Development of real learning environment based on Knowledge Building

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Cotents

Overview of real learning environment development practices

The basic framework for real learning environment development

Knowledge Building Teaching Case in Real Learning Environment

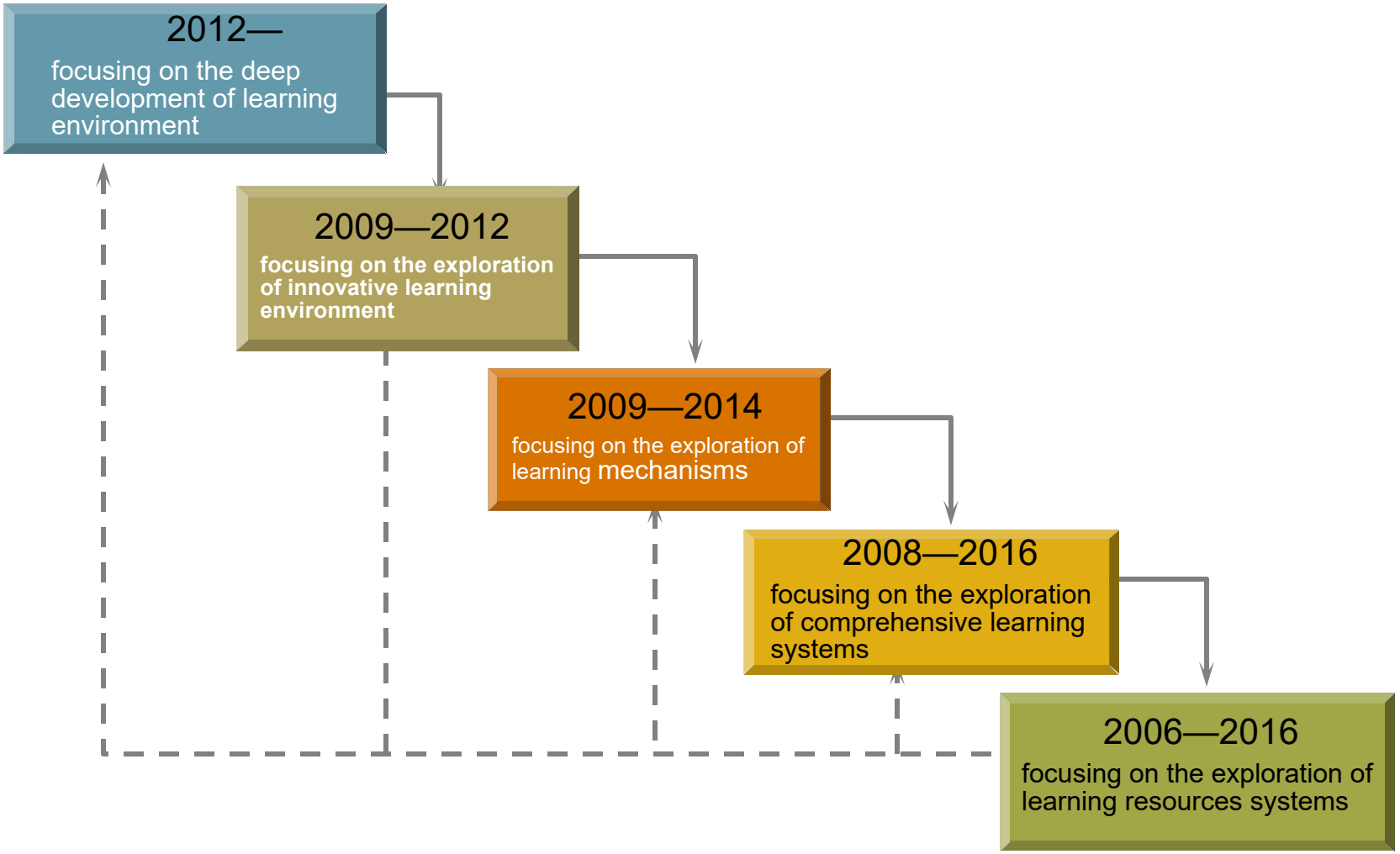
Project practice conclusions and discussion questions

authentic learning definition

Truly experience learning activities that solve real problem in real situations

Project Overview: Regional Real Learning Environment Development Practice

- 1. 2006-2016 hosted the "Chinese and foreign multi-open learning environment construction and off-campus curriculum resources development cooperation research", and cooperated with the United Kingdom, the United States, Northern Europe, Australia, Japan, South Korea, Taiwan , focusing on the exploration of the learning environment system.
- 2. 2008-2016 hosted the "National Education System Reform Project - Social Classroom Construction for Primary and Middle School Students in Haidian District, Beijing", conducted large-scale regional exploration experiments, focusing on the exploration of comprehensive learning systems, including environmental systems, curriculum systems, organizational systems and Guidance system and input system.
- 3. 2009-2014 hosted the key project of the Ministry of Education, “Practical Research on the Construction of Out-of-School Education Bases and Innovative Talents Training Models”, and collaborated with 78 units including Peking University, Tsinghua University, and Chinese Academy of Sciences , focusing on learning mechanisms, and develop courses and measurement scales.
- 4, 2009-2012 hosted the "Innovative Talents Early Training Thousand Talents Program", Tsinghua University and the Chinese Academy of Sciences as the implementation unit, focusing on the exploration of innovative learning environment.
- 5, 2012—Hosted the “Learning Community Construction” and “Device-Driven Teaching Innovation” projects in the class experimental reform area of the Ministry of Education to explore the exploration of the learning environment construction mode.

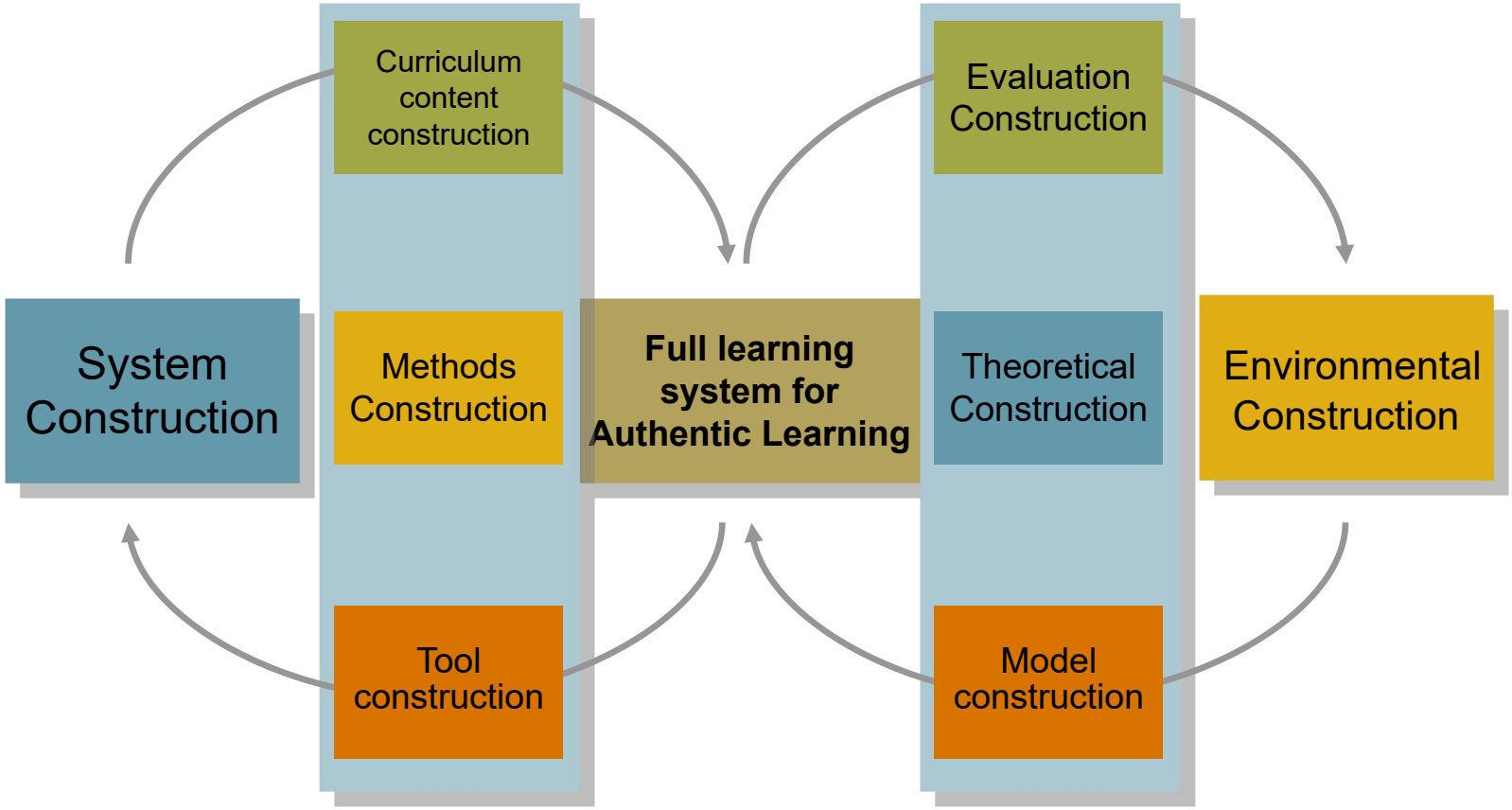


2006−2016 Exploration of the Five Links of Authentic Learning

Practical results of exploring authentic learning

1. System Construction: Forming a collaborative mechanism for the supply of socialized learning resources
2. Environmental Construction: Developing Standards for Off-campus Learning Bases (Resource Units)
3, Curriculum construction: development of four series of 120 courses for authentic learning
4. Methods Construction: Creating a Comprehensive Learning System
5. Tool construction: regional learning platform + management system + implementation system
6. Evaluation Construction: Eight Elements and Three Types of Evaluation Scales
7. Theoretical Construction: Writing 40 books on social classroom series
8. Model construction: large, medium and small linkage, resource alliance, school-enterprise collaboration

