

Sino-Danish Workshop

Education, Learning & STEM

Apr 7, 2021



北京師範大學
BEIJING NORMAL UNIVERSITY



清華大學 終身學習實驗室
Lab for Lifelong Learning, Tsinghua University

**INNOVATION
CENTRE
DENMARK**



A. Getting to know

DK TIME

CN TIME

9:00 - 9:10 Welcome by **Thomas Trøst Hansen**, Science Attaché, Innovation Centre Denmark Shanghai 15:00 -15:10

9:10 - 9:40 Introduction to Tsinghua University Lab for Lifelong Learning (TULLL) 15:10 -15:40
By **Emma Peng** (10 min)

Introduction to China Education Innovation Institute of BNU (CEII)
By **Rui Wei**(10 min)

+ time for questions (10 min)

9:40 -10:00 Introduction to Centre for Primary and Lower Secondary Education Research (15 min) 15:40 -16:00
By **Professor Nikolaj Elf**

+ time for questions (5 min)

B. What about learning

DK TIME

CN TIME

10:00 - 10:45

Topic 1:

Learning as a fundamental question - how to approach the concept of learning?

Moderated by **Thomas Skovgaard**

Talk by **Professor Nikolaj Elf**, Director of Centre for Primary and Lower Secondary Education Research (15 min)

By Professor **Stella Christie**, Department of Psychology, Tsinghua University (15 min)

+ time for questions (15 min)

16:00 -16:45

C. What about STEM

DK TIME

CN TIME

11:00 - 11:45

Topic 2:

STEM – a deeper dive into STEM education. What is a conducive learning environment?

Moderated by **Emma Peng**

Talk by **Professor Connie Svabo**, Deputy Head of Centre, Centre for Primary and Lower Secondary Education Research at University of Southern Denmark (15 min)

By **Professor Rui Wei**, Deputy Director, CEII, College of Chemistry, Beijing Normal University (15 min)

+ time for questions (15 min)

11:45 -12:00

Wrap-up

Potential collaboration and next step

17:00 -17:45

17:45 -18:00

Main Goals:



- Develop & showcase innovative **learning technologies and tools** to stimulate children's playful experiences;
- Conduct world-class scientific **research on** Learning through Play (**LtP**);
- **Convene decision makers** to further the understanding of LtP and its importance for children's development under the Chinese context.

Empower everyone to become a creative and more engaged lifelong learner.

