An Evaluation of Micro-modules Coupled Online Discussion in UGFN1000

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Deep and meaningful learning could be facilitated by the use of asynchronous, text-based collaborative communication.[+]

Micro-modules x UGFN1000

To supplement students basic science knowledge and the related historical and technical background, 160 video clips were produced.

Research Question and Methods

2017-18 Term 1 Students were asked to participate in discussion forum *after watching the micro-modules.*

2016-17 & 2017-18 Term 2 Students participated in the discussion forum *without any prerequisite.*

Which setting is more beneficial to students' learning?

Content analysis
Student responses in the discussion forum in 2017-18 were analysed based on two schemes: (1) ILOs attainment and (2) Cognitive achievement.

Survey
Students in 2017-18 Term 1 were invited to respond to a survey regarding their learning experience in using micro-modules. Results were compared to the survey data in 2016-17 Term 1.

Intended Learning Outcomes (ILOs)

Category of ILOs

ILO1	Textual comprehension and discussion
ILO2	Characteristics of humans' view on nature
ILO3	Societal implication of sicence
ILO4	Development of science
ILO5	Application and limitation of scientific method

Quality of ILOs Attainment

Based on students' reflections, elaborations and connections with course material, we graded each ILO they achieved by:

Poor Fair Good Very Good Excellent

Cognitive Achievement[+]

1. Triggering 🚀
- Recognizing the problem
- Sense of puzzlement

2. Exploration 🎈
- Divergence within online community or single message
- Leaps to conclusions

3. Integration ∫x
- Convergence among online community or within a single message
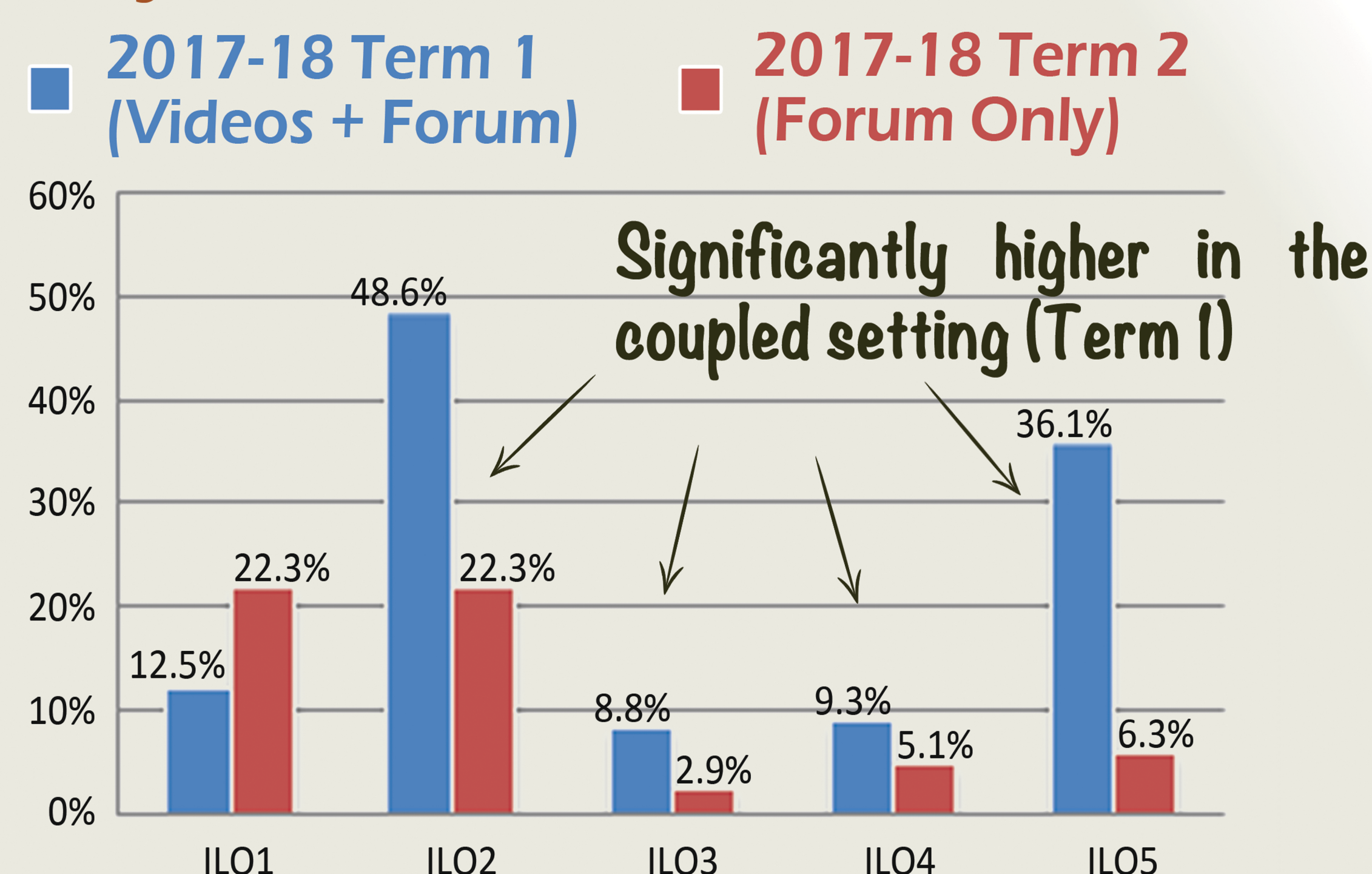- Connecting ideas

