Innovation-driven teaching and learning in Internet+ age

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2017 XJTLU Learning and Teaching Colloquium

Xi'an Jiaotong-Liverpool University
西交利物浦大學

Outline

- **BACKGROUND**
- **AN INNOVATIVE TEACHING AND LEANING MODEL**
- **CSE313 BIG DATA ANALYTICS MODULE TRIAL**
  - **EXAMPLE TEACHING AND LEARNING ACTIVITIES ORGANIZATION**
  - ***technology role in the innovative teaching and learning***
- **RESULTS**
- **CONCLUSION**

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Background

- HE facing challenges
- Technology revolution: Internet, Clouds Computing, Big data and Mobile technologies
- Learning behavior change
- Education rethinking, university reshape and teaching-learning redefine
- Innovation
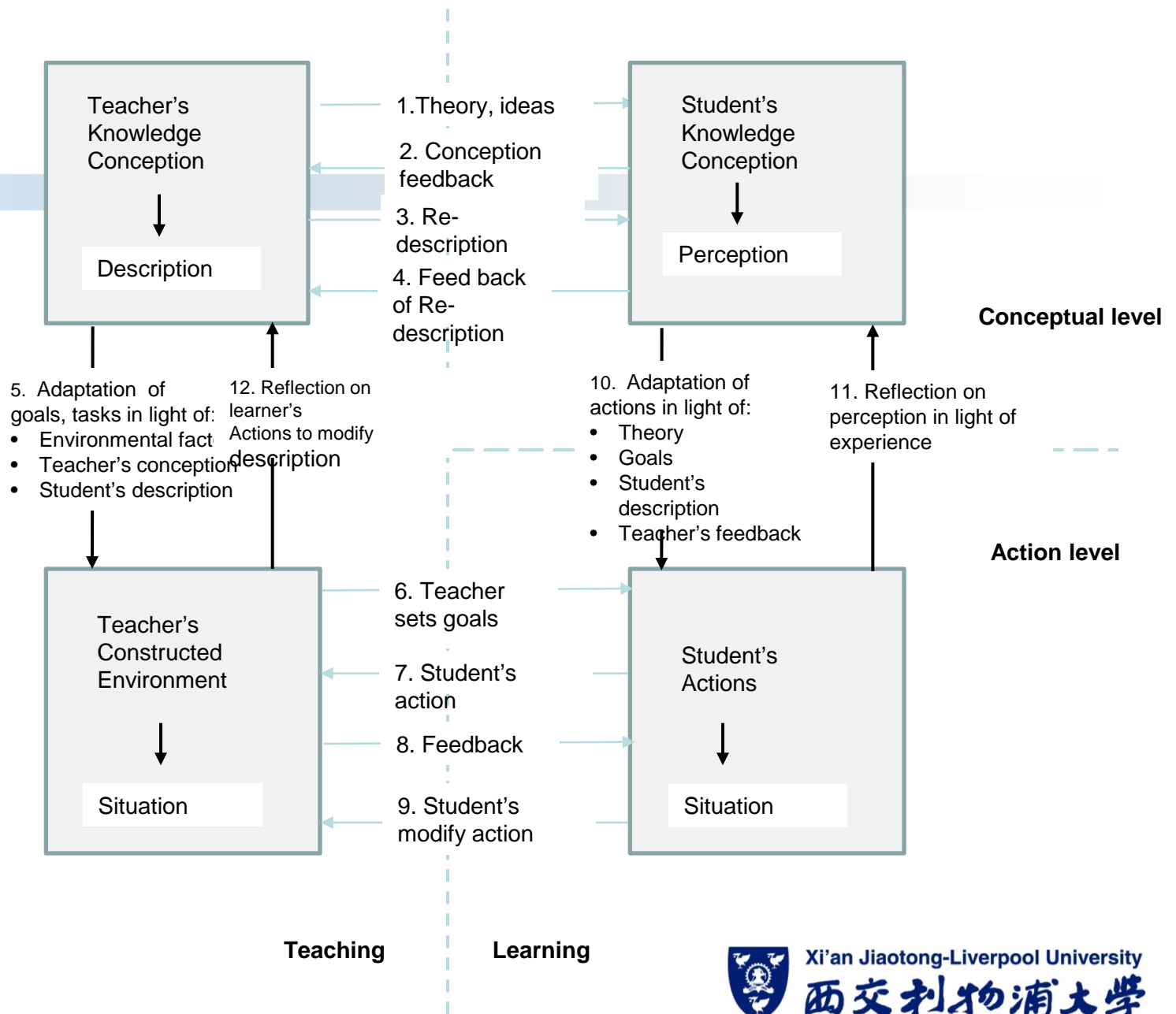- **What is known** vs **How one comes to know**