--TULLL

interest driven and based on learning science

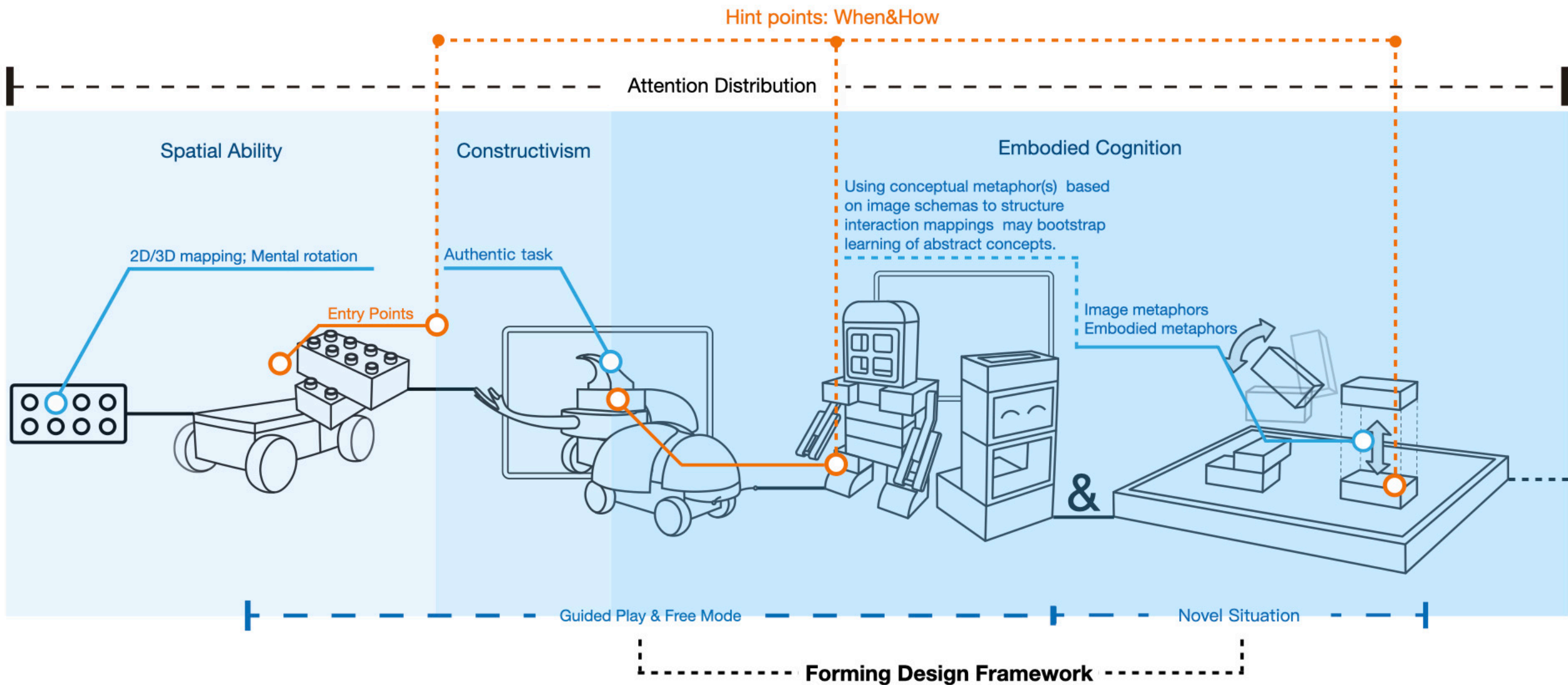


Key Research Questions

How do innovative learning technologies and tools stimulate children's playful experiences?

What are the mechanisms that link Learning through Play (LtP) with children's holistic development?

How can LtP and its impact on children's development be understood and implemented in a Chinese context?

