



Abstract

Narrative Qualitative Analysis (NQA) was developed as the first objective (i.e. based on the teacher's evaluation) and qualitative (i.e. not on Likert scales) assessment tool for the General Education Foundation (GEF) Programme from 2014 to 2017. NQA aims to evaluate and understand students' cognitive complexity by systematically analyzing students' writing assignments. A good understanding of the students' ability would help the teacher cultivate an appropriate learning environment and design suitable learning activities. In NQA, the development of cognitive complexity is divided into four key steps. Correspondingly, there are five thinking performance patterns. In this poster, we will present the two main results from our pilot study. Firstly, by comparing the NQA result from teachers' evaluation with students' self-evaluation of their thinking performance patterns, it is discovered that students generally overrate their cognitive complexity. Secondly, through a systematic NQA study on students' writing assignments, it is found that most students are clustered in the lowest two levels of thinking performance patterns. Furthermore, the study also highlights some common characteristics of students' thinking, which may provide clues for teaching improvement.

Background:

GEF Courses and the NQA Project

- The two GEF courses, *In Dialogue with Humanity* and *In Dialogue with Nature*, two compulsory general education courses for all CUHK undergraduates, are reading and writing intensive. Students are required to read assigned classics and participate tutorial discussions on weekly basis; then they need to integrate their understanding and interpretation to address some enduring open-ended questions in writing assignments. With such course designs, the GEF programme aims to promote students' academic preparedness and confidence in cognitive capabilities, including reading, writing, communication and critical skills.
- To evaluate and improve the teaching, a research through Narrative Qualitative Analysis (NQA) was carried out from 2014 to 2017 in the GEF programme. This NQA project was developed from the Wolcott-Lynch Model, and the main findings were published in the final report. The current poster will report some preliminary results based on an extended study of the NQA project.
- The uniqueness of NQA study is that it enables an objective and qualitative evaluation of students' cognitive capabilities, providing a valuable supplement to the widely-adopted course teaching evaluation (CTE), which is mainly quantitative and based on students' self-reflection. The NQA project focused on evaluating students' cognitive complexity, containing essential skills aimed by the GEF programme as well as University education.

Methodology:

Student Self-evaluation plus Teacher's Evaluation

Student Self-evaluation

Term Start:

At the beginning of the term, the course teacher introduces the Wolcott-Lynch model, and the students are invited to self-evaluate their overall thinking performance patterns voluntarily based on the criteria provided by the model.

Teacher's Evaluation

Term Middle: Reflective Journal Evaluation

After collecting students' reflective journals, the course teacher analyzes each student's individual thinking performance pattern as demonstrated in the writing.

Term End: Term Paper Evaluation

After students submit their final term papers, the course teacher will again apply the Wolcott-Lynch model to analyze students' thinking performance patterns individually.

For each writing assignment, the course teacher needs to:

