



Center for Excellence in Learning and Teaching (CELT)
An-Najah National University (ANU)

Problem Based Learning

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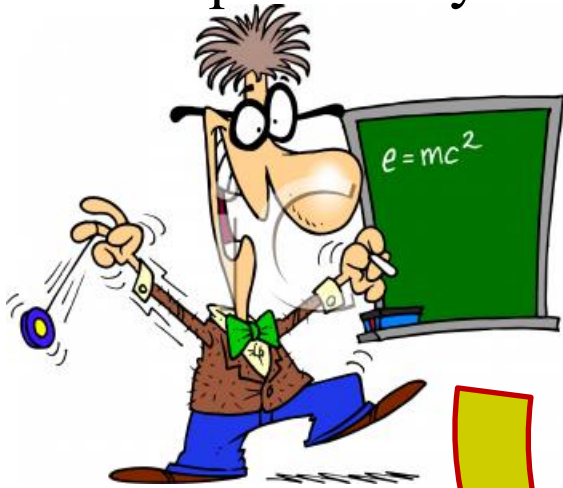
We don't stop playing because we grow old;



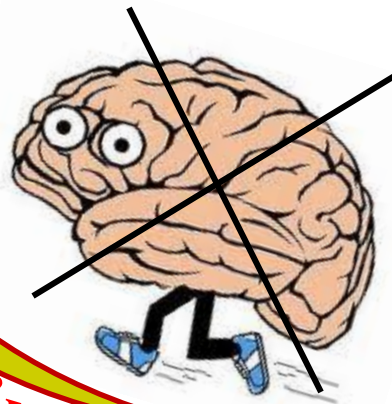
we grow old because we stop playing

The “scientific” definition of a lecture:

“a process by which the notes of a teacher



become **the notes**
of a student



*without passing through
the minds of either”*

Introduction

Solving a Problem

Problems in life to be solved

How can I understand this materials?

How can I pass this workshop?

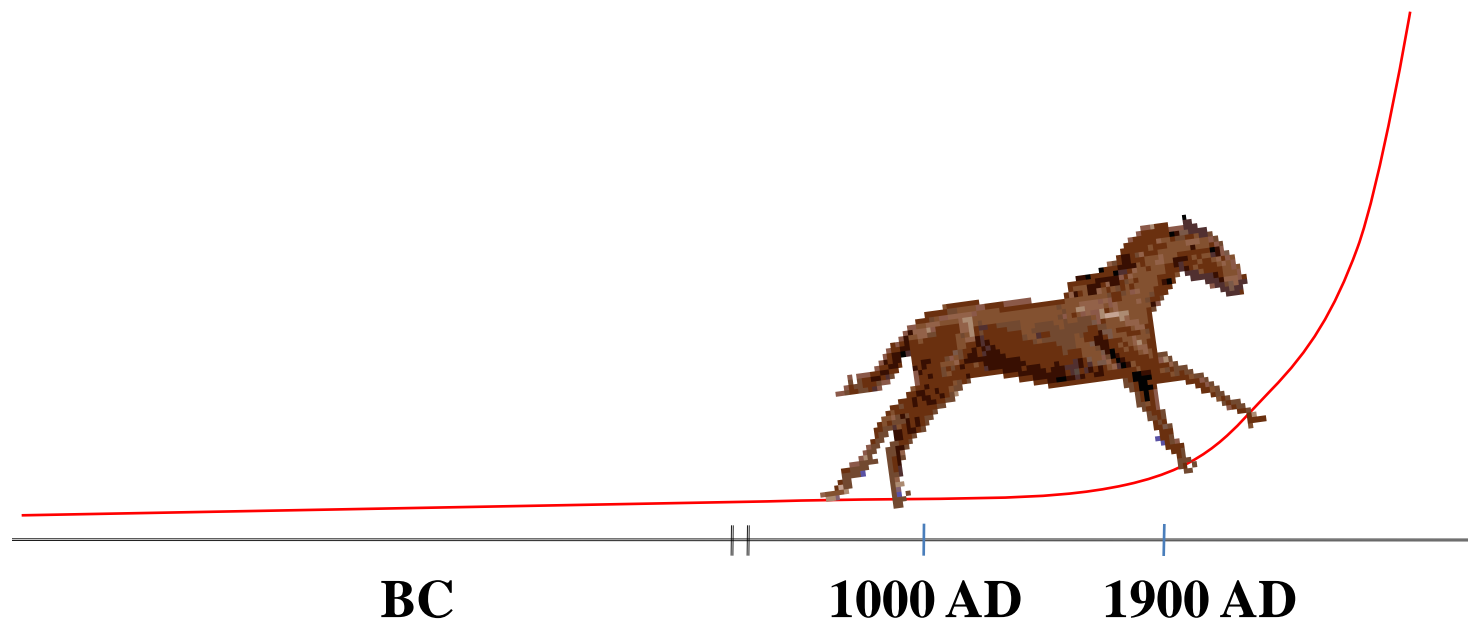
How can I control my time?

What can we improve in teaching process at ANU?

How can I improve my teaching skill?

New teaching methods- Why?

Too much information - too little time



New teaching methods- Why?

