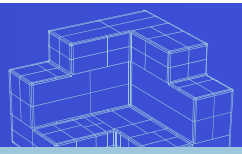
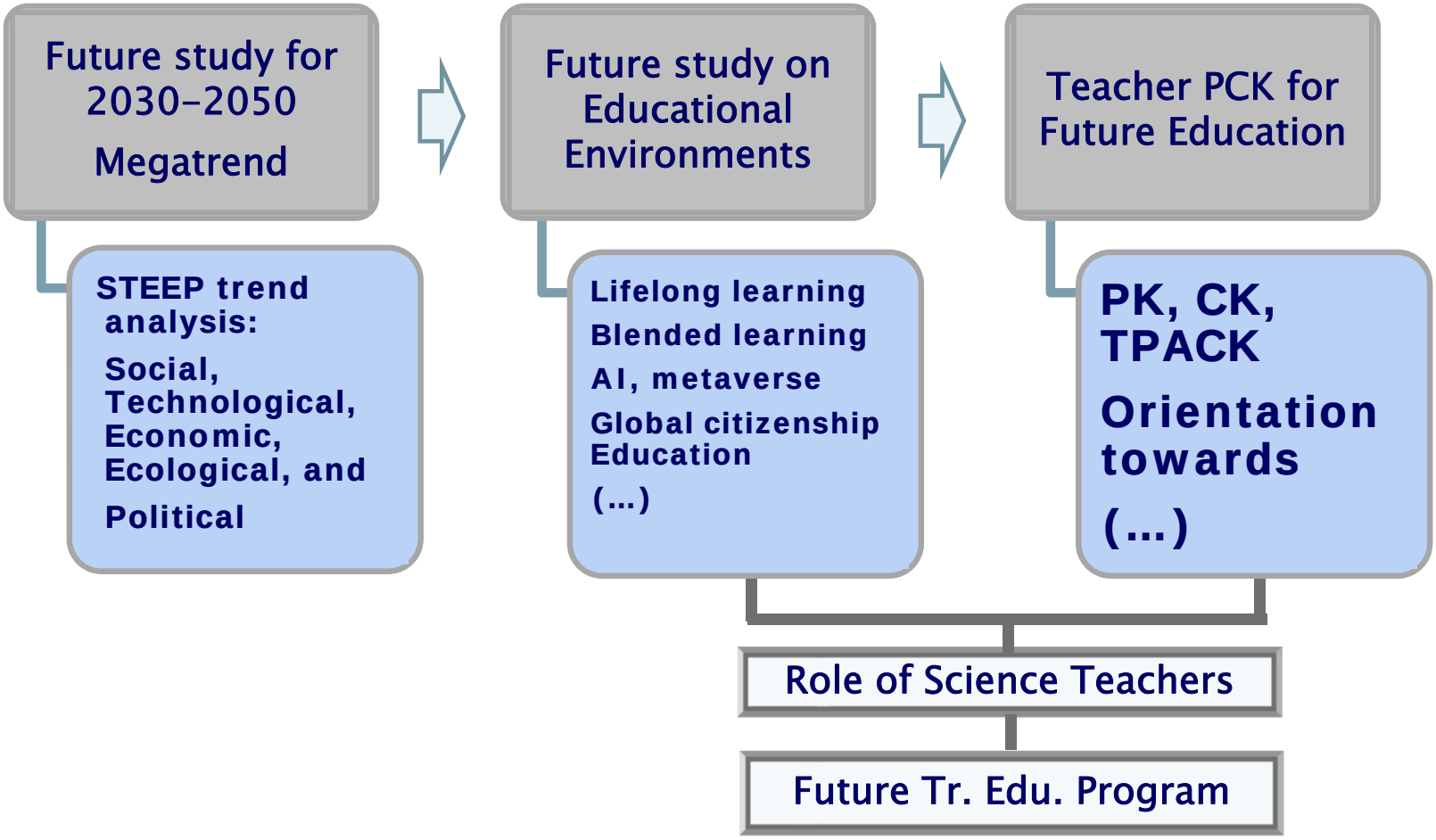
Re-examining
Pedagogical Content Knowledge (PCK)
in light of science teachers & science teacher educators for future schools

