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The impact of an embedded academic literacy approach on international student transition to an Australian university

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International students face numerous obstacles, the greatest of which, in terms of academic success, can be a lack of academic literacy skills. Embedding literacy skill tuition into the curriculum has been advocated as the most effective way to address this need, but there is a dearth of literature into international students' impressions of embedded literacy programs. This exploratory study aims to address that gap and provide much-needed data on international students' perceptions of an embedded approach to academic literacies at an Australian university. A mixed method design was applied with 203 students completing the same survey before and after the embedded sessions. Statistical and focus group analysis show that students perceived an increase in their confidence in their academic literacy skills ability post-intervention. Students who were less confident about their skills before the embedded sessions were more likely to perceive improvement from them, whilst analysis suggests that students who were more confident about their skills before the embedded sessions benefited from them through a re-alignment of perceived and actual competence. Confidence in some skills improved more than others, with referencing rated as the most improved. Students also identified other positive facets of the program, including unit-specific materials, a student-centred pedagogical approach, and transferable skills. As a result of these findings, embedding academic literacy skills into a core unit of study is recommended to support international students during their transition to university.

Key Words: academic literacy, academic skills, embedded model, international student transition, international student perceptions, higher education.

1. Introduction

Successfully transitioning to Australian universities for international students is complex and fraught with difficulties, largely because international students can lack a deep understanding of the academic literacies needed to succeed. McWilliams and Allan (2014) state that academic literacies incorporate critical thinking, research competency, understanding of academic conventions, knowledge of register and the ability to use a variety of academic genres. Over the past two decades, there has been a marked increase in international student admissions to Australian universities which has resulted in an institutionally recognised need for better academic literacy support for transitioning students (Arkoudis et al., 2018; Gunawardena, 2017; Harris & Ashton, 2011). Historically, this academic support was provided in generic or adjunct workshops, followed up with self-help materials and voluntary appointments with academic learning advisers

(ALAs) (Hoadley & Hunter, 2018). However, the literature confirms that this approach is ineffective for transitioning students (Devereux et al., 2018; Gunawardena, 2017; McWilliams & Allan, 2014). These authors give several reasons for this lack of efficacy, including the fact that generic workshops do not usually utilise discipline terminology. Additionally, this approach can be teacher-led, lacking practical application of skills taught in student-centred activities. To address these shortcomings, there has been a growth in the embedded approach to disseminating academic literacy (Cleary et al., 2017; Malkin & Chanock, 2018).

This paper reports on an embedded approach to teaching academic literacies implemented at CQUniversity, a multi-campus regional Australian university, by the Academic Leaning Centre (ALC) in conjunction with a core unit in a Master of Information Technology or Master of Information Systems degree. The paper presents a historical and theoretical perspective on the embedded approach before identifying a gap in the literature relating to international student perceptions of the value of embedded sessions. The primary purpose of this study is to address that gap by analysing international students' perceptions of the ALC embedded sessions to determine whether they deemed the embedded approach useful in improving their academic literacy skills, whilst also identifying pedagogical implications and research directions for future embedded projects.

2. Literature review

2.1. An overview of the different embedded approaches

The literature provides many different descriptions of how to approach embedding academic literature in the curriculum. Briguglio and Watson (2014) discuss embedding on a sliding scale from most to least embedded, which they call the Multi-Layered Model of Language Development Provision. Hoadley and Hunter (2018) provide a more succinct explanation, dividing the approaches into three separate categories: non-integrated, integrated and embedded. Devereux et al. (2018) apply similar concepts to Hoadley and Hunter (2018), referring to an integrated and embedded model, whilst naming the non-integrated model an adjunct one.

The adjunct or non-integrated model offers non-compulsory workshops out of class time. Academic literacy development is further complemented by the provision of online self-help resources and face-to-face consultations (Briguglio & Watson, 2014). Whilst there can be a level of involvement by discipline specific teaching academics, it is conducted on a voluntary basis and not all academics are aware of or invested in the work of ALAs (Gunawardena, 2017).

Although the literature generally disparages the adjunct model (Devereux et al., 2018; Gunawardena, 2017), it does have some benefits. One is that core academic literacies are transferable skills that apply to most generic academic writing styles. Thus, the teaching of such skills is arguably best left to specialist academic writers, rather than discipline specific academics (McWilliams & Allan, 2014). The adjunct model also benefits from a lower investment of time from both ALAs and academics when compared with the 'pure' embedded model (Devereux et al., 2018; Malkin & Chanock, 2018; McWilliams & Allan, 2014). An interesting and somewhat overlooked limitation of the adjunct model, however, is that students who come to generic workshops are often those who do not need the help; they are motivated, dedicated and engaged students who will most likely learn the academic skills they need from the discipline teacher and unit resources (Tran, 2013).

The integrated model builds on the adjunct model by adding more interaction and collaboration with teaching academics. As Devereux et al. (2018) explain, this means that ALAs may be asked to deliver generic, or slightly adjusted generic workshops in class time, but with little to no involvement with the teaching academic or specific focus on assessment topics. Devereux et al. (2018) further explain that ALAs may develop online material to supplement unit offerings, but again without major consultation with teaching academics. Hoadley and Hunter (2018) contend that these limitations render the approach adjunct teaching and suggest that integrated models

need to see ALAs attending orientation events, providing feedback strategies, and possibly offering optional language development workshops.