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AN INNOVATIVE TEACHING AND LEANING MODEL
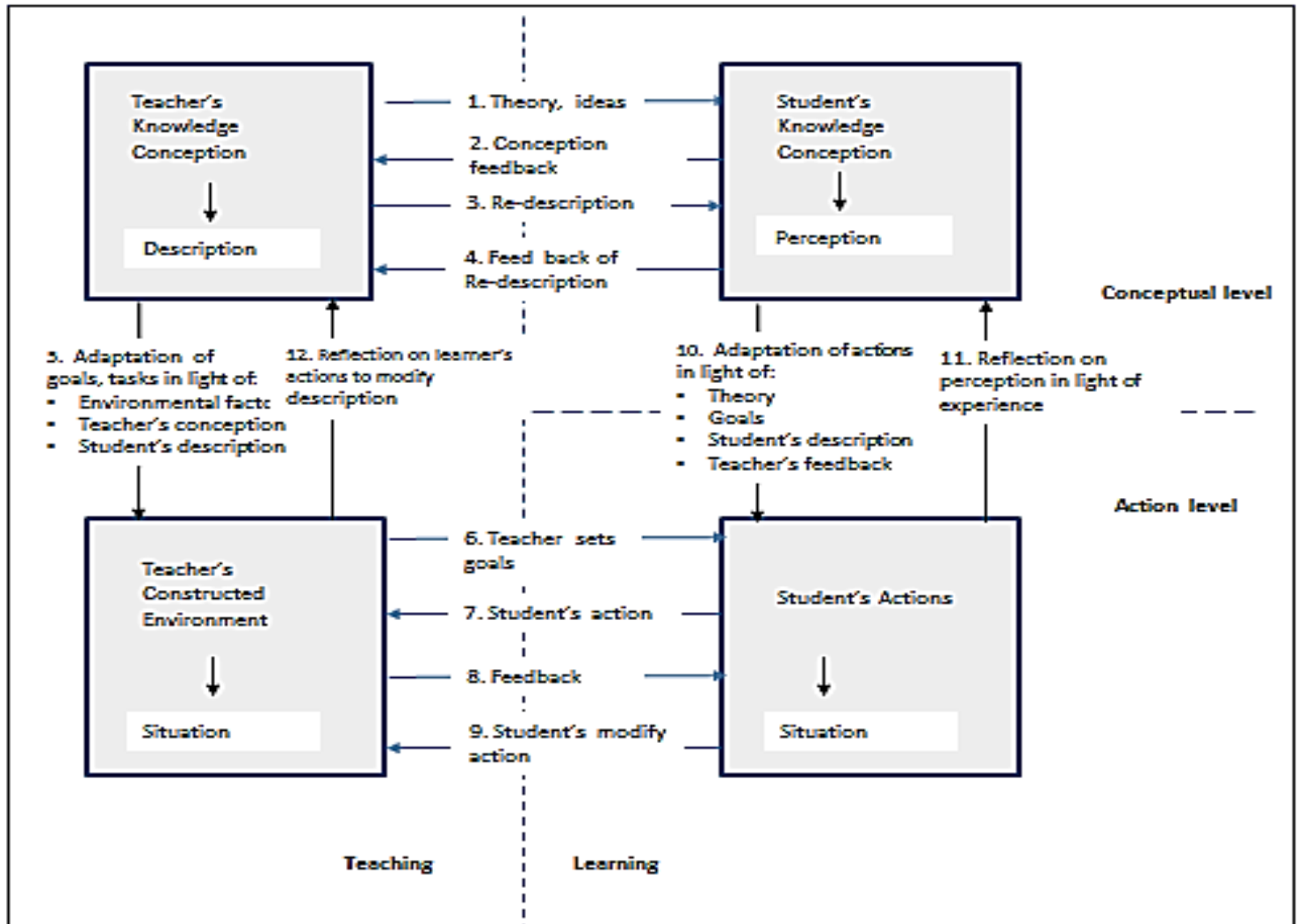
AN INNOVATIVE TEACHING AND LEANING MODEL
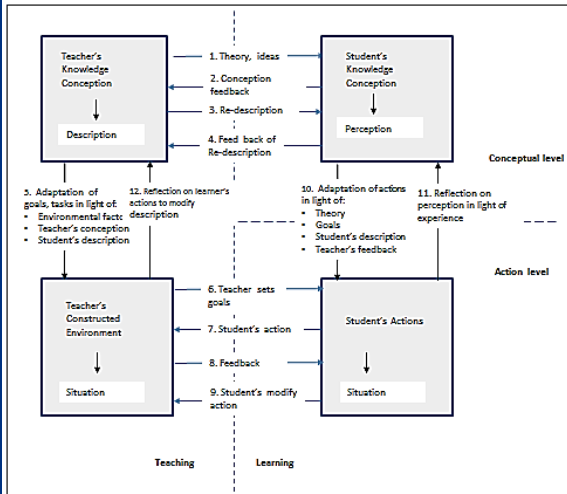
- **Two-layer knowledge transfer.**