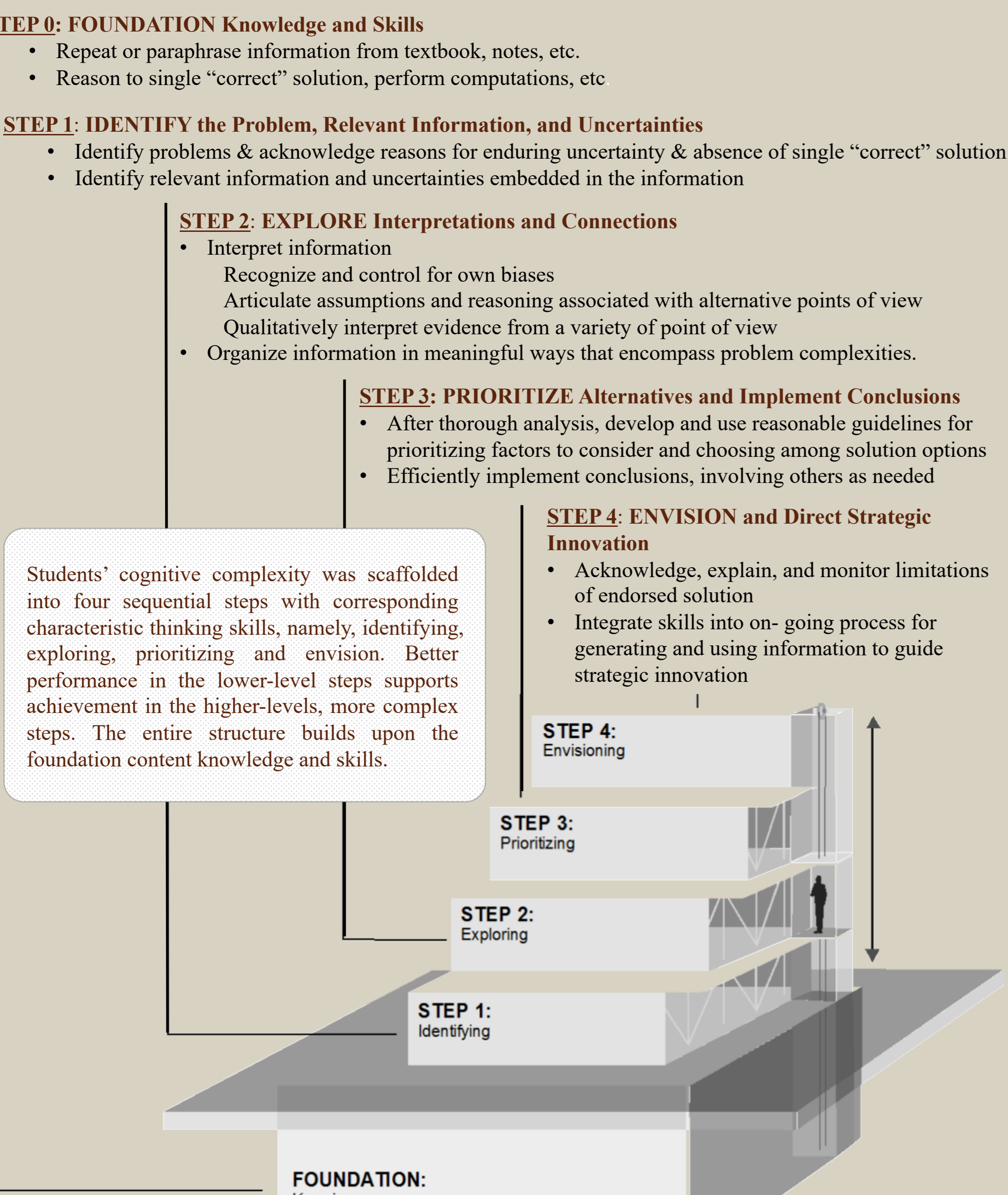
- evaluate the student's overall thinking performance pattern based on his/her writing;
- highlight individual weakness and improvements as demonstrated in the writing;
- write free comments when necessary

Data were collected from an *In Dialogue with Nature* class in 2016-2017 Term 1. 75 students joined the voluntary self-evaluation, and 95 students were evaluated twice by the course teacher in the middle and the end of the term. All data are put together for further analysis.

Theoretical Tools:

Wolcott-Lynch Model & Thinking Performance Patterns

Wolcott-Lynch Conceptual Model



In real situations, when addressing an open-ended problem, students often employ all thinking steps simultaneously. Given the self-scaffolding nature of the model, unsatisfactory performance in lower-level thinking steps often affects the performance in the higher-level thinking steps. Consequently, we can classify students into five thinking performance patterns.

