

The background features a collage of three images: a green-tinted close-up of a calculator on the left, a solid light green square in the center, and a close-up of a hand holding a pen over a calculator and a document on the right. The document has some text, including "More prominent on in" and "speech to the United".

Building A Reflective Collaborative Learning System Model for International Cooperative Problem-based Learning in Engineering Education

In-Sook Kim

Sogang University, Seoul, Korea

(abeek1@sogang.ac.kr)



Contents

1. Introduction

2. Theoretical background

3. Conceptual framework

4. Conclusions



1. INTRODUCTION

Educational Needs

Traditional school learning

: too often fails to prepare students for the kind of learning and performance that is required outside of school



Outside-of-school learning

: involves shared cognition, tool manipulation, contextualized reasoning, and situation specific competencies



1. INTRODUCTION

Educational Needs

Learning & Knowledge

- **Learning: fundamentally situated, and the production of useable**
- **Robust knowledge: supported by tasks and environments that are authentic**



Authenticity in school curricula

- **Investigations that are open-ended**
- **Answers that are not predefined**
- **Student construction of meaning**
- **Student use of scientific tools and techniques**



1. INTRODUCTION

Educational Needs

Problem-based learning

: Provides an approach for addressing such decontextualization, but also presents unique challenges to learners and instructors which overwhelm the cognitive and physical support structures found in contemporary schools



Problem-based curricula

: Demand supports of various kinds that allow learners to engage in meaningful, authentic work



1. INTRODUCTION

Research Purpose

- To provide intelligent support both for the processes of solving a problem and for learning from doing a project
- To provide a shared dynamic knowledge base for working and learning in a community supporting problem-based education
- To support the process for international cooperative problem-based learning in engineering education



2. THEORETICAL BACKGROUND



What is Problem-based Learning?

a form of contextual instruction that places great emphasis on learner problem-finding and framing

PBL Aims

- Engage students in their own learning
- Develop the skills of problem finding, decision making, and problem solving

Accomplish PBL goals

Learners need to

- Ask and refine questions
- Debate ideas and make predictions
- Collect and analyze information
- Draw conclusions
- Communicate with others



2. THEORETICAL BACKGROUND



What is Problem-based Learning?

- The role of Instructors & Learners

Instructors

- Need help to be coaches and facilitators as well as to act as role models
- Manage multiple projects and promote teamwork
- Consult in areas of limited expertise
- Guide with feedback
- Recognize and intervene when problems arise

Learners

- Need to draw from their own personal experience and interests
- Need to collaborate with peers and find mentors, resources, and guidance
- Need to make sense of their results



2. THEORETICAL BACKGROUND



What is PBLSS

Problem-based Learning Support System (PBLSS)

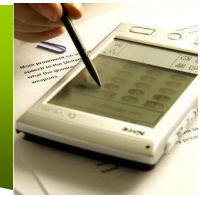
To help meet the needs of instructors and learners engaged in PBL