- **Dual-directional and multiple rounds interaction**

- **Complementary and co-evolving between two levels.**

Teacher's Knowledge Conception

Description

1. Theory, ideas

2. Conception feedback

3. Re-description

4. Feed back of Re-description

Student's Knowledge Conception

Perception

Conceptual level

5. Adaptation of goals, tasks in light of:
- Environmental factors
- Teacher's conception
- Student's description

12. Reflection on learner's Actions to modify description

10. Adaptation of actions in light of:
- Theory
- Goals
- Student's description
- Teacher's feedback

11. Reflection on perception in light of experience

Action level

Teacher's Constructed Environment

Situation

6. Teacher sets goals

7. Student's action

8. Feedback

9. Student's modify action

Student's Actions

Situation

Teaching   **Learning**

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Practical Template

I. TEACHER'S DESCRIPTION ON CONCEPTION

Conception	Data descriptive analysis
Description	Descriptive Analysis is a data analysis method provides quantitatively describing the main features of a collection of data through analysis. Data descriptive analysis is the first step in BDA. It ... a ... D ... c ... b ... h ...
Methods of delivery	L ... d ...
Expected results	F ...
Methods of assessment	C ...

I. TEACHER'S CONSTRUCTED SITUATION

Conception	Data descriptive analysis
Goals	Understand the concept of descriptive data analysis
Scenery	You are given a month of a company's Web logging records. You are asked to analyse the data and provide suggestions for next circle of products development and sale strategy.
Tasks	Describe data you have been given.
Methods of delivery	On line, Web site. Moodle project.
Expected results	Lecture, slides, lecture notes, Online delivery, …
Methods of assessment	Web report, written report.

I. STUDENTS' (RE-)ACTION ON CONSTRUCTED SITUATION

Conception	Data descriptive analysis
Scenery	You are given a month of a company's Web logging records. You are asked to analyse the data and provide suggestions for next circle of products development and sale strategy.
Tasks	Describe data you have been given.
Student's actions	• Check types: categorical or numerical? • Minimum and maximum on numerical • Number of class on categorical • Mean, median • Distribution, standard deviations • Outliers and abnormally • Missing values and human errors • Age over 130, date on 30th of Feb • User clicks without logins

...ON ON CO...

	...s ...Qualitative? ...res? ...What are the next? ...plest class of ...ata into smaller, more useful bits of information or a summary of what happened?
Methods of re-description	Lecture, slides, lecture notes, Online delivery, …

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Teacher's Template

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Conception	Data descriptive analysis
Description	Descriptive Analysis is a data analysis method provides quantitatively describing the main features of a collection of data through analysis. Data descriptive analysis is the first step in BDA. It is also called the "simplest class of analytics". Descriptive analytics allows users to condense big data into smaller, more useful bits of information or a summary of what happened.
Methods of delivery	Lecture, slides, lecture notes, Online delivery, …
Expected results	Fully understand, history, typical usage,
Methods of assessment	Quiz, Q&A, homework, others

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Practical Template

STUDENTS' FEEDBACK ON DESCRIPTION ON CONCEPTION	
Conception	Data descriptive analysis
Feedbacks	Quantitative? Why not Qualitative? What are the main features? Why first step in BDA? What are the next? It is also called the "simplest class of analytics". How to Condense big data into smaller, more useful bits of information or a summary of what happened?
Methods of re-description	Lecture, slides, lecture notes, Online delivery, …

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Examples

CSE313, CSE003,CSE311,EEE103

Technology role in the innovative teaching and learning

Fig. 2. Scenario construction on an online teaching and learning environment.