Wolcott-Lynch Thinking Performance Patterns

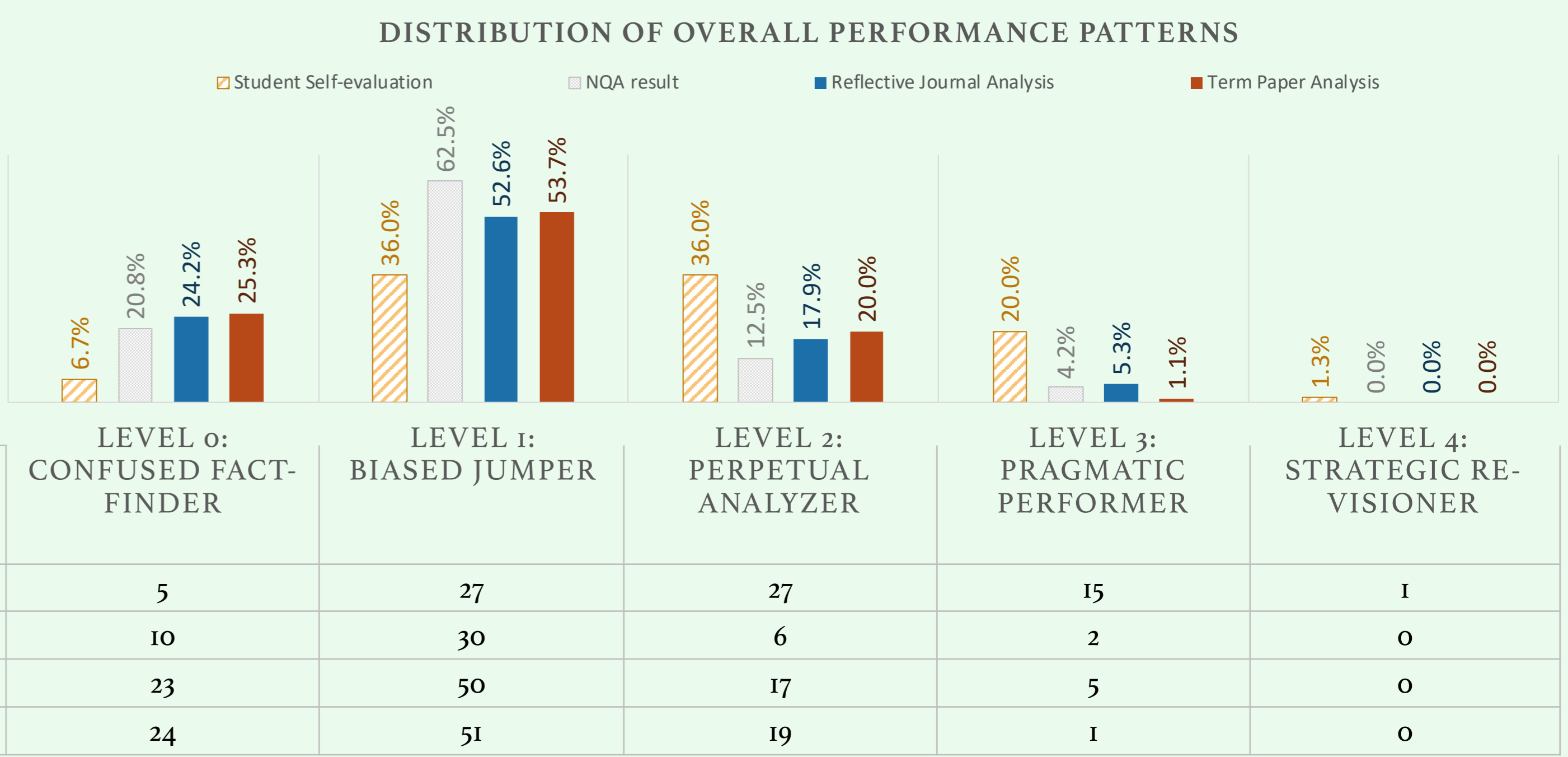
Less Complex Performance Patterns	More Complex Performance Patterns
"Confused Fact-Finder" Performance Pattern 1 Step 1, 2, 3, & 4 skills weak	"Strategic Re-Visioner" Performance Pattern 4 Step 1, 2, 3, & 4 skills strong
"Biased Jumper" Performance Pattern 2 Step 1, 2, 3, & 4 skills weak	"Perpetual Analyzer" Performance Pattern 3 Step 1, 2, 3, & 4 skills weak
"Perpetual Analyzer" Performance Pattern 3 Step 1, 2, 3, & 4 skills weak	"Pragmatic Performer" Performance Pattern 4 Step 1, 2, 3, & 4 skills strong

The mean value of student self-evaluation (1.73) is almost one level higher than that of the teacher's evaluation based on the NQA study, which suggests that students tend to overrate their thinking performance patterns.