4. Solution 💡
- Application to the real world
- Testing solutions

Results

Content Analysis: ILOs

The percentage of students who attained the ILOs with quality of "Good" or above

■ 2017-18 Term 1 (Videos + Forum)   ■ 2017-18 Term 2 (Forum Only)

Significantly higher in the coupled setting (Term 1)

	ILO1	ILO2	ILO3	ILO4	ILO5
2017-18 Term 1	12.5%	48.6%	8.8%	9.3%	36.1%
2017-18 Term 2	22.3%	22.3%	2.9%	5.1%	6.3%

Content Analysis: Cognitive Achievement

The recorded final cognitive stage students (in percentage) attained

■ Exploration   ■ Integration

2017-18 Term 1: Integration 22.2%
2017-18 Term 2: Integration 16.6%

Slightly more students reached the integration stage in the coupled setting
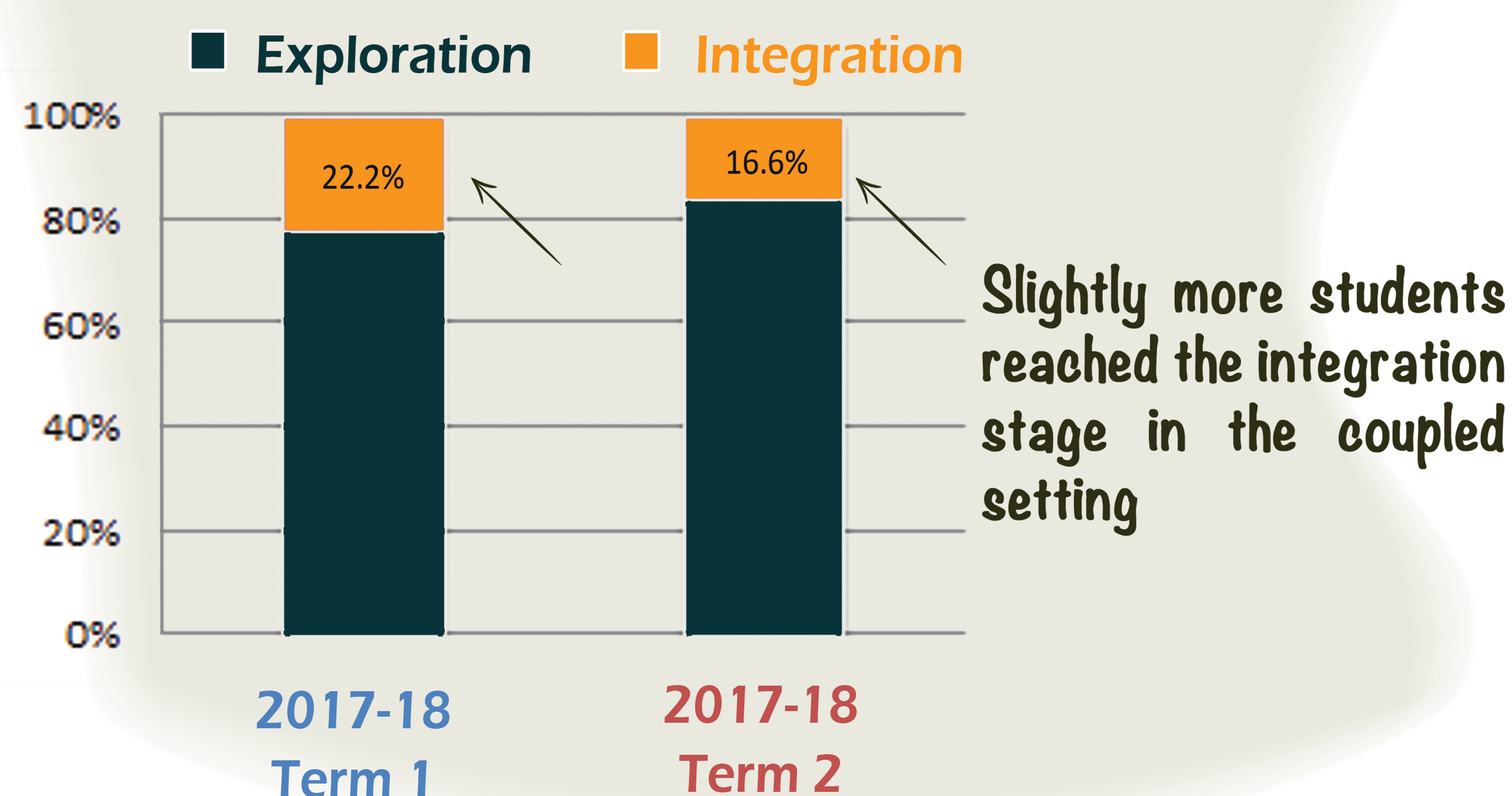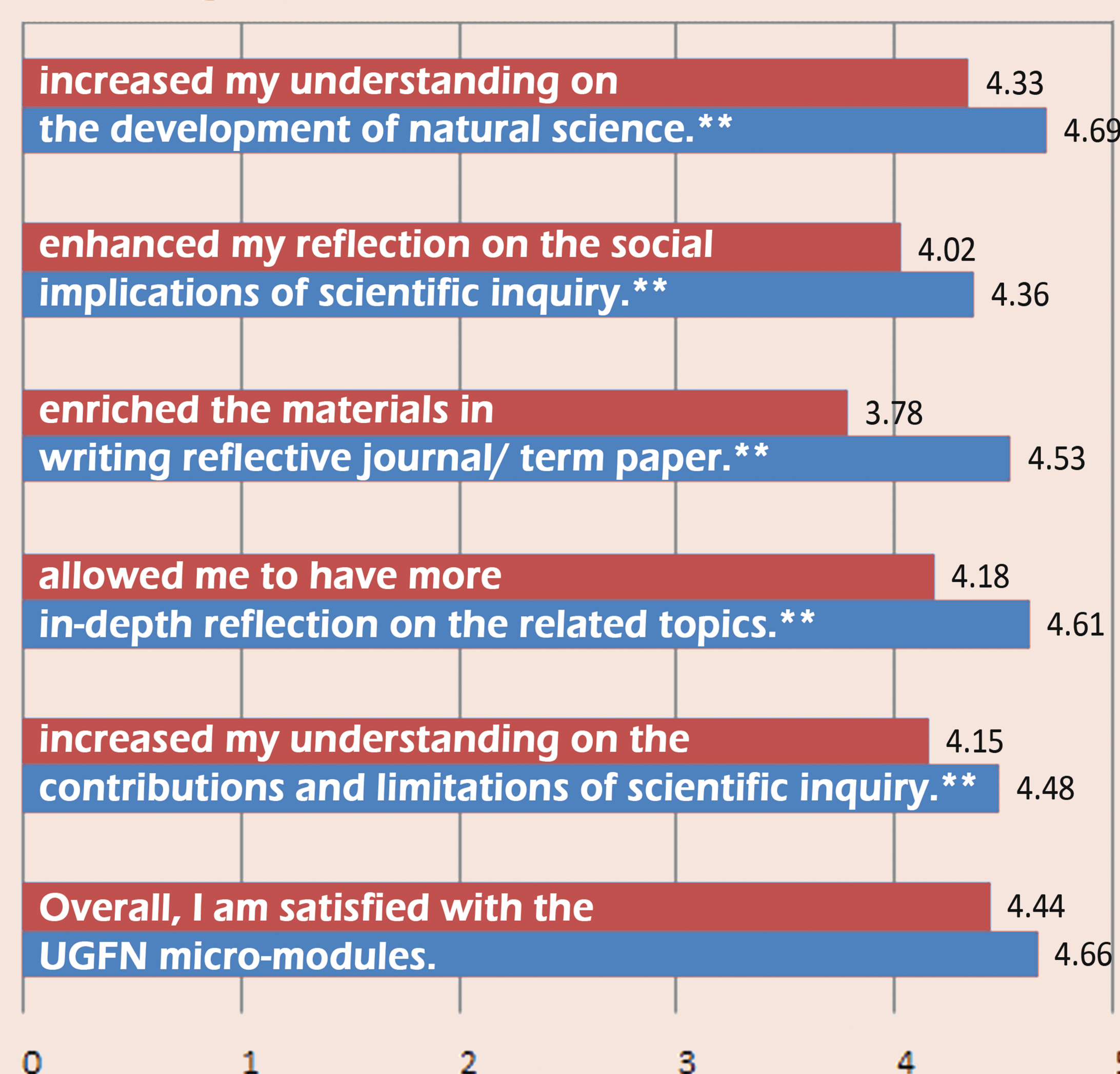
Survey

Online survey on students' perception on micro-modules

■ 2016-17 Term 1 (N=55) (Videos Only)   ■ 2017-18 Term 1 (N=87) (Videos + Forum)

Watching micro-modules

	2016-17 Term 1	2017-18 Term 1
increased my understanding on the development of natural science.**	4.33	4.69
enhanced my reflection on the social implications of scientific inquiry.**	4.02	4.36
enriched the materials in writing reflective journal/ term paper.**	3.78	4.53
allowed me to have more in-depth reflection on the related topics.**	4.18	4.61
increased my understanding on the contributions and limitations of scientific inquiry.**	4.15	4.48
Overall, I am satisfied with the UGFN micro-modules.	4.44	4.66

(** ratings that are significantly different between the terms in an independent t-test in 95% confidence level)

Recommendation

To help students perform better, in terms of ILOs and cognitive achievement, a micro-modules coupled discussion forum is a better approach.

+ Garrison, D. R., Anderson, T., and Archer, W. (2000) Critical inquiry in a text-based environment: Computer conferencing in higher education. The Internet and Higher Education, 2(2-3): 87-105.