Coursework in Lab

Situation construction in a form of coursework and provided data and required tasks.
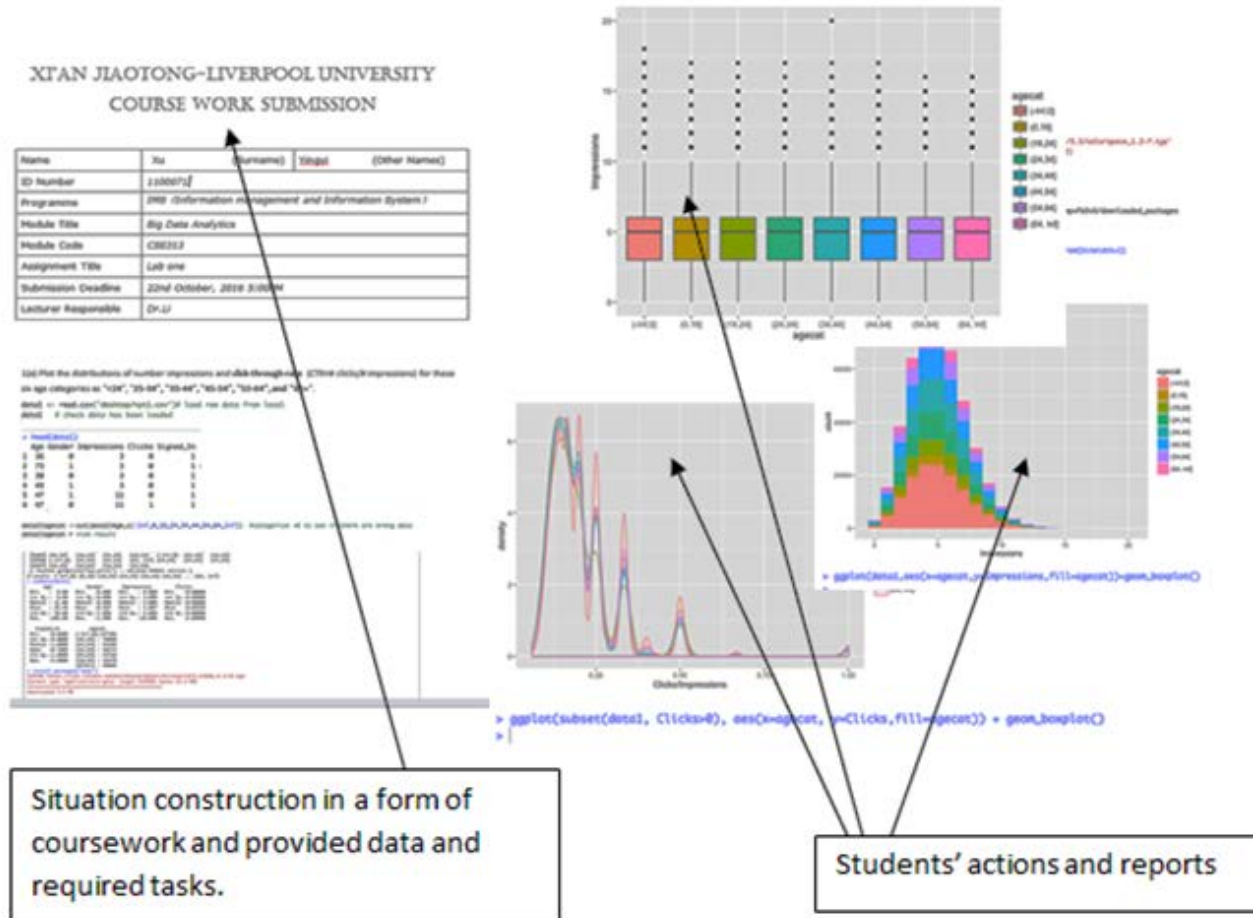
Students' actions and reports

Fig. 3.   Scenario construction in cours works.