Lastly, the 'pure' embedded approach has a greater focus on intense collaboration with teaching academics to alter the curriculum. This includes greater scaffolding of academic literacy to assessment tasks, the provision of specific workshops in class time, and assistance with the development of assessment tasks and rubrics (Cleary et al., 2017; Devereux et al., 2018; Hoadley & Hunter, 2018). Although this approach is more costly in terms of time and resources, much of the literature identifies this as the preferred model for facilitating academic literacy (Harris & Ashton, 2011; McWilliams & Allan, 2014; Salamonson et al., 2019).

2.2. Student perceptions of embedded sessions

Students involved in embedded programs find them useful and survey results show the degree of perceived usefulness to be high (De Maio & Desierto, 2016; Harris & Ashton, 2011; Kennelly et al., 2010). This high satisfaction rate can be attributed to a perceived improvement in written work (De Maio & Desierto, 2016; Goldingay et al., 2014) brought about by an enhanced ability to understand assessment specifications (Maldoni & Lear, 2016) and questions (Beckman & Rayner, 2011); research and make notes from appropriate sources (Beckman & Rayner, 2011); and incorporate these notes into their work using effective paraphrasing (Divan et al., 2015).

Most studies into students' perceptions of embedded programs, however, do not identify whether international students have taken part or do not differentiate their responses from other cohorts (De Maio & Desierto, 2016; Harris & Ashton, 2011; Goldingay et al., 2014; Maldoni & Lear, 2016; Beckman & Rayner, 2011; Palmer et al., 2018). As a result, although these studies are capturing international students' perceptions, it is not possible to definitively extract their responses, so most perceptions of embedded sessions must be presented as homogenous students' views as opposed to the views of international students specifically. The international voice is in much of the literature, but its exact sound is not accessible.

Data from the few studies which do differentiate international students' perceptions, are small-scale. For example, 50 post-graduate international students responded to a questionnaire evaluating a UK based intervention program conducted by Divan et al. (2015). Twenty-five international undergraduate students completed a questionnaire analysing the performance of a University of Melbourne program (Baik & Greig, 2009), and 14 international students provided their perceptions of a discipline-based program embedded into a university preparatory program at the University of Canberra.

Despite these small sample sizes, findings show that international students believe embedded programs are useful (Divan et al., 2015). International students valued assistance because it prepared them for class work, enabled them to participate more effectively in tutorials and workshops, and facilitated better reading of academic texts which resulted in a better understanding of discipline-specific content (Maldoni et al., 2009). Ultimately, students appreciated program elements that addressed course content, as opposed to generic academic or language skills (Baik & Greig, 2009), and the reduction in plagiarism issues which the programs facilitated (Divan et al., 2015). As a result of these priorities, differences exist between the type of input international students found useful, and the type of input that local students found useful. International students rated informational sessions on searching for literature, referencing and plagiarism more useful than local students. In contrast, local students found the application of literacy skills, through the actual writing of a literature review and feedback on it, more useful than the international students (Divan et al., 2015). Finally, most international students (97%) agreed that their writing level was higher after completing the embedded sessions. This perception differed markedly with the local students as only 47% of them believed that their current and original writing levels were different after completing the embedded sessions (Divan et al., 2015).

3. ALC approach to embedding academic literacy in the curriculum

The ALC's approach to academic literacy has changed from an integrated approach to a more embedded one. A decade ago, the ALC worked only on an adjunct model offering generic academic communication workshops. Currently, however, the ALC operates a hybrid form of adjunct-embedded workshops. The ALC still offers generic, non-discipline focused workshops on academic literacies such as referencing, essay writing and task analysis. However, more recently there has been a shift towards collaborating with unit coordinators and academics to embed academic literacies into core units of study. This focus requires close collaboration and has resulted in ALC input into assessment tasks and in-class activities which focus on specific unit assessment items, as well as team teaching – all of which are attributes of an embedded approach.

All of these elements were present in the Masters unit which is the focus of this study with the almost exclusively international student cohort, and large enrolment numbers presenting an opportunity to more comprehensively explore the reactions of international students to an embedded approach. This paper, therefore, aims to contribute to the body of literature on international student perceptions of embedded approaches by analysing and presenting the perceptions of an international student cohort in an embedded unit of study at an Australian university.

4. Research questions

1. Do post-graduate international students, studying in a core unit, find the embedded sessions useful in developing their academic literacy skills?
2. Do post-graduate international students, studying in a core unit, perceive greater gains in particular academic literacy skills after an embedded intervention?
3. Do post-graduate international students, studying in a core unit, provide additional insights into useful facets of an embedded intervention?

5. Methodology

5.1. Ethical clearance

Ethical clearance for this project was given by the Human Research Ethics Committee of CQUniversity for a series of studies in 2018.

5.2. Setting and participants

Researchers collected data from students enrolled in Professional Skills in Information Communication Technology over three terms from 2018–2019. All students were post-graduate and studied on one of four campuses: Rockhampton, Brisbane, Sydney, or Melbourne. The embedded program had been piloted in this unit over three previous terms and was offered once a term over four consecutive weeks (Weeks 2, 3, 4 and 5). The embedded program was compulsory for students as it took place in class time and consisted of four sessions. All sessions used unit specific assessment tasks for input and practice and all campuses followed the same curriculum. The first session dealt with understanding and planning for the unit's assessment tasks. The second session focused on research strategies and evaluation of resources. The third session practiced paraphrasing and APA referencing, and the final session reviewed paragraphs and structural components of a business report.

