Staff and student perceptions of NZQA level expectations

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ABSTRACT
In this cross-sectional study, we surveyed 89 students from four courses to elicit their expectations of the nature of the skills and knowledge, and the degree of self-management and collaboration, which was required for their courses. We compared their responses to the expectations set out in the New Zealand Qualifications Framework. We also sampled a small number (6) of lecturers and compared their expectations to those of students and the framework. We found significant differences between student and framework expectations, with student expectations noticeably lower than the framework. Moreover, student expectations remained at a low level, even in higher level courses, and the gap was wider at the higher levels. We also found significant differences between student and lecturer expectations. Lecturer expectations were broadly between those of students and the framework, which suggests that lecturer expectations are a compromise between both of these. Any misalignment of expectations poses a challenge for educators. We suggest practical measures for aligning these expectations.

Categories and Subject Descriptors
K.3.2 [Computer and Information Science Education]

General Terms
Human Factors

Keywords
Student expectations, lecturer expectations, accreditation expectations.

1. INTRODUCTION
The premise underpinning this study is that learning happens best when there is a close alignment between the expectations of students, educators and other stakeholders. In New Zealand, accreditation of University courses is overseen by the Academic Quality Agency (AQA). Courses from all other providers come under the auspices of the New Zealand Qualifications Authority (NZQA) Zealand [15]. The NZQA publishes the New Zealand Qualifications Framework (NZQF), which is a comprehensive list of all quality assured qualifications in New Zealand. Similar frameworks exist in Australia [1] and the UK [21].

The New Zealand framework is organized into ten levels. Broadly speaking, levels one to three map to school years. For example, New Zealand's National Certificates of Educational Achievement (NCEA) are national qualifications for senior secondary school students at levels one to three. Levels four to ten typically relate to post-secondary qualifications. Levels four to six are usually certificates and diplomas, although it is also possible to have these at all levels from one to eight. Undergraduate degrees are at level seven. Post-graduate certificates and diplomas are at level eight, master's degrees are at level nine, and doctoral degrees are at level ten.

For each of the levels, the framework sets out clear expectations of the nature of skills, knowledge, student self-management, and how a student should interact with others. Given the central role of the framework in accreditation, one might expect to find a close alignment between the expectations of NZQA, and those of educators and students. However, we had reason to believe some differences might be found. For example, Nunn and colleagues investigated student perceptions of desirable graduate characteristics [16] and found considerable differences from academic and employer perceptions. Consequently, it seemed reasonable to expect that we too might find some differences.

Any misalignment poses a challenge for educators. With the on-going consumerisation of education, students are seen more and more as consumers of a service [14] – as *customers*. Somehow, educators need to achieve the stated educational goals while also meeting student expectations. This study aims to answer the underlying question: *How closely aligned are the expectations of students, lecturers and the NZQA*?

The remainder of this paper is organized as follows. Section two discusses related work in the literature. Section three describes our approach to the study and methodology. Section four presents our findings. Section five discusses the implications of the findings for teaching. Finally section six discusses the limitations of the approach and identifies areas where further work is required.

2. RELATED WORK
In the literature, a number of researchers have used external frameworks to analyse courses. In computing, several researchers have investigated the mapping of courses to Bloom's taxonomy [3]. Bloom's taxonomy is widely used in educational contexts to give an approximate indication of the cognitive depth needed for a task. Sanders and Mueller argued [19] that courses in the early stages of a degree should be targeted at the lower Bloom's levels, whereas later courses should be targeted at the higher levels. Lister used the taxonomy to formulate course objectives for a sequence of programming courses [9]. Howard and colleagues carried out a lesson-by-lesson analysis of depth in a CS2 course [7]. Oliver and colleagues carried out a lecturer evaluation [17] of the cognitive difficulty of a number of computing courses. Most of this work is grounded in the programming area and underpinning most of this work is the assumption that in teaching programming "we have traditionally focused on the higher levels of the taxonomy and ignored the lower levels" [10].