The need to promote the skills for independent life-long learning



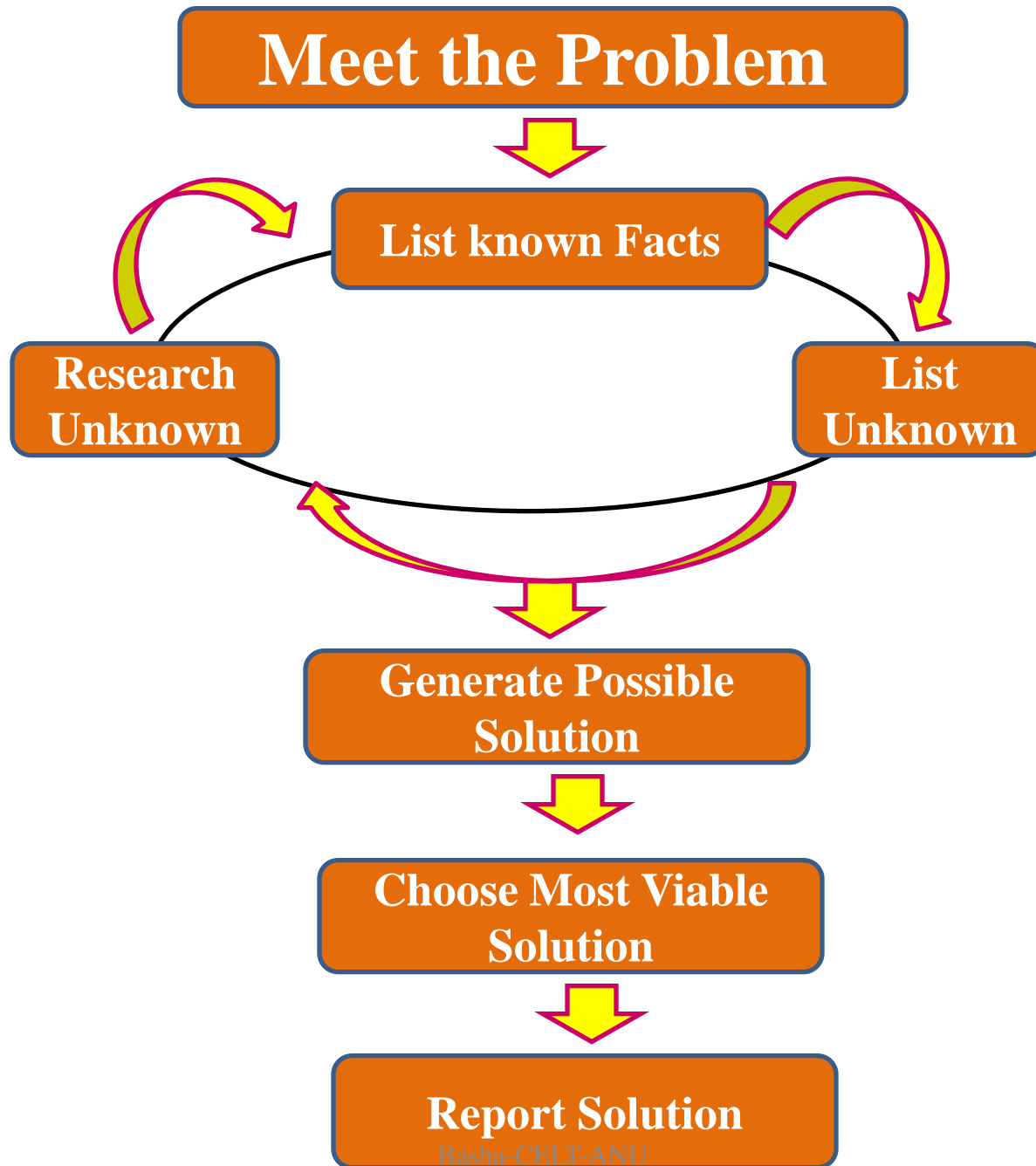
Definition

- PBL is a total approach to education began at McMaster University Medical School over 34 years ago.
- Dr. Howard Barrows and Ann Kelson of Southern Illinois University School of Medicine have defined PBL as:

What is problem-based learning?

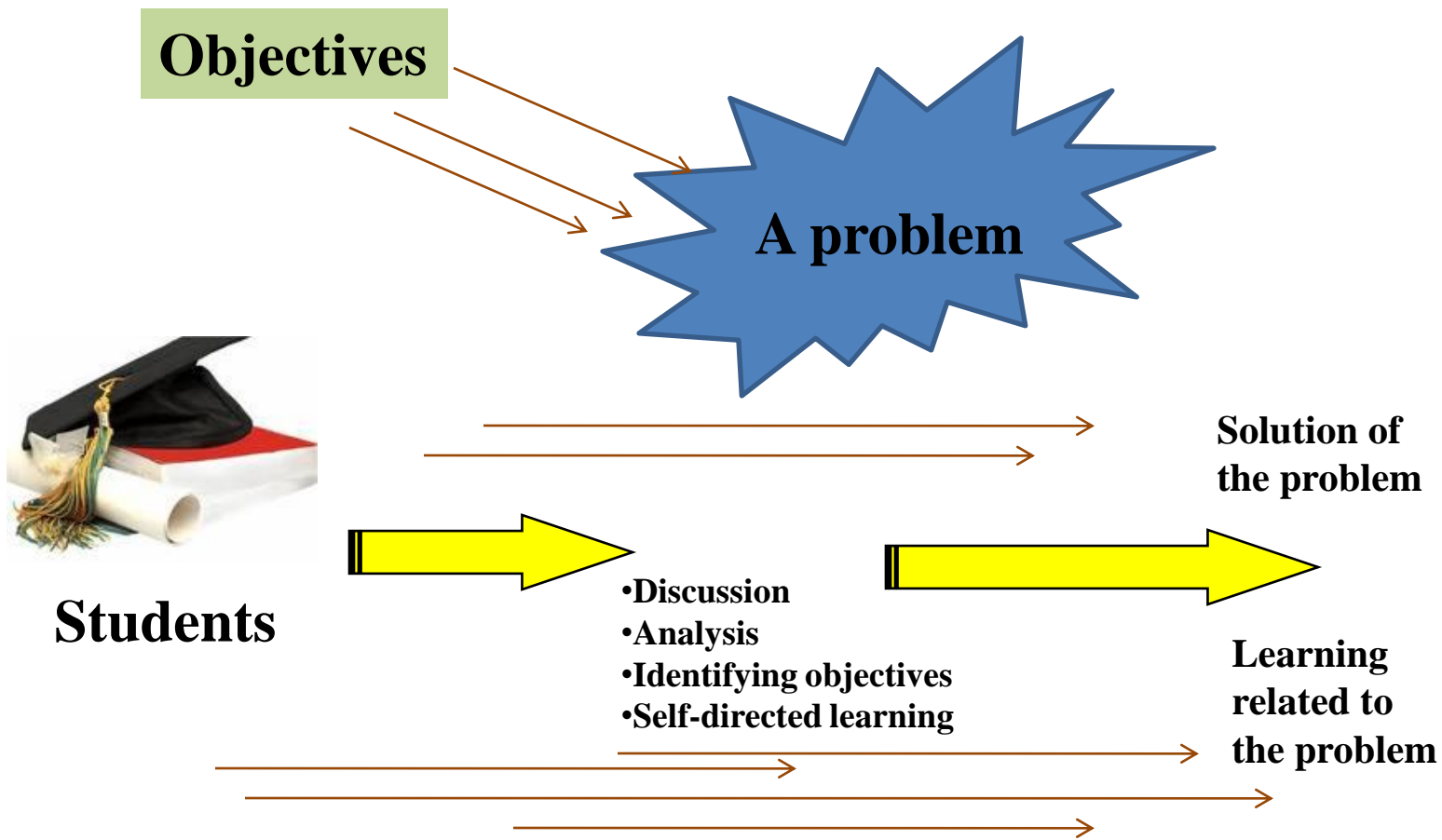
“ A learning method based on the principle of using *problems* as a **starting point** for the acquisition and integration of new knowledge.”

H.S. Barrows 1982



Problem-based learning in medicine?

The use of **problems** as a **focus** for learning basic science and clinical knowledge along with *clinical reasoning skills* in an **integrated**, rather than separate fashion” (Albanese M, et al, Aca Med, 1993)



PBL

Basha-CELT-ANU



Tell me and I **FORGET**

Teach me and I **REMEMBER**

Involve me then I **LEARN.**

PBL is an active learning process

Students engage in a collaborative activity that makes them :

Think



Ask questions



Activates prior knowledge



Elaborates new knowledge



Tests their understanding



Reinforces their understanding by speaking



Provides motivation for learning



makes them practice a logical, analytical approach to unfamiliar situations

Role Changes

- In problem-based learning, the traditional teacher and student roles change.
- **Students** : increasing responsibility for their learning and giving them:
 - motivation
 - feelings of accomplishment
 - become successful life-long learners.
- **Faculty** :become
 - Resources
 - Tutors
 - Evaluators
 - guiding the students in their problem solving efforts.



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Teacher as Coach

- **Models/coaches/fades in:**
- Asking about thinking
- Monitoring learning
- Probing/ challenging students' thinking
- Keeping students involved
- Monitoring/ adjusting levels of challenge
- Managing group dynamics
- Keeping process moving



Problem-solving v.s. PBL



Problem-based learning –

the process of acquiring new knowledge based on recognition of a need to learn.

Problem-solving - arriving at decisions based on prior knowledge and reasoning

What is the
English word of
(UM- Breas)

أم بريص



**Mother
of
Leprosy**





Gecko

Principles Behind PBL

- Understanding is built through what we **experience**
- Meaning is created from efforts **to answer** our own questions and **solve** our own problems
- We should appeal to students' **natural instincts** to investigate and create
- Student-centered strategies build **critical thinking** and **reasoning skills** and further their **creativity** and **independence**

Characteristics of PBL

➤ Learning is student centered.

➤ Learning occurs in small student groups.