Youngsun Kwak (KNUE)

Research Framewok

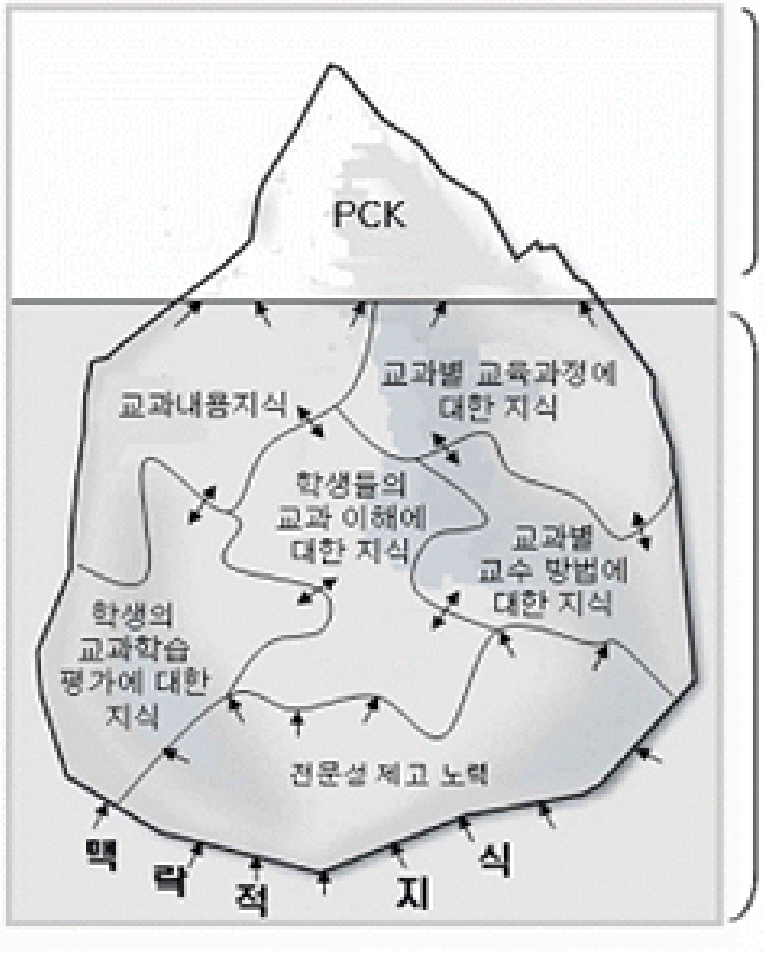




PCK and Teacher Knowledge

명시적 영역

묵시적/지원 영역

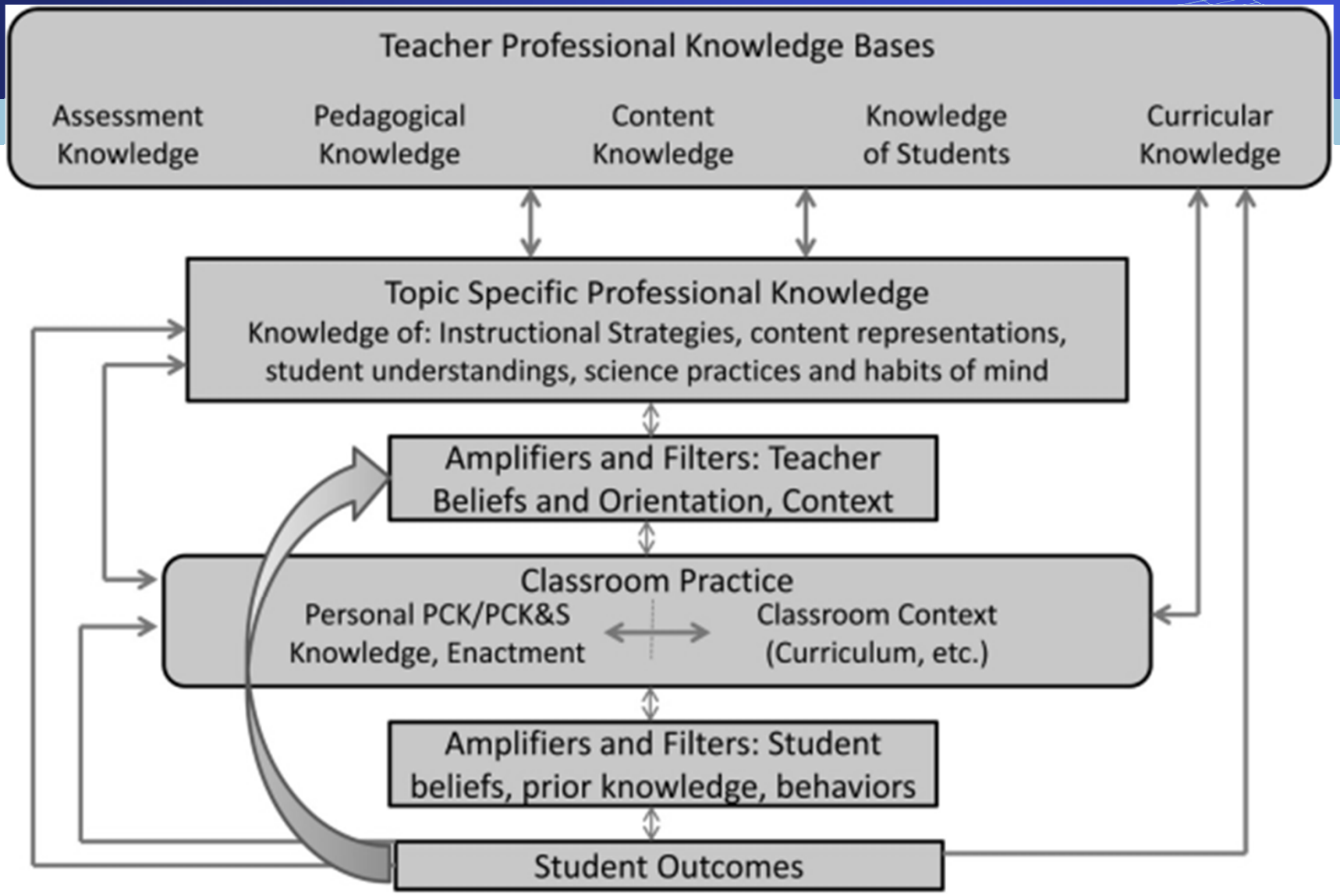


<PCK 유형 예시>
- 교과내용 중심의 PCK
- 교수방법 중심의 PCK
- 학생평가 중심의 PCK 등등

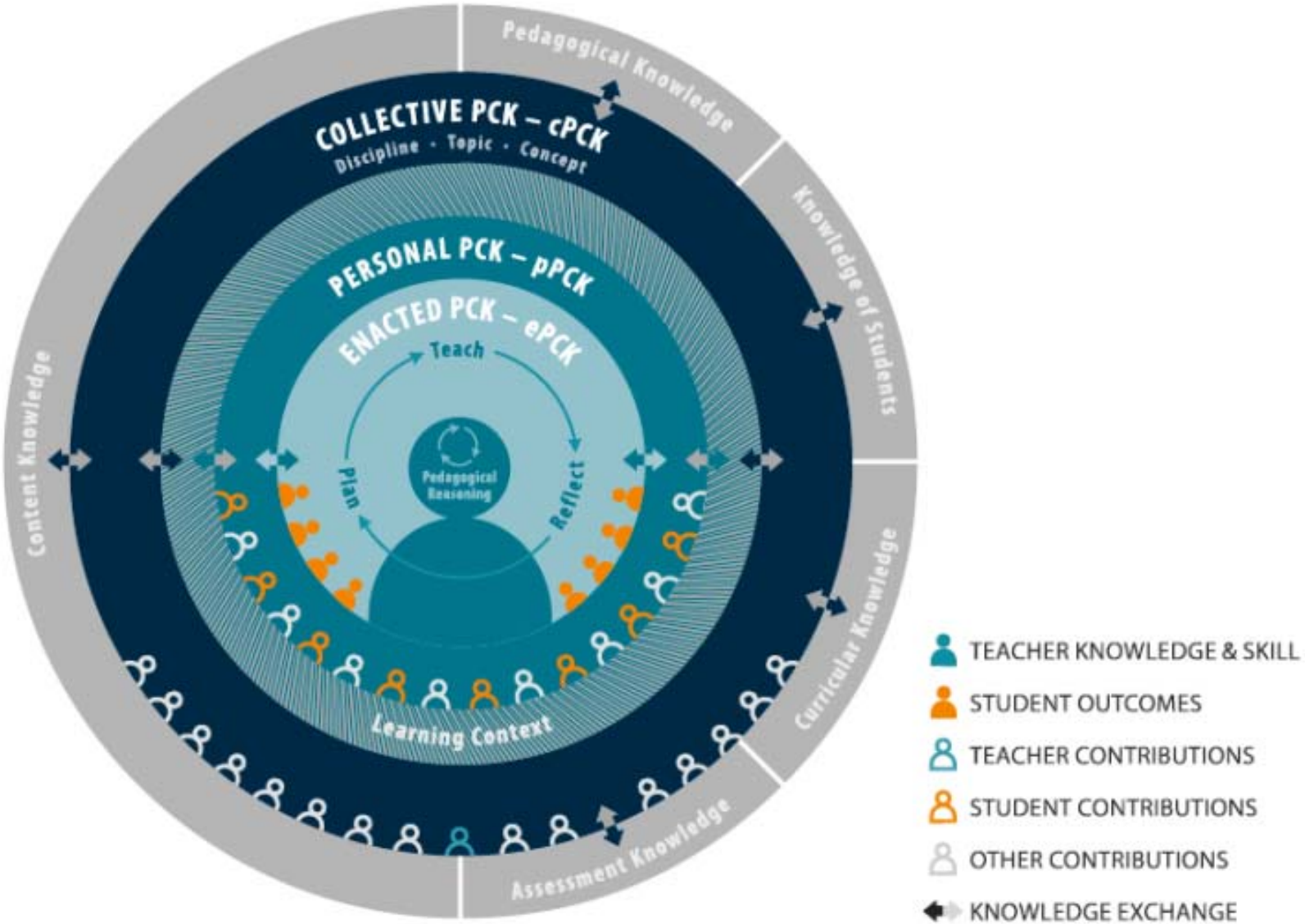
<교사 전문지식 영역>
- 교과별 수업 전문성 기준의 구성 영역들

Model of teachers' professional knowledge and skill including PCK;

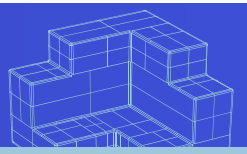
Gess-Newsome (2015: 31), Gess-Newsome et al. (2019: 961).



Refined consensus model of PCK, (RCM)
출처: Carlen et al. (2019: 84)



≫ Linking PCK and teacher education program



≫ Suggested by Lee Shulman(1986)

≫ Pedagogical Content Knowledge(PCK) as the teacher's professionalism, which differentiates teachers from content-specialists.

≫ Content-specific pedagogy; Knowledge of science education

≫ Teachers' knowledge about how to teach particular science content to particular students in ways that promote understanding

≫ professional knowledge of subject teaching, which allows teachers to transform what they know into something meaningful for their students

≫ Teachers who have not taught a particular topic before may have little or no PCK in that specific content area; "successful" and effective teachers are likely to have well-developed PCK in that specific content area.