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Another widely used framework is the SOLO taxonomy [2]. In particular, SOLO has been used to map the cognitive complexity in programming. For example, Brabrand and Dahl [4,5] used SOLO to analyse over 5000 intended learning outcomes, comparing those in in Computer Science to those in Mathematics and natural science. Thompson [22] used SOLO to develop assessment criteria for programming assignments. Sheard and colleagues [20] used SOLO to explore the programming knowledge of novices. Lister and associates [11] used SOLO to describe differences in the way students and educators solve small code reading exercises. Whalley and colleagues [24] used SOLO and Bloom's taxonomies to develop a question set for novice programmers. There are other less widely used taxonomies. For example, Fuller and associates carried out a literature review of the use of Bloom's and SOLO taxonomies and proposed a two-dimensional *matrix taxonomy* [6].

Both SOLO and Bloom's taxonomies have been widely used as a conceptual framework to analyse cognitive complexity in computer science. However, all of the studies cited represent an educator's perspective, rather than that of a student.

To elicit a student perspective, we have to turn to the general tertiary education literature. However, research on student expectations is still sparse within this literature. Lowden and colleagues [12] investigated employer perceptions of the employability of new graduates and Weligamage and Sienthai [23] compared student and employer perceptions. Round [18] investigated broad student expectations of University in the context of understanding and enhancing student retention.

Other than these few examples, we found that, overall, student and lecturer expectations of course levels remain underexplored in the tertiary education literature. The framework descriptors seem to be used for communication between providers and the accreditation authority rather than with students. Indeed Kemmis and associates note:

> Student expectations and the broader set of expectations that flavour VET and HE are often quite different and are often implicitly embedded in subjects and courses. The process of making these differences explicit is left to the student making the transition. [8]

We believe that it is important that expectations are shared between students and educators, and not just be left to the student. Our study aims to identify the extent to which student and lecturer expectations are aligned to each other and the level descriptors.

3. METHOD

In this cross sectional study, we used an anonymous questionnaire to survey lecturers and students. Lecturers were supplied with participant information sheets and paper questionnaires and were invited by email to participate. Students were recruited in selected classes (convenience) sample with permission of the lecturers of those classes. They also were supplied with participant information sheets and paper questionnaires. Participation in both cases was voluntary.

3.1 Instrument

We used a custom questionnaire for the survey. In the questionnaire, we used four questions to investigate characteristics of the levels relating to self-management, working in groups, skills and knowledge. We took the wording for the questions from the level descriptors in the NZQA accreditation document [15]. To align our questions with the wording used in the NZQA document, we prefaced each student question with the stem: *In this course, it is reasonable to expect that a student will …* For the lecturer questions, we asked lecturers to answer the question for a number of programmes and levels and used the stem: *For a course in this program/level, it is reasonable to expect a student to*: …

We then presented the participant with a list of the exact wording used to characterise the levels in the NZQA document and asked the participants to indicate which they felt was closest.

As an example, Question2 in the student questionnaire is shown in Figure 1:

For this course, it is reasonable to expect that a student will:

- Not interact with others – students should work independently.
- Interact with others
- Collaborate with others
- Contribute to group performance and adapt own behaviour when interacting with others
- … and so on

Figure 1: Question 2 in Student questionnaire

Note that, for completeness, we added the first of these options (not interact with others) as a notional level zero. The framework starts with level 1 (interact with others).

3.2 Sample

The questionnaire was administered to 89 students and six lecturers. All lecturers in the authors' department were invited to participate. Of 32 possible lecturers, six (19%) chose to participate. The student sample was a convenience sample in which students in four courses were invited to participate. Of 107 possible students, 89 (83%) chose to participate. The sample characteristics are shown in Table 1.

Table 1: Sample characteristics

Level	N	Response rate
4	22	96%
6	52	78%
7	15	88%
All students	89	83%
All lecturers	6	19%

Because of the low number of lecturer participants, it is unlikely that the views captured are fully representative of the department. Nevertheless, we were pleasantly surprised that, despite the low numbers, effect sizes were large enough that statistically significant results were found in many cases.

3.3 Analysis

For descriptive statistics, we use the mode and mean. For statistical inference, we were interested in the question: *how likely are these data if we are sampling randomly from a population with a mean of the expected NZQF level?* Thus, our data are slightly unusual inasmuch as the population mean is known a-priori. The variance however is still estimated from the sample. To accommodate this, when comparing to the framework levels, we base inference on the standard error of the mean (SEM) and use a z-test for inference rather than the popular t-test. We used t-

tests to compare student and lecturer expectations since the means of both of these were estimated from the sample.