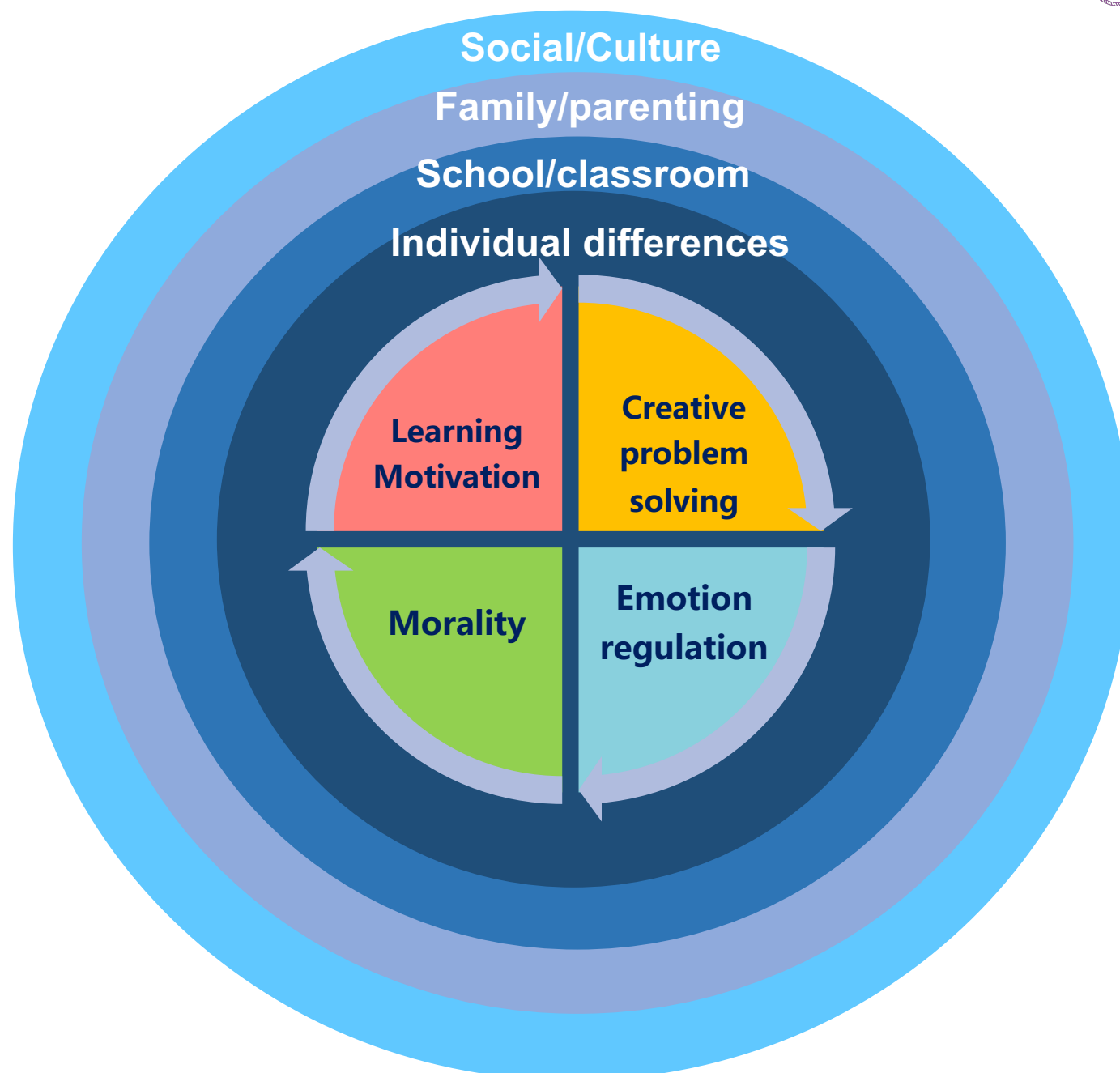




What/ How do children learn through play?



- How to solve problems creatively?
- When bad things happen, how to regulate emotions?
- When conflicts arise, how to be fair and just?
- How to cooperate with each other?
- How does play foster learning motivation?



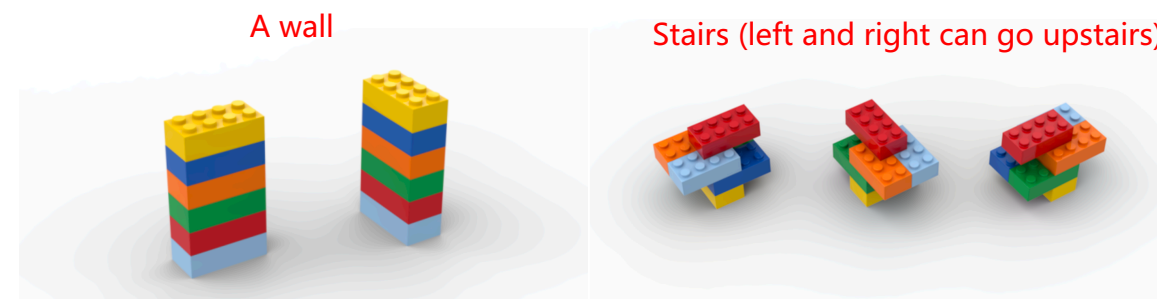
Creative problem solving

- 20 preschoolers constructed AI-LEGO 6-bricks
- 100 six-color block architecture works
- 106 adults evaluated creativity
 - designer, non-designer, parents, teacher