NQA analyses consistently reveal that about 80% of students belong to the lowest two thinking performance patterns. The result is also comparable to the original Wolcott-Lynch study on students in US universities.

	Mean Value	Total No. of Students
Student Self-evaluation	1.73	75
NQA Project	1.0	48
Reflective Journal Analysis	1.04	95
Term Paper Analysis	0.97	95

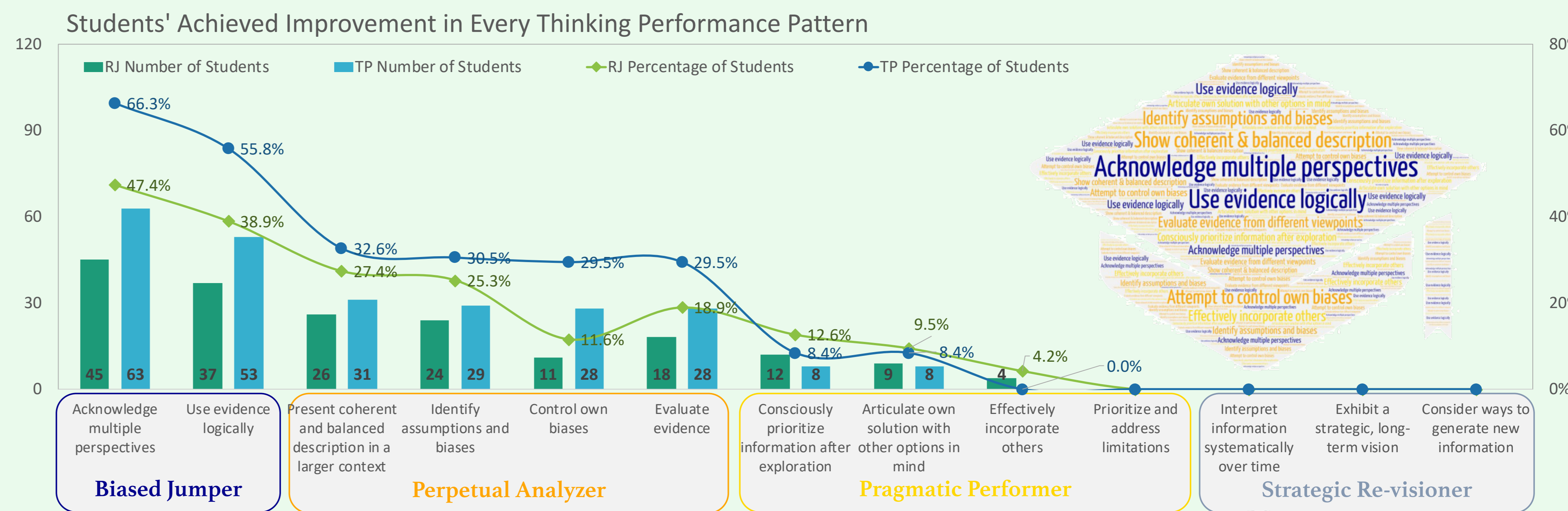
Overall Thinking Performance Patterns



There observes NO statistical difference on the distributions of overall performance patterns between the Reflective Journal analysis and Term Paper analysis. This result is consistent with the Wolcott-Lynch statement that a level-improvement on average requires 2 to 3 years of practice. Comparison between the Reflective Journal and Term Paper analyses for individual students confirms the same result.

Other than overall patterns, we also investigated individual components in every thinking performance pattern, which reveal more detailed descriptions of the cognitive complexity of our students. The discovered patterns will help the teacher to design classroom activities and assessment within the zone of proximal development (ZPD) on the cognitive capability of students, which can improve the effectiveness of the teaching as well as students' learning experience.

Preliminary Results: Patterns of Individual Thinking Performance Components



Students' Weakness in Every Thinking Performance Pattern