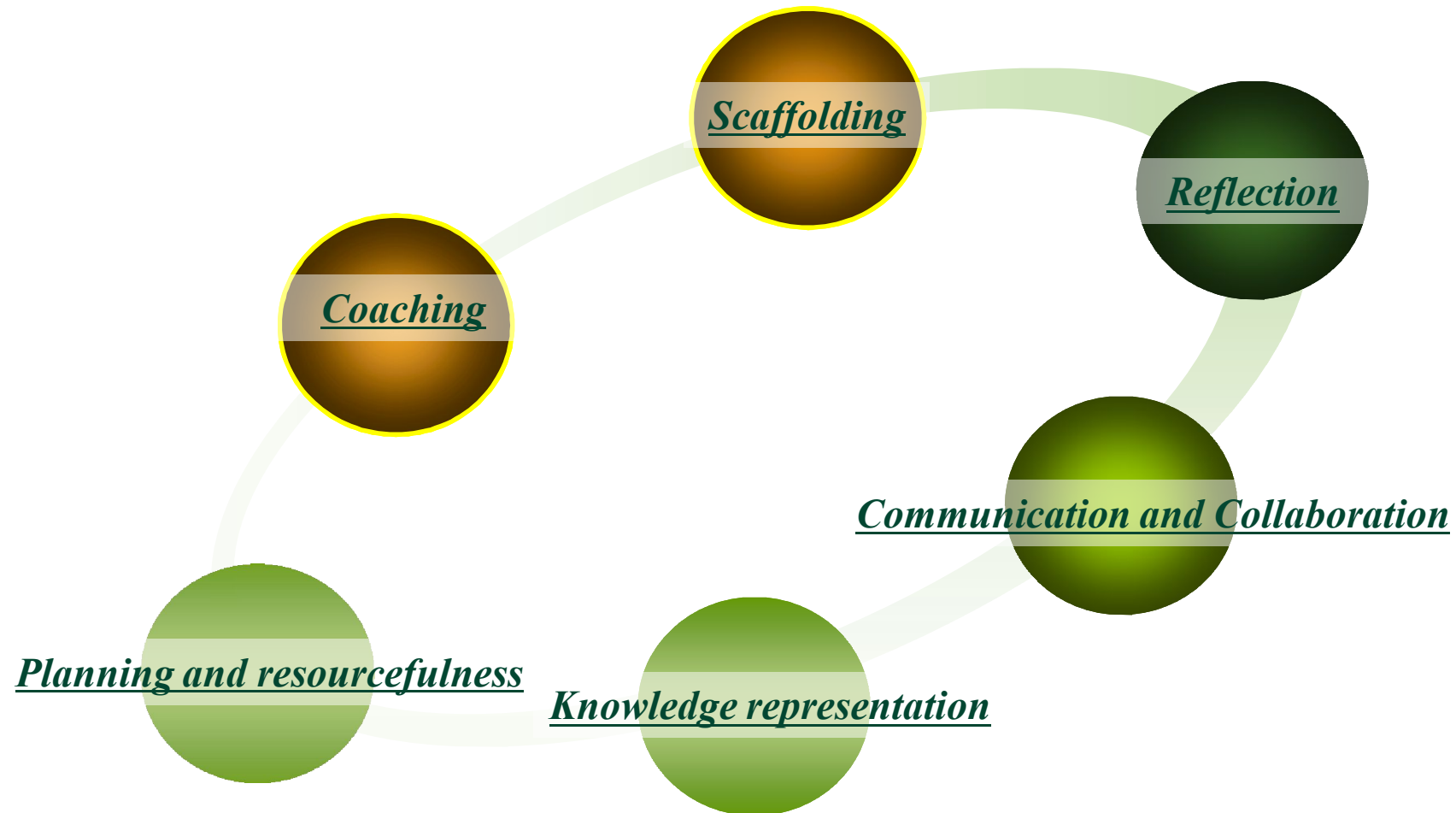
Reflective Collaborative Learning System (RCLS)

To support for instructional processes and learning processes in problem based teaching and learning

2. THEORETICAL BACKGROUND

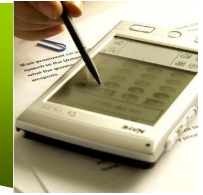


RCLS as PBLSS includes support for six processes





2. THEORETICAL BACKGROUND



RCLS as PBLSS : instructional processes



Scaffolding

a procedure to assist novice learners in performing tasks for which they would otherwise be unprepared



Coaching

a interactive help process including modeling, giving feedback, structuring the way to do things, challenging the learner, providing hints, encouraging, providing reminders, and diagnosing problems



2. THEORETICAL BACKGROUND

RCLS as PBLSS includes support for six processes



Planning and resourcefulness

to assist learners with the complex demands involved in planning and being resourceful within authentic projects

Knowledge representation

Communication and Collaboration

Reflection



2. THEORETICAL BACKGROUND

RCLS as PBLSS includes support for six processes



Planning and resourcefulness



Knowledge representation



Communication and Collaboration



Reflection

a cognitive artifact that is to assist learners in the framing, representation of their ideas, knowledge, and their development from the act of representation



2. THEORETICAL BACKGROUND

RCLS as PBLSS includes support for six processes



Planning and resourcefulness

Knowledge representation

Communication and Collaboration

Reflection

to support the exchange and sharing of ideas and results, collaboration between widely distributed participants, feedback, discussion, debate, and the growth of a community of learners