“Dose not mean small class”

➤ Teachers are facilitators or guides.

➤ Problems form the organizing focus and stimulus for learning.

➤ Problems are a vehicle for the development of clinical problem-solving skills.

➤ New information is acquired through self-directed learning.

Characteristics of PBL

- Shifts away from short, isolated teacher centered lessons
- Creates long term, interdisciplinary student centered Lessons
- Integrates real world issues and practices
- Teaches students to apply what they have learned in university to life-long endeavors

Outcome of PBL

Outcome of the PBL process

To develop:

Knowledge

Basic and practical or clinical content in context

Skills

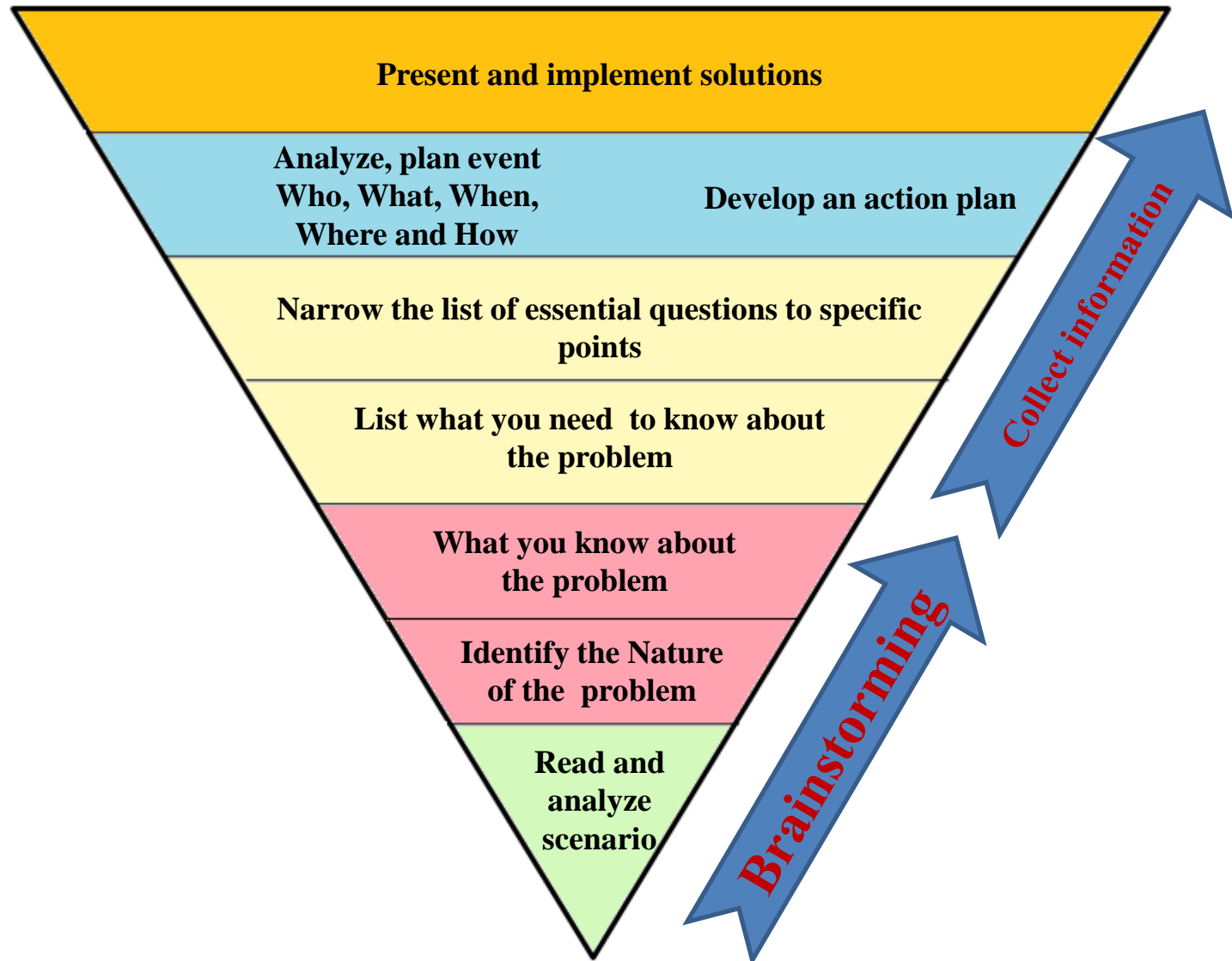
Scientific reasoning, critical assessment, information literacy, the skills of self-directed, life-long learning

Attitudes

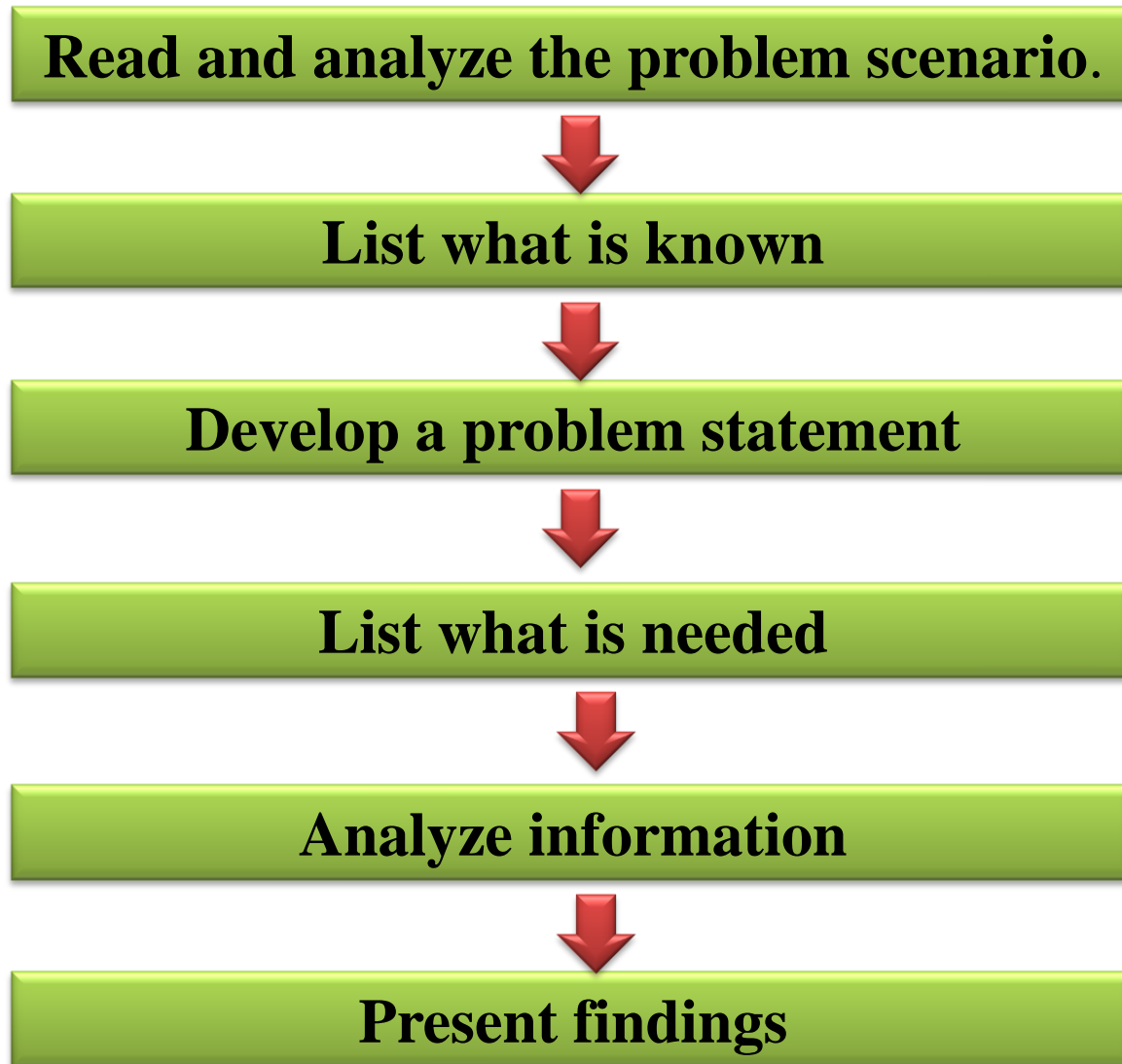
value of teamwork, interpersonal skills, the importance of psychosocial issues