4. RESULTS

Expectations are clearly defined by the qualifications framework. Consequently, one might expect the expectations of students and lecturers to be closely aligned with the framework and, thus, that the expected level description from the framework would be chosen in most cases. However, this was not the case. We begin this section with student expectations and then present lecturer expectations. Table 2 shows, by level and question, the proportion of students who chose the expected level according to the framework.

Table 2: Proportion choosing the expected NQF level

Level	Q1	Q2	Q3	Q4	Overall
4	41%	5%	9%	9%	16%
6	2%	0%	8%	21%	8%
7	0%	7%	7%	13%	7%
Overall	11%	2%	8%	17%	10%

As can be seen, only 10% of the overall student choices were at the expected level, and a strong preference for the expected level is only visible for question one among the level four cohort of students. The most prevalent choices made (i.e. the mode) are shown in Table 3.

Table 3: Modal level chosen

Level	Q1	Q2	Q3	Q4
4	4	2	1	3
6	3	3	3	4
7	4	2	3	5

However, none of these modal choices represented the majority of students in the cohort. The implications for teaching of the lack of dominant modal expectations are discussed in section 5.

To give a view of the progression of students' level expectations as they continue with their study, we present the mean expectation level across all questions (Table 4).

Table 4: Mean expectation by level across all questions

Level	Mean	Std. Err.	Sig.
4	3.4	0.20	.001
6	3.7	0.09	<.001
7	3.5	0.20	<.001
Combined	3.6	0.12	< .001

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

As can be seen, students' expectations were significantly below NZQA expectations at all levels sampled. Moreover, the mean expectation of each higher level cohort was also significantly below level 4 and there was no significant increase in expectations at the higher levels. Although the means of the level six and seven cohorts were slightly higher than the level four cohort, the difference was within the range expected from sampling variation. Overall, the mean expectation was 3.6. Thus, the mean expectations of these students can be characterised as between level three and level four, regardless of the level of the courses studied.

The overall findings for lecturers are presented in Table 5. All lecturer expectations were also significantly below those of the NZQF at all levels. However, there is a clear increasing trend and the gap between lecturer and NZQF expectations narrows at the higher levels.

Table 5: Mean Lecturer Expectation by Level

Level	Mean	Std. Err.	Sig
4	2.5	0.48	.002
5	3.5	0.39	<.001
6	4.5	0.46	.001
7	6.3	0.31	.028
8	7.3	0.32	.020

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

The next four sections present an analysis of the responses to the individual questions.

4.1 Question 1: Self-management

This question asked about the degree of self-management that a student could be expected to show. Table 6 shows the mean level of student expectation by cohort.

Table 6: Mean student expectations of self-management

Level	Mean	Std. Err	Sig
4	3.6	0.31	n.s.
6	3.2	0.14	< .001
7	3.1	0.31	.002

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

As can be seen, the mean expectation at level four is consistent with the framework expectation. However, expectations at levels six and seven are not only below those of the framework, but are also significantly below level four expectations. Moreover, there is an apparent fall in student expectations as they progress through the levels with their study. Overall, the mean student expectation can be characterised as between level three (requiring major responsibility for own learning and performance) and level four (self-management of learning and performance under broad guidance).

Lecturer expectations of self-management are shown in Table 7.

Table 7: Mean lecturer expectations of self-management

Level	Mean	Std. Err	Sig
4	2.0	0.58	< .001
5	3.1	0.43	< .001
6	4.3	0.37	< .001
7	5.3	0.24	< .001
8	6.0	1.0	.046

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with mean of the expected level.

From this table, it can be seen that lecturer expectations are significantly below the NZQF framework expectations at all levels. However, there is a clear increasing pattern of expectations and the data suggest that lecturer expectations are lower than those of students at level four, but higher at levels six and seven.