Over the three terms, 1059 students were enrolled in this unit. Nine students were Australian citizens and two were international students studying offshore. These students were removed from the research data leaving 1048 international students on an Australian Temporary Visa studying onshore (98.96% of the total cohort). Of these students, 539 voluntarily chose to complete evaluation surveys before the embedded sessions and 339 after the sessions.

5.3. Instruments

A mixed methods design was used. Firstly, quantitative data was collected using unit evaluation surveys to identify whether the students believed the embedded sessions were useful in terms of improving their academic literacy skills (RQ1), and whether the students perceived greater gains with particular academic literacy skills (RQ2). Then focus groups were held to gather information which supported or refuted the statistical findings for RQ1 and RQ2. Focus group information was also used to provide additional insight into specific aspects of the embedded program which the students found useful (RQ3). Employing a mixed method approach in this way provides greater insight into an intervention's performance and can inform future use (O'Neill & Russell, 2019a).

5.4. Quantitative phase

According to Bandura's (1986) social cognitive theory, self-efficacy is perceived capabilities for learning or performing actions at designated levels. Schunk and Mullen (2012) identify self-efficacy beliefs as key to student achievement and retention. A survey which recorded the students' beliefs in relation to their academic literacy skills abilities was, therefore, used to determine whether the students found the embedded sessions useful in terms of their academic skills ability. The survey had nine items which were based on the academic literacy skills, which according to the literature and ALAs, international students typically need support with to manage the demands of their discipline. The survey items also aligned with the following learning outcome for the unit: students must communicate ideas effectively in written form using appropriate language. This learning outcome applied to all the unit's assessment tasks. The survey items were, therefore, a means to ascertain how useful the students believed the embedded approach had been in developing the academic literacy skills needed to successfully complete the unit's assessment tasks.

A 4-point Likert-scale tool was used to measure students' responses. Student responses to these nine items were: "*not confident*" (1), "*hardly confident"* (2), "*moderately confident*" (3) and "*very confident*" (4).

The Learning Management System (LMS), Moodle, was used to collect the data with the evaluation surveys stored on a specifically built academic literacy skills companion Moodle site. The students completed the survey twice. The first time was in class before they started the embedded program, and the second time in class after the program was completed

Surveys were downloaded from Moodle and all non-international students, as identified by visa status, were removed. Descriptive and inferential statistical analyses were applied to the data using Statistical Package for the Social Sciences software (SPSS) v26.

5.4.1 Analyses

Although 539 pre-surveys and 339 post-surveys were submitted, only 203 students submitted both a pre- and a post-survey. Consequently, in order to control for the possible impacts "attrition" from pre to post might have had on mean scores, only the data from the 203 matched pairs was analysed. As the surveys used a Likert scale from a paired data set, a nonparametric Wilcoxon matched pairs Signed Rank statistical analysis was performed, with the cut-off for statistical significance set at $p = 0.05$. Finally, to understand the impact of the program more readily, percentages were used. Firstly, the percentages of students who perceived a gain, a decline or no change in their perceived confidence in their academic literacy skills abilities after the embedded literacy sessions were calculated. Then the total percentage gains for specific academic literacy skills were calculated.

5.5. Qualitative phase

Focus group questions were developed based on the literature and the survey questions (see Appendix A). All 1048 students involved in the embedded sessions, irrespective of whether they had completed a survey or not, were invited by email to attend. Six focus groups were conducted with 12 participants in total, of which only eight were transcribable. These transcripts were analysed using NVIVO, with participants' responses grouped thematically according to the focus group questions and references to a particular topic. For example, *differences in the Australian education system to home country* was placed into a node in NVIVO. These nodes could then be seen as a collated collection of responses, allowing the researchers to discern similarities and differences between student perceptions, experiences, and feelings about the intervention.

6. Results and discussion

6.1. RQ 1: Do post-graduate international students, studying in a core unit, find the embedded sessions useful in developing their academic literacy skills?

Table 1 below shows the pre- and post-mean ranking for each item connected to the students' perceptions of their confidence in their academic skills ability before and after the embedded sessions. The pre-mean ranking ranges from 2.52 to 3.12, while the post-mean ranking ranges from 3.17 to 3.33. The mean post-scores are higher than the mean pre-scores for all survey items with perception 3 (cite resources in text) and 4 (write a reference list) showing the highest differences. This mean gain indicates that on average students thought the program was beneficial for each item. Table 1 also reports the *p*-value for the matched data ($n = 203$). As Table 1 shows very small *p*-values for the perceptions, there is a strong claim against the null hypothesis that there is no impact on students after the embedded sessions. The results also reveal that six of the perceptions connected to students' perceptions of their skills ability have a very significant *p*-value (< .001). The very small *p*-values for the perceptions, thus, suggest strong confidence that the embedded sessions had an impact on students' perceptions, particularly for the 6 perceptions with *p*-values of less than .001.

Table 1. Pre- and post- mean values on a four-point scale and *p*-values for statements connected to student perceptions of their confidence in their academic skills ability for the 203 students who completed both a pre-survey and a post-survey.