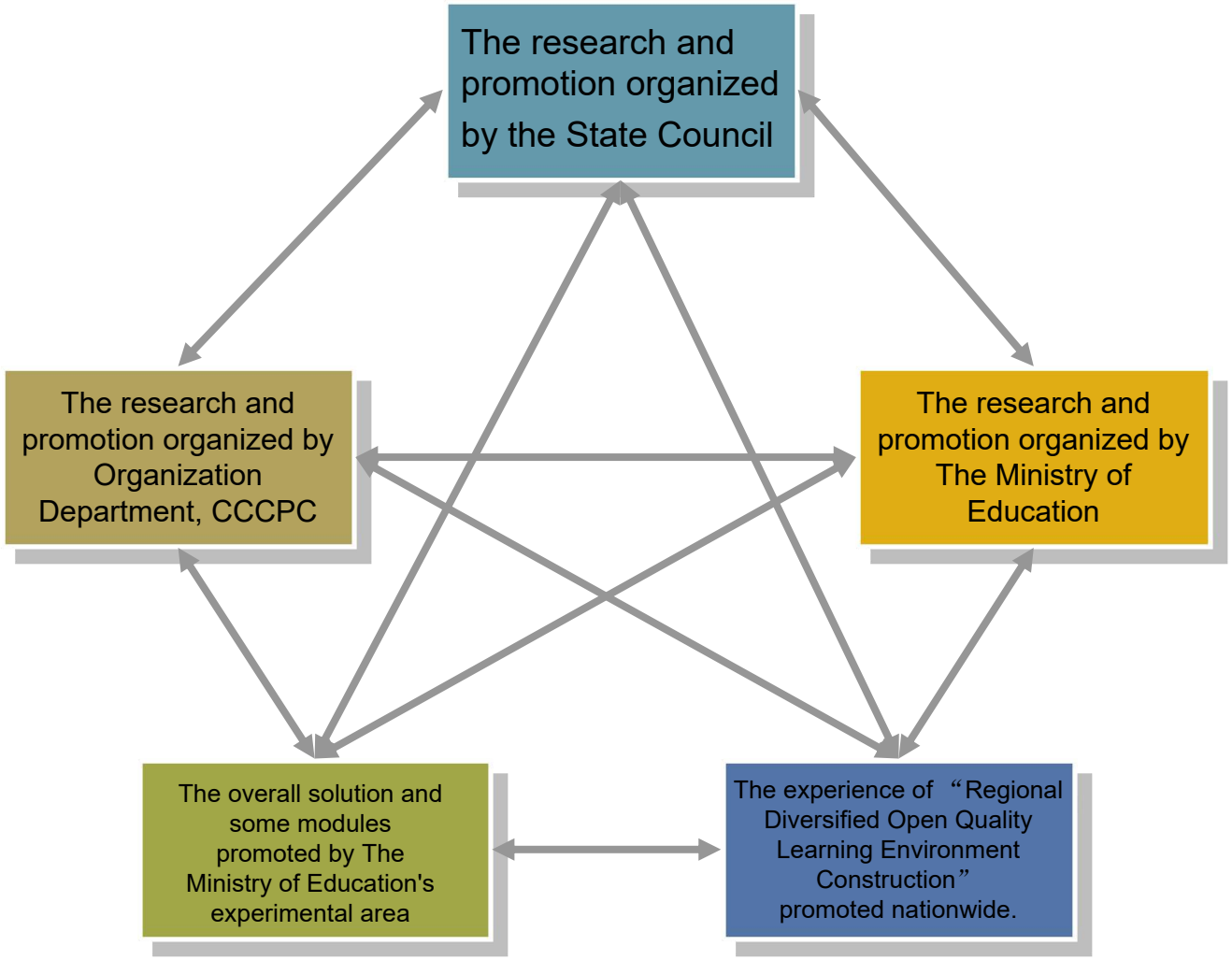
Exploration Dimension of authentic learning



Promotion action of Authentic Learning

1. The research and promotion of the collaborative development model of socialized learning resources organized by the State Council
2. The research and promotion of coupling effects among the large, medium and small organization organized by Organization Department, CCCPC
3. The research and promotion of the social classroom construction model organized by The Ministry of Education
4. The experience of “Regional Diversified Open Quality Learning Environment Construction” was rewarded by the Ministry of Education and promoted nationwide.
5. The overall solution and some modules promoted by The Ministry of Education's experimental area

Promotion action of Authentic Learning



The problems of existing research that needs to pay attention to

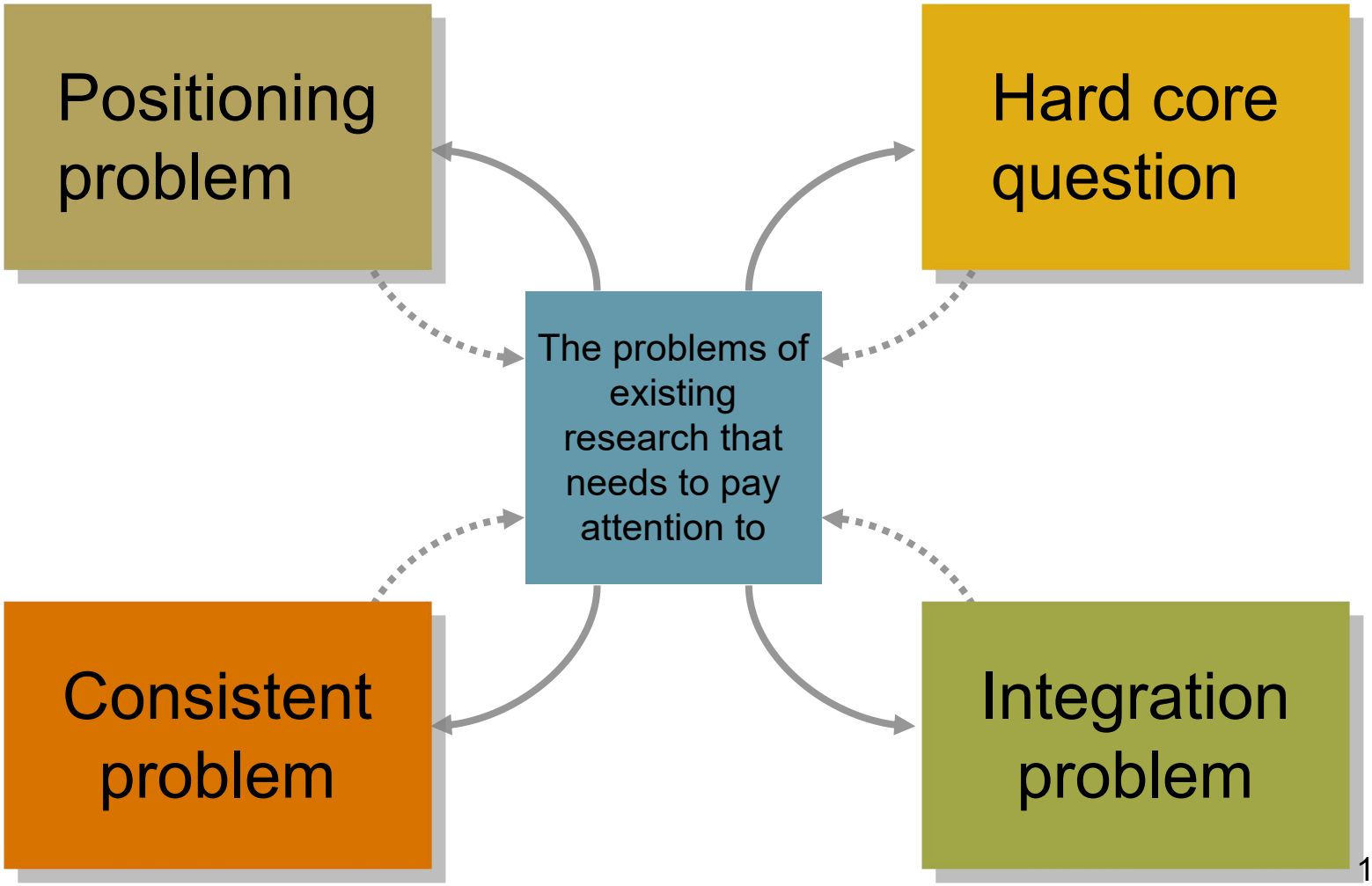
1、Positioning problem: The role and mechanism are not well-explained, as informal learning, positioned as supplement, auxiliary, extension, waiting to be "combined", can the daily class room teaching complete high-level cognition and core qualities acquisition?

2. Hard core question: How did learning happen? How did the deep learning happen? The field of learning science focuses on the core of knowledge construction, but the initial premise and foundation of knowledge construction are still questioned.

3. Consistent problem: There is no connection between authentic learning and knowledge construction, or even a misplacement. Scholars had debated knowledge learning and practical learning for centuries. Now the United States is going to the depths of knowledge. China is moving away from the depths of knowledge. Finland proposes to abolish the disciplines and caused a sensation. Where are the internal connections and consistency of the two?

4. Integration problem: There are four dissociations in the topic of learning science about situational cognition, distribution cognition, knowledge construction, learning environment, and learning community. One dissociation is dissociated from the actual classroom, the other is dissociated from the course content, and the third is dissociated form the learner. The fourth dissociation is dissociated from the synthetic learning. Can we find an integrated framework to achieve the combination of constructive, social, situational, complex, and tacit elements?

The problems of existing research that needs to pay attention to



The Breakthrough Points Expected in this Study

1. How to achieve linkage and integration of various learning methods?

2. How to link formal learning with informal learning, connect internal and external classes, inside and outside the school activities, and inside and outside the school, and substitute learning into the environment to realize the accumulation of original knowledge and experience;

