

# Learning to Learn: Hidden Curricula in a First-term Computing Course

Kim Hagen-Hall

EIT Hawkes Bay

khagen-hall@eit.ac.nz

## Abstract

This paper describes a study that identifies the skills and background knowledge needed to complete a first year Ethics and Professionalism course, then investigates whether students had the required skills prior to the course and how much support they would have liked for each skill. The skills and knowledge areas were compared to the explicit curriculum and a substantial hidden curriculum was identified. This paper considers options for dealing with this hidden curriculum. The findings showed that students had a diverse range of skill and knowledge gaps, and desired diverse levels of support in these skills, making the provision of suitable support a challenge. Implications for similar first-year courses are discussed.

*Keywords:* Computing education, hidden curriculum, tertiary education.

## 1.1 Background

Students who are enrolled in the Diploma of Information and Communications Technology (DipICT) at EIT Hawkes Bay (EIT) take a course called Ethics and Professionalism (“Ethics”) in their first term. The Ethics course is about the ethical and professional standards expected of IT professionals and covers, among other things, legislation relevant to the IT profession and ethical issues. As such, it is one of the first theoretical courses students encounter in the DipICT. It may therefore be their first exposure to a theoretical course in tertiary education, and so play an important part in introducing students to EIT and teaching them how to learn within EIT’s environment. Study skills, research skills and report writing skills are required for students to successfully complete the Ethics paper, but these skills are not explicitly taught in the curriculum.

Anecdotal feedback from students and support staff indicated that some students find the Ethics assessments very hard, which is not the intention and probably not desirable in their first term. This led to the questions “what do students really learn in Ethics? Is it what we say they will learn and, if not, should they be learning it in

this course?”. This study focussed on the skills students learn while doing the Ethics assessments. The purpose was to identify the skills needed to complete the Ethics assessments, and to find out whether students already had these skills and whether they felt they needed support in these areas. This information could then be used to inform choices about what skills should be explicitly taught or whether changes should be made to the assessments. The results may also be relevant to other first-year courses, which may contain similar hidden curricula.

## 1.2 The Ethics Course

Students on the DipICT come from varied backgrounds. Some have progressed from a Certificate in Computing, some have come straight from secondary school but did not meet the entry requirements for the Bachelor of Computing Systems programme, and others are returning to education after a break. Some will be completely new to tertiary education and so will not have developed the study skills needed to succeed at tertiary study (Aloha, 2000).

The major assessments in Ethics at EIT are two research assignments, for which the students must submit a writeup of their research and present a summary of their writeup to the class. This may be the first time the students require the research and general study skills essential for successful tertiary study. The first assignment involves group research into a piece of legislation relevant to the ICT industry, and the second involves individual research into an ethical issue prevalent in the ICT industry. Using an academic library, writing business reports and making presentations are taught in the Communications course in the second term, but other general study skills such as taking notes and time management are not explicitly taught in any course on the DipICT. While some students will learn these skills for themselves some may never learn them, and some will muddle along and may pick up poor study habits which could handicap them in the future.

## 1.3 Hidden Curricula

Anderson notes that the term “hidden curriculum” has “great intuitive appeal amongst educators” (2002). The term is used in several ways (Anderson, 2002). The first is to refer to a “hidden agenda” or the “indoctrination of students in social norms” (see for example LeCompte, 1978; Apple, 1980). This is not the focus here: in Ethics the discussion of ethical issues and social norms makes

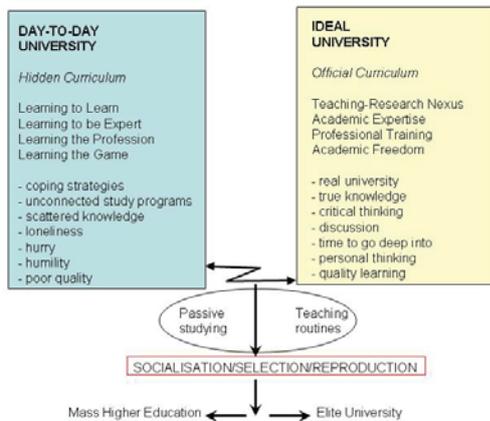
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up the explicit curriculum. The focus in this article is on the second use of the term “hidden curriculum”, to refer to skills or knowledge learnt but “not openly intended” or “not openly acknowledged to the learners” (Martin, 1976). The difference between the hidden and the explicit curriculum can be described as the difference between “what it is openly intended that students learn and what, although not openly intended, they do, in fact, learn” (Martin, 1976). This may include knowledge or skills which the educator does not consciously intend to teach (LeCompte, 1978).