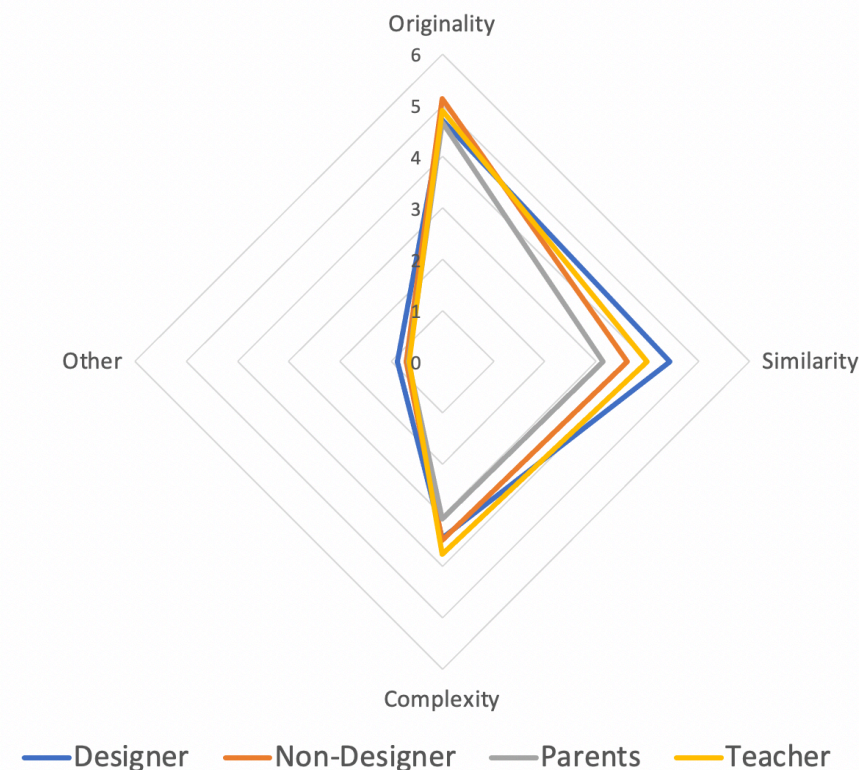
❖ What is a creative work?

originality > similarity > complexity

- ❖ Project ongoing: How to represent originality by assessing block construction?

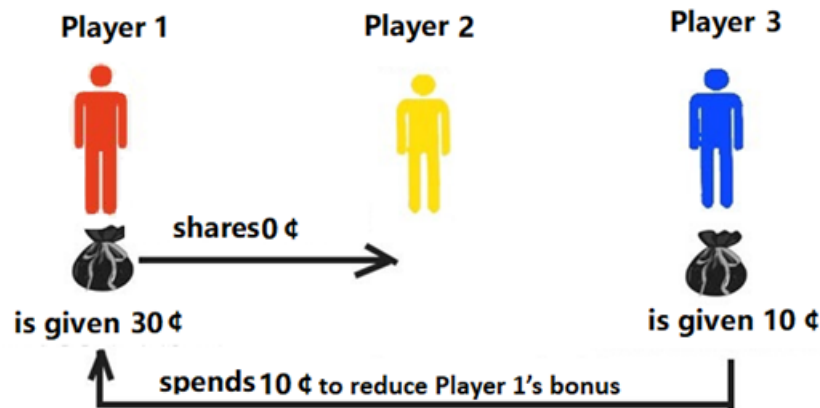


Which of the following dimensions do you think is most important in measuring creativity?



Morality study

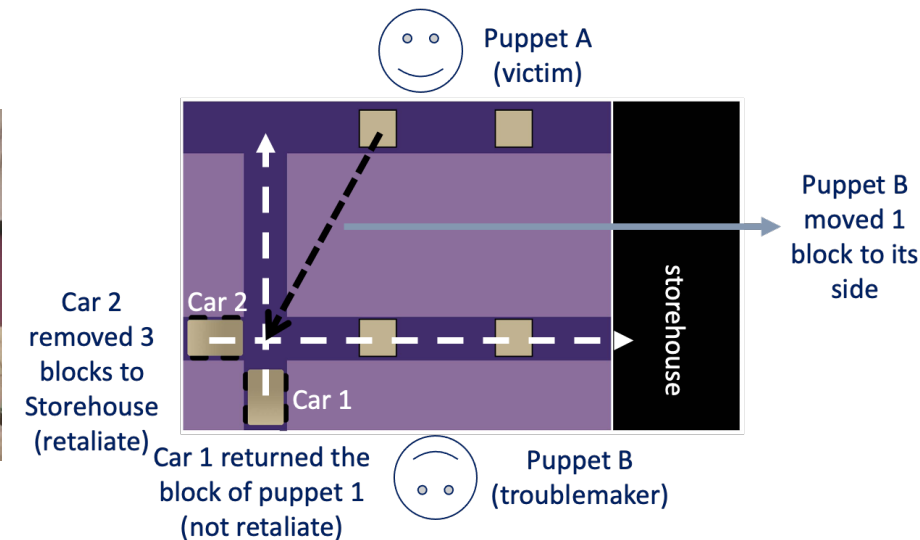
- **Question:** During play, what is considered to be fair and just? Does it differ when interacting with ingroup versus outgroup members?
- 7 studies: **1671** behavioral data, **1588** questionnaire data



Third-party punishment game



Ultimatum game



Justice game

Guo, R. #, Ding, J. #, & Wu, Z*. (2020). How intergroup relation moderates group bias in Third-Party Punishment. *Acta Psychologica*, 205, 103055.