Process

Process of PBL



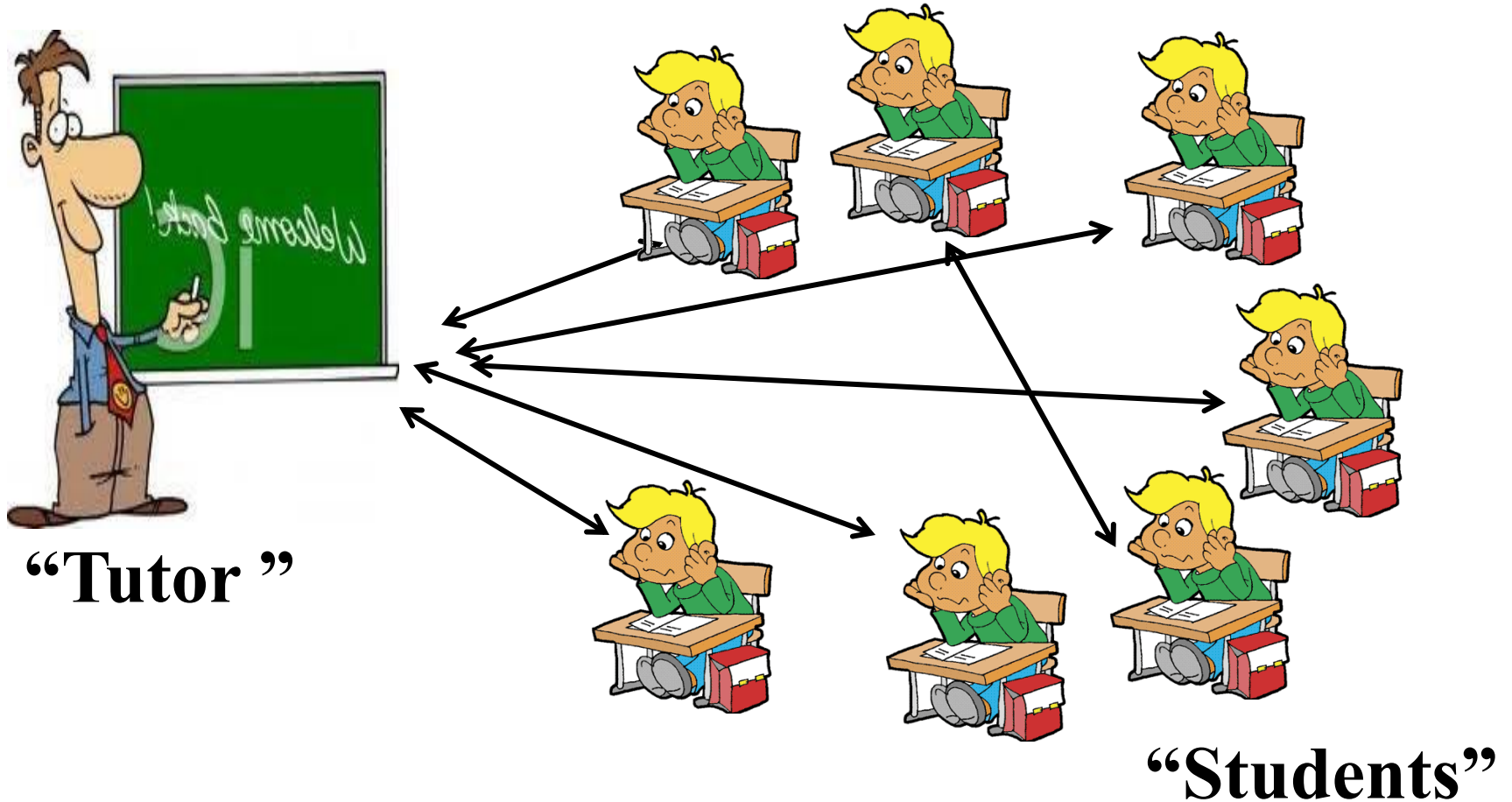
PBL Model



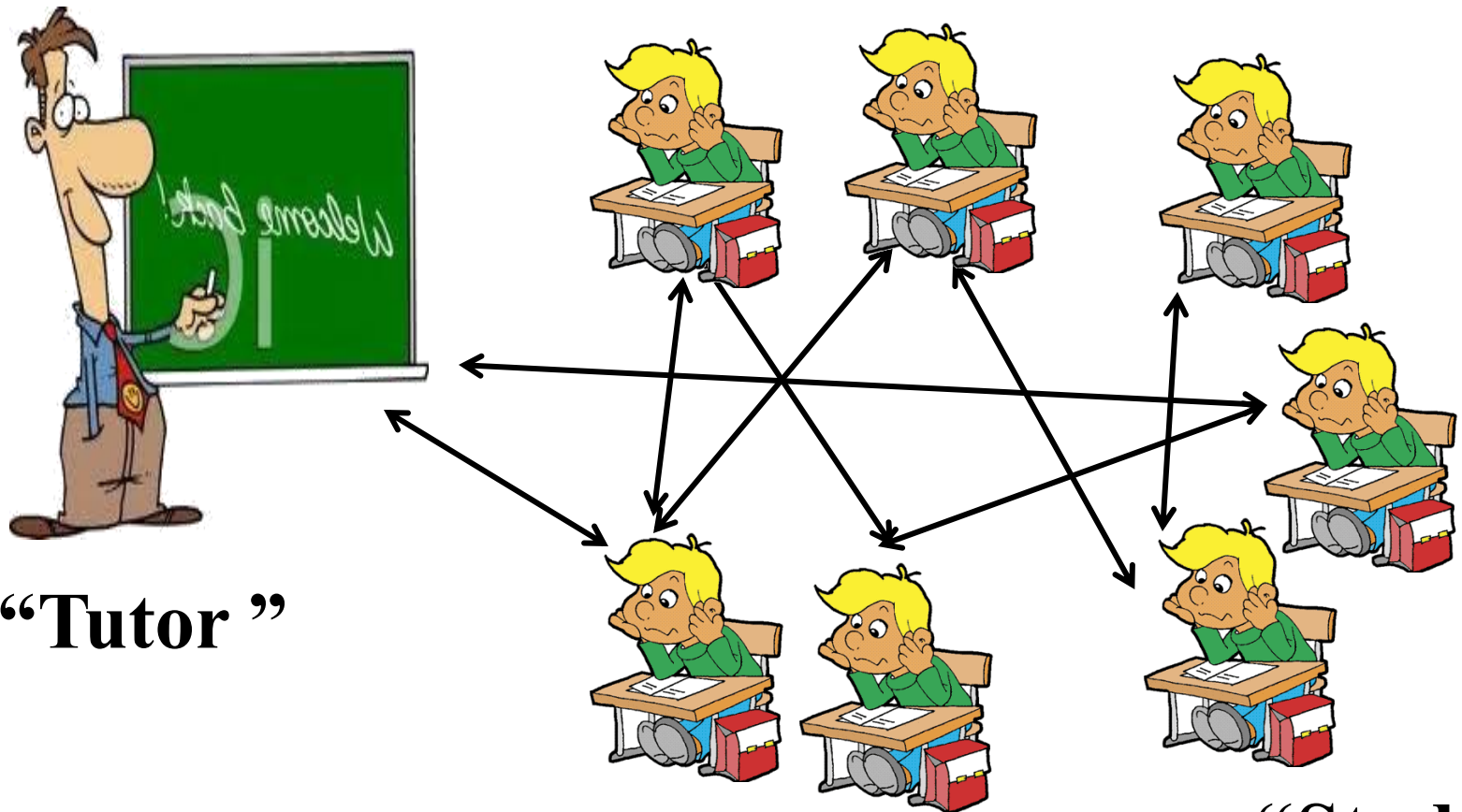
Characteristics of the PBL process

- Usually based on real life or clinical cases, relevant
- Cases are characterized by “progressive disclosure”
- Students determine the learning issues
- Sessions are open-ended to allow learning in the interval
- The tutor is a facilitator and not necessarily an “expert”, except in the process

Traditional Tutorial



PBL Tutorial



“Tutor”

“Students”

“A Typical Case”

Mrs. Fatima Al-Zeer is a 78 year old woman who has come to the emergency room complaining of shortness of breath and pain in her chest. She had been in relatively good health until three weeks previously, when she sprained.....

“A Typical Case”

➤ Opening Scenario

➤ History of present illness

➤ Past history, family history, social context

➤ Physical examination

➤ Investigations

➤ Management

➤ Sequel

Each step may lead back to a previous step, as well as leading to the next step

Characteristics of PBL Cases

➤ Relevant, realistic, logical

➤ Not too complex

➤ Cases are characterized by
“**progressive disclosure**”

➤ Story unfolds, step-by-step

➤ Narrative provokes discussion leading
to next step

“Progressive Disclosure”

- To allow discussion before leading into the next paragraph, page or session
- Assumes students have knowledge to proceed – if not, make it a learning issue
- May involve “cue” statements

➤ “You ask a few more questions...”

➤ “You order some investigations.”

➤ “She says her sister died young.”

“Progressive Disclosure”

-Session Breaks -

