



北京師範大學

BEIJING NORMAL UNIVERSITY

北京師範大學校訓

學為人師
行為世范



Xinyue Jiao

Research interests:

Learning science and Technology, AR in education,
collaborative learning

Beijing Normal University

Date: 2022/10/07

BEIJING NORMAL UNIVERSITY

Basic information



Xinyue Jiao

Faculty of Education, Beijing Normal University

Major: Educational technology

GPA: 3.9/4.0 92.10/100

Advisor: Su Cai

Central China Normal University

GPA: 88.73/100 Ranked 2/48

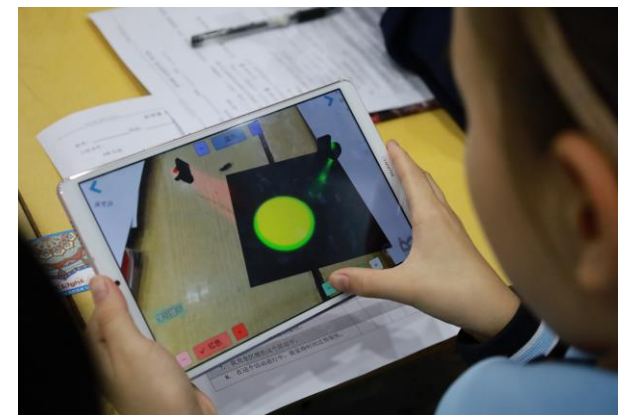
Research program

1. Research focus: AR in Science education

- **Jiao, X.** (2021-2022) Student Research Fund Project of Beijing Normal University. Research on the Mechanism of the collaborative scripts on the effects of collaborative inquiry among middle school students in an **AR environment**. ¥ 3,000. **[AR and collaborative learning]**
- Cai, S., **Jiao., X.** (2019-2023) The National Natural Science Foundation of China. Research on multi-channel information fusion computation and evaluation in intelligent **Augmented Reality** learning environment ¥ 500,000.
- Li, S., **Jiao., X.** (2021-2022) Research on using **Augmented Reality** to enhance students' representational fluency and self-efficacy. **[AR+ mathematics]**

Qualitative and quantitative research method

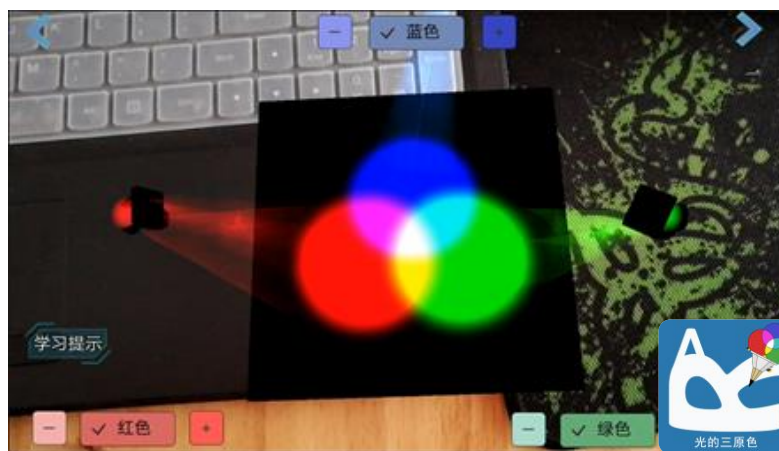
- **Responsibilities:** Planning programs, designing and developing AR apps, designing experiments, collecting and analyzing data, coding interview data ,and writing papers.