Learners new to tertiary study require “completely new ways of thought and action compared to learning in schools” (Aloha, 2000). A project currently identifying hidden curricula in Finnish universities identifies two broad areas which may also be particularly relevant to Ethics students – “learning to learn” and “learning to play the university game” (Aloha, 2000). Learning to learn may include research skills, technical skills and overcoming phobias or negative attitudes to technology (Anderson, 2002). Learning to play the game involves learning how to “survive” – what to do to pass a course including professorial power, self control, the importance of social relations, planning and organizing studies and timetables, verbal abilities and logical reasoning (Aloha, 2000). These are the “actual” skills needed at a tertiary level, and are in contrast to the “ideal” skills needed, as shown in figure 1.

**Figure 1: the dual nature of universities (Aloha, 2000)**



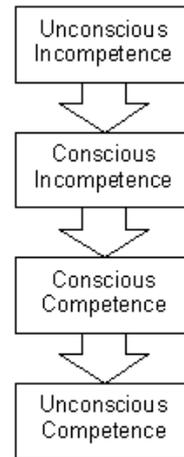
International students, particularly those with poorer English skills, are likely to experience additional hidden curricula, including cultural and language issues and problems in collaborative work (Crump, 2004).

**1.4 What should we do with a hidden curriculum?**

Once a hidden curriculum is identified, “we can embrace it wholeheartedly ... we can attempt to expunge it altogether, or we can do something between these two extremes.” (Martin, 1976, summarizing Vallance, 1973/74). If the hidden curriculum is harmless, “it doesn’t matter much what we do with it”, and if it has been included on purpose there is no need to do away with it (Martin, 1976).

The “Conscious Competence” learning model shown in figure 2 suggests that exposing hidden curricula would help learners move along the learning path. According to this model, all learners move through four distinct stages: “unconscious incompetence”, “conscious incompetence”, “conscious competence” to “unconscious competence” (Chapman, n.d.).

**Figure 2: The Conscious Competence Model (Chapman, n.d.)**



All learners begin at “unconscious incompetence”, where they are not aware of the existence or relevance of the skill area, or they are not aware that they have a deficit in that skill area. For them to respond to training they need to be aware of their own need for it, and so need to progress to the “conscious incompetence” stage (where they are aware of the need for the skill area or that improving can benefit them) before they can begin to learn the skill.

If learners are made aware of the tacit skills that they need to successfully complete their assessments, they will know to learn them for themselves, and be open to opportunities offered to learn these skills, such as library tours.

**1.5 How should we find hidden curricula?**

There are several approaches to gathering data on hidden curricula.

The RUSE project currently underway in Finland to identify hidden curricula in universities by asking “what do students learn and how do they learn it?”, using student surveys. Anderson (2002, quoting Gordon, 1995) recommends that the most comprehensive and valuable research approaches will focus on in-depth interviews combined with observations. Alternatively, Martin (1976) recommends observing learned states and asking “how did the students learn this?”.

Recent studies assessing learners’ skill levels for various purposes have required students to complete set tasks and then gathered information about pertinent skills with

individual interviews and/or questionnaires (Miller and Dick, 2005). Another approach drawn from service quality literature (Hernon, Nitecki et al., 1999) is to interview “nearly lost” students, who were struggling and almost dropped out, to discover the problems they had.

## 2 Methodology

The study which forms the basis of this paper focuses on any hidden curricula surrounding completing the assessments for Ethics, rather than on non-assessed course work. To identify possible skills and knowledge areas individual interviews were held with teaching staff on the DiplCT, who were asked to identify the skills they thought students needed to do the ethics assessments.

These skills and knowledge areas were then compared with the Ethics Course Outline and the NACCQ Course Prescription (NACCQ, n.d.) to identify those which were explicitly stated in the curriculum and those which were “hidden”.

The skills and knowledge gaps identified, along with the skills identified in other studies previously discussed, were then compiled into a questionnaire. Skills relating particularly to international students, such as language barriers, were not included in the present study although skills which may affect all students, such as spelling and grammar, were included.