Perception	Pre-Mean	Post-Mean	Mean Difference	*p*-value $n = 203$	Improvement?
I am able to write a plan for an assessment task (P1)	3.01	3.24	0.23	<0.001***	Yes
I can write academic paragraphs using topic sentences and academically credible resources (P2)	2.87	3.21	0.34	<0.001***	Yes
I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)	2.52	3.17	0.65	<0.001***	Yes
I am able to write a reference list using the university approved reference guide (P4)	2.58	3.28	0.70	<0.001***	Yes
I have an effective method of notetaking (P5)	3.00	3.23	0.23	<0.001***	Yes
I am able to write grammatically correct sentences (P6)	3.03	3.28	0.25	<0.001***	Yes
I feel confident to write academically (P7)	3.06	3.21	0.15	0.030*	Yes
I am confident at reading and analysing an assessment question (P8)	3.12	3.30	0.18	0.009**	Yes
I am confident at finding academic resources using the relevant search engines and databases (P9)	3.12	3.33	0.21	0.001***	Yes

* Indicates p-value less than or equal to .05; ** Indicates p-value less than or equal to .01; *** Indicates p-value less than or equal to .001.

For the 203 students for whom we had matched data, Tables 2–5 show the percentage of students who perceived a change in their confidence in their academic literacy skills after the embedded literacy sessions. Students are organized based on the score that they assigned each skill before the embedded sessions. Changes are presented as: the percentage of students who perceived an increase in their confidence in their skills ability after the embedded sessions; the percentage of students who perceived their confidence in their skills ability had decreased after the embedded sessions and the percentage who perceived no change in their confidence in their skills ability after the embedded sessions. A gain or loss was considered to be meaningful when it constituted a change of at least one level on the four-point scale. A graphical representation of the data is also provided (see Appendix B.)

Table 2 shows that the fewest number of students assigned themselves a pre-evaluation survey score of 1 (*not confident*) for each item. For example, only 1 of the 203 students stated they had no confidence in their ability to analyse an assessment question. This suggests that, prior to the embedded sessions, most students did not consider themselves completely lacking in the skills needed to succeed at university. Most students who registered 'no confidence' believed that they had made meaningful gains after the embedded sessions, with 100% of students acknowledging that their confidence had increased by at least one level for five of the nine skills (P1, P2, P5, P7 and P8). (Note that students with a pre-score of 1 (*not confident)* could not register a decline.)

Table 2. Percentage of students with a pre-score of 1 (*not confident*) who believed there was a gain or no change in their confidence in their academic skills abilities after the embedded sessions.

Perception	Number of Students	% Who gained	% Who stayed the same
I am able to write a plan for assessment tasks (P1)	4	100	0
I can write academic paragraphs using topic sentences and academically credible resources (P2)	5	100	0
I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)	30	93.4	6.7
I am able to write a reference list using the university approved reference guide (P4)	29	96.6	3.4
I have an effective method of notetaking (P5)	8	100	0
I am able to write grammatically correct sentences (P6)	3	66.7	33.3
I feel confident to write academically (P7)	4	100	0
I am confident at reading and analysing an assessment question (P8)	1	100	0
I am confident at finding academic resources using the relevant search engines and databases (P9)	5	60	40

Most students who assigned themselves a pre-evaluation survey score of 2 (*hardly confident)* also believed their confidence in their academic ability had improved after the embedded sessions. The percentage of students who recorded a meaningful gain in confidence in their skills ability was again high and ranged from 73–87.6%. A perceived decline was registered for 4 items and

ranged from 1.6–5.4%, while the percentage of students who recorded no change from their initial score ranged from 3%–21.6% (see Table 3).

Table 3. Percentage of students with a pre-score of 2 (*hardly confident*) who believed there was a gain, decline or no change in their confidence in their academic skills abilities after the embedded sessions.

Perception	Number of Students	% Who gained	% Who declined	% Who stayed the same
I am able to write a plan for assessment tasks (P1)	37	73	5.4	21.6
I can write academic paragraphs using topic sentences and academically credible resources (P2)	45	86.7	2.2	11.1
I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)	62	85.5	1.6	12.9
I am able to write a reference list using the university approved reference guide (P4)	65	87.6	0	12.3
I have an effective method of notetaking (P5)	35	85.7	0	14.3
I am able to write grammatically correct sentences (P6)	37	78.4	2.7	18.9
I feel confident to write academically (P7)	26	96.2	0	3.8
I am confident at reading and analysing an assessment question (P8)	20	85	0	15
I am confident at finding academic resources using the relevant search engines and databases (P9)	33	96.9	0	3

Table 4 shows that the majority of students assigned themselves a pre-evaluation survey score of 3, which denoted a moderate belief in their academic skills ability before the embedded sessions. For example, 135 of the 203 students were moderately confident about their ability to analyse an assessment question. Across all nine of the survey questions, 24.4%–43.7% of these students registered a perceived improvement in confidence. Perceived gains were approximately 3 times higher than perceived declines for each item, with perceived declines ranging from 5.2% of students whose confidence in their ability to analyse an assessment task had decreased and 12.6% of students whose confidence in their ability to cite sources in-text had decreased. In absolute numbers, that equated to 7 out of 135 students whose confidence in their ability to analyse an assessment task had decreased and 11 out of 87 students whose confidence in their ability to cite sources in-text had decreased. The percentage of students who believed their confidence in their ability had not changed was highest for all statements and ranged from 48.3%–67.7%.