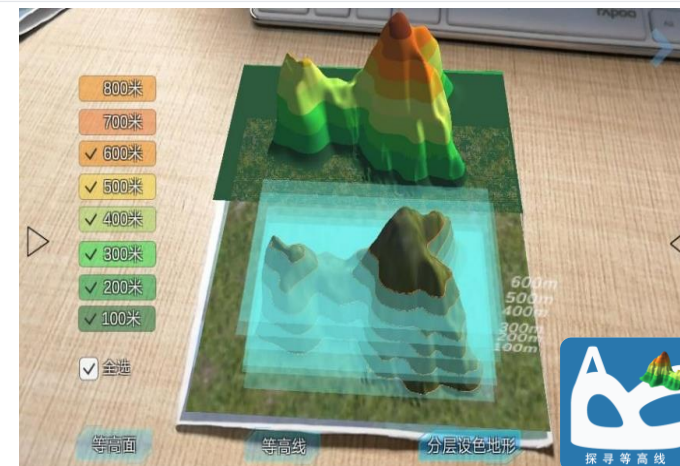
AR applications



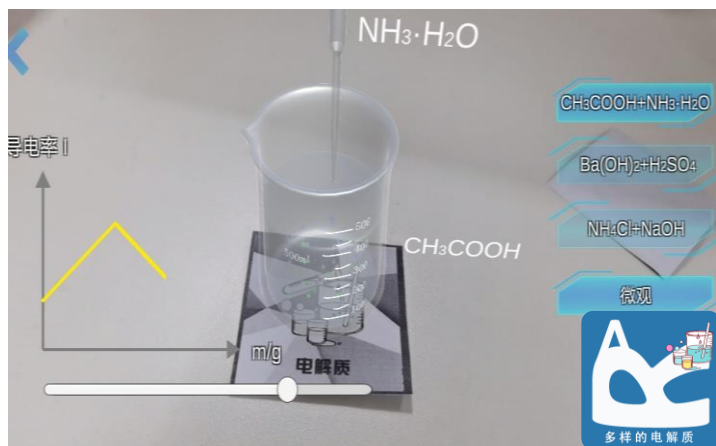
<English> Our Earth



<Science> The three primary colors of light



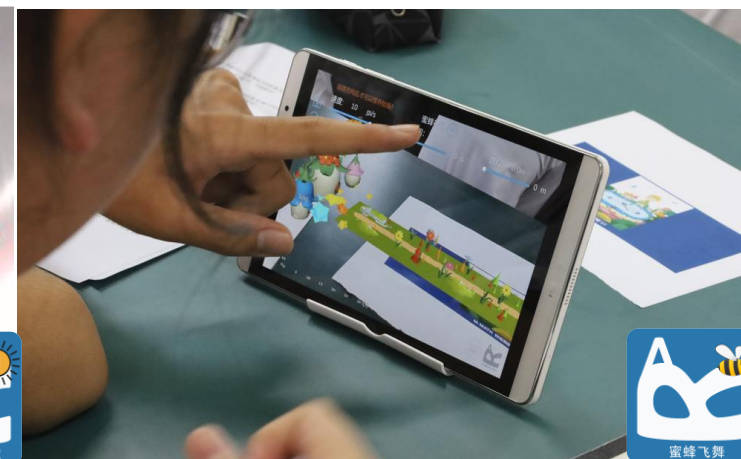
<Geography> Contour line



<Chemistry> Electrolyte

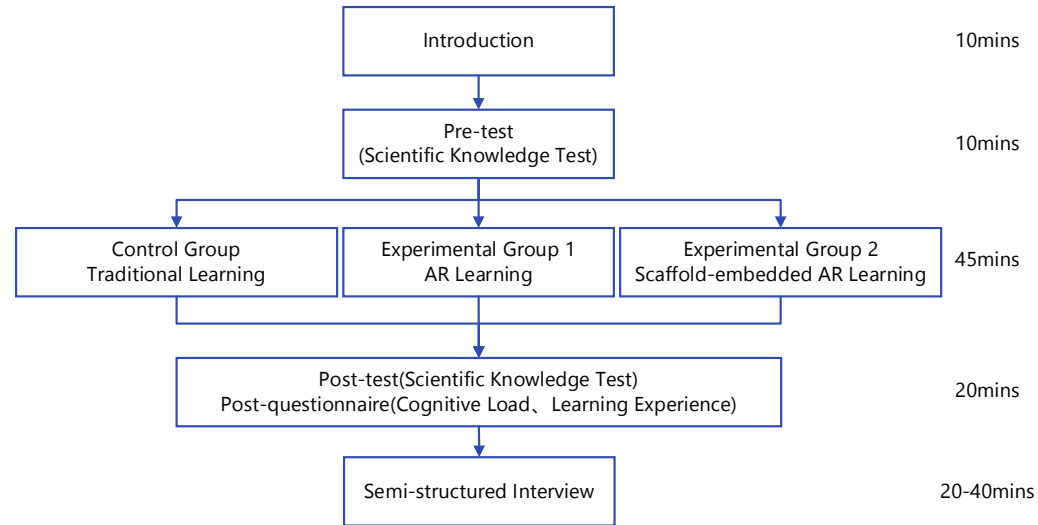


<Geography> Solar altitude

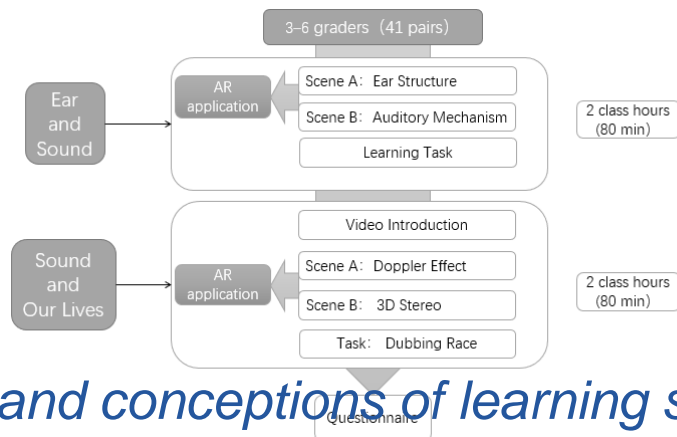


<Math> Function

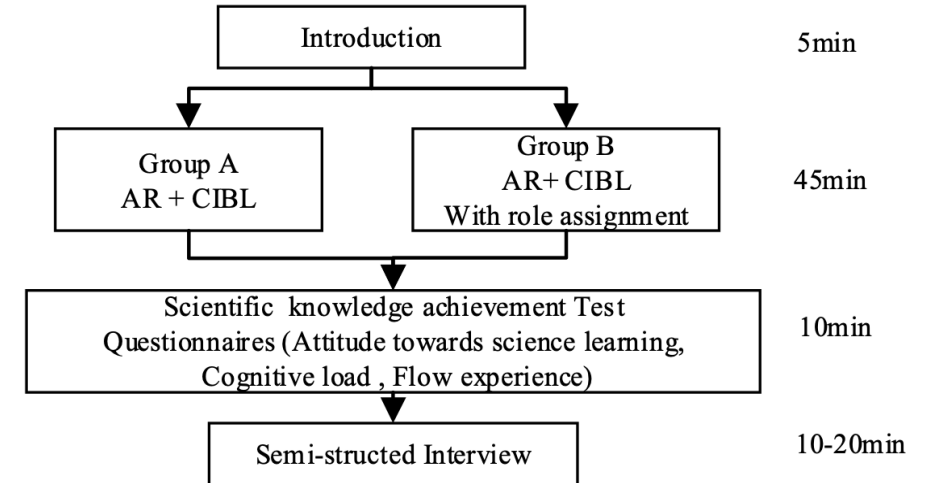
Teaching experiments