- At the end of the first and the second sessions Leaves students with enough to work on - issues essential for all, individual issues
- Reading between sessions should lead naturally to the next - e.g., leading to a differential diagnosis while the next session presents new data



An important part of PBL is the *learning*
between sessions

Student PBL Workshop Task (normally 45 minutes)

Read the case

What do you know about this scenario?

What do you need to know?

Discuss & list learning issues

Discuss & list potential sources of information

Organize who (theoretically) will do what

Evaluate how you performed as a group

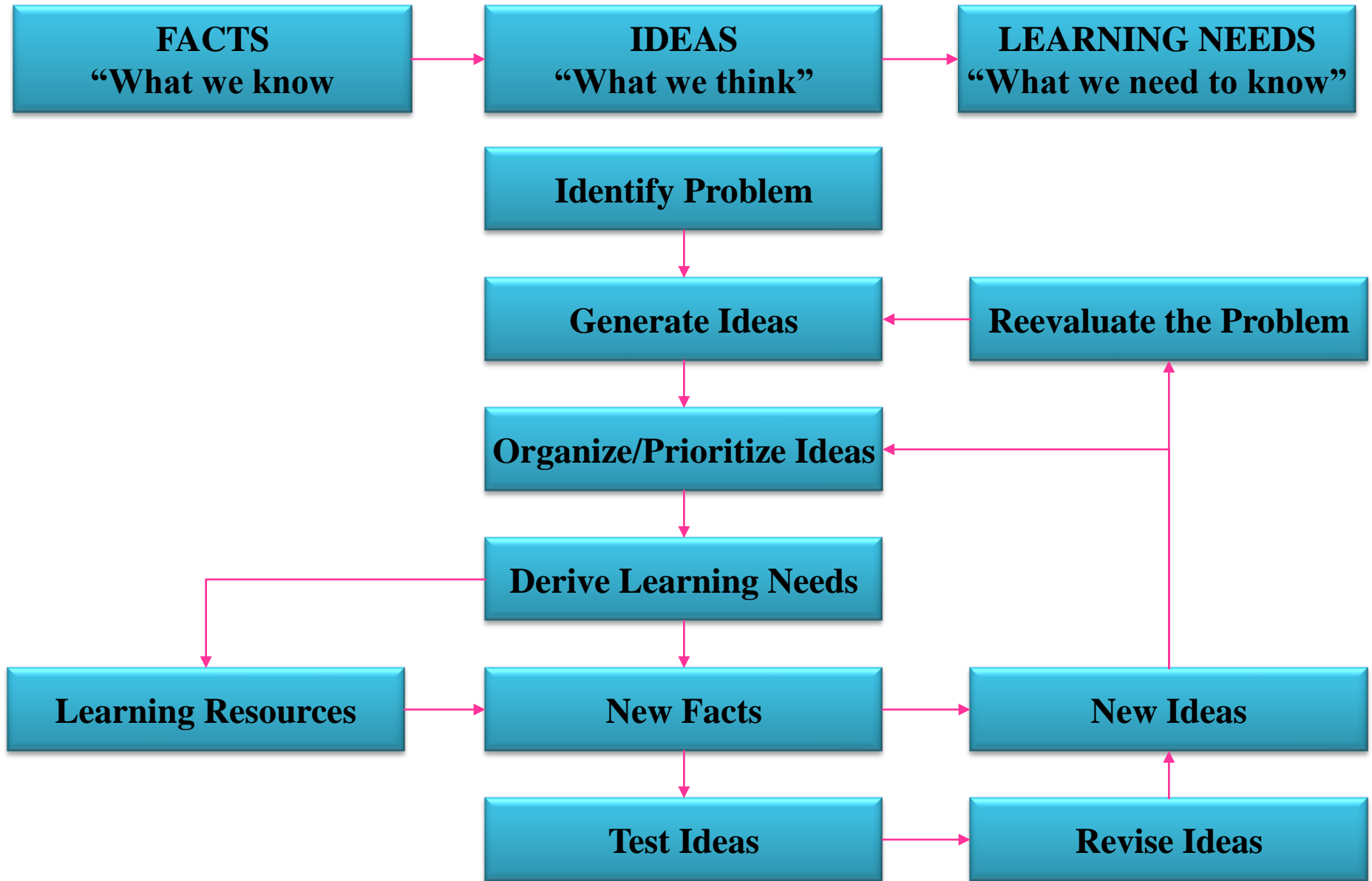
Case

You are a family practitioner in Nablus. Mr. Ahmad is a 38 yrs who comes complaining of a painful swelling in the palm of his right hand. About 4 days ago he was clearing brush behind the barn and pricked his hand on a thorn. The thorn injured about 4 cm. There was very little blood and he thought it was OK until yesterday. He tells you he last had a tetanus shot 11 years ago.

You examine his hand. It is red, swollen and inflamed. He is tender along his inner forearm and there is a tender swelling in his axilla.

Otherwise his physical exam is normal.

PBL Process



Well structured problem VS ill-structured problem

Well structured problem

Problem for which the existing state and desired state are clearly identified, and the methods to reach the desired state are fairly obvious.

Ill-structured problem

Situation in which its existing state and the desired state are unclear and, hence, methods of reaching the desired state cannot be found..