Students were asked to provide demographic information of age, gender, nationality and prior study experience. They were then asked how difficult they found each of the Ethics assessments. For each skill or knowledge area, students were asked to indicate how much support they would have liked on a Likert scale from 0 – 4. They were then asked whether they already had this skill before they took Ethics, and if not, how much *not* having that skill was a problem for Ethics, again on a Likert scale of 0 – 4.

The original intention had been to ask students which skills they needed, but Aloha’s (2000) study found that students were generally not able to do this, showing the tacit nature of the skills acquired. Given this result, in the current study students were not directly asked to identify required skills and knowledge areas or whether a particular skill was needed or not, although they were given the opportunity to add additional skills to the survey instrument (consistent with Aloha’s findings, none did).

The survey instrument was checked for face validity and peer reviewed, and then piloted by five respondents. It was expected that the pilot would highlight skills that were not thought to be relevant and so could be removed, but this was not the case and in fact only a few minor wording changes were made. A sample of 22 students was then taken randomly from a list of students who had completed Ethics in the past three years who were still studying at EIT.

## 3 Findings – Initial Study

In the initial study 50 different skills and knowledge areas were identified by educators as being needed to complete the Ethics assessments. The main categories of skills

identified were technical skills, research skills, academic English, background in New Zealand society and culture, group work, general study skills, how to do an assignment, and cognitive skills.

Interestingly, while most of the 50 skills and knowledge areas were identified by more than one educator, the most skills an individual educator identified was 23, with most educators identifying 10 – 15.

When compared with the NACCQ course prescription (NACCQ, n.d.) and the Ethics course outline, only 7 of the 50 identified skills or knowledge areas were explicitly mentioned in one of these documents. 21 were not mentioned in either document. The remaining 22 were implied in one of the documents, as the document mentioned a higher-level skill. Examples of this include the ability to spell and use correct grammar, knowing how to work in a group, and understanding the need to attend every class. These findings are summarised in table 1.

**Table 1: Explicit and hidden skills in the Ethics curriculum**

Explicitly in curriculum	7
Alluded to in curriculum	22
Not in curriculum	21
	<b>50</b>

## 3.1 Discussion – Initial Study

Individual educators identified under half of the final list of skills and knowledge gaps. This indicates that a wider range of skills is needed – at least in this course – than the educators realise. This has important implications on workload balancing and the provision of support for the skills that new learners need.

The 21 skills and knowledge areas which are not mentioned in the explicit curriculum clearly form a hidden curriculum in Ethics. The 22 skills which can be inferred from the explicit curriculum are also likely to form a hidden curriculum to some students (if not all). For example, some students are unlikely to understand that “personal research” involves using the library catalogue, article databases and the internet.

## 4 Findings – Student Survey

### 4.1 Demographic Information

A summary of the sample demographics is presented in table 2. The majority of respondents were between 17 and 30 (77%), but there was still a spread of respondents in their 30’s (18%) and one student in their 40’s, giving some representation for older students. 73% of respondents (16) were male, with 27% (6) female. A different 27% of respondents were international students. All but one of the international students had a first language other than English, which could affect the level of difficulty they experienced for the assessments.

**Table 2: Summary of Demographic Information**

Age Group			Gender		
< 20	10	45%	Female	6	27%
20's	7	32%	Male	16	73%
30's	4	18%	Total	22	100%
40's	1	5%			
Total	22	100%			

Nationality			ESL		
New Zealander	16	73%	English first language	17	77%
International	6	27%	Other first language	5	23%
Total	22	100%	Total	22	100%

## 4.2 General Findings

60% of respondents reported finding the assessments quite easy or very easy. The remaining 40% found them “OK”, difficult or very hard.

There was no apparent trend as to which group a student might fall into, except that the two students who initially had very poor English skills both reported that they found the assignments “hard”. People in both groups had previous tertiary study, some at EIT, and there were people in both groups who had done the course straight from secondary school.

There were only a few clear trends of skills that students held before the course. There was only one student who had not used Microsoft Word and another who had not used Microsoft Excel. The majority of students reported not previously having skills in APA Referencing (77%), using Library databases for research (68%), and the New Zealand legal system (59%). 76% reported that they did not understand what the Treaty of Waitangi was before taking the course, although international students made up only 27% of respondents, which means that a significant number of New Zealanders reported that they did not understand what the Treaty of Waitangi was before the course.