Table 4. Percentage of students with a pre-score of 3 (*moderately confident)* who believed there was a gain, decline or no change in their confidence in their academic skills abilities after the embedded sessions.

Perception	Number of Students	% Who gained	% Who declined	% Who stayed the same
I am able to write a plan for assessment tasks (P1)	114	34.2	11.4	54.4
I can write academic paragraphs using topic sentences and academically credible resources (P2)	124	26.6	9.7	63.7
I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)	87	39.1	12.6	48.3
I am able to write a reference list using the university approved reference guide (P4)	71	43.7	5.6	50.7
I have an effective method of notetaking (P5)	108	29.6	11.2	59.3
I am able to write grammatically correct sentences (P6)	113	29.2	7.1	63.7
I feel confident to write academically (P7)	127	24.4	7.9	67.7
I am confident at reading and analysing an assessment question (P8)	135	29.6	5.2	65.2
I am confident at finding academic resources using the relevant search engines and databases (P9)	97	28.9	10.3	60.8

Table 5 reveals that many of the international students identified as being very confident in their academic literacy skills prior to the embedded sessions. As 4 was the highest rating, there was no possible perceived gain in confidence for these students. For five of the nine items (P1, 2, 5, 6 and 9), a higher percentage of students stated that their confidence in their skills ability was unchanged as opposed to subject to decline. An equal number of students (50%) believed that their confidence to cite in-text had stayed the same or decreased, but more students in this group believed that their confidence in their ability to write a reference list had declined rather than staying the same (57.9% v 42.15%). Students also perceived a meaningful decline in confidence in their ability for two other items – writing academically (60.8%) and analysing an assessment question (61.7%).

Table 5. Percentage of students with a pre-score of 4 (*very confident*) who believed there was a gain, decline or no change in their confidence in their academic skills abilities after the embedded sessions.

Perception	Number of Students	% Who gained	% Who declined	% Who stayed the same
I am able to write a plan for assessment tasks (P1)	48	0	37.5	62.5
I can write academic paragraphs using topic sentences and academically credible resources (P2)	29	0	41.3	58.6
I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)	24	0	50	50
I am able to write a reference list using the university approved reference guide (P4)	38	0	57.9	42.1
I have an effective method of notetaking (P5)	52	0	44.2	55.8
I am able to write grammatically correct sentences (P6)	50	0	38	62
I feel confident to write academically (P7)	46	0	60.8	39.1
I am confident at reading and analysing an assessment question (P8)	47	0	61.7	38.3
I am confident at finding academic resources using the relevant search engines and databases (P9)	68	0	39.7	60.3

Overall, this information supports the findings in Table 1 and is in line with findings from Divan et al. (2015), which also showed that a high percentage of international students believed embedded sessions were useful because they believed they had a positive impact on their academic literacy skills' ability and confidence in academic writing at a Masters level. Greater nuances can, however, be drawn from this data as the perceived improvement is on a sliding scale and depended on how the students rated their academic abilities before the sessions began. Students who had no confidence in their academic skills ability were the most likely to believe that the embedded sessions had been useful in developing their academic literacy skills, closely followed by students who had hardly any confidence in their ability prior to the sessions. However, as students started to assign themselves greater capabilities, the perceived positive impact of the embedded sessions began to wane, with students with moderate capabilities more likely to perceive no change and students who believed they were very capable, most likely to believe their confidence in their skills had declined after the intervention. This finding is similar to Hunter and Tse (2013) in which students who were more confident in their writing abilities were less likely to find an embedded intervention useful than students who identified as having little confidence in their writing abilities. That study, however, did not specify whether the students were international or domestic, so findings can now be generalised to include international students.

The decline in some students' confidence after the intervention may seem to suggest that the embedded academic literacy support may have a negative effect on students who begin the intervention with high confidence in their skills. However, this change may also be interpreted as a recalibration of students' perceptions of their skills in the Australian context. Kennelly at al. (2010) identify a limited knowledge of the Australian university culture as a challenge for international students and it is possible that, prior to the embedded sessions, some international students had an elevated sense of their skills ability, because of a lack of exposure to western academic traditions and expectations. This overestimation would align with findings in Grayson et al. (2019), who found that students can rate their academic abilities higher than they should because they do not understand their shortcomings. These authors further explain that the more the student is unaware of their skills gap, the more erroneous they will be in their self-evaluation. Students, it would seem, are likely to think they are far more competent than they actually are. This dissonance between perceived and actual skills ability has significant implications for student performance. According to Schunk and Muller (2012), self-efficacy influences students' commitment to their learning and their approach to it, so an erroneous sense of competency can result in erroneous learning goals and strategies which will adversely affect achievement. Two things can realign self-efficacy: outcomes, for example student grades, and inputs, such as instructor feedback (Schunk & Muller, 2012). The embedded sessions are a way to provide that input through explicit instruction, practice and feedback, and can thus be seen as a low stakes way to address the dissonance between perceived and actual ability. Better for students to find out that their skills are not what that they should be in the embedded sessions, and then apply the information from sessions to improve them, than to find out about the gap through assessment feedback and reduced grades.