Problem-based learning has as its organizing center the ill-structured problem that ...

➤ is messy and complex in nature

➤ requires inquiry, information-gathering, and reflection

➤ is changing and tentative

➤ has no simple, fixed, formulaic, right solution

Examples of ill-structured problems used in PBL

You are a consultant to the Department of Natural Protection. A first draft of a plan for the reintroduction of Barn Owl to Jordan valley next to Tubas area has received strong, negative testimony at hearings. What is your advice regarding the plan?



Evaluation

Student

Group

Evaluation

Content

Tutor

Characteristics of a good PBL tutor

- **A knowledge** of the process of PBL
- **Commitment** to student-directed learning
- **Ability** to generate a non-threatening environment while still acting to promote discussion and critical thinking
- **Willingness** to make constructive evaluation of student and group performance



Characteristics of a good PBL student

- Prompt and present for all sessions
- A knowledge of the process of PBL
- Commitment to self/student-directed learning
- Active participation in discussion and critical thinking while contributing to a friendly, non-intimidating environment
- Willingness to make constructive evaluation of self, group and tutor



Assessment Rubric Example

1. Your Process	Evidence	Marks
Your sources of inspiration for the problem.	Project theme and interview	/ 5
Problem is real and relevant to the theme of “Nutrition”.	Group Problem Statement	/ 5
Your group generates a variety of ideas and gives convincing reasons for deciding on the problem.	Individual <i>My Problem Log</i>	/ 10
Problem solving tasks are well defined and good thinking questions are asked.	<i>Need-to-Know</i> worksheets Project planner	/ 5

2. Your Product	Evidence	Marks
Your group shows that you have made thorough use of knowledge from the content of the theme “Nutrition”.	Explanatory report	/ 5
Your group has carried out some experiments / data-collection procedures in the course of your Project.	Explanatory report	/ 15
Your group findings were well-analyzed, interpreted and reported.	Conferences / Explanatory report	/10
Your explanatory brief is clear and comprehensive and explains well all of the steps that you have taken to solve the problem.	Explanatory report	/ 5
There is a high level of creativity in your ideas, approaches, solutions, and use of resources.	Explanatory brief	/ 10

3. Your Oral Presentation	Evidence	Marks
The group presentation is very well organized as a whole.	Oral presentation	/ 5
Ideas and findings were well communicated.	Oral presentation	/ 5
IT/ visual aids used are effective.	Oral presentation	/ 10
The group was able to answer the questions raised by the audience well.	Oral presentation	/ 10

Advantages

The Advantages of PBL

➤ Emphasis on Meaning, Not Facts

- By replacing lectures with discussion forums, faculty mentoring, and collaborative research, students become actively engaged in meaningful learning.

➤ Increased Self Direction

- As students pursue solutions to their classroom problem, they tend to assume increased responsibility for their learning.

➤ Higher Comprehension and Better Skill Development

- Students are able to practice the knowledge and skills in a functional context, thereby to better imagine what it will be like using the knowledge and skills on the job .

➤ Interpersonal Skills and Teamwork

- This methodology promotes student interaction and teamwork, thereby enhancing students' interpersonal skills.

➤ Self-Motivated Attitude

- Students think problem based learning is a more interesting, stimulating, and enjoyable learning method, and that it offers a more flexible and nurturing way to learn.

➤ Facilitator-Student Relationship

- The aspect faculty liked most is the tutor-student relationship (Vernon, 1995). Faculty also consider problem based learning a more nurturing and enjoyable curriculum, and believe the increased student contact is beneficial to the cognitive growth of the student (Albanese & Mitchell, 1993).

➤ Level of Learning

- Problem based learning medical students score better than traditional students with respect to learning skills, problem-solving, self-evaluation techniques, data gathering, behavioral science, and their relation to the social-emotional problems of patients (Albanese & Mitchell, 1993).

Disadvantages

Problems with PBL in hybrid curricula

- Finding enough tutors - 1 for each 6 students
- Faculty busy with “traditional” curriculum
- The range of topics which can be discussed is a limiting factor - quality control is difficult
- Heavy on library, computer resources, support
- Objective evaluation of PBL is difficult
- Inherent conflict with lectures - waste of time

Models

Factors In Choosing a Model

- Class size
- Intellectual maturity of students
- Student motivation
- Course learning objectives
- Instructor's preferences
- Availability of peer tutors

Medical School Model

- Dedicated faculty tutor
- Groups of 8-10
- Very student-centered
- Group discussion is primary class activity
- *A Good Choice for*
- Highly motivated, experienced learners
- Small, upper-level seminar classes

Floating Facilitator Model

- Instructor moves from group to group:
 - asks questions
 - directs discussions
 - checks understanding
- Group size: 4
- More structured format: instructor input into learning issues and resources

Floating Facilitator Model

- Class activities besides group discussions:
 - groups report out
 - whole class discussions
 - mini-lectures

A Good Choice for

- Less experienced learners
- Small to medium-sized classes

Peer Tutor Model

- Advanced undergraduates serve as tutors
 - help monitor group progress and dynamics
 - serve as role models for novice learners
 - capstone experience for tutor

- Group size: 6-8 (dedicated peer tutor)
4 (if tutor rotates among 2-3 groups)

Peer Tutor Model

- Tutor training important
 - Development of questioning skills
 - Group dynamics
 - Resource guide

A Good Choice for

- Classes of all sizes

Large Classes

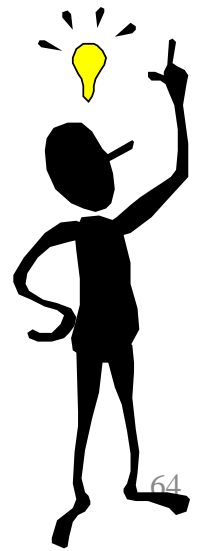
Large Classes

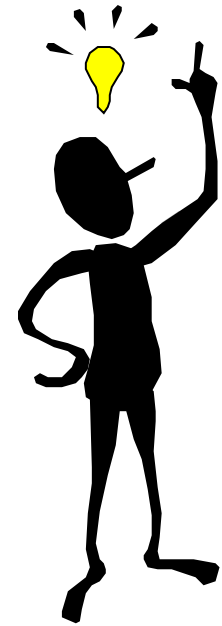
- Floating facilitator or peer tutor models are the most appropriate
- Requires a more teacher-centered, structured format: instructor directs group activities
- Group size: 4
- Numbers advantage in dealing with group vs. individual papers, projects

Planning and Implementing PBL

6 Basic Steps to Planning and Implementing PBL

- **Decide on the project/problem**
 - content, scope, major goals of project
- **Draft time frame**
 - Length, due dates, check points, (allow room for growth and changes in project)
- **Plan for activities**
 - Tie these in with the time frame





➤ **Plan for Assessment**

– Rubrics, checklist, etc.

➤ **Begin project with student**

– discussion, show possible samples

➤ **Finish project and reflect**

– highlights, improvements, personal reflection and things to remember next time



Be Creative

How we can Implement PBL in Our University

**Let put the quality of our practice in
teaching as a problem**

My colleague (صديق نصوح) could be tutor

Action Research

Why should I use action research?

- Because you want to change your practice.
- You may be concerned that things might not be going as you wish, or you may need to implement a new initiative but are unsure how to do it effectively.
- What you want is a way of sorting out these concerns that offers **practical solutions**, but that derives from the specific circumstances of your practice.
- You know that someone else's solution **may have merit**, but that it is **never quite right** for the individual situation within which you work.
- You know that **practice** is always **influenced by context**.