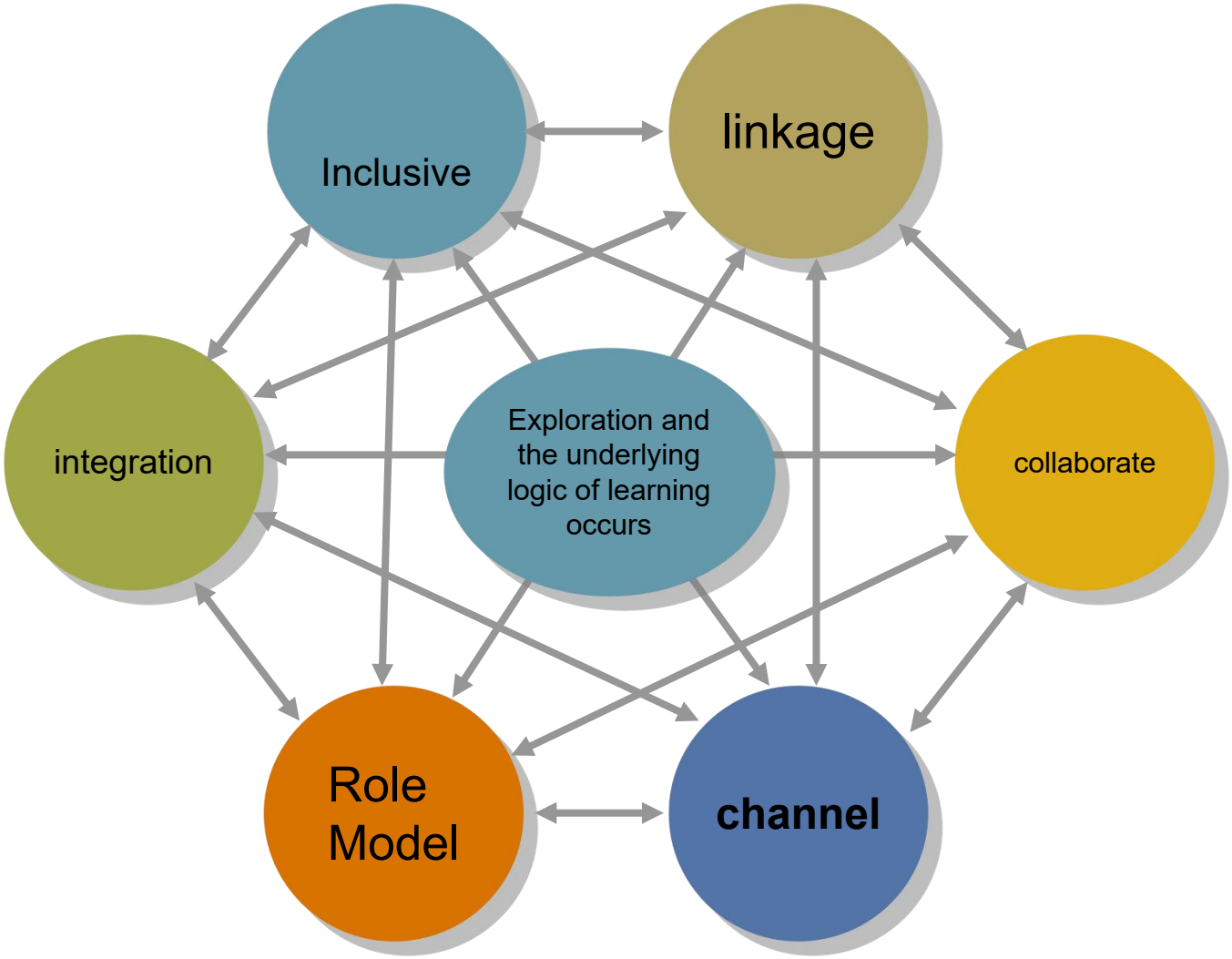
3. How coordinate how to learn and what you learn? Docking of knowledge types;

4. How to integrate various resources to construct elements such as constructiveness, sociality, context, complexity, and tacit;

5. How to extend the knowledge to construct the social context, backtracking and linking to the prototype and general model of learning and cognition;

6. How to achieve deep understanding, provide underlying logic for each discipline, create new results, realize knowledge innovation, and develop new cognitive and thinking pathways.

Expected Breakthrough



Real learning environment development framework

Spatial distribution of Knowledge Building

Four spatial Knowledge Building analysis frameworks

Various environmental elements support the relationship of Knowledge Building

Policy value of Knowledge Building in the real learning environment

Spatial distribution of Knowledge Building

Knowledge space + resource space + activity space

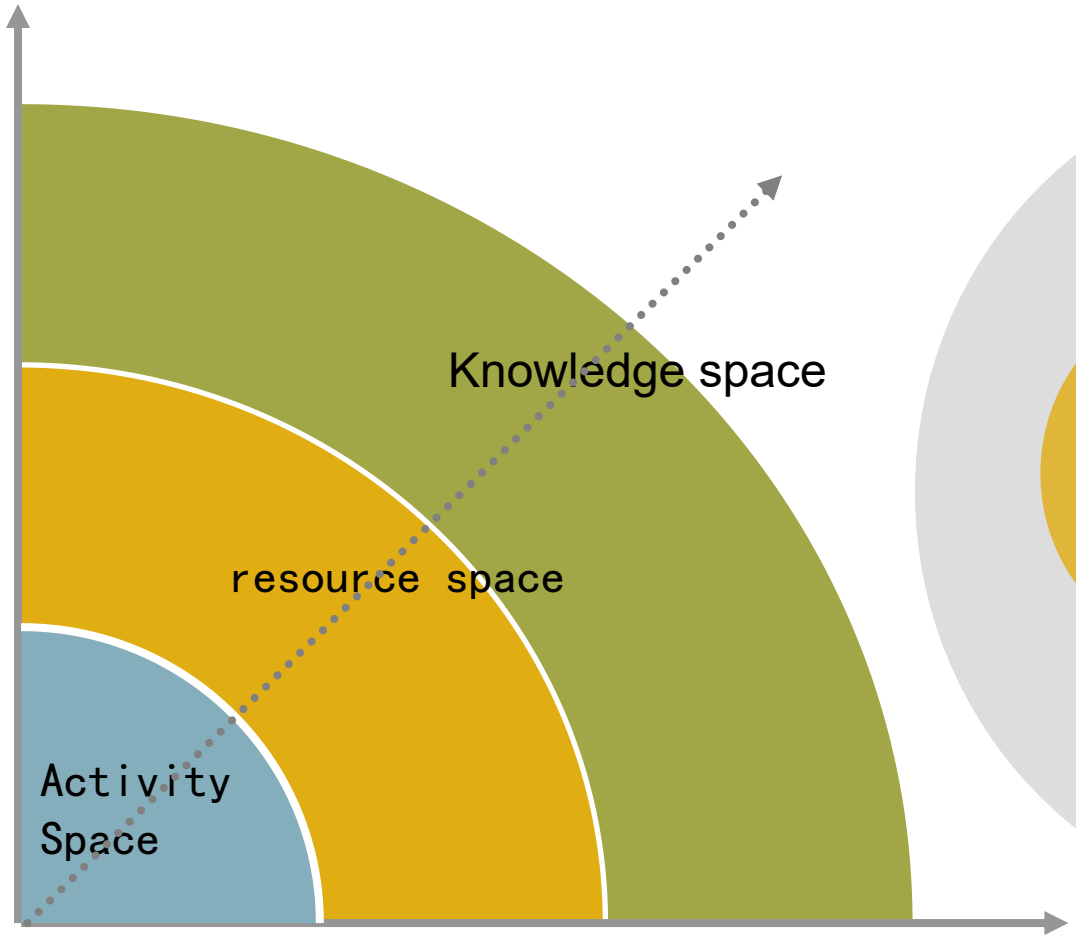
Real world:

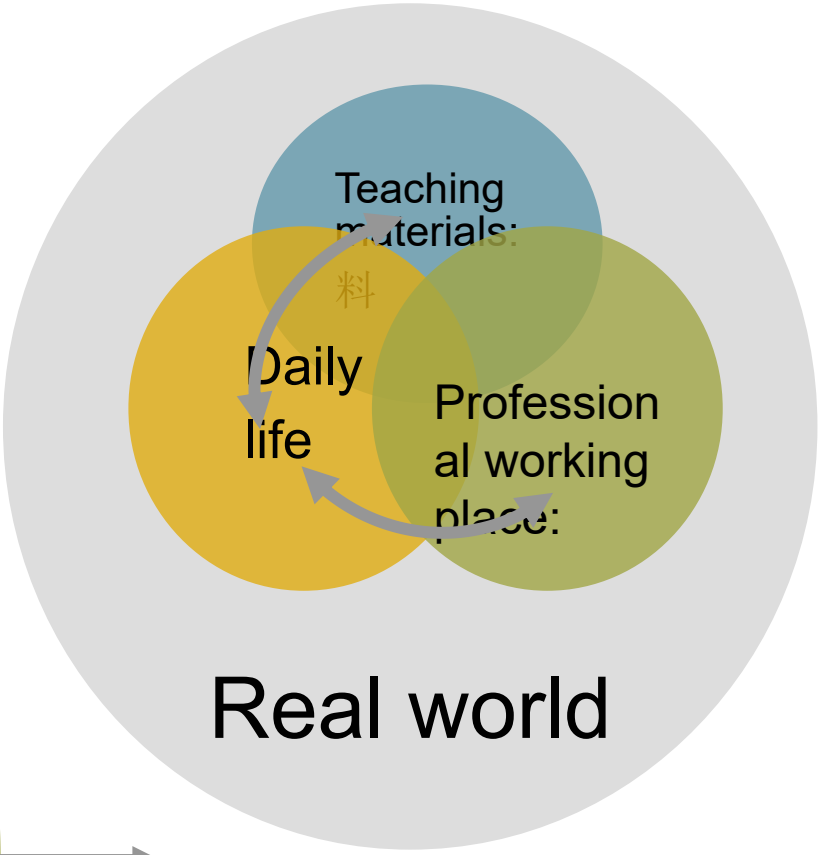
Professional working place:

Teaching materials:

Daily life:

Where is the Knowledge?





Four spatial Knowledge Building analysis frameworks

Scope of support / Space category	Core knowledge mastery	Deep understanding model	Deep principle construction	advanced thinking development
First space real world				
Second space professional working place				
Third space teaching material				
Fourth space Daily Life				

Various environmental elements support the relationship of Knowledge Building

Support validity / Environment Elements	source code stimulation	Construction and accumulation	reorganization and assimilation	integration and acclimatization	application and transformation	development and creation
Complete world						
Environment Support						
Task Substitution						
embodied Learning						

Policy value of Knowledge Building in the real learning environment

Macro: docking lessons reform mission, highlighting practice, innovation, and responsibility education