Focus group comments support the statistical findings. Firstly, no focus group attendees articulated a loss or stagnation in confidence in their academic skills ability. All attendees, however, did mention the differences between the academic literacy skills they were used to in their home countries and those that were expected in Australia. They all went on to mention the role that the ALC sessions had played in reconciling the academic skills they needed to succeed at university in Australia with those they believed they possessed. For example, one focus group participant referred to their experience during the embedded sessions as a *"culture shock of doing referencing and everything"* and went on to explain that the sessions were a *"great help"* in alleviating this shock. Another student clarified the help that she received in terms of *"actually like giving us an idea or preview of how the system works here."* The results of this insight into a system, hitherto unknown to them, was summarised by another participant who believed the sessions had *"improved [his] confidence, especially in writing academic stuff, which … is different from our country."*

Statistical determinations and focus group findings, thus, support the supposition that the embedded sessions were useful not just in terms of increasing some students' confidence in their academic literacy skills ability, but in terms of realigning some students' understanding and expectations of the academic literacy skills need to succeed at university in Australia. Further research is needed to explore the perceptions of those students whose post-tests indicated that their confidence in their academic literacy skills had declined following the embedded skills intervention to confirm the hypothesis that this is related to a recalibration of their pre-test perceptions of their skill level. In addition, the findings about student perceptions of their academic literacy skills in this study could be usefully supplemented by research that used an objective measure of student skill levels in pre- and post-testing, such as the formal assessment of ability used by Palmer et al. (2018).

6.2. RQ 2: Do post-graduate international students studying a core unit perceive greater gains in particular academic literacy skills after an embedded intervention?

Table 6 shows the percentage of students who perceived an improvement in their confidence in particular academic literacy skills after the embedded literacy sessions. The perceived gain is for each item and for each level that the students initially assigned themselves. Students with a pre-score of 4 (*very confident)* were excluded from the analysis as they could not register a gain. The total percentage gained for each item was also calculated as follows: (the number of students with all three pre-scores who gained / total number of students with all 3 pre-scores) x 100%. The skills which students assigned the greatest total percentage gains were then ranked.

Table 6 supports the findings from RQ1 that the students with a pre-score of 1–3 responded positively to the intervention as all skills registered gains. Total percentage gains across the items ranged from 37.2%–70.3%. As with the data in RQ1, students who indicated they had no or hardly any confidence in their academic skills ability, prior to the embedded sessions, registered greater gains across each item than students who were moderately confident.

Table 6. Percentage gain for specific academic literacy skills for students with a pre-score of 1–3.

Perception	% Gained (Pre-Score 1)	% Gained (Pre-Score 2)	% Gained (Pre-Score 3)	Total % Gained	Rank of Total % Gained
I am able to write a reference list using the university approved reference guide (P4)	96.6	87.6	43.7	70.3	1
I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)	93.4	85.5	39.1	64.2	2
I am confident at finding academic resources using the relevant search engines and databases (P9)	60	96.9	28.9	46.7	3
I have an effective method of notetaking (P5)	100	85.7	29.6	46.4	4
I am able to write a plan for assessment tasks (P1)	100	73	34.2	45.2	5
I can write academic paragraphs using topic sentences and academically credible resources (P2)	100	86.7	26.6	44.3	6
I am able to write grammatically correct sentences (P6)	66.7	78.4	29.2	41.8	7
I feel confident to write academically (P7)	100	96.2	24.4	38.2	8
I am confident at reading and analysing an assessment question (P8)	100	85	29.6	37.2	9

Overall, referencing was the skill in which the international students perceived the greatest gains. The highest total percentage gain was recorded for the students' confidence constructing a

reference list (70.3%) and the second highest was for students' confidence to cite in-text (64.2%). This improvement was more marked for students who believed they had no ability or hardly any ability (96.6% and 93.4% respectively), prior to the intervention. Moderately confident students also ranked them as the skills which had most improved, but the gain was lower (43.7% and 39.1% respectively).

Research into international students typically identifies referencing as the skill which students think they need to improve (Goldingay et al., 2014) and for which higher education institutions do not accord enough developmental support (Gravett & Kinchin, 2018). Focus group findings from this study concur as every student mentioned the need to improve their referencing. This was at times because referencing was *"compulsory"* and *"new ... we never used referencing in my home country. We just write down in our own words, we don't give credit to the authors"* or because *"we do referencing, but ... we don't have a specific way ... like APA, we don't follow those ... set of rules."* The embedded sessions provided the support advocated by Gravett and Kinchin (2018) by demystifying those patterns or rules and giving students the opportunities to practice in-text citation and reference lists. It also familiarized students with the ALC abridged APA guide which students found *"very helpful"* as it meant they did not have to memorise how to reference but could use the guidelines to *"follow the pattern"* and *"remember what to do ... you know like the capitalization and the underlining."* As a result, when asked, "which skills do you feel improved most?", every student in the focus groups answered *"referencing"*, with one student describing it as her *"key takeaway"*, another stating *"referencing, I got for the first time"*, and others revealing that, *"referencing is the most helpful for me."*