Morality: main findings

- **Cultural differences:**
 - **Chinese** participants: favor ingroups all the time
 - They were more angry when ingroups were selfish, but they did not punish selfish ingroups
 - **American** participants: punished selfish ingroups more after **deliberate thoughts**, maybe to enforce ingroup norm
- **Competition leads to immorality:** children punished fair outgroup distributors
- Children preferred restorative justice more than retributive justice
- Low-SES children preferred resources, whereas high-SES children preferred fairness



Motivation-Why ?

Play is the **original motivation** of children' s lasting enthusiasm for learning in establishing lifelong learning habits.

In order for playful activities to be educational, the following features must be met: joyful, meaningful, social, engaging, and iterative.

Motivation is the key to be a lifelong learner.



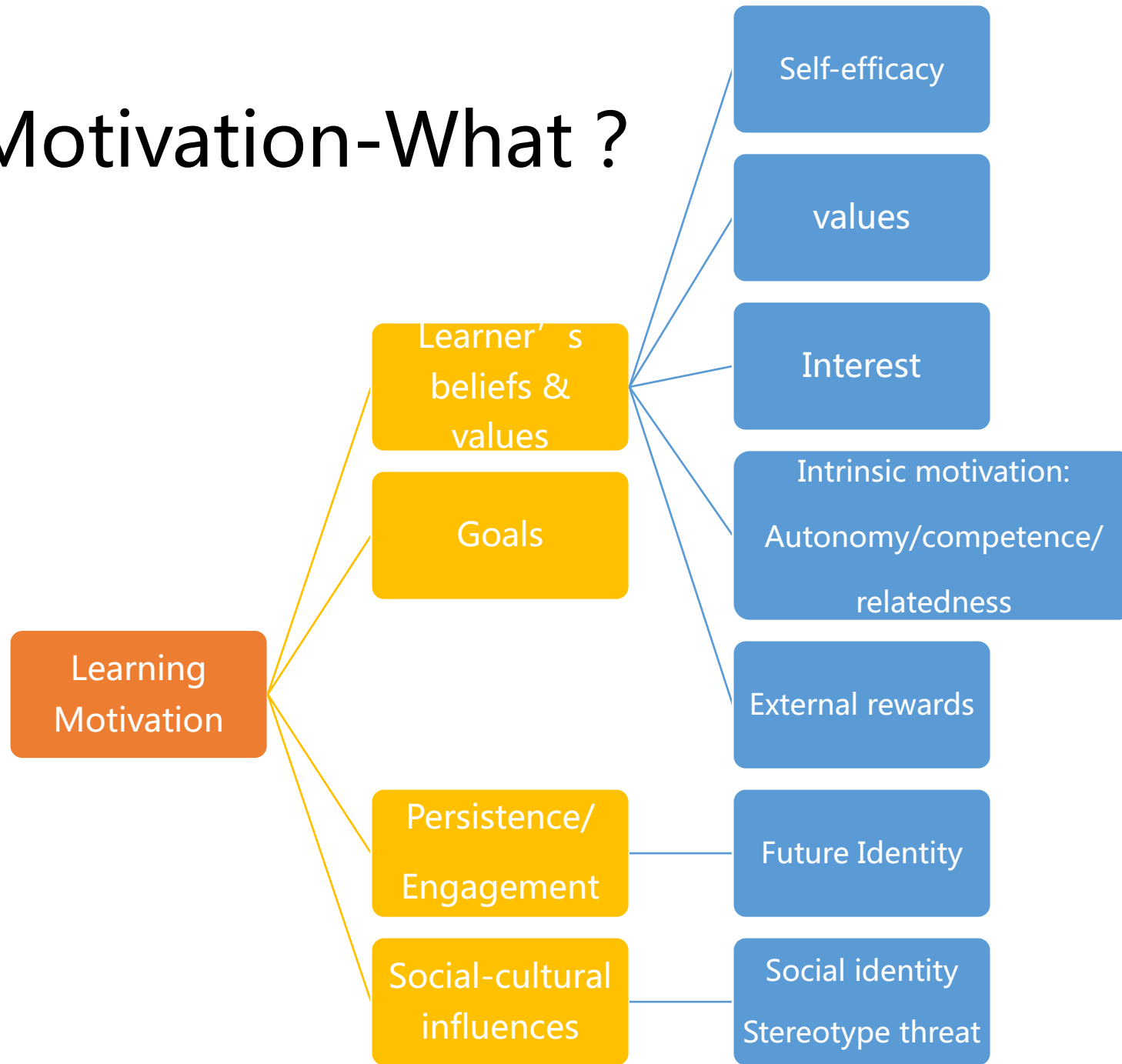
Figure 1. Five characteristics of playful learning by the LEGO Foundation, 2017