1 Breaking through the bottleneck of curriculum reform - shortage of resources

2 Respond to Dr Qian Xuesen's question - cultivate innovative talents

3 Deepen the theme of quality education - focus on core qualities

Medium: How to achieve deep understanding, how to achieve cognitive breakthrough

4 Environmental elements that support different course content

6 Environmental elements that support different curriculum forms

5 Environmental elements that support different learning styles

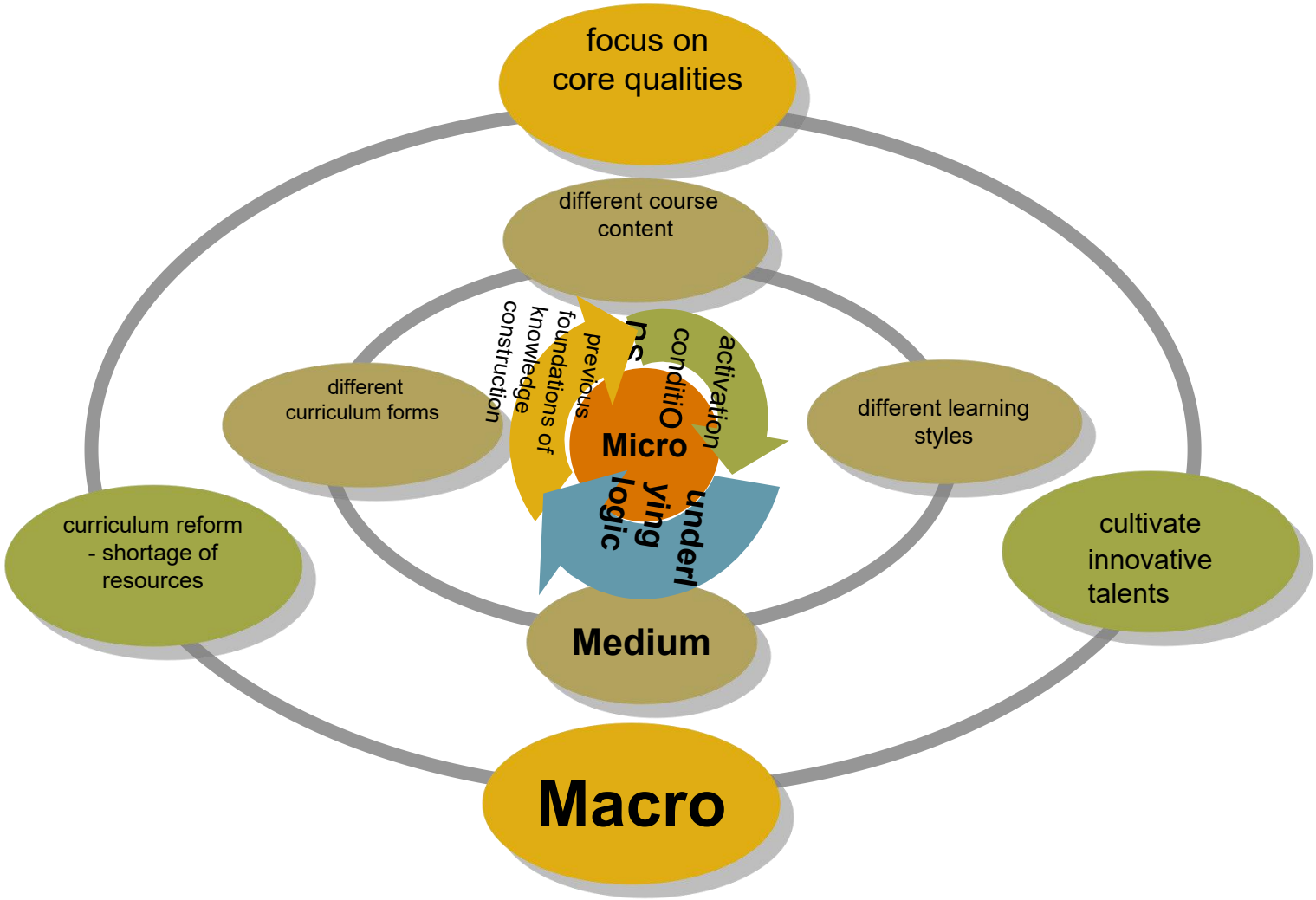
Micro: How to support construction learning, how to support linkage

7 Explore the previous foundations of knowledge construction

8 Exploring inert knowledge activation conditions

9 Explore learning the underlying logic

The objectives of exploring the authentic learning environment



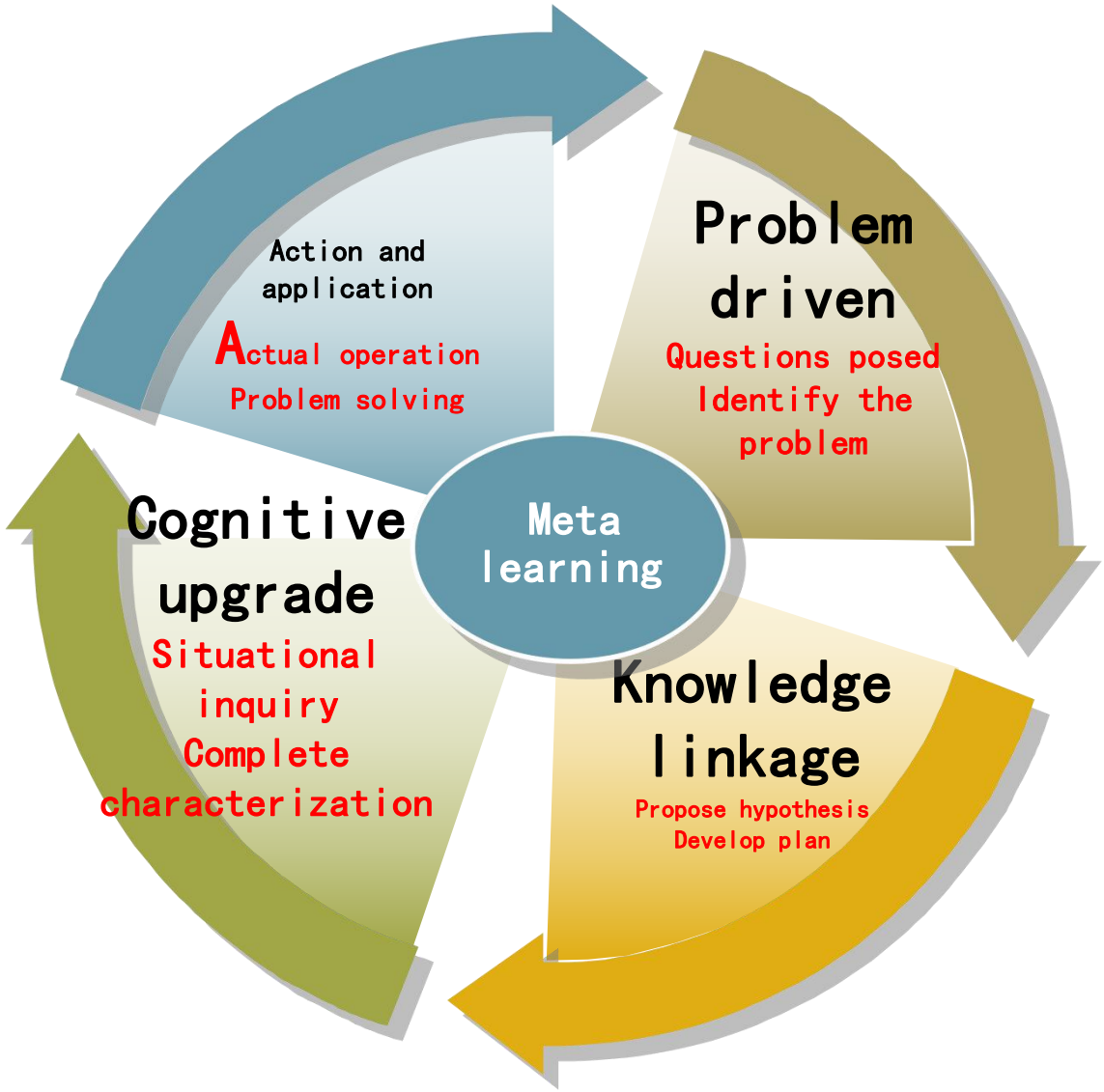
Educational objectives, teaching and assessment space requirements

Teaching Elements / Space Category	EEducational Objectives	Course Content,	Method Tools,	Environmental Resources
First space real world				
Second space professional working place				
Third space teaching material				
Fourth space Daily Life				

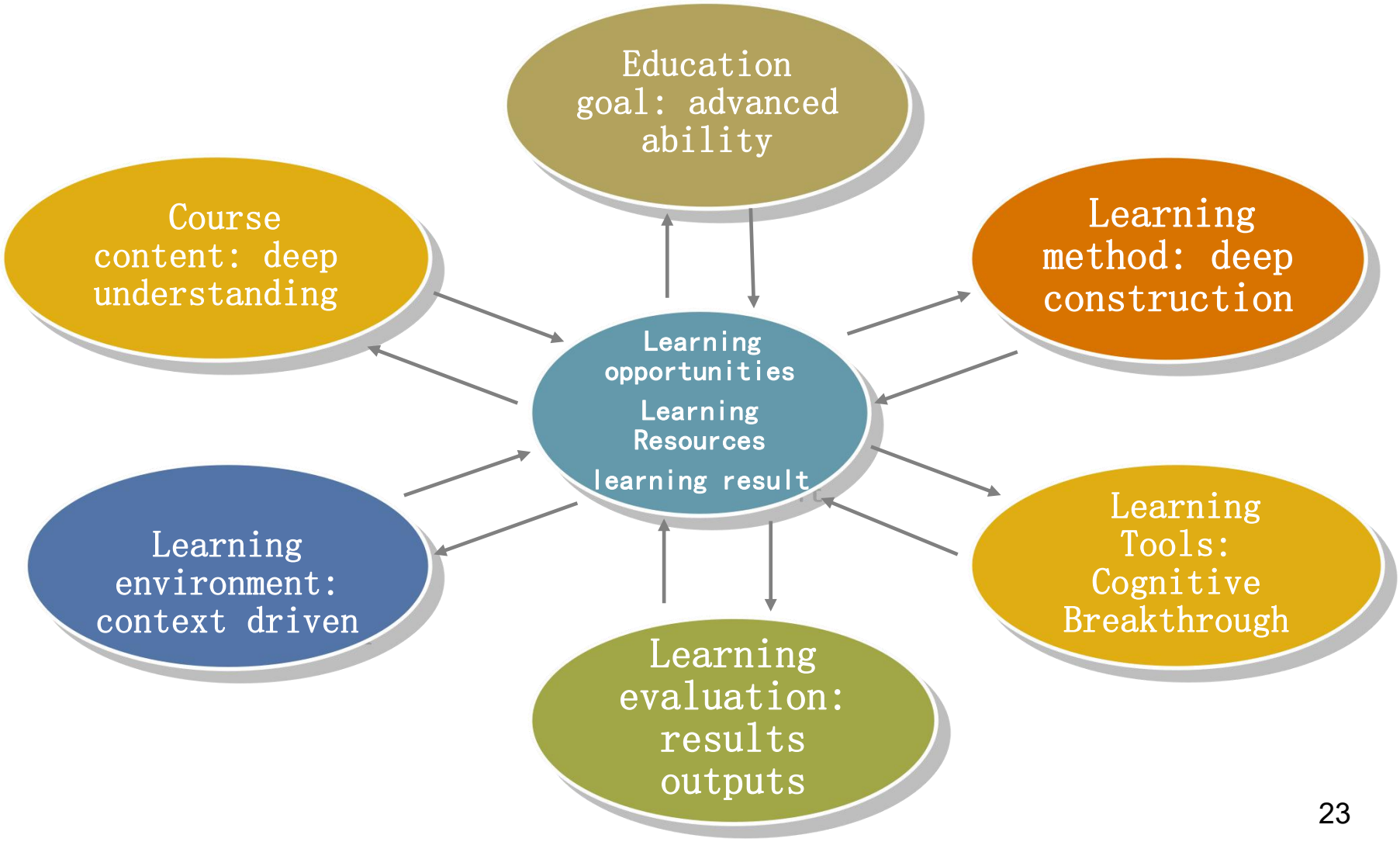
The Knowledge Building teaching case in the real learning environment