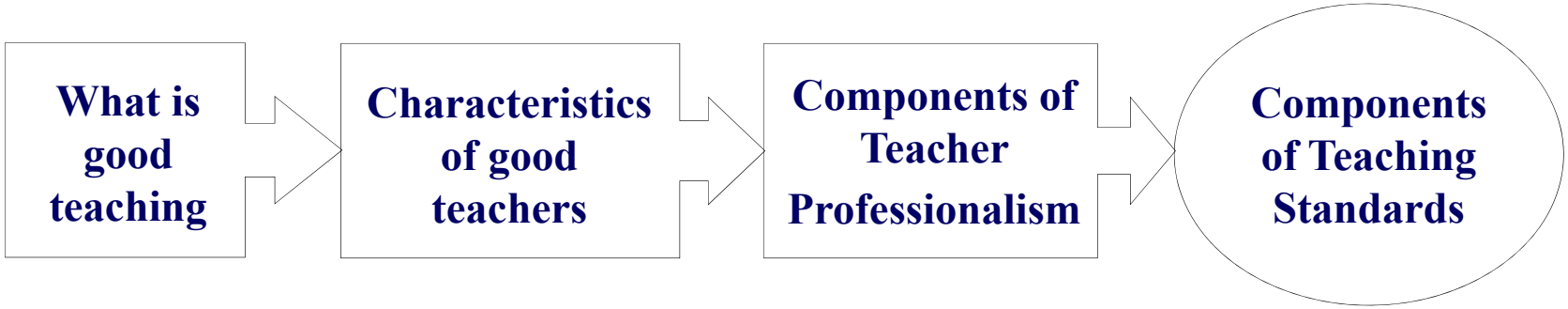
≫ The purpose of our PCK research is to prevent every teacher from reinventing the wheel.

≫ Teaching Standards in Tr. Evaluation

≫ Teaching standards are essential to a professional model of teaching and provide a sound basis for teachers' learning.

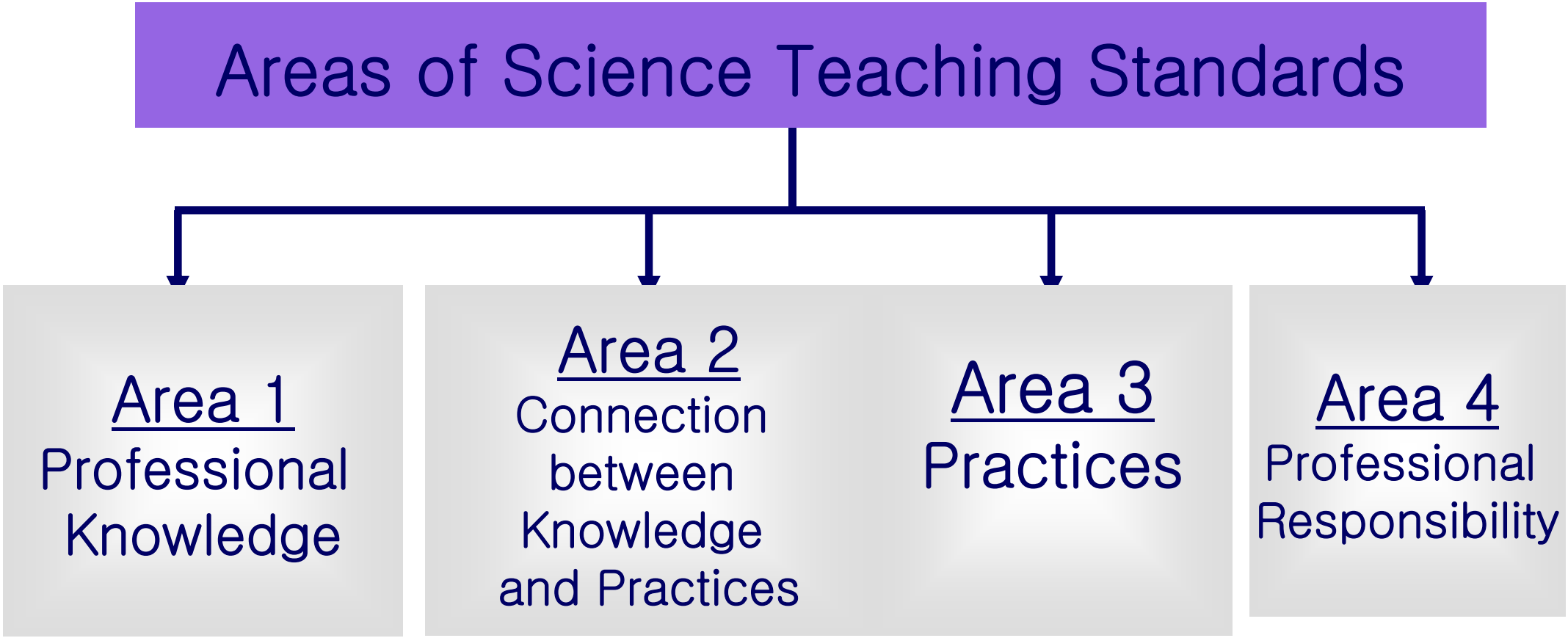
≫ Teacher effectiveness is defined in terms of constructivist ideas.

