

"3+3+4" Symposium on General Education

Teaching of Science in GE

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Acknowledgement

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Outline

- **Introduction**
- **Findings on instructors' and students' views**
- **Recommendations**
- **Experience Sharing**

The Core Courses

Arts and Humanities	9 credits
Social Analysis	9 credits
Science and Technology	6 credits
Quantitative Reasoning*	3 credits
English Communication*	6 credits
Chinese Communication*	3 credits
Total credits	36 credits

* Must be taken in Year 1

** To be determined

Development of Science General Education

- **A spectrum of general education courses have been developed under the School of Science over the past years**
 - 2007/08 Fall: 7 courses, about 1,060 students
 - 2007/08 Spring: 9 courses, about 860 students

- **More general education courses may be required for the 334 educational reform**

General Education Courses under School of Science

- **2007-08 Fall (7 courses, about 1,060 students)**
 - BISC 002 Biology of Human Health (259)
 - BISC 003 Environmental Science (408)
 - BISC 103 Nature of Biochemistry and
Biotechnology (40)
 - CHEM 001 Introductory Chemistry (78)
 - MATH 106 Multivariable Calculus and Basic
Probability (77)
 - PHYS 002 Introduction to Astrophysics and
Astronomy (132)
 - PHYS 006 Energy and Related Environmental
Issues (62)

General Education Courses under School of Science

- **2007-08 Spring (9 courses, about 860 students)**
 - BISC 001 Appreciation of Biological Sciences (78)
 - BISC 006 Environmental Conservation and Public Health in Hong Kong (192)
 - CHEM 100 General Chemistry (63)
 - MATH 106 Multivariable Calculus and Basic Probability (161)
 - MATH 161 Mathematics in Civilization (29)
 - PHYS 002 Introduction to Astrophysics and Astronomy (103)
 - PHYS 006 Energy and Related Environmental Issues (133)
 - PHYS 007 Physical Phenomena in Everyday Life (44)
 - SCIE 003A Gastronomy (60)

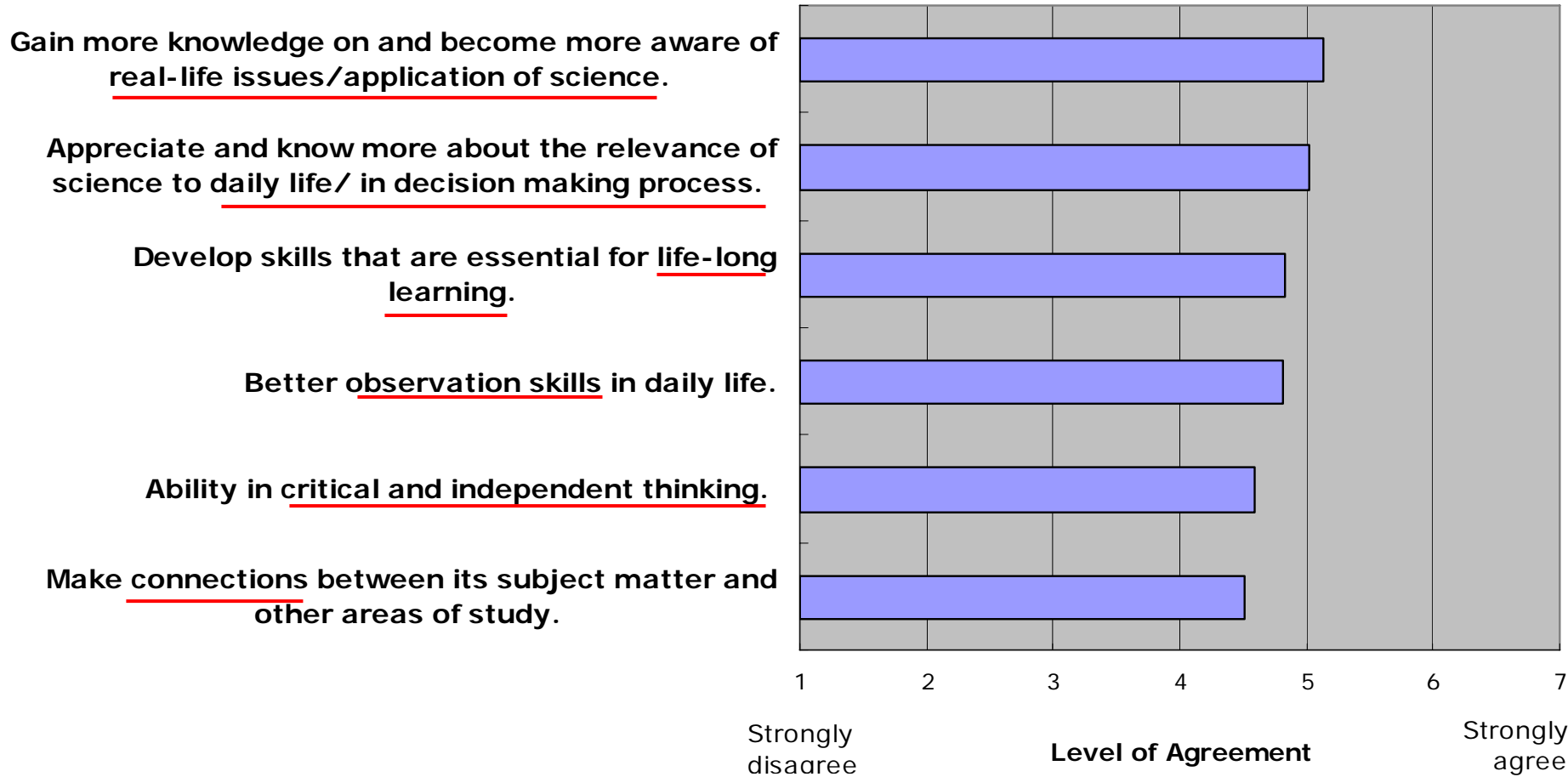
Student Survey (Fall 07-Spring 08)