Figure 2. Five companies researched and analyzed in this report



Motivation-What ?



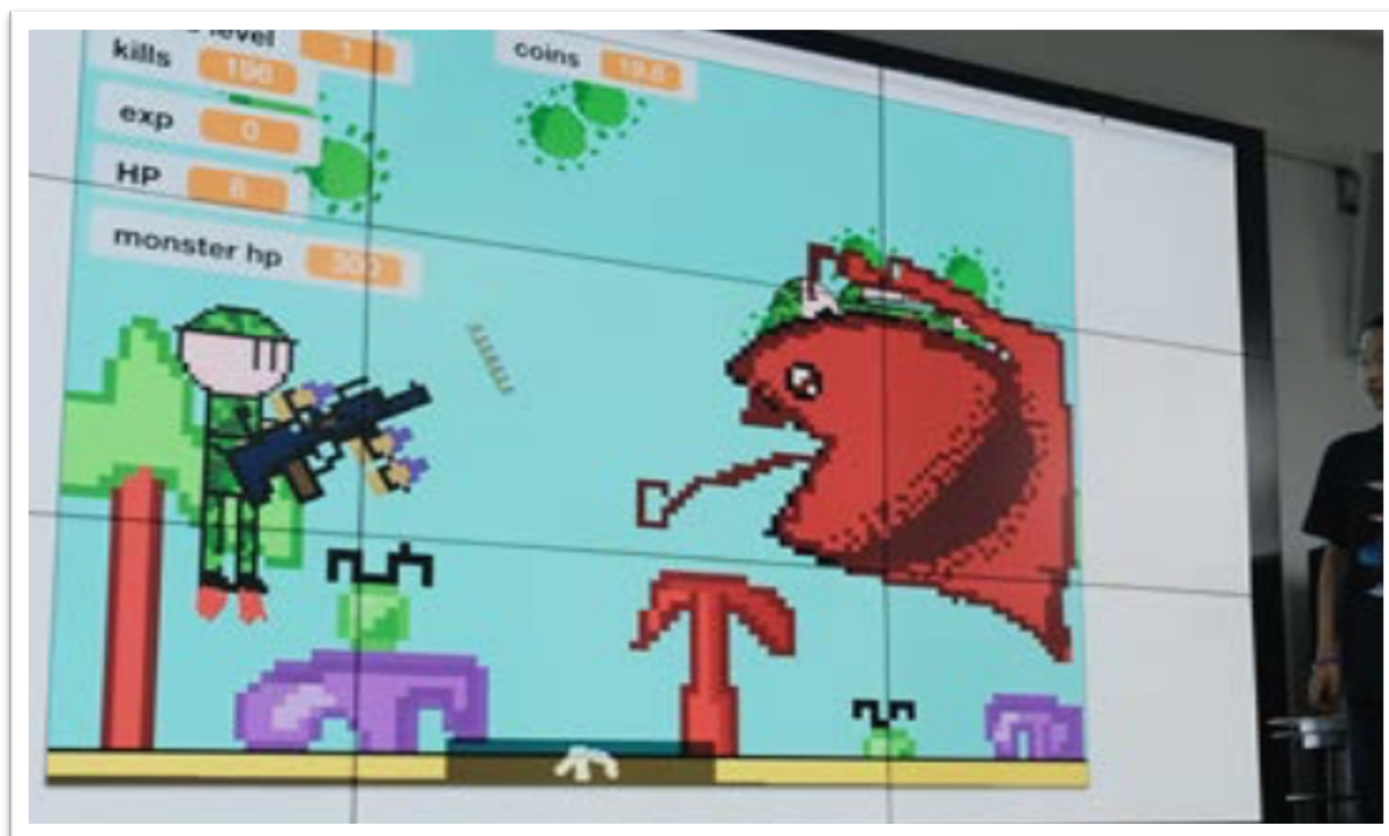


Motivation-How?

Epstein (1989) TARGET Framework	
Task	Multi-dimensional - numerous and varied tasks and athletics challenges.
Authority	Students involved in decision making and task design.
Recognition	Recognition and feedback on improvement and effort. Private diaries and consultations with teacher.
Grouping	Mixed ability individualistic and co-operative groups.
Evaluation	Self-referenced. Based on improvement and effort scores.
Time	Many attempts at each challenge. Flexible time to practice, plan or evaluate



Teaching & learning





Teaching & learning



- **Task:** interesting, the more you know the more you will be interested; diversity and challenging
- **Authority:** students ' sense of independence, providing students with choices about what they learn, how they learn, and with whom they learn; as well as opportunities to evaluate themselves/ others
- **Recognition:** praise and motivate achievements
- **Group:** cooperative group learning; being accepted and appreciated





Teaching & learning



- Evaluation & Time

2019TULLL秋季长期班
程序测试报告

一号编程任务：使用Scratch完成与E.T.相遇的故事，并向E.T.介绍自己。

测试日期	2019.10.13
测试员	王欢
程序员	张荣源
程序名	Scratch作品
版本号	1.0

测试对象质量评估 (各维度评分0-5)

任务符合度：是否完成编程任务
程序流畅性：程序中无显著BUG
故事趣味性：故事情景有趣
创意性：程序使用较为有趣的交互形式
编程多样性：使用不同模块进行编程

需求符合度
程序流畅性
故事趣味性
创意性
编程多样性

测试体验及建议

非常好的作品。可以取个更酷的作品名称。

2019TULLL秋季长期班
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程序员	张荣源
程序名	Scratch
版本号	0.1

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需求符合度
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故事趣味性