- Peking University Affiliated High School Case

Authentic learning model

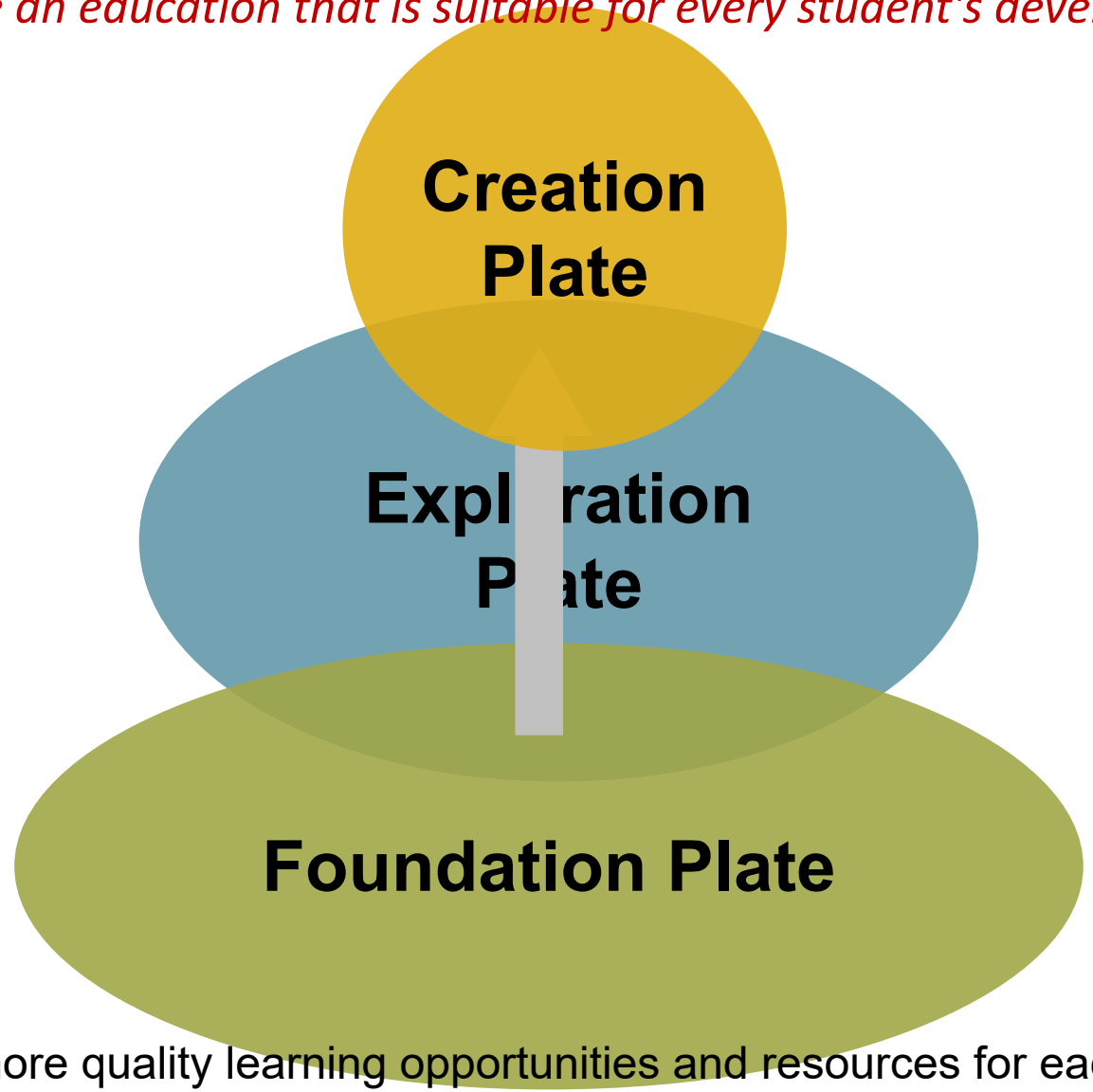


Learning environment design logical framework



Three types of courses: clearly positioned, orderly connected

Create an education that is suitable for every student's development

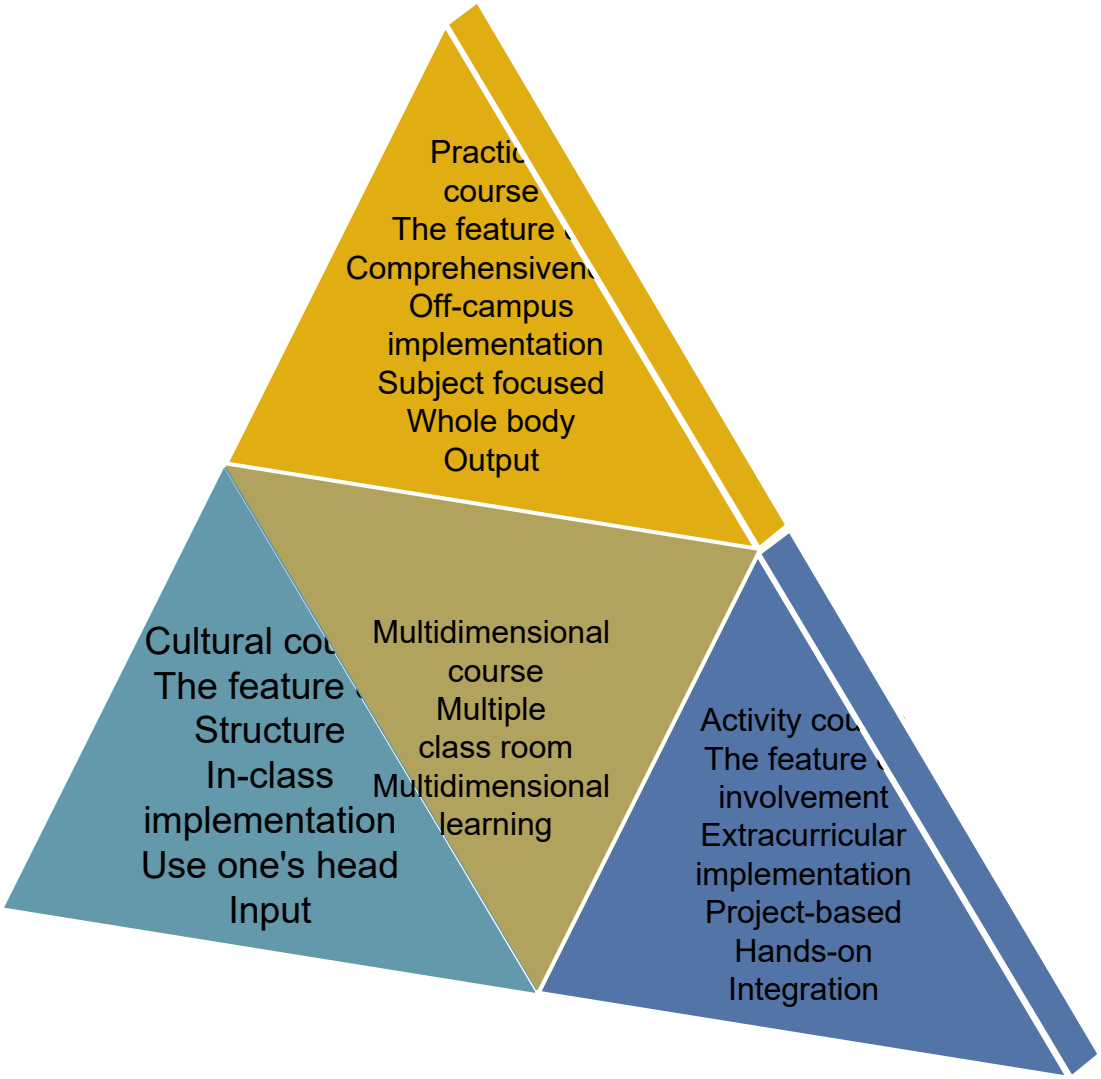


Provide more quality learning opportunities and resources for each student

Provide each student with the possibility of academic success

Three systems: mutual support, comprehensive learning

Create more quality learning resources

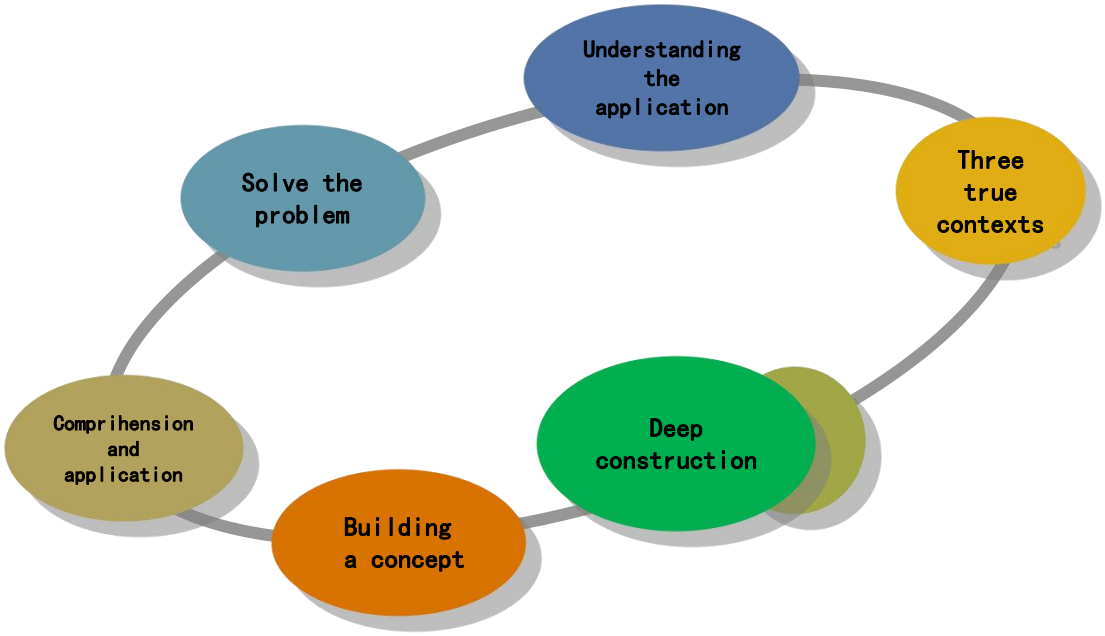


Course Golden Triangle

Three Frameworks: coordinating and coupling effects, winning by system

Create more potential learning projects

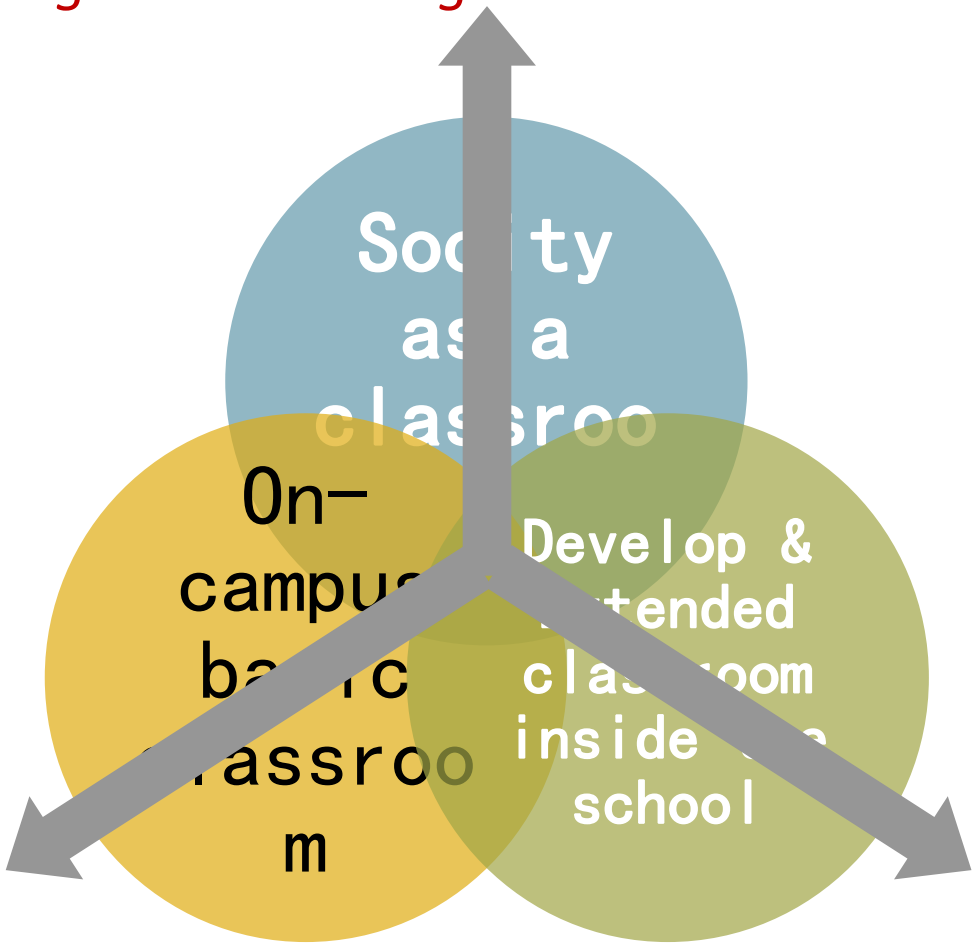
- Scientific dimension：
- Technical dimensions：
- Engineering dimension：
- Fusion dimension ：



Three spaces: taking students as a Whole learners

Create the most suitable growth learning mechanism

- Knowledge learning space：