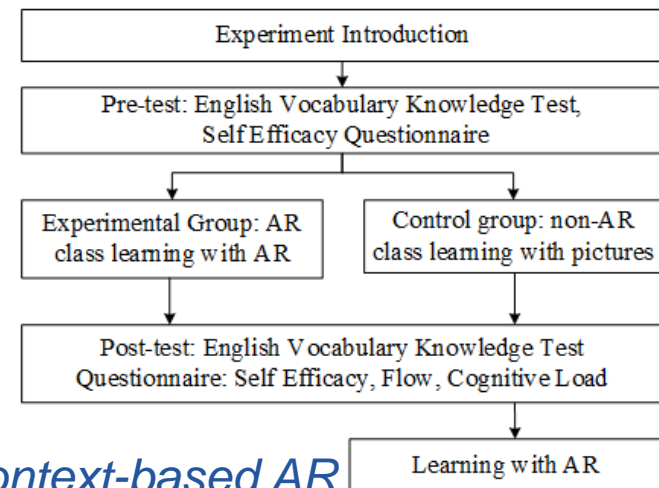
AR and scaffoldings



AR and conceptions of learning science



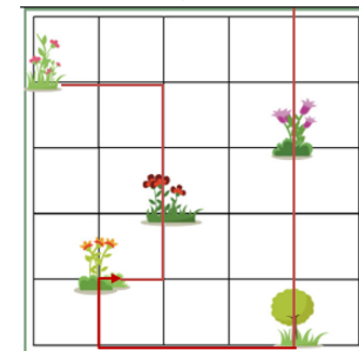
role assignment in collaborative learning



context-based AR

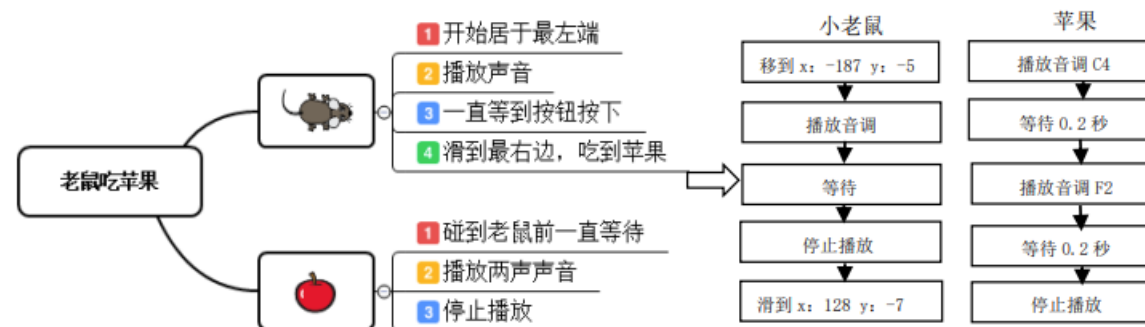
▷抽象 Abstraction: 将实际问题抽象化。

将花的位置抽象到纸上，进行路线规划。



2. Research focus: STEM+C (computational thinking)

- **Jiao, X.** (2018-2019) The National-level Project for Student Innovation and Entrepreneurship Training. Research on the influence of integrated **STEM** courses on students' **computational thinking and interdisciplinary attitudes**. (Project No. CCNU201810511043)
- **Jiao, X.** (2019-2020) The National-level Project for Student Innovation and Entrepreneurship Training. Research on the integrated STEM curriculum's influence on primary school students' problem-solving ability. (Project No. CCNU201810511043).



- **Responsibilities:** Planned projects, designed STEM+C courses (mblock), and wrote papers