2. THEORETICAL BACKGROUND

RCLS as PBLSS includes support for six processes



Planning and resourcefulness

Knowledge representation

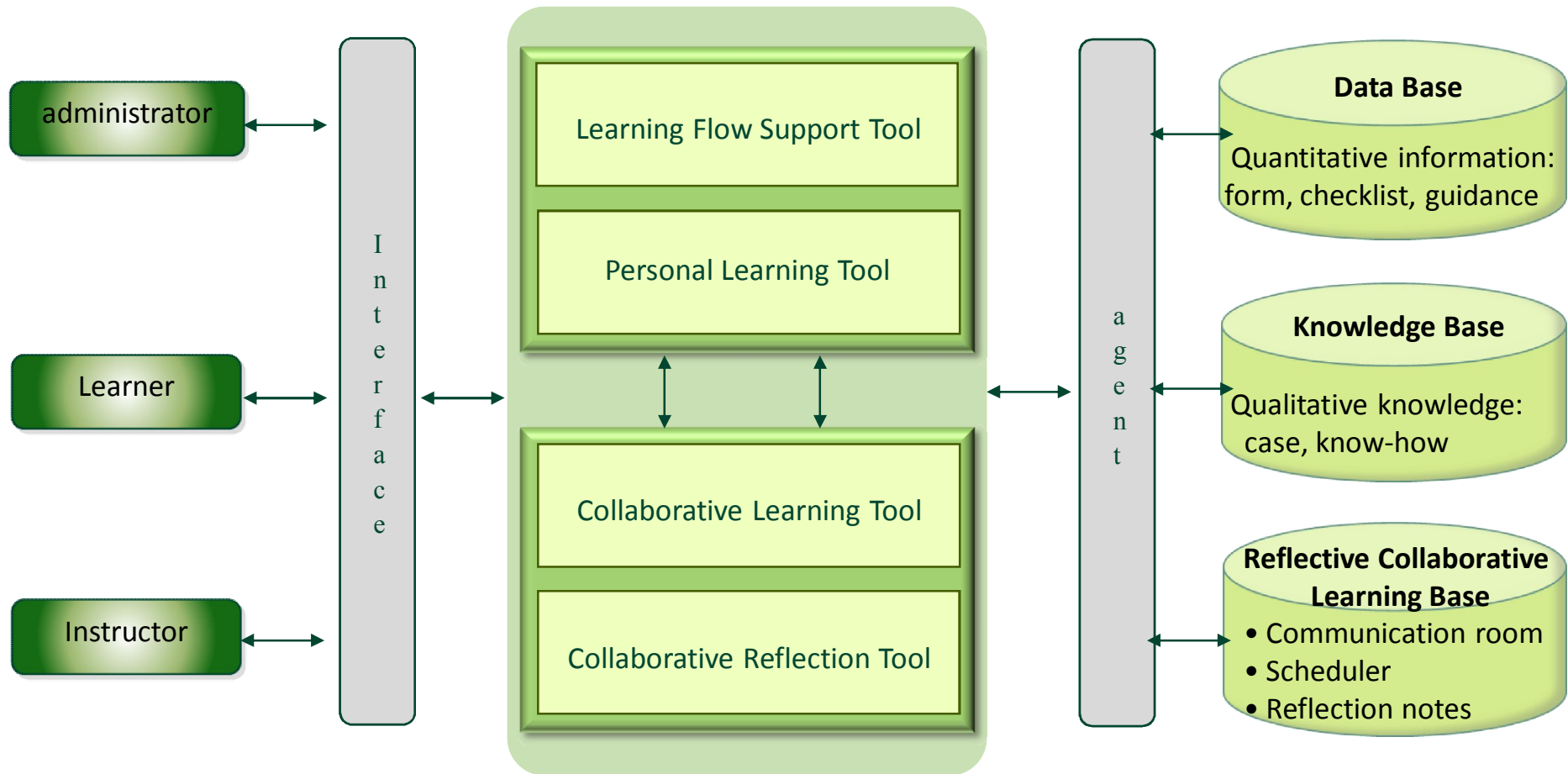
Communication and Collaboration

Reflection

to support self and communal evaluation and reification of previously completed work with subsequent cognitive and physical revision, re-framing, and restructuring of ideas, assumptions and representations

3. CONCEPTUAL FRAMEWORK

The architecture of RCLS



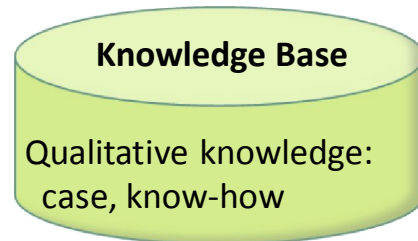
3. CONCEPTUAL FRAMEWORK

The components of RCLS

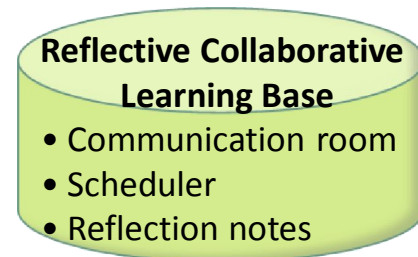
RCLS is composed of three parts:



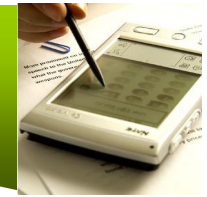
- Resourcefulness



- Instructional Scaffolding
- Coaching

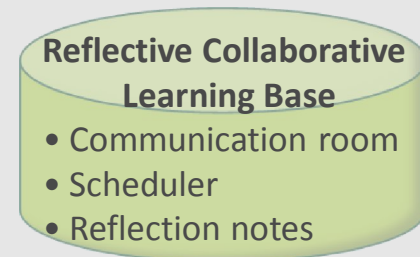
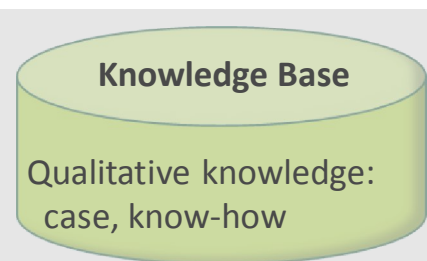