- One project manager: a year-three student Mr. Xiaoyang Wang
- 9 Volunteers in 5 groups from year-two students

Task	No. of Volunteer Needed
Oscilloscope	2
DC Power supplier	2
Multimeters	2
AC Signal Generator	2
Video editing	1

▾ 6 March - 12 March

General Information about robot car assessment 188.2KB PDF document
WK3 Smart car pre lab tutorial 1.6MB PDF document Uploaded 5/03/17, 23:44
Arduino-Part-III 1.6MB PDF document Uploaded 5/03/17, 23:40
Oscilloscope Tutorial
Signal Generator Tutorial
Multimeter Tutorial
DC Power Supply Tutorial
Breadboard Tutorial
EEE103(1617) Group forming for Group A_final result 140.6KB PDF document Uploaded 5/03/17, 23:38
Smart Car Manual 5MB PDF document Uploaded 6/03/17, 14:17
For more information, please visit this Link
Sustainable Development Assignment
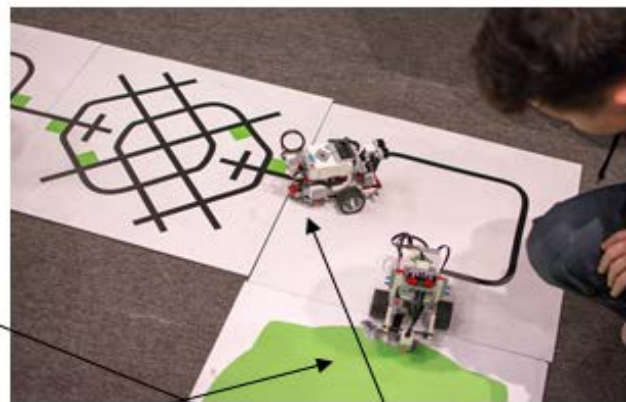WK3 Attendance question
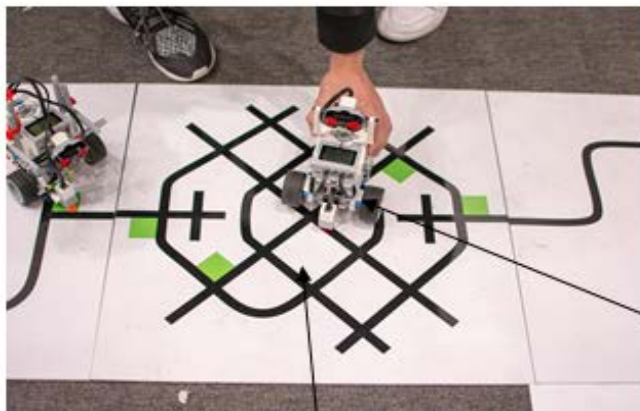
学生的各种有意义尝试