In the embedded sessions, paraphrasing was taught in the same sessions as referencing and highlighted as an integral part of notetaking. Notetaking recorded the fourth highest total gains with 46.4% of students who registered a pre-score of 1, a pre-score of 2 and a pre-score of 3, acknowledging that their confidence had increased by at least one level. In the focus groups, the students homed in on paraphrasing when asked about notetaking. The students appreciated the paraphrasing sessions because of its role in reducing academic misconduct and plagiarism, which one student acknowledged was *"a big issue in our country."* Like the students in Gravett and Kinchin's (2018) study, the fear of committing unintentional plagiarism triggered anxiety in our international students, with one student *"very worry about similarity in my essay. Like it could be 60% or 70% because I don't know anything ... about paraphrasing ...we only copy, copy and copy."* That same student explained how after the embedded sessions, he was *"confident with paraphrasing"* because he had learnt "*how to use the author's idea and write in my own words."* Two students wanted more time accorded to paraphrasing practice, but all students, bar one, mentioned that their ability to paraphrase had improved after the embedded sessions which meant that they *"couldn't make academic misconduct."*

Academic misconduct is a major concern in Higher Education (HE) institutions globally (Luck et al., 2021) and according to Divan et al. (2009), the literature shows that international students are more likely to plagiarise compared to local students. The embedded sessions are, therefore, an effective pedagogical response to the issue of plagiarism and the findings from this study suggest that scaffolded sessions on referencing and paraphrasing, coupled with a free, downloadable, and abridged university referencing guide, are a good start in supporting international students, particularly those who are new to these skills.

At the other end of the scale, students recorded lower gains in confidence in reading and analysing assessment questions (37.2%), writing academically (38.2%) and using grammatically correct sentences (41.8%). Focus groups did not provide insight into why students' confidence did not increase when unpacking assessment questions, with only two students mentioning this skill in interviews. The first student acknowledged that international students "*sometime struggle with the task or question because they don't understand it*" but thought that the "*ALC team [was]*

always there to help with this". The second student detailed this help and explained that *"underlining the action words like for the instructions … was helpful … engaging ... fun*". Similarly, no light was shed by students in the focus groups into the finding relating to academic writing. In fact, of the four students who mentioned academic writing, three stated that the embedded sessions had been useful in writing a report; for example, one student stated the intervention had *"absolutely improved my confidence, especially in writing academic stuff … specially with the written report*." More research, thus, needs to be undertaken to determine why students felt their confidence in analysing research questions and academic writing were the least improved.

Focus groups were, however, more instructive in relation to perceived improvement in confidence using grammar. International students need explicit teaching of grammar to improve their academic writing (Knoch et al., 2014) because there are surface level errors, connecting to accurate grammar, punctuation and spelling in their work (Tynan & Johns, 2015). Because of time constraints and a focus on *"other things … rather than English"*, the embedded sessions were unable to provide much grammar input. Students did not do any surface-level grammar practice outside of some paraphrasing techniques: such as the use of synonyms and antonyms, changing active voice to passive and manipulating the subject and object in a sentence. Two students in the focus groups were a little frustrated with this lack of grammar input and requested *"more support from ALC to learn the language."* The exact form that this language support should take is a perennial issue at universities with several strategies advocated; for example, institution-wide academic language development frameworks (Edwards et al., 2021) and automated feedback, like *Grammarly* (O'Neill & Russell, 2019b). The solution proffered by one of the students in the focus groups was for personalised appointments after the embedded sessions: *"I have to come to the ALC for my assignment check-up, … after I do my assignment … and then get my assignment checked, so from there I find my syntax and grammar mistakes."* The embedded sessions are a way for ALAs to proactively promote this follow-up service and as a relationship between the ALA and the students has already been fostered, it increases the chances of students accessing this additional support.

6.3. RQ3 Do post-graduate international students, studying in a core unit, provide additional insights into an embedded intervention?

Focus group findings provided insights into additional aspects of the embedded intervention from the international students' perspective. These insights can help inform embedded practice and are listed below.

6.3.1. Unit specific content

All focus group participants appreciated the fact that the sessions were unit specific and dealt with assignments directly related to unit learning outcomes. The importance of this focus on unit content is congruent with Baik and Greig (2009), who revealed that English as Second Language (ESL) students most benefited from support sessions which leveraged course content as opposed to generic skills.

6.3.2. Appropriate time allocation

The sessions seemed to reconcile the amount of input needed to facilitate improvement and the amount of time accorded to the sessions. This issue of timing has proven contentious in the literature. Some students found embedded sessions time-consuming and to the detriment of their subject-specific learning (Lalonde, 2015), and others that the program was rushed (Hunter & Tse, 2013) and insufficient to develop literacy skills (Maldoni & Lear, 2016). Three respondents in this program stated that the hour accorded to the session was *"too short"*, but the majority of students thought that the length (60 minutes) and number of the sessions (4) *"were perfect"* because it rendered the content manageable: *"If you expand it, I think it would be like*

overwhelming… it's just enough because you're able to get a good grasp of … what to expect and … what we should be doing."

6.3.3. Pedagogical approach

Students liked the student-centred, participatory approach with all participants in focus groups commenting that they were engaged in the activities and exercises and that these were very useful. One participant stated: *"I think most of the group activities are very engaging"*, while another commented on the active monitoring and feedback strategies employed during activities with "*the ALC group members … checking us… yeah, they were guiding us."* Maldoni (2017) noted that student engagement increased when a participatory pedagogy was employed in embedded interventions and added that this engagement with the learning experience increased the student's capacity to learn.