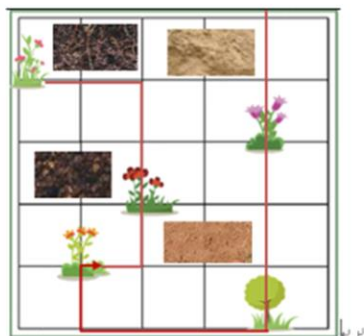
▷分解：带领学生分解问题

实现小车在园中保持匀速行驶需要几个步骤？完成任务单（见附页）

▷算法：带领学生完成初步编程

引导学生思考：小车匀速行驶如何实现呢？

▷尝试解决



根据上面的结论，应该怎么设置小车的速度呢？

用马达的转速来实现，具体步骤是什么呢？

1. _____
2. _____
3. _____
4. _____
5. _____

学习坐标，完成老鼠角色的编程

本节完成的整个程序的流程图

角色：

初始居于最左边。

播放声音。

一直等待到按钮按下。

向最右边，吃到苹果。

角色：

在碰到老鼠之前一直等待。

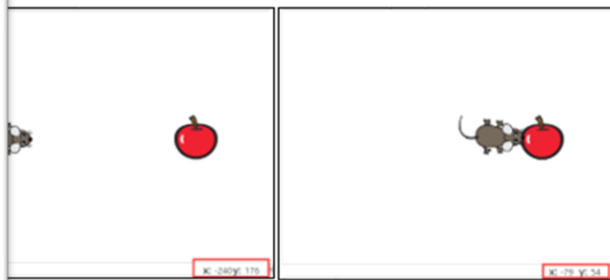
播放两声声音。

停止播放。

一想 怎么让老鼠从左边移到右边呢？是什么发生了变化？我们用什么来

这种变化呢？【分解问题】

学生观察老鼠在不同位置的坐标变化。



交通安全小助手——组建红绿灯

和建设，人们在驾驶的时候经常会碰到交通施工路段。因此，在合
号灯就显得尤为重要。现在在武汉市某条交通干线的某一段正在进
十字路口变成了丁字路口，如图。因此，A 处的交通信号灯就显得