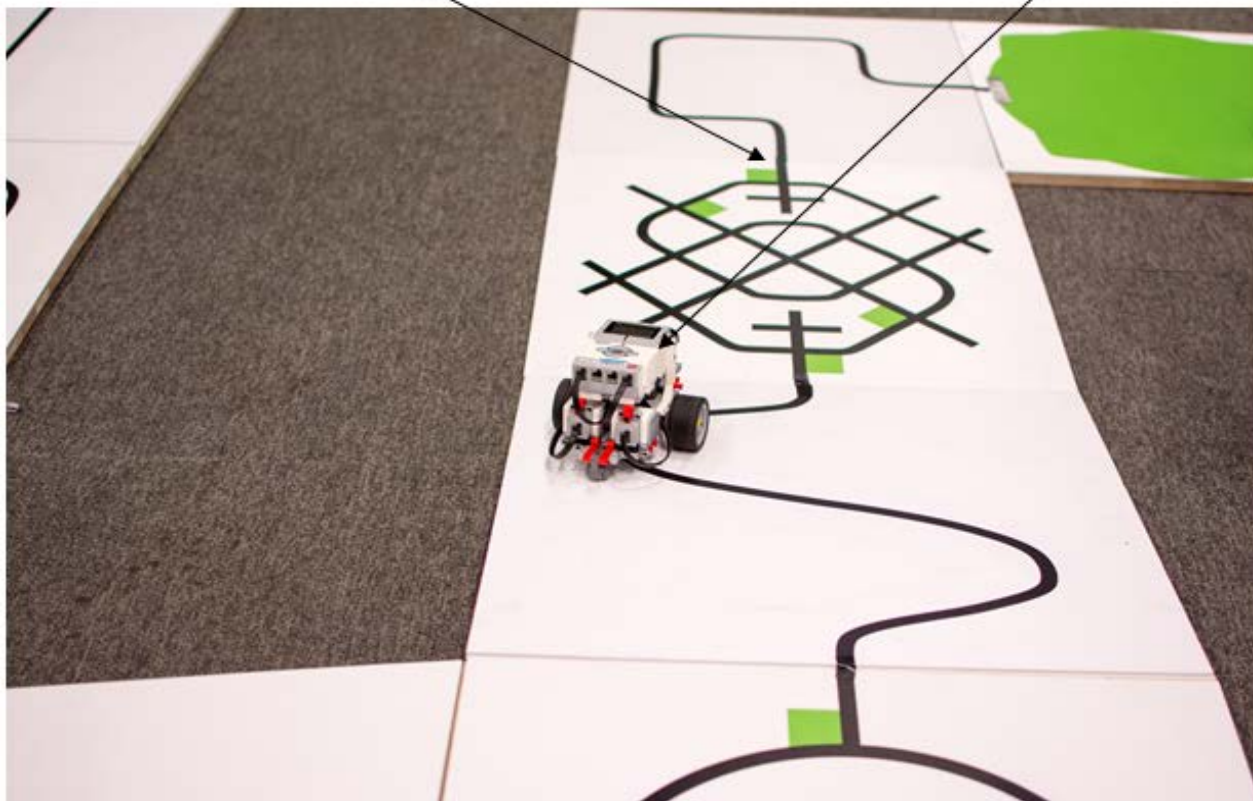学生以录制视频形式记录所学知识

老师对学生的行为进行有意义的指导,修改原来情景。

图 5.《互动创新》教学模式在 EEE103 "电路基础" 课程中的使用

老师设计的情景：要求乐高车按照规定
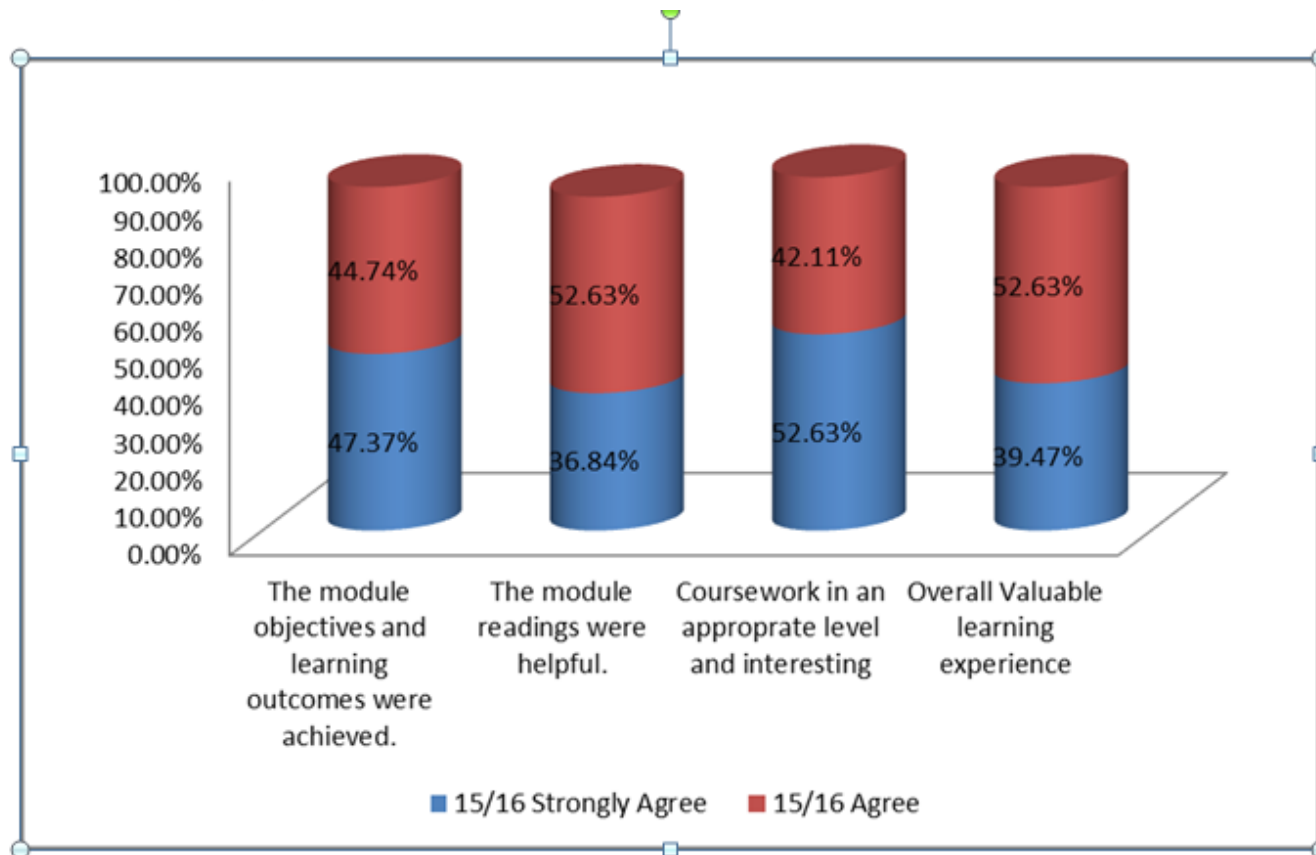线路行驶。