Objective: To collect students' opinions for the **improvement** and **overall planning** of general education courses under the School of Science.

Findings of Pre-study Questionnaire

Pre-Study Questionnaire – Findings (1)

Students' Expectations from Science General Education (Pre-study)



■ Pre-study: 07/08 Fall (N=384-385) & Spring (N=196-198)

Pre-Study Questionnaire – Findings (1) (Cont'd)

The most important expectations from Science general education:

- Gaining knowledge on and becoming more aware of **real-life issues/application of science**
- **Relating science to daily life/in decision making process**
- Developing skills for **life-long learning**
- Achieving better **observation skills**

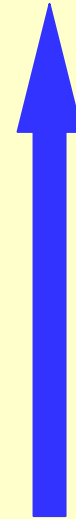


Increase in
expectation

Pre-Study Questionnaire – Findings (2)

Students' preference among various interactive teaching methodologies:

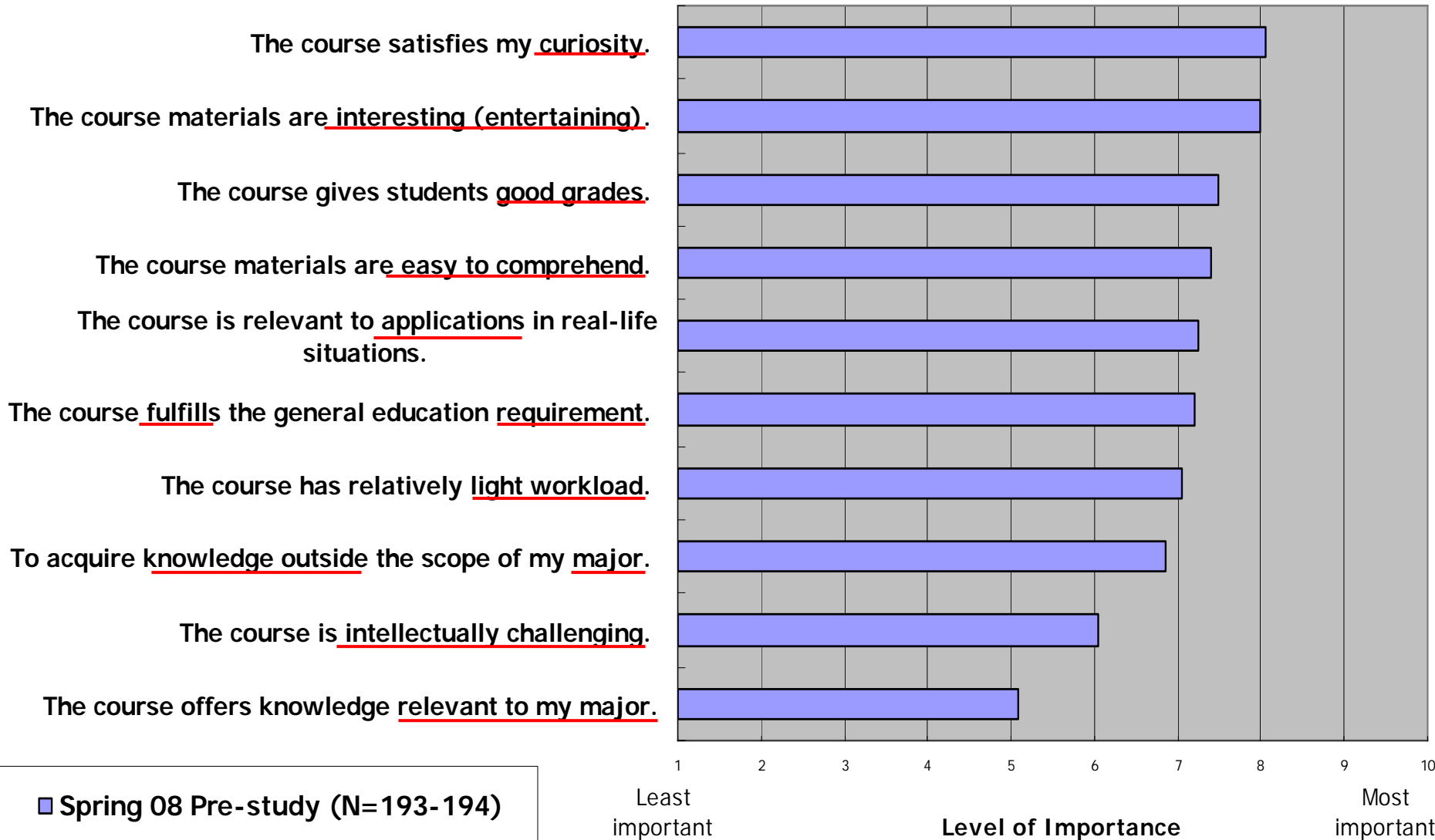
1. Demonstrations
2. Experiments
3. Field visits
4. Discussions
5. Projects



More preferable

Pre-Study Questionnaire – Findings (3)