周的安全检查中，发现 A 处红绿灯发生线路老化，急需一个新的红
绿交通能够正常。现在我们需要制作一个红绿灯 来替代 A 处已

在营救！人质情况，两名男
特殊原因，明早才能出发，
区营地，紧接着的暴雨笼
看从 B 地到 A 地的路程，

有一块寸草不生的盐碱地，
从营区到河流的一段路程有
行提前勘察，配合使用最新

认识丛林中的相关知识，
等。

Watering Robot

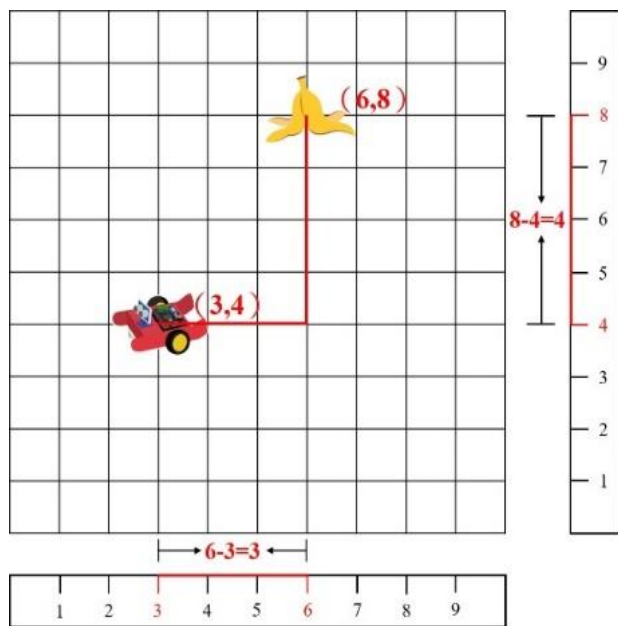
Little Mouse's Apple Land

Traffic safety assistant-formation
of traffic lights

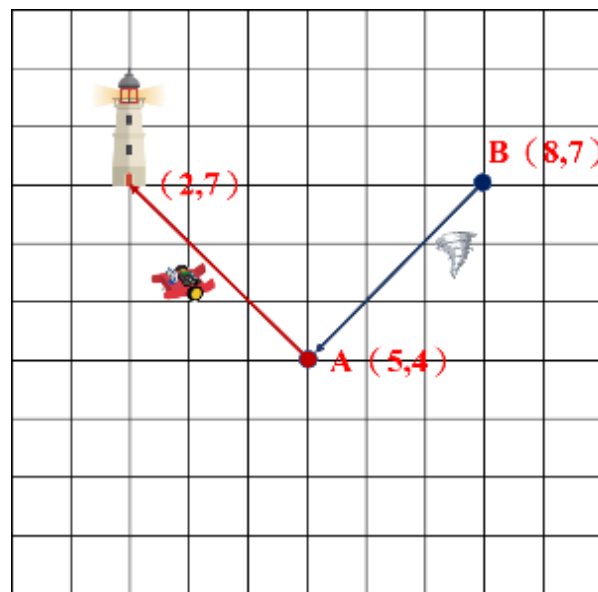
Rapid Rescue

STEM+C courses design

STEM+C courses design

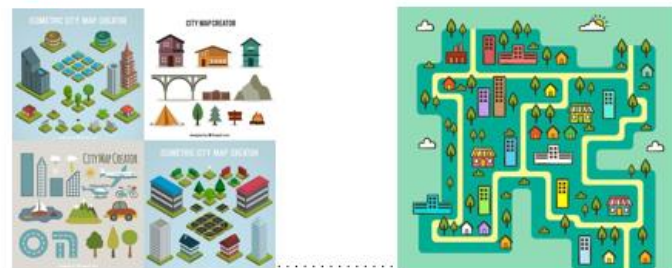


小小垃圾分类师



神奇的航海寻宝之旅

学习者根据所提供的地图范例，通过纸板、建筑物模型，自己动手搭建场景，将合适的建筑物放在坐标纸的对应位置。



课上所提供的建筑物模型.....地图范例。

●→ 第三步：基础出行技能学习

学习者利用扣叮“创意实验室”编程平台，通过编写积木代码实现小车直行、左转、右转、倒车等驾驶动作，并实现转向灯的控制，帮助学习者学会“顺序结构”。



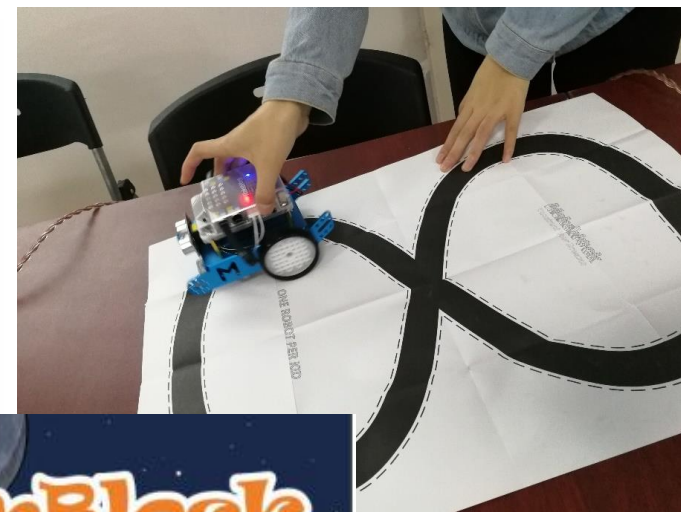
《小小驾驶员的城市道路之旅》

Teaching experiments

qualitative research method



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3. Research focus: Scientific argumentation

- Yong, X., **Jiao, X.** (2021-2022) Student Research Fund Project of Beijing Normal University. Research on the role path of metacognitive skills of pre-service science teachers in collaborative argumentation. ¥ 3,000.
- Lin., Y., **Jiao., X.** (2018-2019) The Youth Foundation for Humanities and Social Science Research of the Ministry of Education in China. Brainwave exploration of scientific argumentation for learning ¥ 20,000.
- Responsibilities: **Conducted qualitative research, analyzed data, and wrote papers.**

3 Journal Articles, 7 Conference papers

- **Jiao, X.**, Cai, S., Li, J., Zhou, H. (2023). The influence of context-based Augmented Reality applications on students' English language learning. Submitted to *JCAL* **[Under Review]**
- Cai, S., **Jiao, X.**, Li, J., Jin, P., Zhou, H., & Wang, T. (2022). Conceptions of learning science among elementary school students in AR learning environment: A case study of "The Magic Sound." *Sustainability (Switzerland)*, 14(11), 116783. doi:10.3390/su14116783
- Li, S., Shen, Y., **Jiao, X.**, & Cai, S. (2022). Using Augmented Reality to enhance students' representation of linear functions. *Mathematics*, 10(10). doi:10.3390/math10101718
- Yang, Y., Cai, S., Wen, Y., Li, J., & **Jiao, X.** (2021). AR learning environment integrated with EIA in science education: Improving students' scientific literacy and reducing the cognitive load of students. *Sustainability (Switzerland)*, 13(22), 12456. doi:10.3390/su132212456