Individual t-tests confirm these differences between student and lecturer expectations. At level four, the mean lecturers' expectation of 2.0 is significantly lower than the student expectation of 3.6 (p=.041). At level six, the mean lecturers' expectation of 4.3 is significantly higher than the mean of 3.2 for students (p=.022). At level seven, the mean lecturer expectation of 5.3 was significantly higher than the mean of 3.1 for students (p=.003).

4.2 Question 2: Collaboration

This question related to the degree to which a student could be expected to collaborate with others. Table 8 shows the mean level of student expectation of collaboration by cohort.

Table 8: Mean student expectations of collaboration

Level	Mean	Std. Err	Sig
4	3.1	0.38	.018
6	2.8	0.15	< .001
7	2.6	0.39	< .001

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

As can be seen, the mean expectation at all levels is significantly below the framework expectation. Moreover, expectations at levels six and seven are not only below those of the framework, but are also significantly below level four expectations. There is a clear falling pattern of expectations as students carry on with their study to higher levels. Overall, mean student expectations can be characterised as between level two (collaborate with others) and level three (contribute to group performance and adapt own behaviour when interacting with others). The expectation is significantly below level four (demonstrate some responsibility for the performance of others) at all levels, even at levels six and seven.

Lecturer expectations of collaboration are shown in Table 9.

Table 9: Mean lecturer expectations of collaboration

Level	Mean	Std. Err	Sig
4	2.7	0.49	.007
5	3.3	0.41	.001
6	4.0	0.46	<.001
7	5.0	0.58	.001
8	5.7	0.33	<.001

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

As can be seen, the mean expectation is significantly below the framework expectation at all levels. There is a clear rising pattern across the levels, although the low rate of increase means that the gap between lecturer and framework expectations increases at the higher levels.

There are also differences between student and lecturer expectations. At level four, the mean lecturer expectation is not significantly different from that of students. At level six, the mean lecturer expectation of 4.0 is significantly higher than the mean of 2.8 for students (p= 0.036). At level seven, the mean lecturer expectation of 5.0 is significantly higher than the mean of 2.6 for students (p=.032). Overall, the gap between student expectations and lecturer expectations increases at the higher levels.

4.3 Question 3: Knowledge

Question three asked about the nature of knowledge. Table 10 shows the mean expectations of students by level. It can be seen that mean student expectations are significantly below the framework at all levels.

Table 10: Student expectations of knowledge by level

Level	Mean	Std. Err	Sig
4	2.8	0.46	.008
6	3.8	0.28	<.001
7	3.7	0.58	<.001

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

Overall, the mean expectation can be characterised as between level 3 (some operational and theoretical knowledge in a field of work or study) and level 4 (broad operational and theoretical knowledge in a field of work or study). In particular, we note that both level six and level seven student samples had mean expectations well below the NQF expectation for level 6 (specialised technical or theoretical knowledge with depth in a field of work or study). Lecturer expectations of knowledge are shown in Table 11.

Table 11: Mean lecturer expectations of knowledge

Level	Mean	Std. Err	Sig
4	2.7	0.67	.046
5	4.1	0.46	n. s. (.050)
6	5.2	0.52	n. s. (.136)
7	4.8	1.88	n. s. (.250)
8	5.5	2.14	n. s. (.242)

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

As can be seen, the mean expectation is significantly below the framework expectation at levels four. It is also lower at the higher levels, but is within sampling error limits due to the large standard error associated with a small sample.

4.4 Question 4: Skills

The fourth question was about the nature of skills. Table 12 shows the mean student expectation by level.

Table 12: Mean student expectations of skills demonstrated

Level	Mean	Std. Err	Sig
4	3.9	0.46	n.s.
6	4.6	0.25	< .001
7	4.9	0.43	< .001

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

Overall, the mean expectation of the level four cohort was consistent with the NQF level (select and apply solutions to familiar and sometimes unfamiliar problems), but the mean expectation of the level six and seven cohorts was significantly lower than the framework. Although there is an increasing pattern, the gap between student expectations and the framework widens at the higher levels. The mean expectation of the level six and level seven cohorts was consistent with level five (select and apply a range of solutions to familiar and sometimes unfamiliar

problems). In particular, we note that, the mean expectations at levels six and seven were both significantly below the framework expectation at level six (analyse and generate solutions to familiar and unfamiliar problems).