Key Criteria for Students to Select General Education Courses

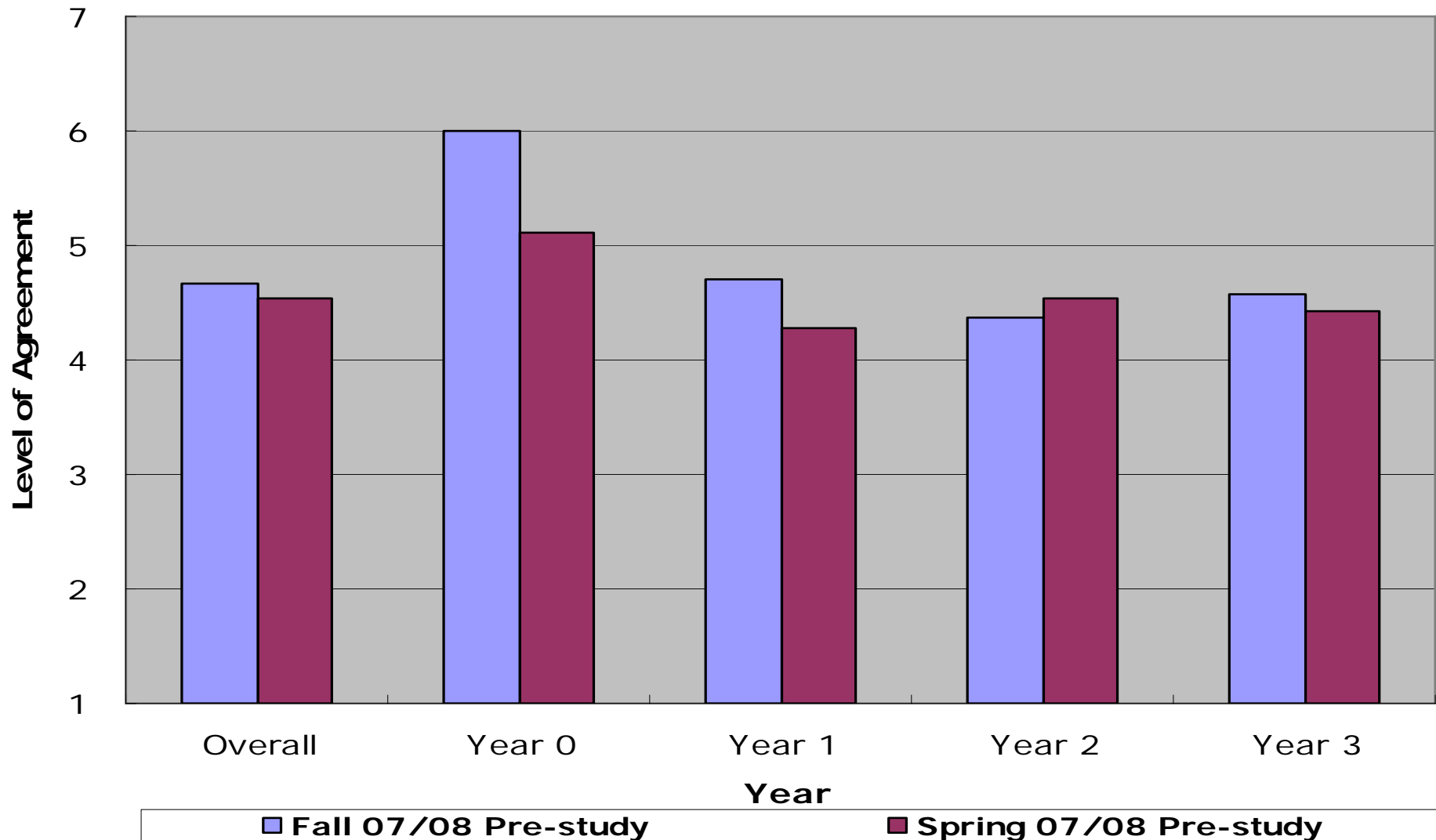


Pre-Study Questionnaire – Findings (4)

- **‘Year 0’ students had more enthusiasm, better learning attitudes, and higher expectations from Science general education. They had the highest expectation in all the studied aspects.**
- **There is a progressive increase of concern for good grades from Year 0 to Year 3.**

Pre-Study Questionnaire – Findings (4) (Cont'd)

Students' expectation on achieving an **enhanced ability in critical and independent thinking** from the courses.