学生自己编程完成老师设计情景下的任
务。

Results

Fig. 4. Students' feedback on the learning experience of CSE313 in academic year 15/16.
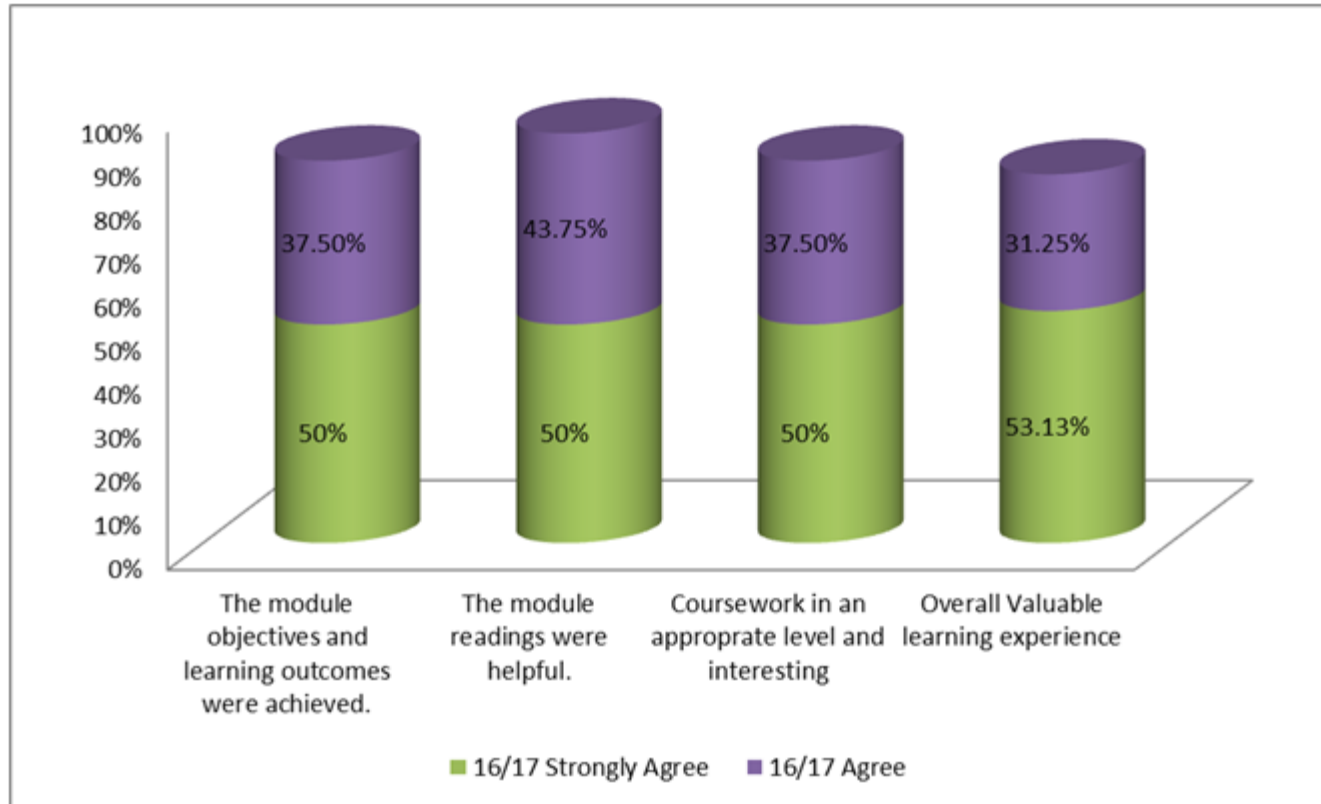
Results