Goals

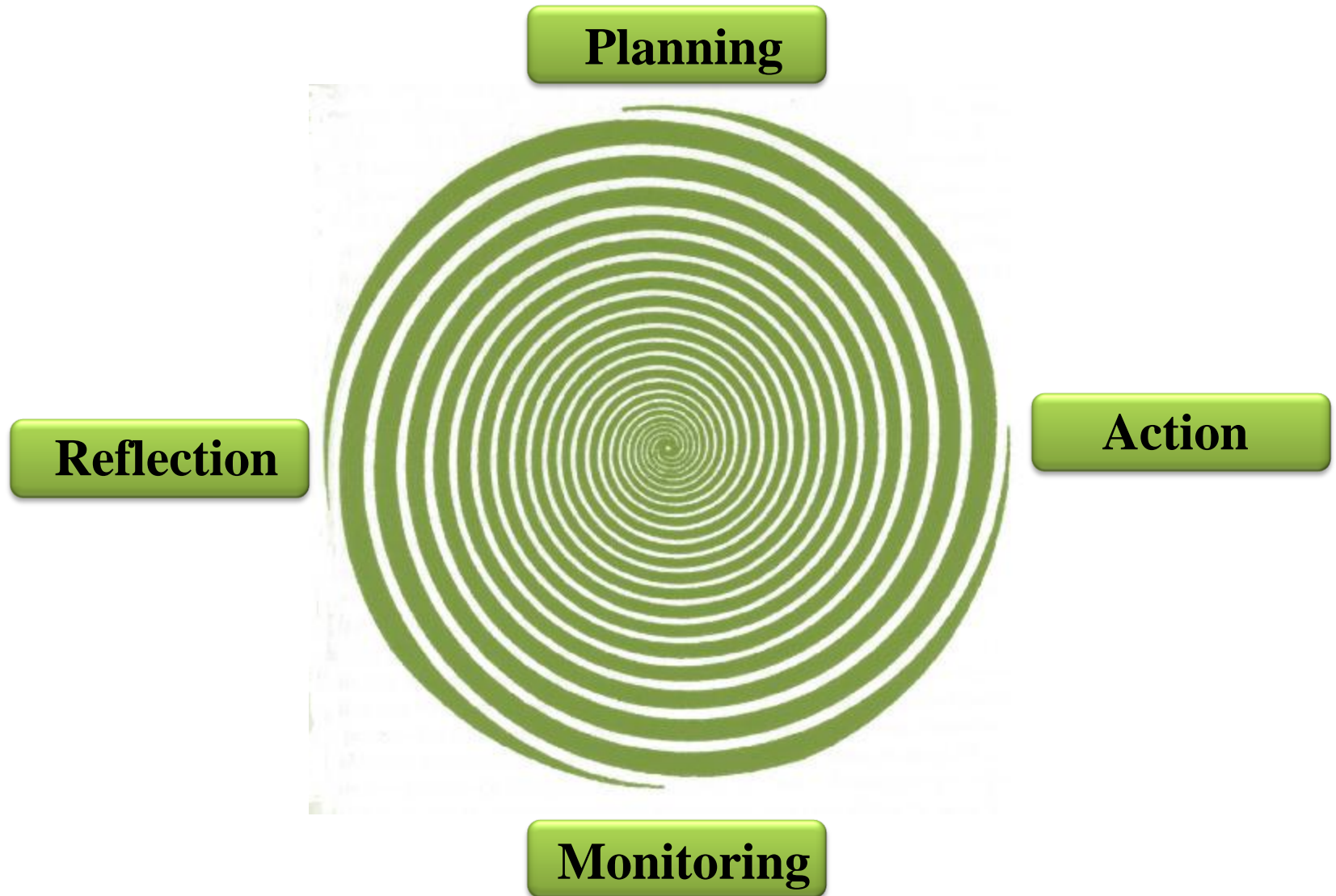
- Overall goal should be to solve a problem
- Include collaboration
- Professional development
- Enhance professional practice

Action research can thus be used to

Understand:

- one's own practice;
- How to make one's practice better;
- How to accommodate outside change in one's practice;
- How to change the outside in order to make one's practice better.

Action research involves a spiral or cycle



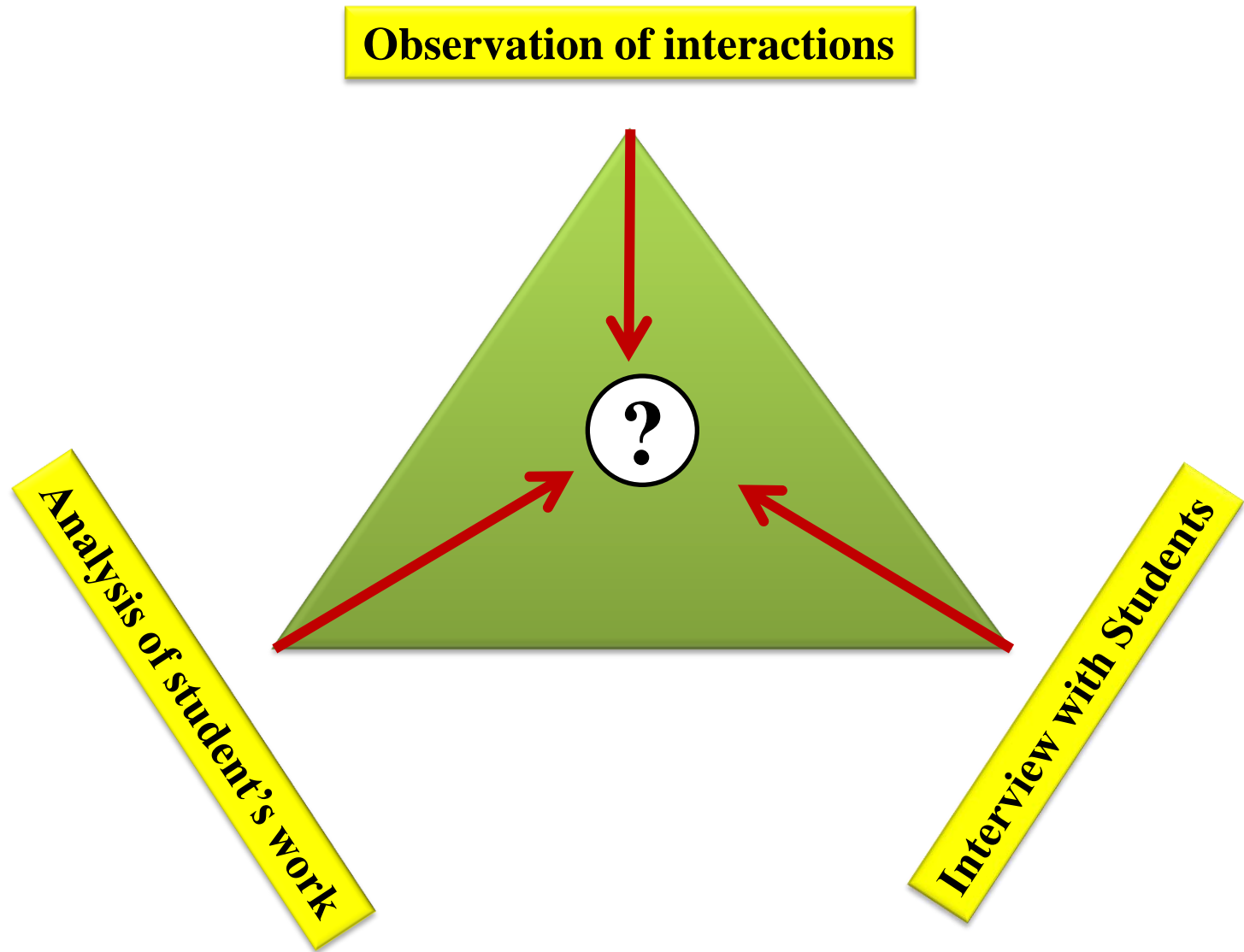
Action research in Summary

- Action research is a practical way for individuals to explore the nature of their practice and to improve it.
- Action research encourages practitioners to become knowledge-makers, rather than merely knowledge-users.
- Action research uses action as a means of research; planned change is implemented, monitored and analysed.
- Action research proceeds in an action-reflection cycle or spiral.

