Learning introductory mechanics via pre-lecture on-line quiz, multimedia animation, demonstrations and video-tapes of the demonstrations

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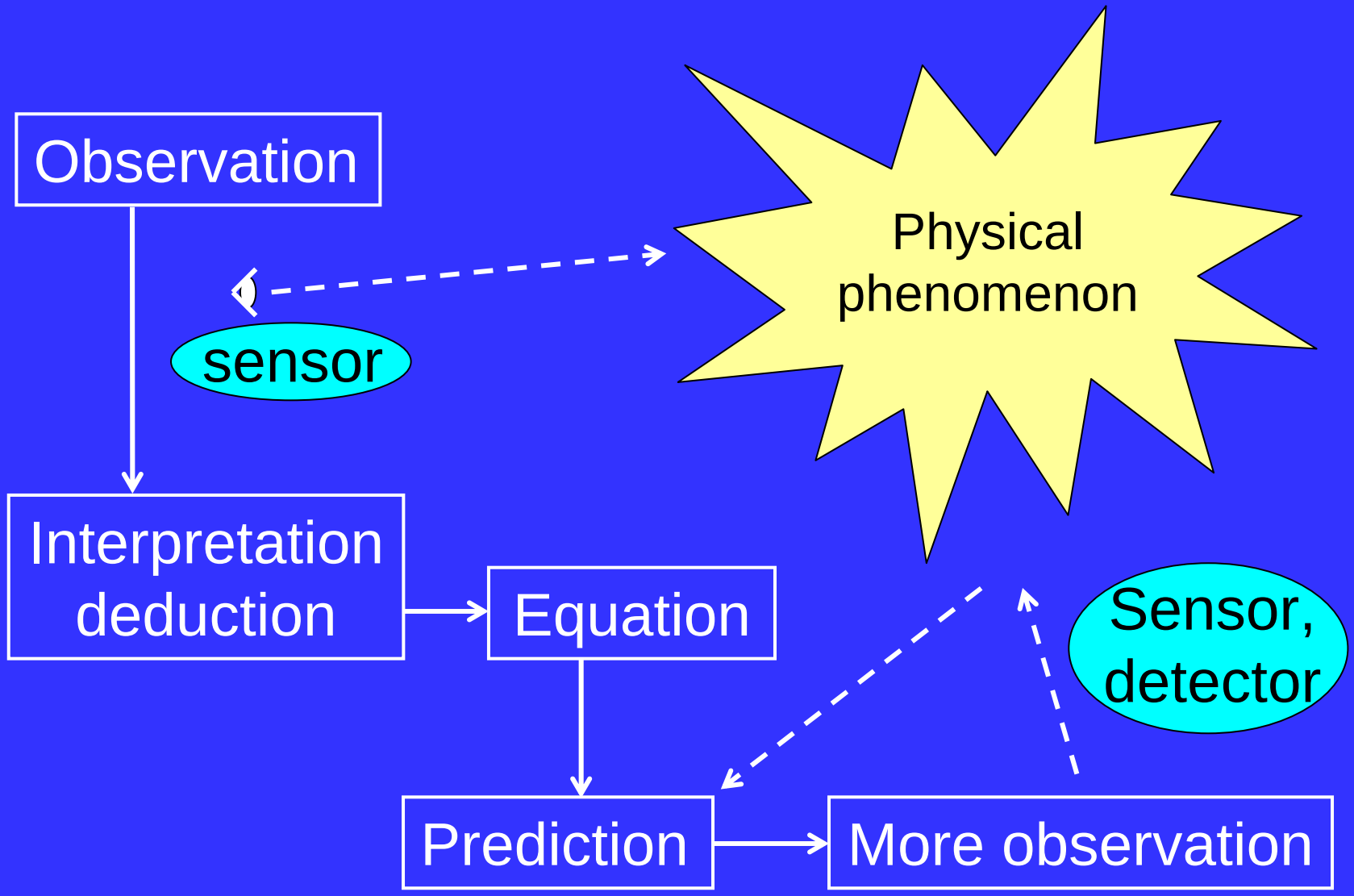
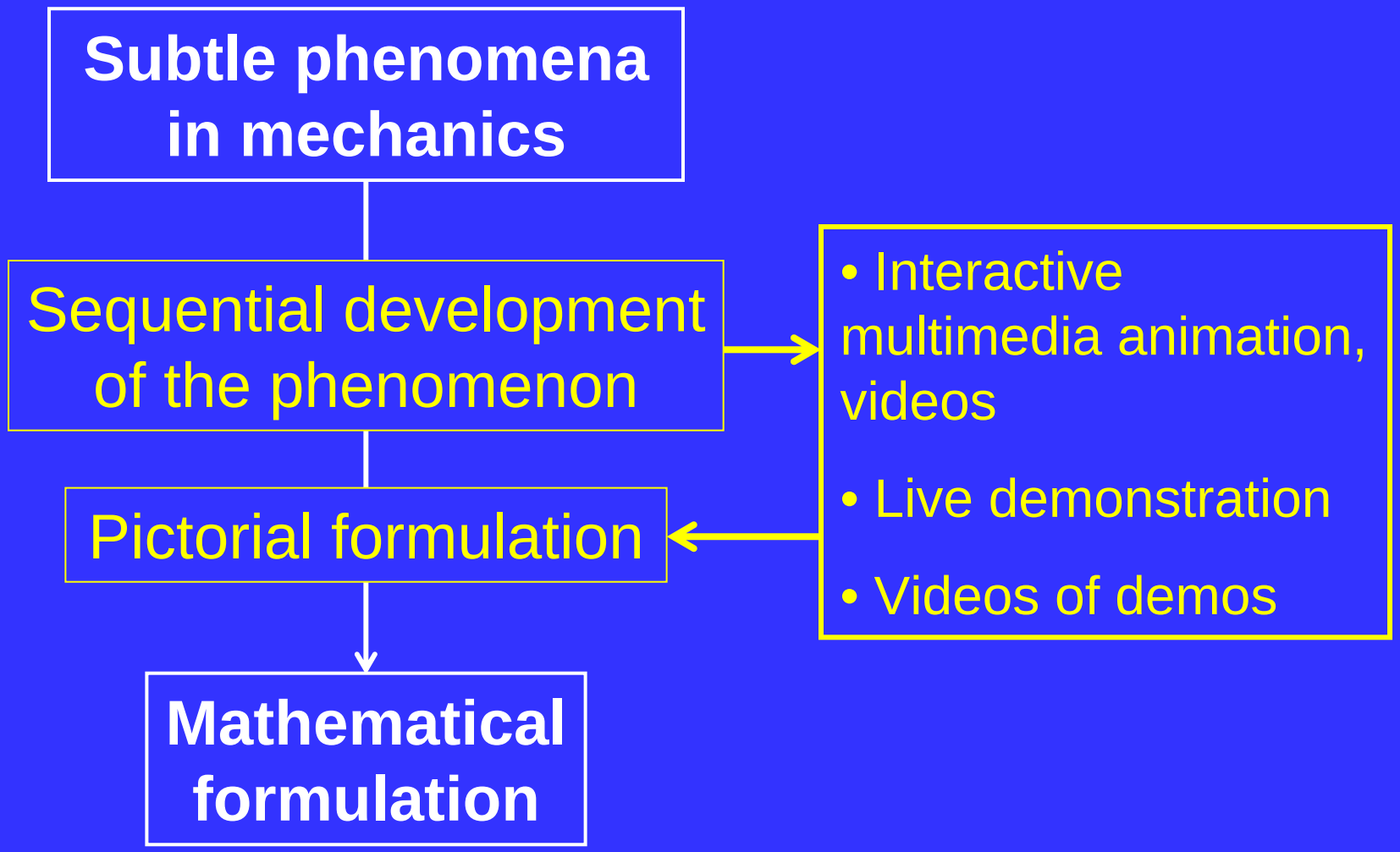
Phys 011 General Physics I – Mechanics and waves

