further with the exact phrase “Action research” for the years 2008-2012 further narrowed down the search results to 18,500. The search terms “Action Research HCI” resulted in about 1410 search results.
- While searching from Google scholar was easier to narrow down article search to the latest research, searching Wikipedia provided a brief description on action research methodology. The bibliography section on Wikipedia also provided useful links to scholarly journals.
- We also found interesting articles describing Action Research methodology from regular Google search: *In particular the article “An Overview of the Methodological Approach of Action Research”* gave an overview of action research processes and principles, and its history. It describes the different types of action research used in contemporary settings.

III. Criteria
Several of the articles reviewed illustrate why action research is sound methodology for forming hypotheses and collecting data with the goal of creating solutions for problems. Criteria for evaluating this method include the following:

1. Can the question posed be investigated empirically?
2. Does action research adhere to a sound definition qualitative research?
3. How do ethical considerations or acknowledgments strength this methodology?
4. Does the methodology permit direct investigation of the question?
5. Is the question clearly operationalized?

Can the question posed be investigated empirically?
Action research allows us to “pose significant questions that can be investigated empirically” (Shavelson, 2002). Action researchers use qualitative methodologies, such as interviews and observations, to gather empirical data for a specific problem that requires attention. The data gathered regarding a problem are used to formulate a hypothesis and potential solutions or interventions for the problem. During the intervention phase of the action research cycle, further empirical data is gathered to determine if the intervention adequately addressed the problem. For example, research journals, interviews, surveys, observation logs will be analyzed to determine

Does action research adhere to a sound definition qualitative research?
Denzin (2003) describes qualitative research as a situated activity that “locates the observer in the world.” Qualitative research is defined by a set of interpretive and material practices which give visibility to phenomena. Action researchers adhere to the description of qualitative research because study is initiated in the natural environments.
Action research, which is typically initiated by practitioners, provides the opportunity to both reflect upon and have an impact upon problems they face. Devers (1999) recounts that “qualitative researchers argued that there were fundamental limits to the extent to which the methods and procedures of the natural sciences could be applied to the social world. Underlying this view was the ontological assumption that reality is dynamic, contextual, and socially constructed. Unlike inanimate objects, people think, have feelings, communicate through language, and attribute meaning to their environment, and, at least superficially, have different beliefs and personal characteristics.” (Devers, 1999). Action researchers aim to solve problems in dynamic social environments through cycles of planning, acting and reflecting based on empirical data.

**How do ethical considerations or acknowledgments strengthen this methodology?**
Admission of subjectivity and admissions of the limitations of findings to the primary context help bolster the ethics of action research. One of the primary goals of qualitative research methodology is to understand phenomena, and Devers (1999) makes the case that because researchers have values and are members of a wider social community, it is impossible to purge themselves and social science more generally of values. The Center for Collaborative Action Research (2012) defines action research as the following:

“Action research as a method is scientific in which the effects of an action are observed through a systematic process of examining the evidence. The results of this type of research are practical, relevant, and can inform theory. Action research is different than other forms of research as there is less concern for universality of findings, and more value is placed on the relevance of the findings to the researcher and the local collaborators.”

Action researchers acknowledge subjectivity and seek to balance subjectivity with empirical data collected which can provide multiple perspectives on a challenge under examination: “As (action) researchers, they seek evidence from multiple sources to help them analyze reactions to the action taken. They recognize their own view as subjective, and seek to develop their understanding of the events from multiple perspectives.” (Center for Collaborate Action Research, 2012)

**Does the methodology permit direct investigation of the question?**
Shavelson (2002) asserts that scientific inquiry provides methodology that permits direct investigation of the question. Through the use of qualitative research methods such as observations, interviews, group discussions, research journals, and surveys, action research permits direct investigation. Additionally, action research permits a mixed methods approach to research investigation. If strict quantitative methods were used in action research, it would be much more difficult to direct investigate action research problems. In many instances, quantitative methodology answer a direction question, but do not answer underlying questions such as “why?” or “how?” With the use of qualitative methods, those questions can be answered; therefore the combination of methods in action research permits comprehensive investigation.