Looking at responses for skills held and support desired across the whole sample there were again few clear trends.

For each skill measured there was at least one student who reported not having that skill before the course, and for each skill the majority of students reported they would have liked more support, but the individual students making up that majority, and the amount of support they desired, differed for each skill.

Dividing students into those who found the assessments quite easy or very easy, and those who found them “OK” or difficult, did identify some trends. These groups were termed the “easy” and “hard” groups respectively. Students in the “easy” group had most of the general study skills and the skills involved in doing assignments. However, for each skill measured under “general study skills” and “doing assignments”, at least 25% of the

“hard” group reported not having that skill prior to the course; sometimes this figure was as high as 75%.

Generally, students in both groups desired little or no support with technical skills (with the exception of APA Referencing) and desired moderate to high support with research and general study skills.

## 4.3 Technical Skills

Students in both groups clearly indicated they would like support doing APA-style referencing, which is explicitly required in the curriculum. 67% did not previously have the skill, with 75% of these students reporting that this was a moderate to big problem for them. Students desired little support using the student email system, the Blackboard learning management system, Microsoft Word and PowerPoint and the internet resources (web pages) provided.

## 4.4 Research Skills

A summary of the research skills held before the students took Ethics is shown in table 3. 83% already knew how to use the internet for research. 78% of the “easy” group desired a little support in the research skills but 50% of the remainder desired moderate to a lot of support in this area.

**Table 3: Research skills previously held**

	Yes	No
Research using the internet	83%	17%
Using the library catalogue	33%	67%
Using the library (e.g. find books on shelves)	83%	17%
Using the library databases (e.g. ProQuest)	33%	67%
Ability to choose good sources of information	83%	17%
Ability to interpret/understand the articles/sources found	83%	17%

As expected, many students did not previously know how to use the library databases (67%). However, surprisingly 67% did not previously know how to use a library catalogue, despite library tours being recommended to them during orientation sessions, and these students regarded this as a small to moderate problem. All respondents indicated they would like support using the library databases, most wanting a little support, with a few wanting a lot.

17% could not previously choose good sources and interpret them, and found this a big problem. 93% of respondents indicated they would like at least some support in this area.

## 4.5 Academic English

93% believed they already had the Academic English skills to complete the assessments, although all indicated they would like moderate support interpreting the Acts of Parliament.

#### 4.6 Background Information

All respondents in the “hard” group had no background knowledge of legal systems and only one had background knowledge of the Treaty of Waitangi (including three New Zealanders with no background knowledge of the Treaty). The “easy” group found not having an understanding of legal systems a moderate problem but half the “hard” group found it a big problem. Both groups felt moderate support would be beneficial.

#### 4.7 Group Work

The entire “easy” group reported already having the group work skills measured, although one respondent didn’t know how to deal with a group member who wasn’t contributing. However, for each of the skills listed, at least 40% of the “hard” group indicated they did not previously have that skill. They found this a moderate problem. Across all group work skills all of the “hard” group and 67% or more of the “easy” group indicated moderate to large amounts of support were desirable. Surprisingly the “easy” group desired more support than the “hard” group. A comparison of the “hard” and “easy” groups is shown in table 4.

**Table 4: Group work skill previously held by level of difficulty experienced**

	Easy		OK/Hard	
	Yes	No	Yes	No
How to work in a group	100%	0%	25%	75%
That people rely on you, so you have to deliver	100%	0%	40%	60%
How to form a group	100%	0%	60%	40%
How to allocate work between group members	100%	0%	40%	60%
How to pull your weight in a group	100%	0%	40%	60%
How to encourage others to pull their weight	100%	0%	40%	60%
How to encourage others, not just take over yourself	89%	11%	40%	60%
How to get other group members to turn up (to meetings, class etc)	89%	11%	50%	50%
How to deal with conflicts	89%	11%	75%	25%
How to put together a cohesive group assignment	89%	11%	50%	50%
What to do if a group member’s work is not good enough	89%	11%	50%	50%

#### 4.8 Study skills

In this section there was an interesting difference between the two groups. 100% of the “hard” group didn’t previously have time management skills or know how to schedule time to work on an assignment, and 67% didn’t previously know to take notes or use a diary. 75% said

that lack of time management skills was a moderate problem and scheduling time to work on the assignments was a moderate to large problem. In comparison 100% of the “easy” group previously knew how to use a diary and 78% previously had time management skills, knew how to schedule time to do the assignments and take notes. All respondents across both groups indicated they would like moderate to a lot of help with these skills. A comparison of the “hard” and “easy” groups is shown in table 5.