Mean lecturer expectations of skills are shown in Table 13.

Table 13: Mean Lecturer Expectations of Skills

Level	Mean	Std. Err	Sig
4	1.9	0.49	<.001
5	3.7	0.42	.002
6	5.0	0.44	.023
7	4.5	1.75	n. s. (.154)
8	5.3	2.09	n. s. (.202)

Note: Sig is the probability of observing a mean this low in a random sample drawn from a population with the expected mean.

As can be seen, the mean expectation is significantly below the framework expectation at levels four to six. It is also lower at the higher levels, but is within sampling error limits due to the large standard error associated with a small sample.

4.5 Comparing Lecturers to Students

The results presented in the previous sections suggest that lecturer's expectations, although below the framework levels, rise more rapidly than students' expectations. To give a clearer picture of this, Figure 2 shows the overall mean expectations of students and lecturers, compared to the framework levels.

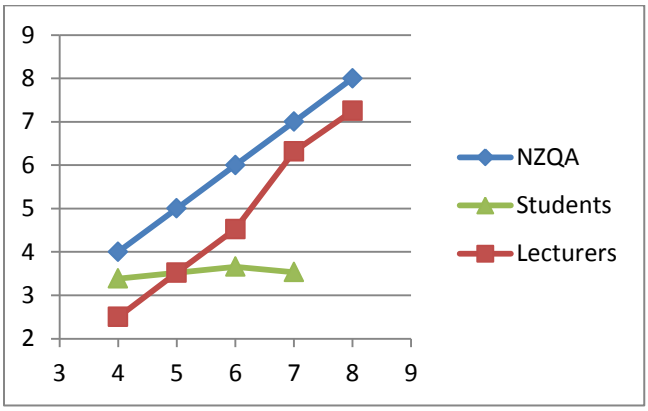

Figure 2: Comparison of Student and Lecturer Expectations

From this figure, it can be seen that overall student expectations remain relatively stable at between three and four across all cohorts. Conversely, lecturer expectations, although starting somewhat lower at 2.5, increase steadily across the levels, getting closer to, but not reaching, the framework expectations at the higher levels.

4.6 Comparing Degree to Diploma Courses

The framework expectations for any level do not vary across programmes. However, curiously, we found that lecturers' expectations of diploma courses were significantly lower than their expectations for degree courses of the same level. Table 14 shows lecturer expectation by programme and level.

Table 14: Lecturer expectations by programme/level

Level	Programme	Mean	Std. Err	CI-L	CI-H
5	Diploma	3.05	0.10	2.85	3.24
	Degree	3.78	0.06	3.66	3.90
6	Diploma	3.99	0.10	3.80	4.18
	Degree	5.03	0.05	4.92	5.14

Note: CI-L is the lower bound of a 95% confidence interval; CI-H is the corresponding upper bound.

In this table, the confidence intervals for the expectations in each programme in a level do not overlap and thus there is a clear difference in expectations by programme. On average, diploma courses were rated lower than degree courses by 0.89 of a level. In this dataset, we did not have the necessary data to determine whether this also held for students.

5. DISCUSSION

In this section, we discuss the implications of our findings for teaching. First, as shown in Table 2, very few students chose the category expected by the framework. Moreover, in no case did the modal category represent the majority of students (Table 3). This poses a challenge for lecturers because there is no simple solution to the problem of what level to target for student activities.

Second, we note that student expectations remain broadly stable between levels three and four across all cohorts. This suggests that students do not expect the nature of skills, knowledge, self-management and group work to change as they progress through the levels. To improve alignment, educators should consider carefully the nature of coursework and learning activities to ensure that these are closely aligned with the framework. It is especially important to consider feedback mechanisms such as assessment in this regard.

Third, we note (see Figure 1) that, apart from starting somewhat lower at level four, lecturer expectations progress steadily through the levels. Broadly, they are between framework and student expectations at the higher levels. This pattern can be readily understood in the context of extant feedback mechanisms to lecturers. In these days of the consumerisation of education [14], most institutions use student surveys to evaluate the quality of teaching. This feedback mechanism will tend to bias lecturer expectations towards those of the student cohort if this is away from the framework. Such feedback mechanisms are unlikely to change in the near future, so educators should consider fostering appropriate student-educator conversations to improve alignment.