**Is the question clearly operationalized?**
The cycles which typify action research allow for visible operationalization of the questions posed by action researchers. Action research is characterized by a multiple cycles of the following steps: 1. Study and plan. 2. Take action. 3. Collect and analyze evidence, and 4. Reflect. Action research
provides a concrete path to form hypotheses about problems, create action plans, and to reflect on the process. Additionally, multiple cycles allow for iteration of actions.

IV. Deep Dive

Article One:


Cameron Richards article “The Design of Effective ICT-Supported Learning Activities: Exemplary Models, Changing Requirements, and New Possibilities” (......) is an example of action research which studies how information and communication technologies (ICT) can be integrated into school curricula to effectively support learning.

Posing Important Research Questions
Cameron Richards article “The Design of Effective ICT-Supported Learning Activities: Exemplary Models, Changing Requirements, and New Possibilities” aims to address the issue of ICT into primary and secondary school curriculums. Because the evolving nature of ICTs and the impact they have had on classrooms, learning and curriculum, Richards poses an important research question. Richards argues that ICTs are used currently as “add-ons” to curriculum, and as a result, focuses on the challenge of integrating ICTs in education in a way which at the same time connects more effectively with both the specific contents of the curriculum and the various stages and elements of the learning process.

Can the question posed be investigated empirically?
Richards describes the challenges of integrating ICTs into schools which traditionally have used teacher-driven curricula, and poses questions to be address through his action research study which takes place in Singapore. The primary question which Richards asks is: “How might teachers be prepared and encouraged at practical, concrete, and "micro" as well as reflective levels of pedagogical design to integrate ICTs more effectively in their pupils' learning and in their own teaching?” This question will be answered empirically by examining three case studies. Each study describes an ICT foundations course for primary and secondary school teachers with use of an action research model. Richards’ model is characterized by the following stages: design, implementation, and evaluation.

Operationalize the research question
By using case studies with clearly defined stages in the action research model, Richards clearly and logically operationalizes his research question. Because the use of stages is an integral part of the action research model, it is clear how the stages of design, implementation, and
evaluation address his research question.

**Satisfy criteria for good qualitative research**
Richards provides a thorough review of the literature on the use of ICTs in curricular design. Additionally, he uses surveys and data from learning activities with study participants to substantiate his claims. Additionally, he provides a critical analysis of each case study to show a progression of different “stages” of ICT integration into educational curricula. By clearing establishing a question, labeling the cycles, and connecting interview and survey data collected, Richards forms a basis for internal validity and credibility.

**Are Ethical considerations satisfied?**
While the author describes the current policy issues and challenges of working with schools in Singapore and Hong Kong, he makes no mention of ethical considerations at play. For instance, he does not discuss the efficacy of use of ICTs in education or describe the debate about whether the investment in ICTs has produced better educational results.

**Article Two:**


The author Cynthia Hope conducts action research in her class to determine the effects of classical music on student performance, motivation and focus in math. She used quantitative methods like t-tests (which aim to establish the results as significant) and qualitative methods like Likert rating scale surveys and questionnaires to collect and analyze data. The results of her research show that the effect of music on math performance has been inconclusive.

**Posing Important Research Questions**

The author has clearly identified the research question of try to find the effects of music on student performance. According to Shavelson (…), scientific inquiry provides methodology to directly investigate the research question. Here the author follows a concrete path to form hypotheses about the problem, create an action plan, execute it and also reflect on the process.

**Investigate the research question empirically**

Shavelson (2002) suggests that research questions should be investigated empirically. Here the author uses qualitative method like a Likert scale survey and a quantitative tally count and T-test to gather and analyze empirical data. The data gathered is used to form the hypothesis and interventions for the problem are identified. Empirical data is also calculated during the intervention phase to verify that the problem has been sufficiently addressed.
Operationalize the research question

According to Christiansen (1997), questions in qualitative research should be clearly operationalized. In this research study the author has operationalized the research question by focusing on results of the unit test for measuring performance, tracking the percentage of homework completed and using the Likert scale survey to measure motivation and tallying the number of student prompts to measure focus.

Satisfy Criteria for good qualitative research

According to Devers (1999), good qualitative research is characterized by the importance it pays to research practices like credibility, reliability and transferability. The author has controlled for reliability for each of the three factors in the research. She has also checked for internal validity in her research by switching around the control groups and using the same performance tests for all the different classes.

Are Ethical considerations satisfied?