Conference Proceedings

- **Jiao, X.**, Liu, Z., Zhou, H., & Cai, S. (2022). The Effect of Role Assignment on Students' Collaborative Learning in Augmented Reality Environment. *Proceedings of the 22nd International Conference on Educational Technologies, ICALT 2022*, July 1, 2022 - July 4, 2022, Bucharest, Romania.
- **Jiao, X.**, Yi, C., Liu, C., Xie, Y., & Ma, N. (2021). How Different Cognitive Style Groups Affect Learning in Collaborative Argumentation. *Proceedings of the 13th International Conference on Educational Technologies and Computers, ICETC 2021*, May 24, 2021- June 2, 2021, Virtual, Online.
- **Jiao, X.**, Liu, Z., & Cai, S. (2020). The influence of augmented reality embedding cognitive scaffolds on elementary school students' scientific learning. *Proceedings of the 28th International Conference on Computers in Education, ICCE 2020*, November 23, 2020 - November 27, 2020, Virtual, Online. **[Nominated for the Best Overall Paper Award]**



BEST OVERALL PAPER AWARD NOMINEE



is presented to

Xinyue Jiao, Zifeng Liu and Su Cai


for the paper entitled
The Influence of Augmented Reality Embedding Cognitive Scaffolds on
Elementary Students' Scientific Learning



Hyo-Jeong SO
Program Chair



Ma. Mercedes T. RODRIGO
Program Co-Chair



Tanja MITROVIC
Conference Chair

AR Design and Development

- AR Software Design and Development(Unity3D), 3D max, Photoshop),
- Developed 5 AR applications about science, language, and math

Instructional Design

- Instructional design, E-Learning (Storyline), Animiz, Learning Management Systems (Moodle LMS)
- Designed 5 AR courses and two STEM courses (Scratch and robots)

Data Analysis

- **Quantitative** Data Analysis Tools (SPSS), correlation analysis, regression analysis
- **Qualitative** Data Analysis Tools (NVivo 11)
- Structural Equation Modeling (AMOS/SmartPLS)
- Lag Sequential Analysis (GSEQ)

Programming

- Unity, C#/C++, Java, ActionScript 3.0

- Enjoy doing research(designing courses, analyzing data and reporting data)
- Enjoy staying around with children, teaching in the classroom
- A sense accomplishment
- Eager to make students learn better

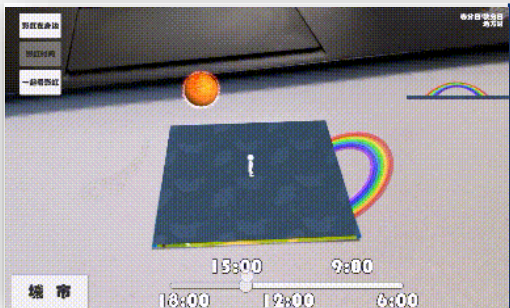


Thank you!

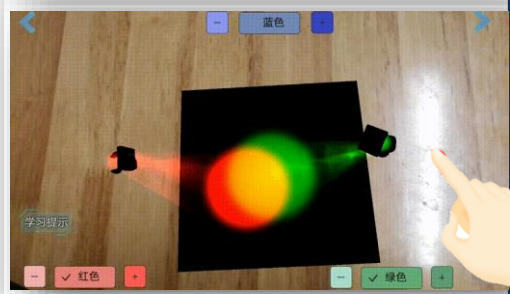
Xinyue Jiao
Beijing Normal University

北京師範大學校訓
學為人師
行為世范

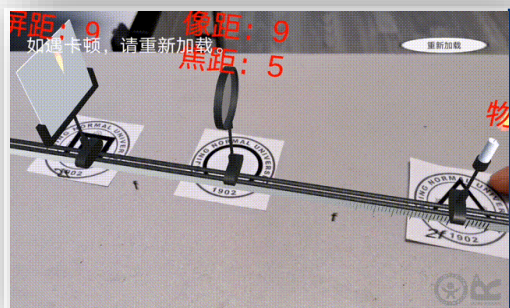




1 / 光的色散——彩虹的秘密



2 / 光的三原色——光影的艺术



3 / 凸透镜成像