



**The Practice of Research
and the Research of
Practice**

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International Contexts of Research in Mathematics Education

- **Mathematics Education Research is International**
 - **Most countries have some form of research in the field**
 - **Locally conducted research is often shared internationally**

However

- **Not all countries have contributed equally**

and

- **Not all types of research developed in certain cultures have the same status**



➤ **Mathematics Education Research is Also Globalised**

Concepts, theories, and results of research conducted in one place are often taken to be global in their application

For example, constructivism or ethnomathematics, and qualitative research



Globalisation goes hand in hand with diversification

Globalisation can bring similarities at global level and increase diversification at the local level.

Two main areas of diversification



▪ **A diversification in research methodologies**

Experimental

Quantitative

Qualitative

Ethnographic

Naturalistic

Action research

Teachers research(teaching experiments)

- 
- **A variety of theoretical perspectives to understand the practices of teaching and learning and the professional development of teachers**

**Psychological paradigms –
sociocultural paradigms – critical
paradigms**

The Practice of Research

Questions:

- **How successful has research been in solving the problems in mathematics teaching and learning?**
- **Has research really changed the classroom practice all that much?**

Gaps

- **Between the research findings and the practices of the classroom**
- **Between theory and practice**
- **Between the research community and teachers.**
- **Between the time of knowledge generation and knowledge application**

Teachers find reading research:

- **Difficult to read**
- **Not interesting or relevant**
- **Done by experts who know little about real problems of classroom**

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- **External demands that “force” teachers to change is resisted by teachers.**
 - **Professional development of teachers to deal with changes is not adequate**
 - **Separate agendas of reforms - curriculum, teacher professional development, school organisation ...**
 - **Knowledge can not be transmitted from expert to knowledge**

What can we conclude?

We need more resources to do research

But

The failure of research in mathematics education to reform practice in many Western countries is due to the fact that research has left the teacher behind if not out

A spiral-bound notebook with a brown cover and a white page. The spiral binding is on the left side. The page is mostly blank, with a large brown rectangular area in the center. The text "We need different type of research!" is written in blue, bold, serif font in the center of the brown area.

We need different type of research!

The Research of Practice

Two dimensions to classify approaches to study practice

- **Individual/Social dimension**
 - Practice as how an *individual* acts, thinks or speaks

Or

- Practice as a *social* phenomenon where the individual actions, beliefs and speech can only be understood as constituted within the social context

(Based on Kemmis 1989)

➤ **The Objective/Subjective dimension**

▪ **Practice is seen as observable actions by the individual or the social group as studied *objectively* from outside**

Or

▪ **Practice as internal individualistic or social beliefs, attitudes and understandings can best be studied *subjectively***

| | Objective | Subjective |
|-------------------|------------------|-------------------|
| Individual | 1 | 3 |
| Social | 2 | 4 |

Methods for Studying Practice

| | Objective | Subjective |
|-------------------|------------------|-------------------|
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Methods for Studying Practice

1. Practice as *individual/objective*.

- **Research the external actions or language of individuals.**
- **Actions are observed objectively from outside**
- **No attempt to analyse the social origins and meanings of these actions**

- **Examples of research: measurement of achievement, psychological research, patterns of student errors, classroom interactions, problem solving, and most quantitative research.**

- **Typical instruments used include tests.**

| | Objective | Subjective |
|-------------------|------------------|-------------------|
| Individual | 1 | 3 |
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Methods for Studying Practice

2. Practice as *social/objective*:

- **Focuses on actions and interactions between groups of people.**
- **Also studies practice objectively from outside by experts.**
- **Examples: social-psychology, text analysis, social structures, and ethnomathematics.**
- **Typical data collection instruments include tests and observational schedules.**

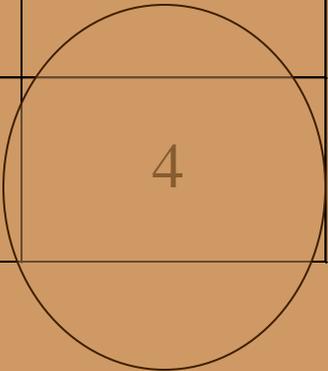
| | Objective | Subjective |
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Methods for Studying Practice