- Mind growth space：
- Capacity development space：
- Personality perfection space：



Learning, cognition, and environmental connection

Basic courses (knowledge accumulation and construction)

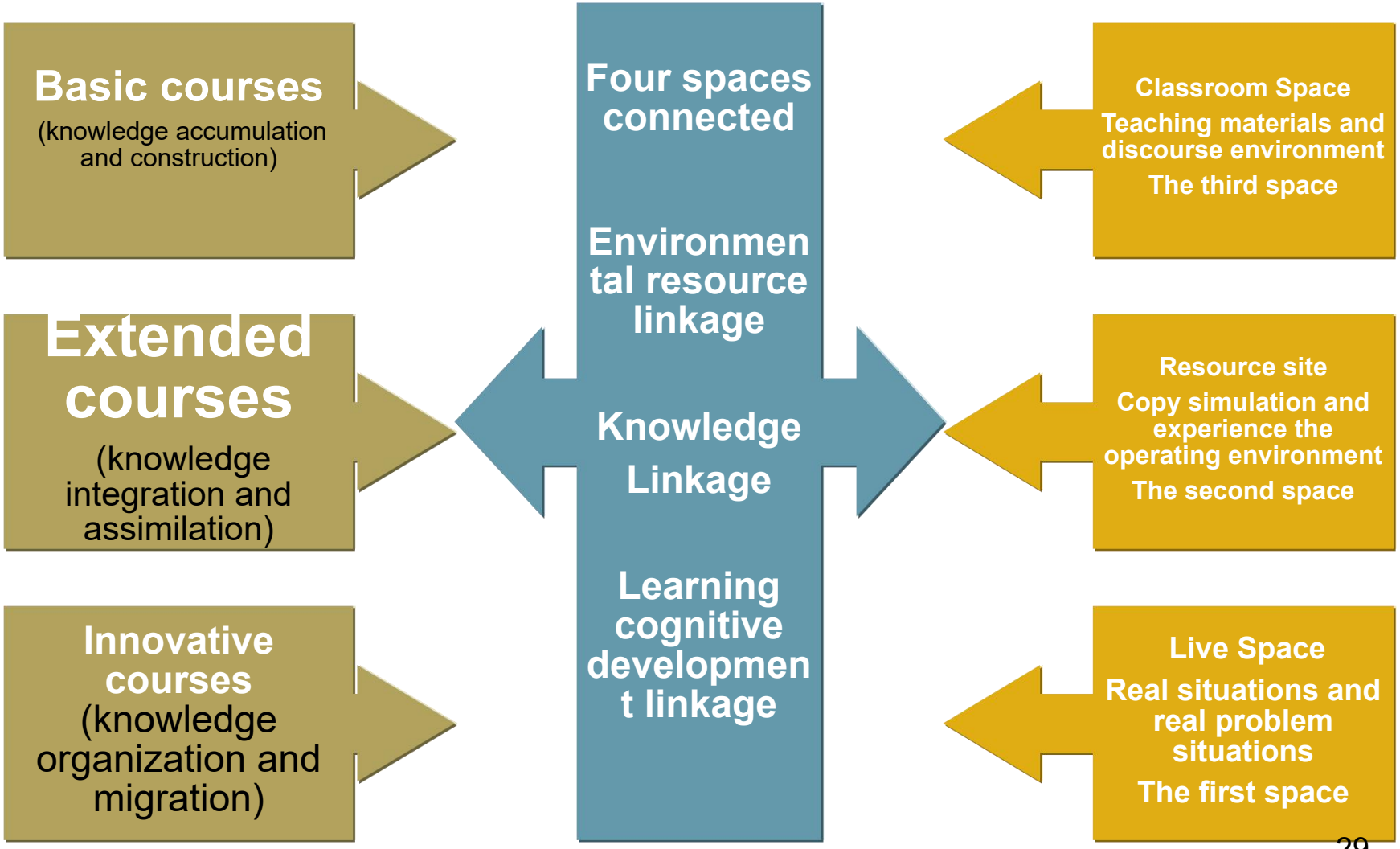
The basic function is knowledge acquisition, accumulation and understanding. The main activity is in the third space -- ordinary classroom. The tool is teaching materials and the method is speaking and practicing

Extended courses (knowledge integration and assimilation) The basic function is knowledge application, analysis and integration, and the main activity is in the second space -- functional classroom. The tool is to enhance the cognition of real objects, and the method is to simulate and verifing.

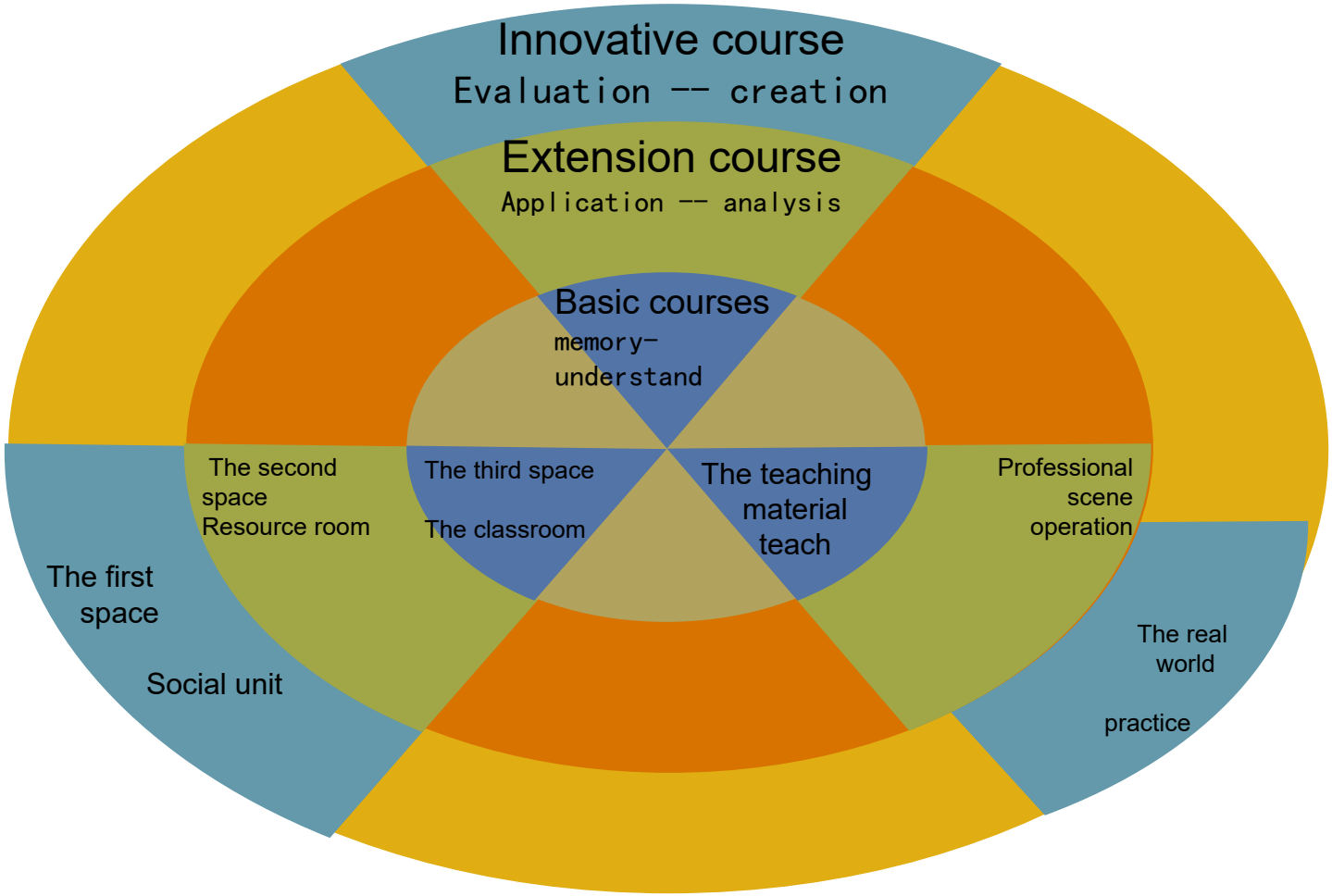
Innovative courses (knowledge organization and migration) The basic functions are knowledge application, transfer and creation. The main activities are in the first space -- the real world. The tools are professional production and research tools