Preparatory year engineering and science students from mainland China and other countries. They are

- **highly motivated**
- **high achievers**

Course web:
http://teaching.phys.ust.hk/phys011/





- Simplification
- Idealization
- Approximation
- Pictorial representation
- Mathematical formulation
- Modeling
- Numerical results

Transferable skills, in addition to Newton's laws of motion in mechanics

To change the mode of study from passive to active learning

- **Active learning : student-centered**
- **Passive learning: teacher-centered**

Basic active learning: reading the text before lecture

Facilitated with pre-lecture on-line quizzes (20% of course grade)

Help the students to visualize what has happened with

- **interactive multimedia animation, videos**
  - **from publisher**
  - **from internet**
- **live demonstration***
- **videos of the demonstrations***

***Supported with a grant from CELT, HKUST**

Live demonstrations

- Lecture theatres in HKUST are not equipped to support live demonstration, demonstrations shown on Wednesdays
- 50 demonstrations in 13 weeks, almost 4/week
- 26 of the 50 demonstrations video-taped
- 8 of the 26 videos are interactive

Acknowledgement

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Collaborators

- Mr. S.K. Lau
- Mr. David K.S. Mak
- Mr. Ray Y.H. Lai
- Ms Jenny Chan
- Prof. T.K. Ng

What the instructor says or implies and what the students interprets or infers as having been said or implied are not the same.

There are often significant differences between what the instructor thinks the students have learned in a physics course and what the students may have actually learned.

L.C. McDermott, “What we teach and what is learned – closing the gap”,
Am. J. Phys. 59, 301 (1991)

Teaching by telling is an ineffective mode of instruction for most students… They must be intellectually active to develop a functional understanding.

L.C. McDermott, “How we teach and how students learn – a mismatch?”, *Am. J. Phys.* 61, 295 (1993)