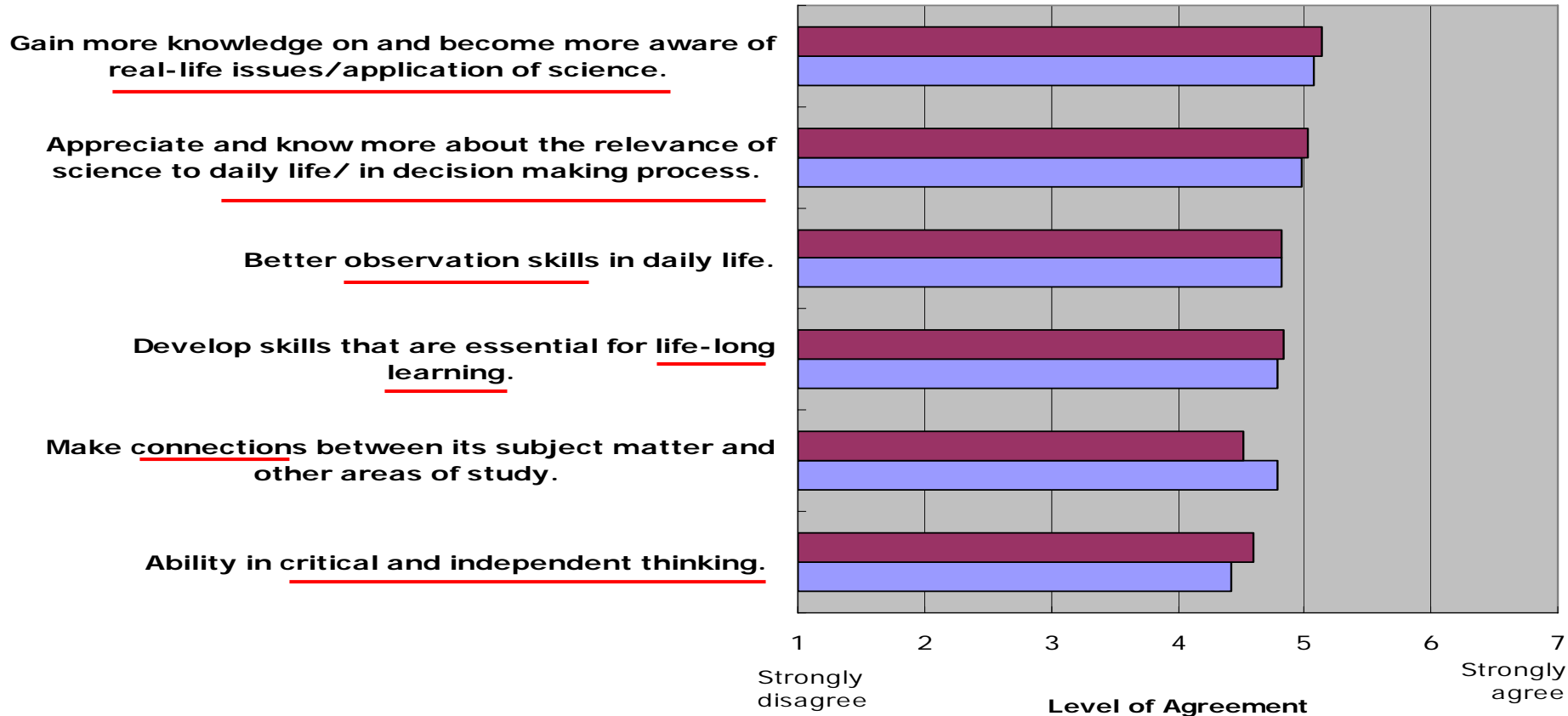


Findings of Post-study Questionnaire

Post-Study Questionnaire – Findings(1)

Students' **expectations (pre-study)** and their opinions on **how well the courses have met their expectations (post-study)** are in parallel:

Students' Expectations (pre-study) and their Opinions on how well the Courses have met their Expectations (post-study)



■ Pre-study: 07/08 Fall (N=384-385) & Spring (N=196-198)
■ Post-study: 07/08 Fall (N=266-267) & Spring (N=60)

Post-Study Questionnaire – Findings(2)

Students' **preference (pre-study)** and the **ranking of effectiveness (post-study)** of the following interactive teaching methodologies are the **same**:

1. Demonstrations
2. Experiments
3. Field visits
4. Discussions
5. Projects



**More preferred/
Increasingly effective**

Recommendations

Considerations of Students' Views (1)

- Their selection criteria:

That course materials are interesting (entertaining) and satisfy their curiosity remained the top criterion in students' selection of courses.

This is even more important than light workload and good grades.

- Emphases on life experience:

Students expected that they could be most benefited by gaining ability to relate science to daily life, becoming more aware of real-life issues, and applications of science

Considerations of Students' Views (2)

- The Role of Lively teaching methods

Demonstrations > Experiments > Field Visits > Discussions > Projects)

- Year effect

Year 0 students have the highest enthusiasm and expectation, better learning attitudes, and least concern for workload.

There is a progressive increase of concern for good grades from Year 0 to Year 3.

Considerations of Instructors' Views (1)

It is a myth that students welcome courses with only light workload and good grades.

Instructors' efforts to increase the interest of their courses should pay off.

However, instructors should balance between course content and elements of interest; this should be determined from the intended learning outcomes conceived in the design of the course.

Considerations of Instructors' Views

Instructors can make good use of the general observation that life experience is a good starting point of student learning.

On the other hand, instructors should have a balance between life experience and concepts and systematic expositions.

Some of the more conceptual and systematic objectives can be achieved outside lectures (e.g. projects).

**Development of the Gastronomy
Course:
Experience Sharing**

Hong Kong Students like eating and cooking!



Hong Kong Students like ice cream!