[Fig.] Development of Teaching Standards



Teaching Standards

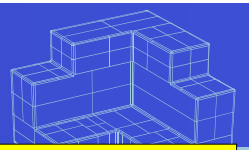
Areas of Science Teaching Standards



Science Teaching Standards

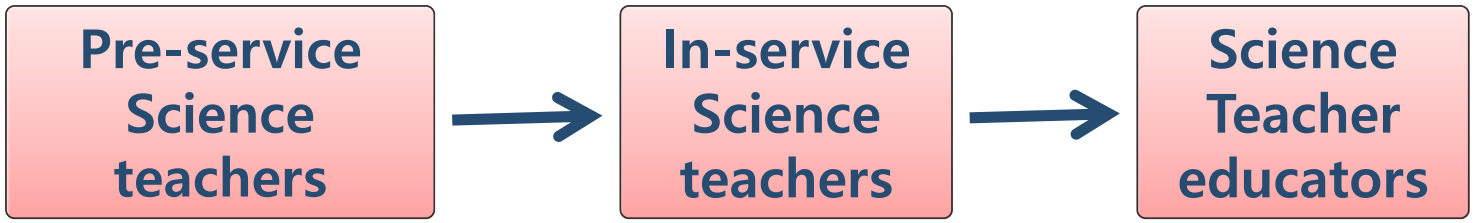
Area	Component		
Professional Knowledge	Ⅰ. Knowledge about science content and curriculum Ⅱ. Knowledge about science teaching methods and assessment Ⅲ. Knowledge about students		
Connections between Knowledge and Practices	Ⅳ. Coherent Instructional Planning		
Practices	Ⅴ. Classroom learning environment: learning culture		
	Ⅵ. Teaching Practices	Methods	Ⅵ-1. Use of various and appropriate teaching and learning methods Ⅵ-2. Providing effective feedback to student Ⅵ-3. Flexible classroom management
		Contents	Ⅵ-4. Understanding of science concepts Ⅵ-5. facilitation of scientific inquiry ability Ⅵ-6. Connections between sciences
	Ⅶ. Evaluation of learning outcomes		
Professionalism	Ⅷ. Development of Professionalism		

Representing PCK using CoRe



CoRe (Content Representation)	PCK components					
	Big Idea A	Big Idea B	Big Idea C	Big Idea D	Big Idea E	what else?
What you intend the students to learn about this idea.						
Why it is important for students to know this.						
What else you know about this idea (that you do not intend students to know yet).						
Difficulties/limitations connected with teaching this idea.						
(...)						
(...)						
(...)						

≫ Future Direction



≫ **Changes in Tr. Roles in the future society / school**

≫ **Representing PCK at different career stages using CoRe, etc.**

≫ **PCK LPs**

≫ **Describe *educative PCK* LPs, a form of curriculum material that scaffolds the development of teacher knowledge and practice for teacher education programs**

<Thank you!>