**Table 5: Study skills previously held by level of difficulty experienced**

	Easy		OK/Hard	
	Yes	No	Yes	No
How to get help if you miss a class or the class is not enough	89%	11%	40%	60%
How to take notes	78%	22%	33%	67%
Scheduling time to work on assignments	78%	22%	0%	100%
Time Management	78%	22%	0%	100%
Using a diary	100%	0%	33%	67%
How to ask questions, and to do so quickly	100%	0%	40%	60%
Ability to do the course work without direction from the tutor	100%	0%	60%	40%

#### 4.9 Doing Assignments

This section showed another distinct difference between the groups. 100% of the “easy” group already knew how to tackle an assignment but 60% of the “hard” group did not. 78% of the “easy” group knew how to set out an assignment but 80% of the “hard” group did not. While 93% of students across both groups already knew how to do presentations, 100% of the “easy” group knew how to overcome fear of presentations but 67% of the “hard” group did not. While they regarded this as a small or moderate problem, the entire “hard” group wanted moderate to a lot of support for overcoming fear of presentations, while the “easy” group wanted moderate to low support. A comparison of the “hard” and “easy” groups is shown in table 6.

**Table 6: Assignment skills previously held by difficulty experienced**

	Easy		OK/Hard	
	Yes	No	Yes	No
How to tackle an assignment	100%	0%	40%	60%
How to set out an assignment	78%	22%	20%	80%
What the lecturer expects for the assignment	89%	11%	17%	83%
Report writing	56%	44%	20%	80%

How to do presentations	100%	0%	83%	17%
Overcoming fear of presentations	100%	0%	33%	67%

#### 4.10 Cognitive Skills

Most respondents either knew how to solve a problem and think critically or found it only a small problem. However, both groups indicated that moderate to high levels of support were desired.

#### 4.11 Discussion – Student Survey

It was expected that the study would identify sets of skills that most students were lacking when they started the course, and/or sets of skills that most students previously had – this was not the case. Apart from a few clear trends such as the desire for high levels of support for APA referencing, students had differing skill sets and diverse “knowledge gaps”, desired differing levels of support for the skills identified, and experienced differing levels of problems with the lack of certain skills. The skills levels differed even among people who had previously studied the Certificate In Computing, the prior “staircasing” course, who might have been expected to have the requisite skills to undertake the DipICT. It was clear, also, that significant numbers of students did not have all the skills that educators might reasonably expect, such as using the library catalogue. These findings have significant implications for the provision of learning support – support must be flexible and able to be tailored to students’ individual needs, because different people need support in different skills, and desire different levels of support.

As discussed above, few trends were apparent when looking at the group as a whole; however there were some clear differences when comparing students who found the assessments easy with those who found the assessments hard. The most noticeable of these differences were in the prior knowledge of general study skills and how to do assignments. The “hard” group did not previously have time management and scheduling skills, making these prime candidates for inclusion in the curriculum.

The “easy” group previously had group work skills while 25% to 75% of the “hard” group did not. However varying responses in this category may be related to whether they had a dysfunctional group – students with a good group may not have realised they didn’t have these skills.

It seems, then, that educators wishing to better support their students should provide support for study skills and writing assignments, such as scheduling time to work on assignments, using a diary, managing conflicting priorities, and how to tackle and lay out an assignment. However teaching time management skills is difficult – students have to be in a position where they realise that their current time management skills are not good enough (conscious incompetence) – by which stage it may be too late, at least for the current term’s courses.

Group work skills seemed to be an issue for students who found the assessments “hard”. It is felt that the results do not necessarily indicate differing skill levels amongst the students – students in the “easy” group may have happened to be in a functional group, for which their existing group work skills were sufficient. Regardless, group work was included to provide mutual support for students as they start the course, but should be reviewed to ensure it is not causing more harm than good.