创意性
编程多样性

测试体验及建议

故事很有趣味性，稍稍慢点就好了。



Teacher Education

At policy level: the MOE of China has published:

"Implementation Plan of the National Scientific Literacy Action Plan (2016-2020)" ,
"Education Informatization 2.0" and "Opinions on Comprehensively Deepening
the Construction and Reform of Teachers in the New Era" .

Practical level: there is a significant shortage for STEAM teachers, or
Existing teachers lack a common language for pedagogy surrounding STEAM Ed

Teachers are not prepared in pedagogies aligned with the STEAM content. i.e.
growing up they are not exposed to "LtP" or "Teaching Through Play"
Ideology

Academically, research on training teachers with a LtP perspective is lacking.
All called for research and experience design surrounding Teacher Ed in China



A Teaching through Play STEAM Teacher Education Program was designed and implemented by TULLL

- Using immersive teacher education pedagogy with STEM teachers.
- Specific pedagogical technique such as assigning group work roles to each novice teacher using role cards.
- Each card listed roles such as the time keeper, the resource manager, the facilitator, and the recorder



Integrate LtP to the teacher population



清华大学 终身学习实验室
Lab for Lifelong Learning, Tsinghua University

2019 ICLL

终身学习与未来人才国际会议

International Conference on Lifelong Learning and Future Talents



Mitchel Resnick

麻省理工学院教授、Scratch之父
Professor of MIT Media Lab, the Father of the Scratch



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Professor
Tsinghua Un
Lifelong



20+ Key Speakers
1,000+ Attendees
3 Parallel Sessions
Youth Talk



Q & A

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