Fourth, we note that the pattern of students' expectations for self-management is low at level four and falls progressively at the higher levels. At level seven, it was significantly below the framework objective at level four: "self-management of learning and performance under broad guidance". In this context, we note that the Ministry of Education states:

> Given the significant investment the Government makes in students both through tuition subsidies and student support, students are expected to take responsibility for their own performance. [13]

Changing student expectations of self-management is likely to require the whole teaching team to take a consistent approach and actively promote expectations of self-management and the associated benefits to students. Some practical measures could be wider use of self and peer assessment and involving students in

setting appropriate framework-related learning activities and assessment criteria.

Fifth, as with self-management, students' expectations of collaboration show a low and falling pattern across the levels with expectations of the level seven cohort below level three. It is interesting to note the objective at level four: "demonstrate some responsibility for the performance of others". From our own teaching experience, it seems likely that students reject the validity of this, even though employers place a high value on working effectively in a team. This suggests that one way of modifying these expectations would be to expose students more to the values articulated by employers.

Sixth, although there is some evidence of an increasing trend, students' expectations of the nature of knowledge are low and remain below level four, even for the students in the cohort at level seven. At level four, the expectation is: "broad operational and theoretical knowledge in a field of work or study". In contrast, the expectation at level seven is "specialised technical or theoretical knowledge with depth in one or more fields of work or study". From our own experience, we believe that students are too ready to carry out an internet search and copy and paste findings, considering this acceptable as knowledge. Activities that may be useful to effect change include requiring paraphrasing and summarising of material found, essay-type activities with compare and contrast, and embedding taxonomies such as SOLO [2] into assessment rubrics. However, changing students' expectations of the nature of knowledge will require a substantial "whole of team" approach.

Seventh, in contrast to the foregoing areas, students' expectations of skills demonstrated appropriate expectations at level four and an increasing pattern at higher levels. However, these expectations were still below the framework expectations. Remedying this would require greater use in course work of unfamiliar and complex problems, and some unpredictable problems.

Overall, we believe that a concerted "whole of team" approach should be taken to align student expectations, and thus indirectly lecturer expectations, with those articulated in the framework. One way of achieving this would be to include a perspective of framework levels into regular course reviews. Learning activities, and especially assessed activities, should be mapped to framework levels to ensure alignment. It will be important to carry this out progressively, starting from lower levels, so that a student is presented with a coherent evolution of expectations as they progress with their study through the levels.

6. CONCLUSION

This study aimed to investigate the alignment of the expectations of students, lecturers and the NZQA. We carried out a small scale survey using an anonymous questionnaire to determine these expectations. We have presented our findings above. We summarise these findings in section 6.1 and then discuss threats to validity in section 6.2 and discuss our plans for further work in section 6.3.

6.1 Main findings

Overall, we found that students' expectations were significantly below the expectations set out in the qualifications framework. Moreover, they did not increase significantly as students progressed with their study to higher levels. Lecturer expectations were also below framework expectations, but exhibited an increasing pattern across the levels. Since lecturer expectations are necessarily a compromise between framework and student expectations, we believe that addressing the misalignment between student and framework expectations will indirectly result in a better alignment of lecturer expectations to the framework.

6.2 Threats to Validity

Although the lecturer sample size is sufficient to indicate that in many cases, there is a systematic difference between lecturer expectations and that of the framework, the sample size is too small to be considered fully representative of lecturer views. Furthermore, the resulting confidence intervals are too large to give a good estimate of mean lecturer expectations.

The student sample size is adequate for our purposes, but there are still two related issues. First, the sample was a convenience sample, which raises concerns about generalisation of the findings. Second, our sample did not include any students from level five courses. Including these students in our sample would enable a clearer picture to emerge of how student expectations develop.

6.3 Further work

We plan to extend this study with further cohorts of students, including, in particular, students in level 5 courses. We will also carry out a more systematic sampling of students. We also aim to solicit additional lecturer expectations to help get a more representative sample of the lecturer perspective. If the findings suggested from this study are replicated, we would like to develop an action research framework to address the misalignment and monitor the effect of any initiatives.

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