Action research in Summary

- The process can be messy; as research proceeds, wider links are likely to be identified.
- Action research is carried out by individuals, but these individuals may work collaboratively.
- Action researchers may use a variety of research methods, both qualitative and quantitative.
- Action researchers must ensure triangulation in their methods.

The principle of triangulation:



Doing action research

What can I investigate through action research?

➤ Investigate practical, everyday issues:

➤ Investigate everyday problems experienced by teachers

(Elliott, 1981).

➤ ‘All you need is a general idea that something might be *improved*’

(Kemmis and McTaggart , 1982).

➤ ‘I experience a problem when some of my educational values are negated in my practice’

(Whitehead 1985).

Starting

Some key questions:

Barrett and Whitehead (1985) ask six questions which should help you start your inquiry:

1. What is your concern?
2. Why are you concerned?
3. What do you think you could do about it?
4. What kind of evidence could you collect to help you make some judgment about what is happening?
5. How would you collect such evidence?
6. How would you check that your judgment about what has happened is reasonable, fair and accurate?

Starting points might be of the following kinds:

➤ I want to get better at my science teaching...

➤ I'm not sure why my students don't engage in discussion...

➤ I have to implement the speaking and listening guidelines, but I'm not sure what is the best way...

➤ How can we make staff meetings more productive?....

Starting points might be of the following kinds:

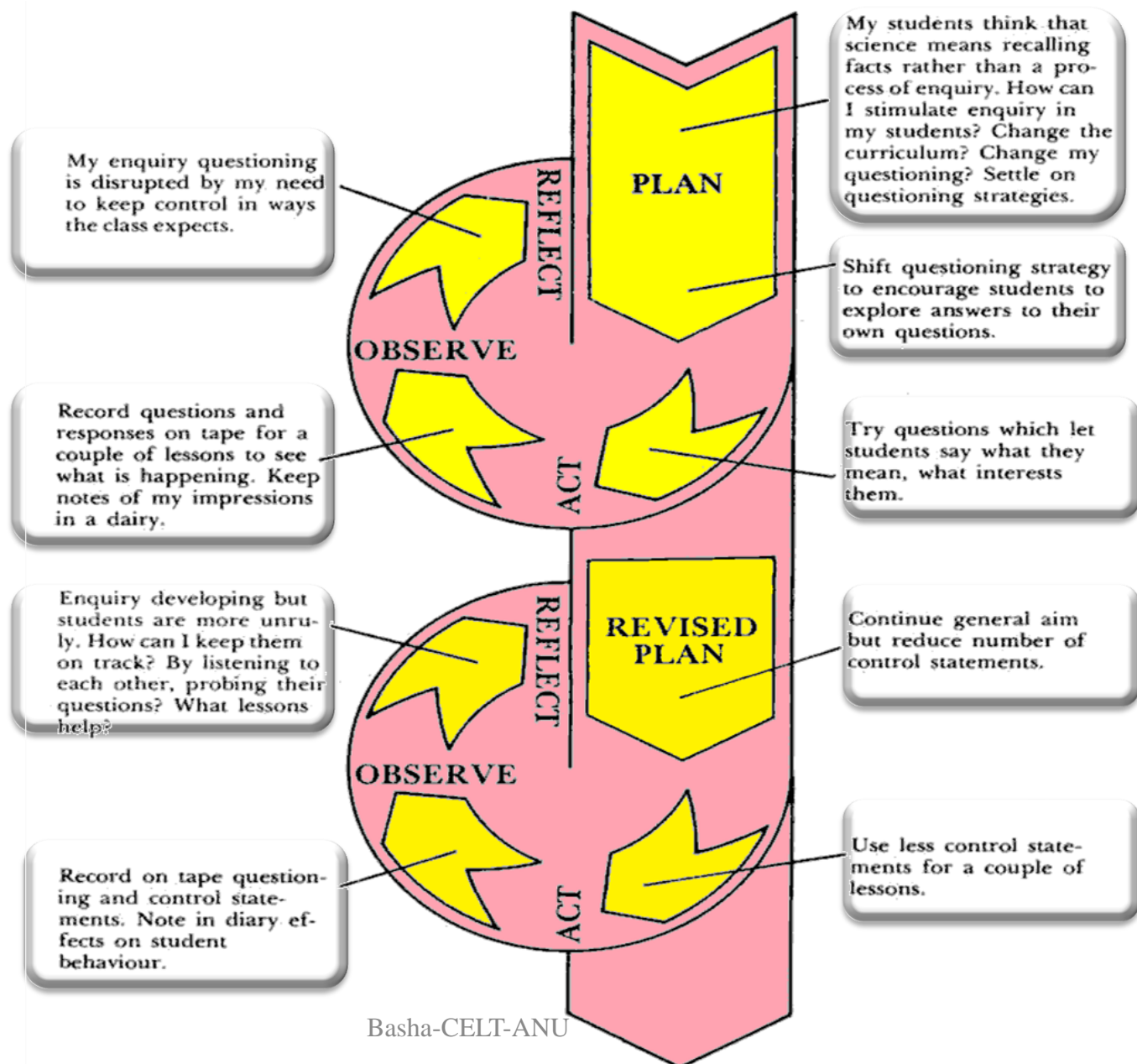
➤ I've seen something working well in school X; I wonder if it would work for me?...

➤ Is there anything we can do about our poor take-up of A level mathematics?...

➤ How can I promote more use of computers in the Humanities?...

➤ I wonder if I'm too focused on recording with my six year olds?...

Strategic action



McNiff (1988, p 27)

The Process of Action Research

- Identify the problem; select an area of focus.
- Review the related research literature.
- Collect the data.
- Organize, analyze & interpret the data.
- Take the action (apply the findings).

Identify the Problem

Select the Area of Focus

➤ Determine & describe the current situation

➤ Discuss

➤ Negotiate

➤ Explore opportunities

➤ Assess possibilities

➤ Examine constraints

Review the Related Literature

- Become familiar with other research done on the area of focus
- Utilize the findings of others to help develop the plan
- Apply research findings through the lens of others' experience

Collect the Data

➤ Using a variety of data collection strategies, gather information that will contribute to the findings

➤ Triangulate

➤ Data should be analyzed as it is collected

Organize, Analyze & Interpret the Data

- As the data is collected, it is also continually organized & analyzed
- As new perspectives are gained on the original area of focus, the problem statement may change
- Interpretation is based on ongoing analysis & continually reviewing the area of focus

Take Action; Apply Findings

➤ Draw conclusions from the data analyzed

➤ Translate conclusions into actions or behaviors

➤ Plan how to implement the actions or behaviors

➤ Do it!

Identifying the Problem

- Explore **your** understanding of theories, your educational values, how your work fits into the larger context of schooling, the historical context of your school, the history of the development of your ideas about teaching and learning
- Describe the Who, What, When & Where of the situation you want to change
- Explain the Why of the situation

Define your own problem

Discuss with your colleague your problem

Group discussion

Give an expected solution

Application of Action research on The University

It is a contentious process for life long