Space connection -- environmental resource linkage --Knowledge experience connection - learning cognitive development

The map for Learning, cognition, and environmental connection



Learning - cognition - environment linkage map



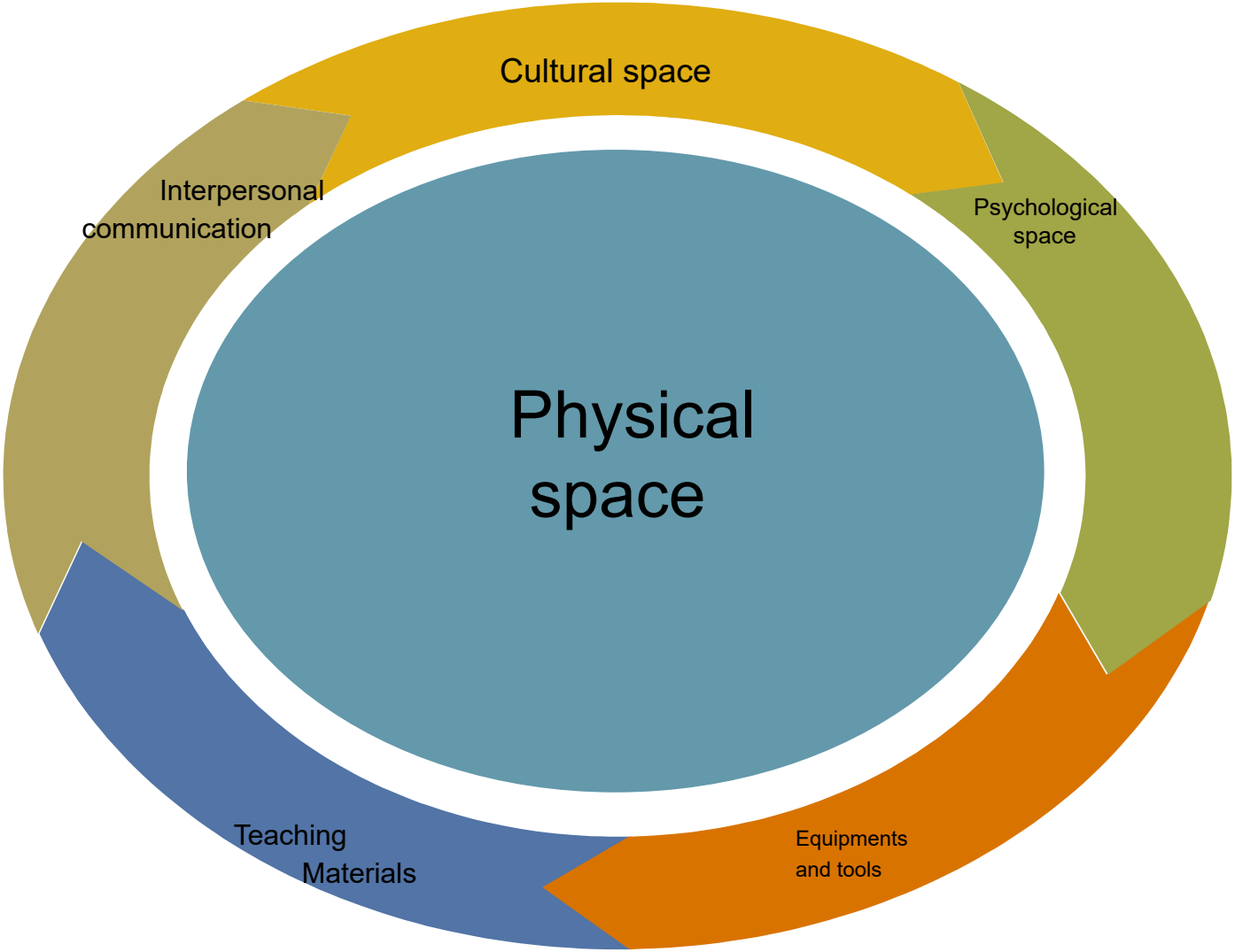
Practical conclusions and discussion of issues

- Real learning environment elements based on Knowledge Building
- Real learning environment elements and Knowledge Building needs
- The mechanism of real learning environment to support Knowledge Building
- Logic of real learning environment to support Knowledge Building

Real learning environment elements based on Knowledge Building

- Physical space
- Interpersonal communication
- Teaching materials
- Equipments and tools
- Psychological space
- Cultural space

Authentic learning environment elements



Real learning environment elements and Knowledge Building Establishing Connections—Conditional requirements

Support validity / environment elements	context fit	resource matching	technical support,	working methods
Physical space				
communication space				
teaching materials				
equipment tools,				
psychological space				
cultural space				

Real learning environment elements and Knowledge Building Establishing Connections—Knowledge accumulation

Support validity / environment elements	Factual knowledge	Conceptual knowledge	methodological understanding	value knowledge
Psysical Space				
Communication Space				
Teaching Material				
Techology and tools				
Psychology Space				
Cultural Space				

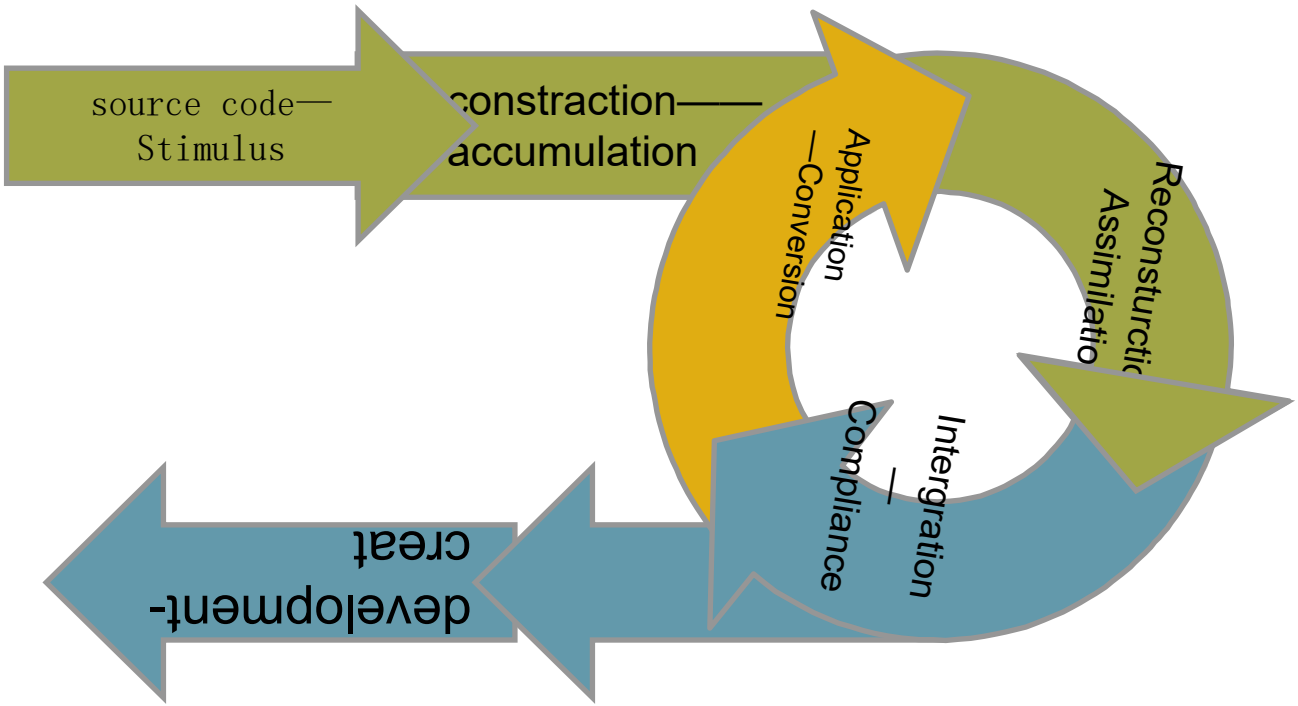
Real learning environment elements and Knowledge Building Establishing Connections —Thinking development

Support Validity / Environment Element	Memory	Comprehension	Application	Analysis	synthesis	Creation
Physical Space						
Communication Space						
Teaching Materials						
Equipment \Technology and Tools						
Psychological Space						
Cultural Space						

The real learning environment supports the mechanism of Knowledge Building

- Stimulus - input
- Assimilation-construction
- Compliance-reconstruction
- Conversion-output

Mechanism


source code—
Stimulus
constraction——
accumulation
Application
—Conversion
Reconsturctio
Assimilatio
Integration
—
Compliance
creat
development-

Program

Learning mechanism / Learning environment	source code— Stimulus	constraction — accumulation	Reconstraction — accumulation construction	Intergration -Compliance	Application- Convension
Physical space					
Communication Space					
Textbook space					
Technical space					
Psychological space					
Cultural space					

Real learning environment supports the logic of knowledge Building

Learning mechanism / Real environment	Source code stimulation	construction and accumulation	reconstruction and assimilation	integration and adaptation	application and transformation	Development and creation
Meta Habitat						
Meta System						
Meta Structure						
Meta Discourse						
Meta Concept						
Meta Analysis						