Fig. 5. Students' feedback on the learning experience of CSE313 in academic year 16/17.
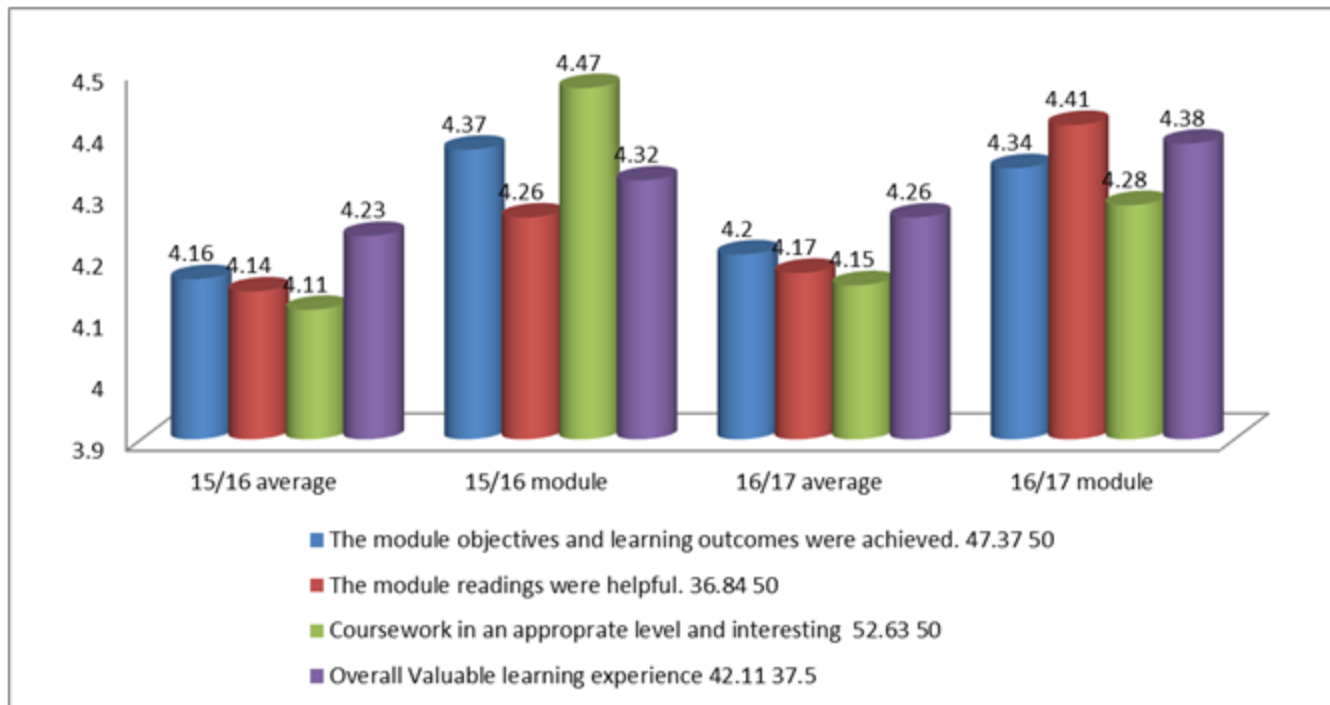
Results

Fig. 6. A comparative scale between module CSE313 and the average scale in the same department

Conclusion

- Education for innovation rather than transfer knowledge is a **tough task** for HEs.
- Innovative teaching and learning never stop
- Developing a course using innovative model proposed in this paper entails a **tremendous commitment time and efforts**.
- Current HE system tends to rewards good research far more than **good teaching**.
- Generic forms that reflecting the model proposed is needed.
- Web technologies can be used to design and delivery

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THANKS

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