It is felt that whether the student indicated they previously knew how to overcome a fear of presentations relates to whether presentations scare them. If this is a significant factor in students finding the assessments difficult, the requirement to make a presentation should also be reviewed to ensure it is suitable.

While these skills gaps are perhaps not surprising, skill gaps such as the use of the library catalogue and a general understanding of the Treaty of Waitangi indicate that educators should take care not to make assumptions about what students can do, and may want to ensure that support is available if these skills are important to success.

### 5 What should be done about the hidden curriculum in Ethics?

A substantial hidden curriculum has clearly been identified in Ethics. Martin (1976) suggests the following possible courses of action when a hidden curriculum is identified:

1. Do nothing if the learning state is not undesirable.
2. Change or abolish the practices (in this case, assessments).
3. Embrace the hidden curriculum by either
  - a. openly acknowledging the skills (making them part of the explicit curriculum), or
  - b. intending the learning states but not openly, so that they remain part of the hidden curriculum.

The feedback provided by the students in this study enables the analysis of the impact of skill or knowledge gaps. According to Martin (1976), if the hidden curriculum is harmless, it doesn’t matter much what we do about it. The assumption was made that if a skill or knowledge area was previously known by students, or students who did not know it did not consider it to be a problem, or if low levels of support were desired, it could be considered fairly “harmless” for this purpose. No skills clearly met these criteria.

As all skills were therefore either a problem for students who did not have them, or required moderate or higher levels of support, educators on the DipICT at EIT must now decide whether to make the skills explicit and, if so, whether to provide support for them, or whether to change the assessments so the skills are not needed. This includes deciding whether the skills are desirable, whether Ethics is the right place to teach them, and whether they need to be learnt so early in the DipICT. In making this decision educators need to bear in mind that replacing the assessments with new ones will introduce new hidden curricula, which will need to be similarly examined.

The requirements for group work and to make a presentation are prime candidates for review. While both are important skills in the workplace, a first-term course might not be the right place to introduce them. While group work might intuitively seem to provide a mutual support system for group members, student responses indicate that it is creating difficulties for them.

When deciding whether to revise the assessments, it must be remembered that the key skills identified in this study are required throughout tertiary study. Desirable skills such as assignment, research and general study skills are skills that Aloha (2000) identified as being part of “learning to learn” and “learning to play the university game”. The Conscious Competence model (Chapman, n.d.) suggests that these skills should therefore be made explicit, in order to move learners from the “unconscious competence” stage to “conscious competence” – the point at which they are aware that there is something they need to know and so are open to learning it.

One option is to include skills such as time management, group work and research skills in a “foundation” course in the curriculum, although experience suggests that this must be done at a time at which learners are receptive to it; in the first week of term they do not understand the need for such skills.

The final resolution of the hidden curriculum in Ethics is likely to involve a mixture of approaches: some skills will be explicitly identified, some will be removed by the revision of assessments, and some will be left implicitly in the curriculum.

## 6 Limitations of the Study

Due to the availability of students who have completed Ethics but are still at EIT, the findings come from a small sample of students. They do not include many students who have already graduated but more importantly they do not include “lost” students, who dropped out of the course. Their input would have been valuable in identifying skills in which struggling students desired support.

## 7 Conclusions

From the initial study it became apparent that a wider range of skills is required than any of the teaching staff anticipated. The student survey showed that learners have much more diverse skill and knowledge gaps than expected, and require diverse levels of support. Educators wishing to support their students better will find it challenging to design support to meet such diverse needs.

By far the majority of skills identified as significant for completing the Ethics assessments formed a hidden curriculum, whether “hidden in plain sight” (Anderson, 2002) by being inferred in the curriculum, or left out altogether.

Student responses indicate that none of these skills is inconsequential, so they cannot be safely ignored. While this study identified skills required for Ethics, other first year courses are likely to yield similar results. Educators in Ethics and other subjects on the DipICT need to decide

whether to embrace the hidden curriculum by making it explicit, deliberately leave it hidden, or change the assessments to remove the need for the hidden skills.

This study raises many interesting question for future research. The same approach could be taken on other first year courses in order to identify skills specific to each course or generic across courses. Additionally, historical comparisons of grades could provide an indication of whether the provision of the support in these areas has had an effect on overall student achievement. Skill and knowledge gaps particular to international students were excluded from this study and would provide useful information for educators supporting international students.

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