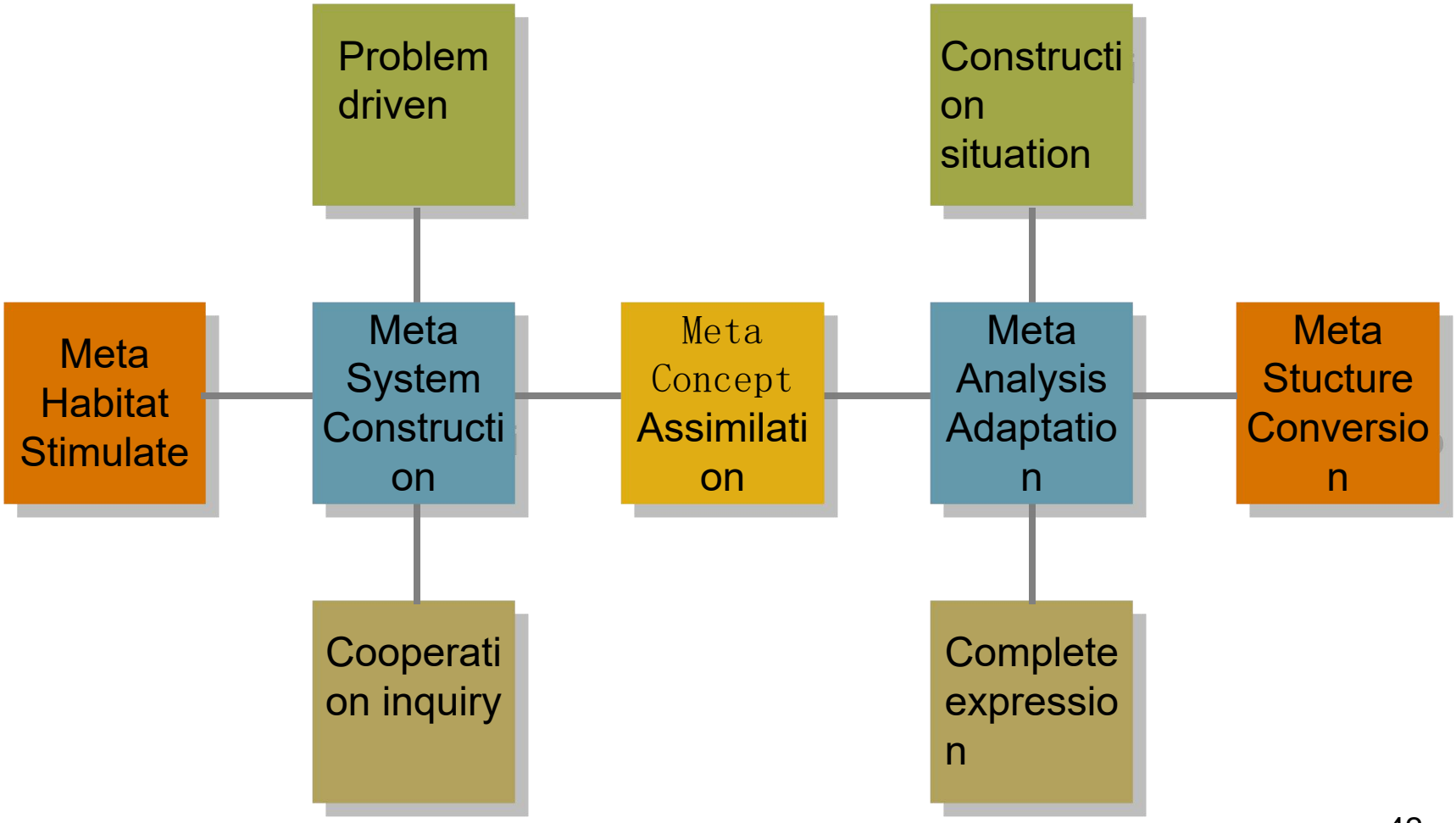
Logic of real learning environment to support Knowledge Building

- 真实场景
- 问题驱动
- 情境建构
- 合作探究
- 完整表达
- 发现通道

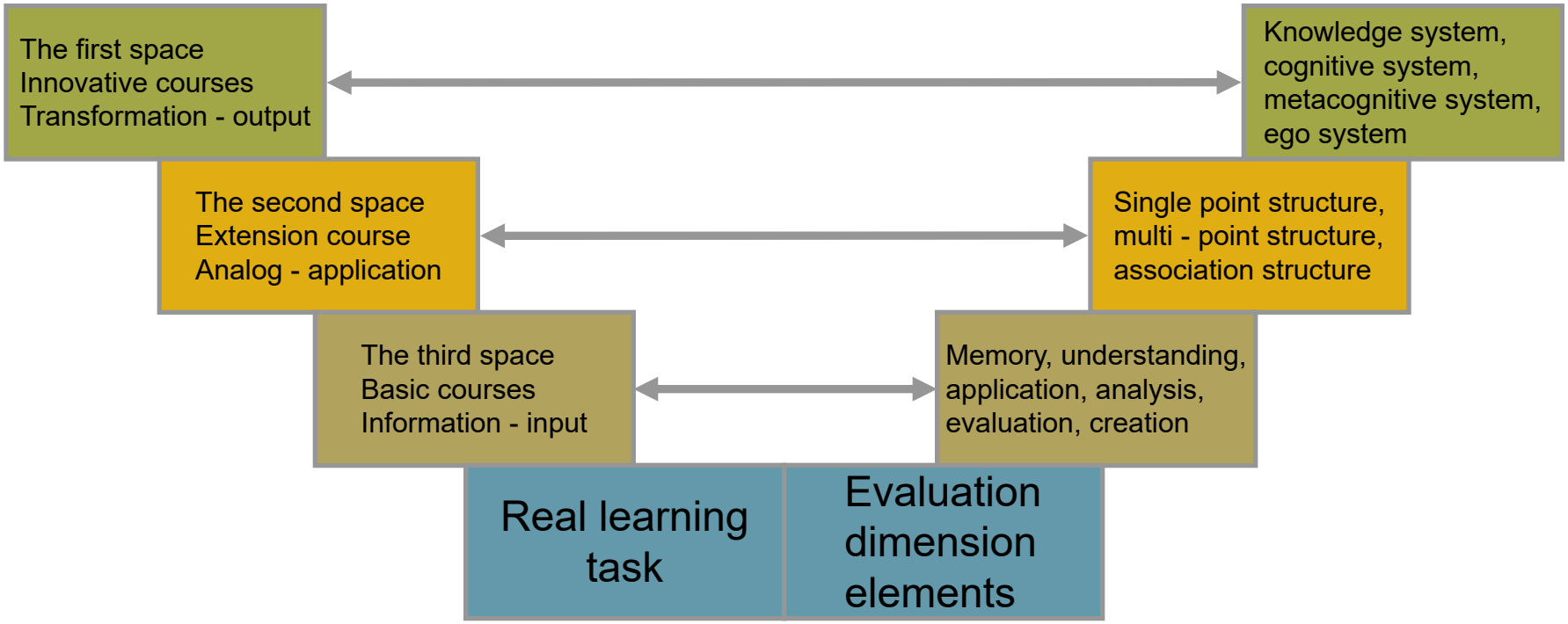
- The real scene
- Problem driven
- Construction situation
- Cooperation inquiry
- Complete expression
- Discovery channel

同化——顺应，建构——重构
Assimilation - adaptation, construction - reconstruction

Real learning environment Knowledge Building system



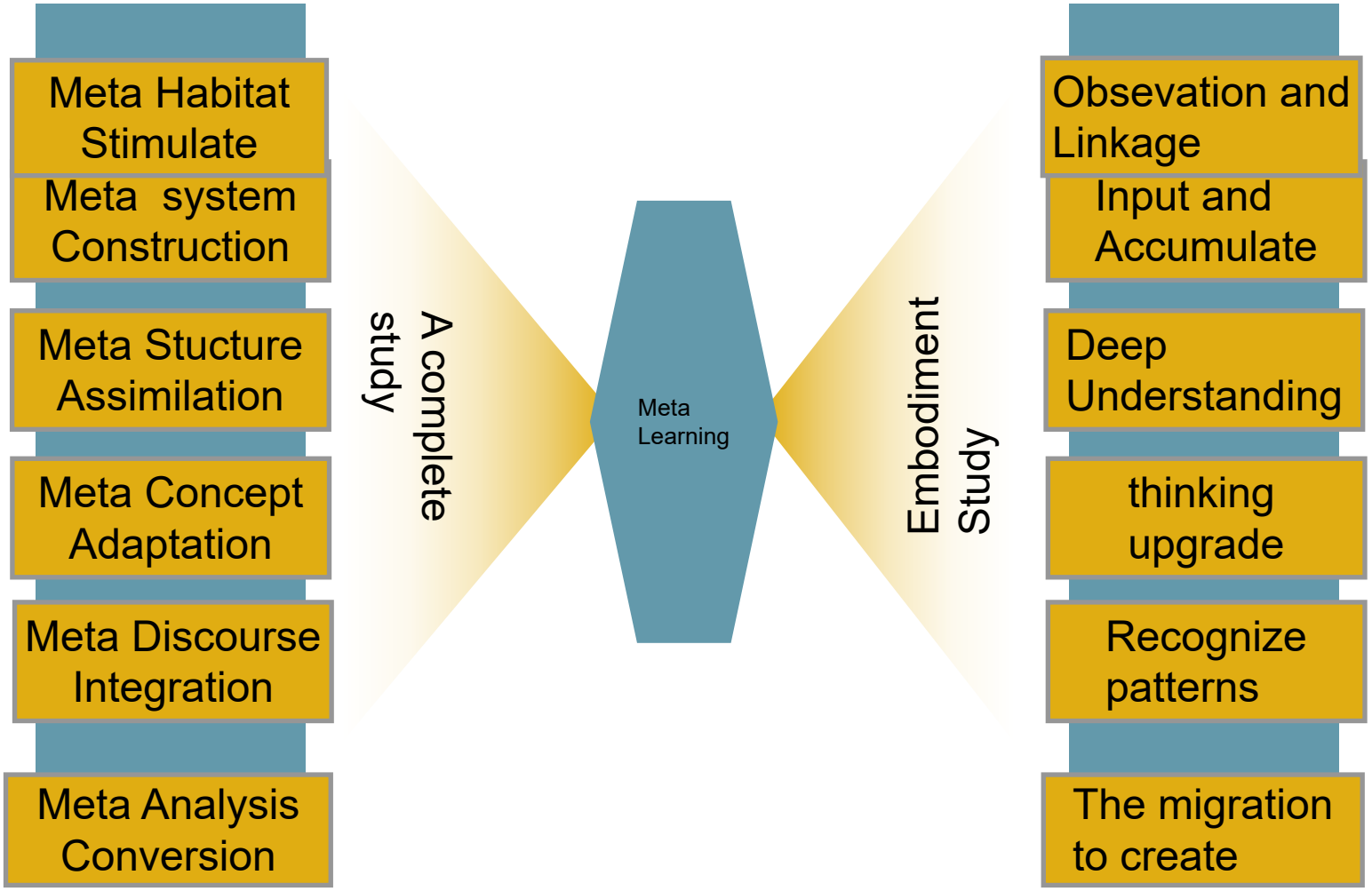
Three kinds of scene ladder evaluation for the the authentic learning



Explore what progress has been made -- find growth points, demand points, support points

- Meta habitat -- stimulation: "observation connection", connecting and integrating various learning modes;
- Meta-system -- construction: "input accumulation" connects the inside and outside of the class, inside and outside of the school, and inside and outside of the school. Learning is substituted into the environment to realize the accumulation of original knowledge and experience;
- Meta-structure-assimilation: "deep understanding", combining how to learn with what to learn;
- Meta-concept -- adaptation: "thinking progression", integrating various resources with embodied participation, and compositing constructivism, sociality, contextuality, complexity, tacit understanding and other elements;
- Meta-discourse -- integration: "recognition pattern" extends knowledge to construct social context, and connects the prototype of learning and cognition；
- Meta-analysis -- transformation: "thinking is visible", realizing deep understanding, providing underlying logic for various disciplines, growing new cognitive and thinking pathways, and creating new achievements.

Find growth points, demand points, support points



Related issues discussion

- The relationship between real learning and various learning styles
- Real learning and technology integration
- Support for education policies in various countries

Related issues discussion

The relationship between real learning and various learning styles

Real learning and technology integration

Support for education policies in various countries

Thank You !

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