Sharing of our experience

Key factors:

Good preparation

- **Student helper**
(paid or coupled with an independent study)
- **Dedicated teaching assistant with relevant background**
- **Ourselves**

Resources

- **Time, at least nine months (free)**
- **Space for our development (and storage)**
- **Facilities (hardware)**
- **We pray & somebody prays for us (free)**
- **Funding (somebody pays, not free)**

Sharing of our experience

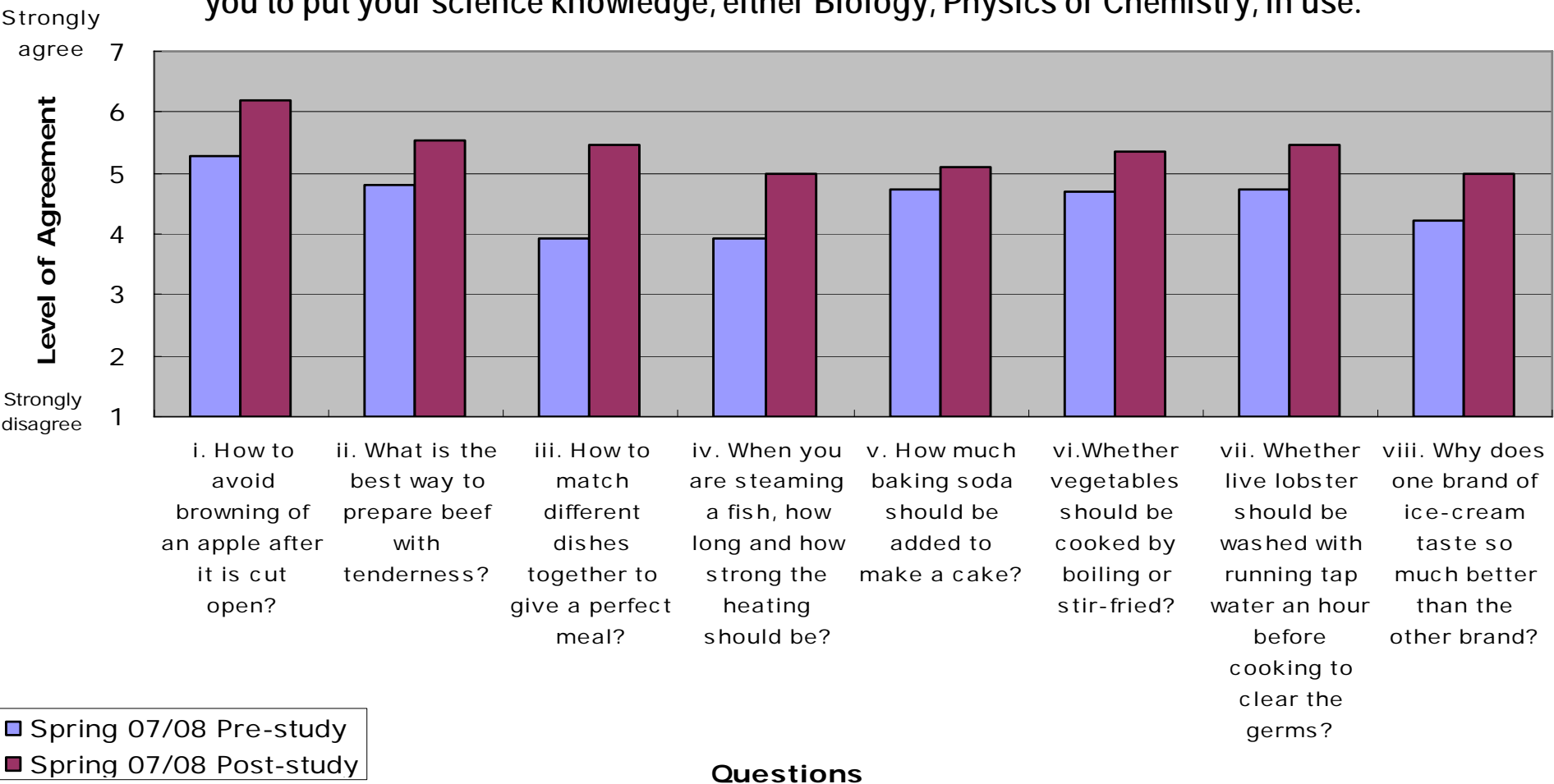
Key factors:

- **Test run, pilot test, its scale**
- **Gather feedback instantly and at the end of sessions**
- **Constantly modifying the course to fit the need**
- **It takes three to four rounds before you feel comfortable that you have found the right level of tuning. (we are just at round 2.)**

How students associate Science Knowledge after taking the course SCIE003A?

After taking SCIE003A Gastronomy, students became more aware of the scientific components in their daily experience.

Before and after taking the course SCIE003A, which of the following scenarios requires you to put your science knowledge, either Biology, Physics or Chemistry, in use.



The take home message is

Start early – 2012 is just around the corner!



The end
Thank you very much!