- Planning
- Representation
- Communication & Collaboration
- Reflection



3. CONCEPTUAL FRAMEWORK

The components of RCLS



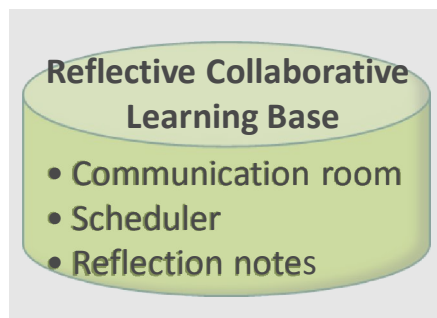
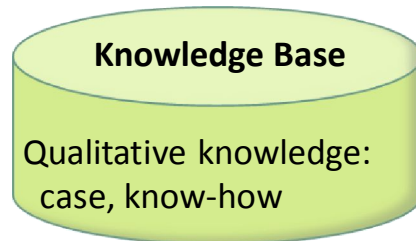
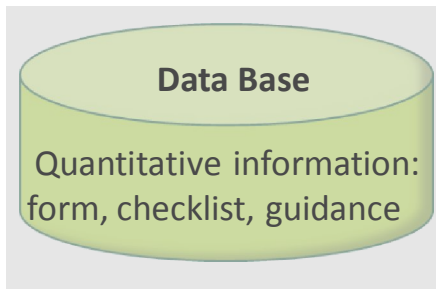
- **Resourcefulness**

Resources tool for specifying material and information resources necessary for the project, with linking to specific objectives



3. CONCEPTUAL FRAMEWORK

The components of RCLS



- **Scaffolding**

Process of doing authentic projects that must be available for an objective to be reached

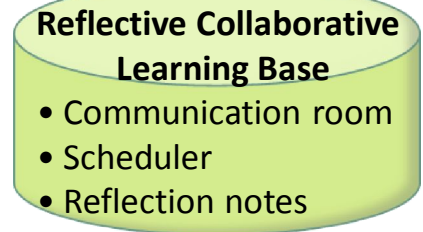
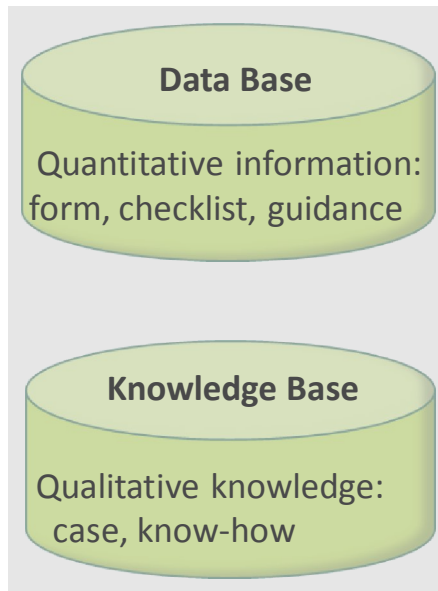
- **Coaching**

Knowledge base via communicating learner work to the instructor in forms that support the instructional decision-making process



3. CONCEPTUAL FRAMEWORK

The components of RCLS



• **Planning**

Provides the complexities of real task by offering organizational and management tools for project planning

• **Representation**

Help learners organize their thoughts for representation of a project abstract, project goals, objectives, resources, and extensions of the work

• **Communication & Collaboration**

Provides site customizable, threaded, topic-based discussion groups to enable discourse and information sharing

• **Reflection**

Supports reflection by requiring learners to articulate their work, by facilitating comments and critiques from others, and by making it easy to review and compare previous work





4. CONCLUSIONS

Firstly, RCLS as PBLSS is an attempt, but through continuously cyclic design and revision, I believe that the RCLS is becoming a valuable support tool in engineering education.

Secondly, to support reflective collaborative learning for cooperative PBL in engineering education both efficiently and effectively a well-designed learning instructional strategies is needed.

Thirdly, the conceptual model of RCLS for international cooperative PBL will provide an environment for studying authentic learning, the processes of doing projects, and the structures needed for their support.

Lastly, in engineering education, it is necessary for an expansion of international collaborative learning for continuous quality improvement of engineering college and students to improve their performance.



Thank You !