3. Practice as *individual/subjective*:

- **Human action can only be understood in the light of the values, intentions and understandings of the practitioner.**
- **These can only be inferred with the help of the individual and are not merely observable from the outside.**
- **Examples: the study of attitudes, beliefs and metaphors of teachers and students.**
- **Typical data collection instruments may include clinical interviews, concept maps and questionnaires.**

| | Objective | Subjective |
|-------------------|------------------|-------------------|
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Methods for Studying Practice

4. Practice as *social/subjective*:

- **Based on the assumption that individual beliefs and actions are the result of social interactions and hence are studied as a function of social understandings and meanings of actions.**
- **These beliefs and understanding are elicited with the help of people from inside the practice**
- **Examples: Research into values, ethnographic research, and research of classroom culture.**

➤ **This classification is based on a binary logic:
inside vs outside
individual vs social
objective vs subjective**

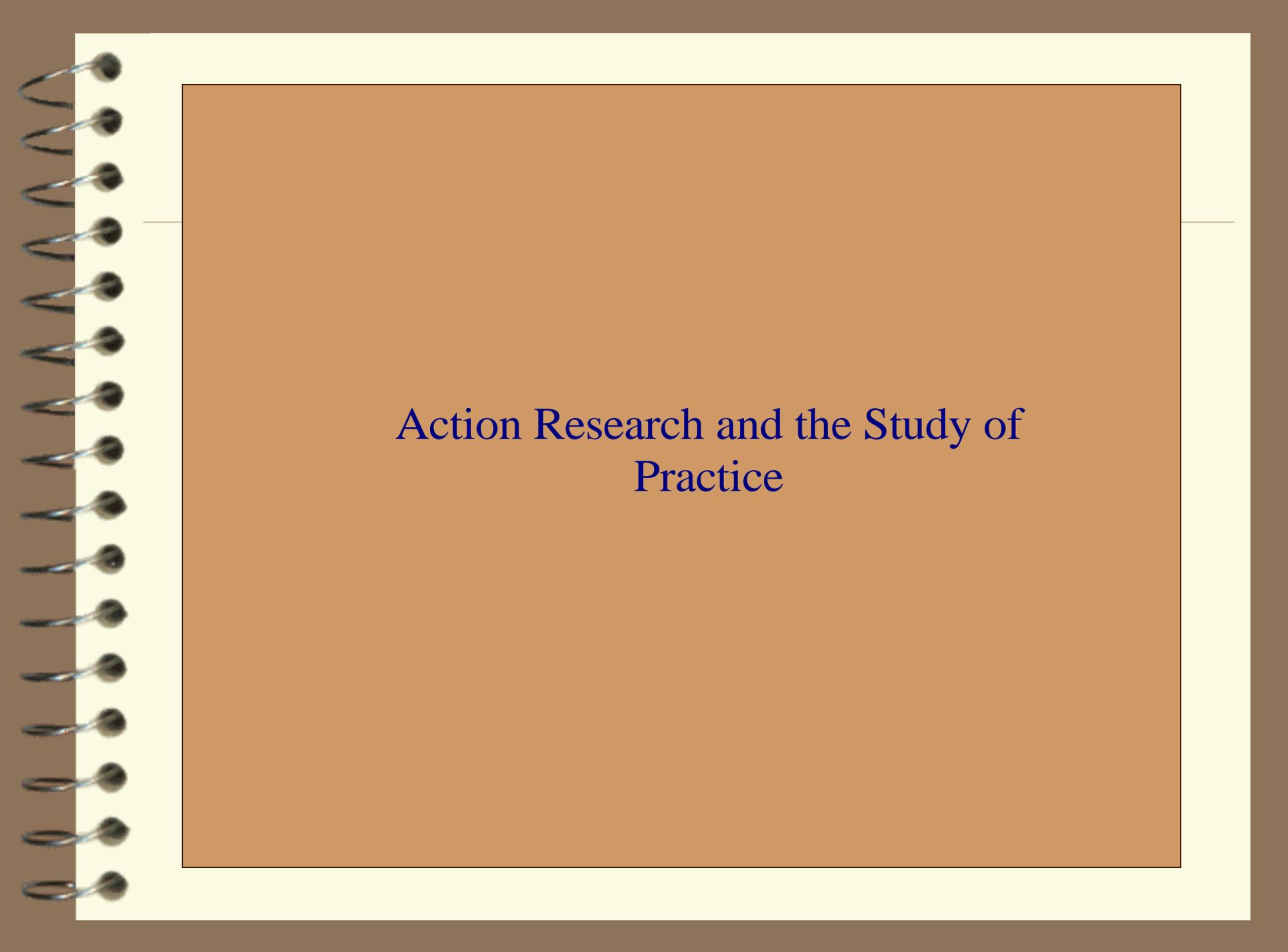
➤ **The above are false dichotomies.**

➤ **No individualisation without socialisation –
and no socialisation without individualisation**

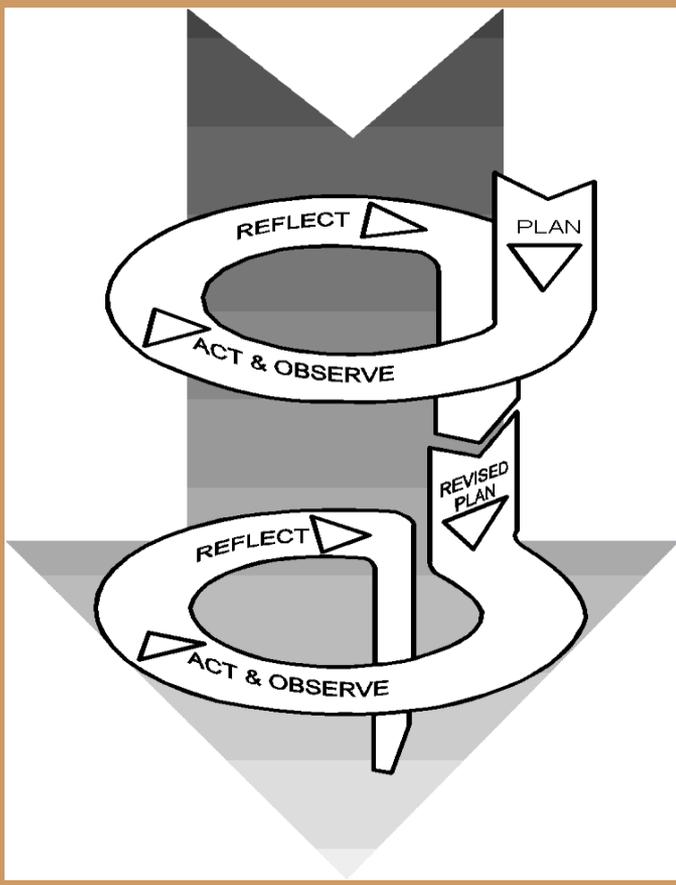
➤ **No internal without external and no external
without internal.**

5. Practice as *reflexive/dialectical*:

- **Aims to study the interaction of the subjective and the objective and the social and individual.**
- **In this sense, the historical development of the practice becomes central to its study.**
- **Examples: the use of critical social science and participatory action research.**

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Action Research and the Study of
Practice



Action research is *social* in three meanings.

- **It studies the classroom holistically as part of a wider set of constraints, relationships, and agendas.**
- **Many action research projects are based on socially just practices.**
- **The process of research itself is a social process – hence questions of power relationships between the participants, and voices should be raised. As a social activity, action research is never neutral.**

AR is *participatory*

- **It engages people in examining their practices and develop their own knowledge.**
- **People can only do action research “on” themselves —individually or collectively. It is *not* research done “on” others.**
- **Teachers need support in both training and infrastructure to allow their participation in research toward improving their practice.**

PAR is *collaborative*

- **It is a research done ‘with’ others”**
- **Collaboration means both collaboration between all people involved in the practice and between them and outsiders.**

Beware:

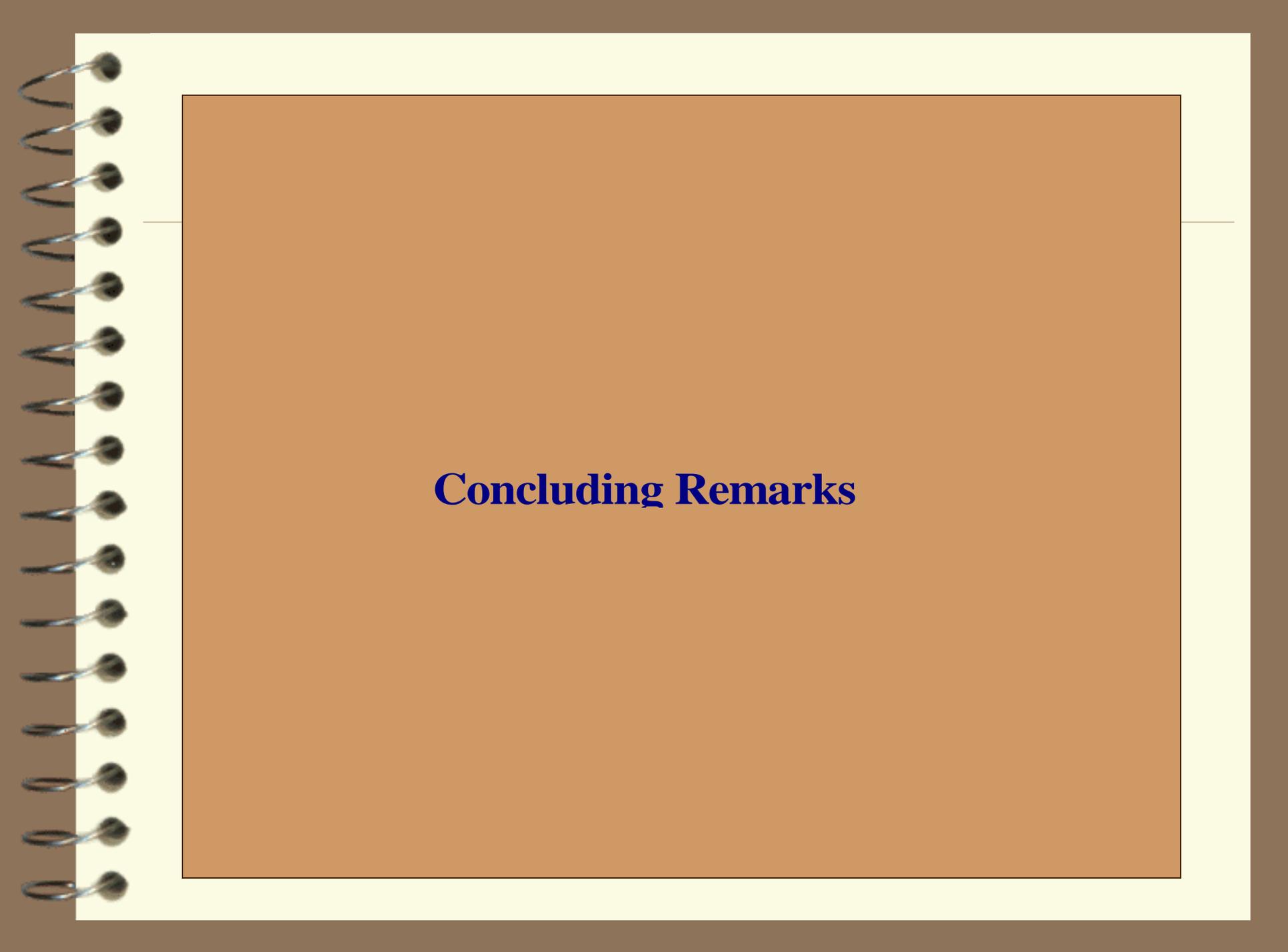
- **Forced or contrived collaboration may be used to impose special interest agendas on participants.**
- **Different agendas of the partners, their backgrounds and expertise, should be considered.**

Action research is *emancipatory*

- **Action research helps teachers to analyse the social constraints on their practice and find ways to counteract these constraints and/or learn to work around them.**
- **Teachers seeking solutions to the problems identified by themselves develop a sense of ownership of the solutions and the knowledge generated through their action research projects.**

Likewise, PAR is *critical*

- **It always raises questions about the conditions of practice and the assumptions and values of the various participants. Always asks why and why not!**
- **It attempts to develop an understanding of the history of the practice as it aims to look for insights about its possible change.**
- **It also examines itself as a social process with its own assumptions and aims.**

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Concluding Remarks