According to Breuch (2002), researchers should acknowledge the concept of ethics in their research practices and treat their research subjects ethically. The author has handled the issue of ethics by having the students write their names at the back of the paper while measuring performance and to keep the grading standards consistent. Also while measuring motivation, the Likert survey was anonymous and while measuring focus the author did not use the students’ individual names while tallying the focus count.

Despite the literature review talking about the lack of conclusive evidence about the use of music in the development of students’ skills in learning the author still went ahead with her research hypothesis. The result of the research was inconclusive on all fronts, but the reason for this result has not been clearly explained. Despite these issues the research has clear and simple reasoning backed with appropriate research methods and has good potential for future research.

Article 3:


The paper is an example of action research which focused on developing a mobile learning model of literacy development for underserved migrant indigenous children in Latin America.

Posing Important Research Questions

The author tries to examine whether conventional technology such as a mobile learning model can help bring sustained literacy exposure for extremely marginalized (economically, educationally, geographically, and technologically) migrant indigenous children who have no
consistent access to a formal education system. The research study poses a significant research question (Shavelson, 2002) as it tries to investigate the learning model in a relatively isolated social setting drastically different from contexts for which conventional technology solutions are usually developed.

**Can the question posed be investigated empirically?**

The paper focused on action research methodology for developing and testing a new technology product. The author employs four stages of action (Strategize, Apply, Evaluate, and Reflect – iterative cyclic testing methods that permit direct investigation of the question (Shavelson, 2002)) and six guiding investigative criteria (Situation Specificity, Cultural Sensitivity, Practical Usability, Theoretical Applicability, Economical Scalability, and Viable Sustainability) to empirically test whether conventional technology such as a mobile learning model can help bring sustained literacy exposure for extremely marginalized migrant indigenous children.

**Operationalize the research question** -

The author clearly operationalized the overall understanding of the context, the learning model and its constraints (Christiansen, 1997). Based on his research study, he provides coherent and explicit chain of reasoning (Shavelson, 2002) for future opportunities in mobile learning from multiple perspectives (learning experience, affordability, content development and scalable sustainable solutions).

**Satisfy Criteria for good qualitative research**

The author tried to establish credibility and rigor by collecting various types of data (Devers, 1999)—including diaries from observations, documents, audio recordings, photos, and video recordings—through a series of interactions- (Tools of Action Research). He involved all constituencies in this study including corporate representatives, government agency officers, local NGO leaders, university partners and other constituencies relevant to the project. The multiple constituencies provided multiple viewpoints on the research findings- (Collaborative nature of Action Research)

Between the period December 2006 and March 2008, the author repeatedly visited five times all of the five villages at an approximately a 4-month interval - (Cyclical nature of action research). At each visit, he conducted a series of iterative formal and informal meetings, conferences, direct and indirect observations, and interviews; his interactions included the introduction of the mobile learning model, technical training, and on-site observations (direct and shadow) - (Plural and reflexive nature of Action research)

**Are Ethical considerations satisfied?**

The author included ethical considerations such as age and skill appropriate, cultural sensitive learning content under his six evaluation criteria. But it is not clear whether the author
collected data from these underserved (at–risk populations) with fairness by providing informed consent, confidentiality as (Breuch, 2002) suggests.

V. Discussion and Conclusion

Interesting Discoveries

Action research is interesting because of its focus on finding solutions to contemporary issues. By involving practitioners and teaching them to conceive of problems and solutions through the use of evidence, action research is very relevant in our society. The information available has increased precipitously in the past ten years, but the human ability to process information remains consistent. Action research provides a clear path to generate information and place it in a relevant context. It also provides a way to change the solutions and add to them through iterative cycles.

Since action research does not aim to increase knowledge, issues of research generalization and external validity can be downplayed in action research while practicality and immediate usefulness become more important. For this reason, action research often seems an attractive option for researchers new to research. Action researchers do not have to worry about creating valid research designs, using inferential statistics, or addressing concepts such as triangulation and replicability. While these points are to some extent true, conducting useful action research still requires serious devotion of time and effort, and a lot of thoughtful consideration.

While action research is well suited to complex environments with difficult problems to solve, its persistence in education is surprising. Because education tends to have strong quantitative underpinnings when testing theory or making policy decisions, questions remain as to how successful action research projects help to shift policy.
Works Cited