6.3.4. LMS: Moodle

Student perceptions' of LMSs are generally positive (Maldoni, 2017), with Thies et al. (2014) finding the online component of an embedded intervention particularly helpful for students to get started with their studies. To better facilitate students' understanding of academic literacy skills and enhance the learning experience in the embedded sessions, the ALC, therefore, developed a companion Moodle site specifically for the embedded program. This was a self-service model of skills acquisition where students could select one or more of virtual workshops, recorded workshops, PowerPoints, information sheets, activity sheets and quizzes. It was independent of the main Moodle site for the core unit of study, but links to the ALC companion site were on the core unit's Moodle site.

Most students found the companion site *"useful"* and agreed that the resources stored on it were useful; for example, students mentioned reviewing the PowerPoint slides when doing their assignments and some used the resources in other units of study. Some students, however, thought there was too much material stored on the site and found it *"overwhelming"* with *"too much stuff going on."* This suggests that, whilst Moodle sites for embedded interventions are useful in developing academic literacy skills, a streamlined approach is needed. The Student Activity Monitor (SAM) feature in Moodle could be used after each term to inform this streamlining. SAM allows educators to assess how many times a resource has been accessed by students, so resources which are not being accessed by embedded students can be removed to make the companion site *"less busy."*

6.3.5. Forced participation

Some participants pointed out that students know about ALC services but do not come to adjunct workshops or utilise the ALC services online or on-campus. One participant stated:

> *Yeah, I can remember in the uh, orientation, you guys (ALC)- you came in and talked all about you, and that students should come to see you (to learn about academic literacies), but we didn't. Yeah, we missed that opportunity.*

The embedded sessions bypassed this reticence to engage with the ALC by bringing academic literacies to the students. This in-class delivery recorded no negative responses in the focus groups, which refutes some findings that compulsory academic literacy skills courses are not well received and should not be compulsory (Gunawardena, 2017; Timor, 2018).

6.3.6. Transferable skills and materials

In four out of five focus groups, students mentioned that they had used the materials and skills delivered in the embedded sessions in other units of study: *"(The resources) on ALC Moodle… it's actually it helped me throughout my… stay in the uni."* Others said they had used skills acquired in the embedded sessions throughout their degree program: *"Once we have learned*

(referencing) we can use it everywhere." Another participant stated they thought the skills were transferable to the workplace and possibly into their future Research Higher Degree studies.

6.3.7. Recommend to other students

Finally, the international students endorsed the embedded sessions as all students agreed that they would recommend them to other students. This endorsement is summarised by the following student: *"Yes, I would like recommend [embedded units] for other students because it very useful and helpful for all the processes in this uni."*

7. Conclusion

International students need support to develop their academic literacy skills in order to transition effectively to university. Embedding these skills into core units of study has been advocated as a key way to achieve this aim. However, little research has been undertaken into international students' perceptions of embedded sessions. This paper aimed to address that gap by analysing international students' perceptions of the usefulness of an embedded approach at an Australian university. An increase in post-intervention means and statistically significant results for all survey items suggest that most international students believed their confidence in their academic literacy skills ability had improved after the embedded sessions. An analysis of percentage changes also showed that most students perceived an improvement in their confidence in their academic literacy skills after the embedded sessions. This improvement, however, was not uniform. Students who were less confident in their abilities, prior to the intervention, were more likely to believe there had been a gain, and students who were moderately or very confident in their abilities registered lower percentage gains and were more likely to register no change or a decline in ability. This decline could be explained in terms of an initial over-estimation of academic literacy skills ability by students and the argument was advanced that the embedded sessions re-aligned students' skills ability in accordance with Higher Education expectations in Australia. Research is now needed to further explore this hypothesis.

Some skills were perceived to be better developed than others, particularly referencing and paraphrasing. Considering the positive implications that effective referencing and paraphrasing have on student performance through the prevention of plagiarism, it is suggested that these skills should be placed front and centre of embedded sessions involving international students. Students recorded lower gains analysing assessment questions, academic writing and grammar. More research is needed to explain why this occurred with the first two skills. Time-constraints explained why it was difficult to accommodate grammar input in the embedded sessions; clear and proactive promotion of post-intervention language support was advocated to provide international students with the grammar support they wanted.

Focus group findings largely supported the statistical determinations that students found the sessions useful and particular skills, namely referencing and paraphrasing, most useful. They also provided additional reasons as to why students liked the sessions. These included unit-specific input; appropriate length and frequency of the sessions; student-centred approach in the design and delivery of materials and activities; transferable skills; compulsory sessions, and a separate Moodle page which housed the academic literacy resources.

Further studies into international student perceptions are needed, but based on this exploratory study it can be concluded that the embedded sessions offered at CQUniversity are a useful starting point in developing international students' confidence in their academic literacy skills ability and in supporting them whilst they transition to university.

8. Limitations of the methodology

It must be noted that some researchers express reservations around the use of null hypothesis significance testing (Balluerka et al., 2005; Silva-Ayçaguer et al., 2010). To address such concerns, the qualitative phase of the research was conducted to complement the statistical analysis, however only eight participants' contributions converted to useable data; it is possible that students who were less positive were not represented in the focus groups. Finally, there was a limitation in the study design as the pre-post-test scale did not allow for analysis of improvements for those at the highest level of confidence in the pre-test.

9. Future studies

Future studies should seek to further explore students' perceptions of changes in their academic skills by including explicit questions about whether students believed their confidence in their skill level had improved, even if they did not think it had improved enough to go up one point on the scale; for example, from 3 (*moderately*) to 4 (*very*). It would also be helpful to further investigate the exact reasons behind perceived stagnation and decline. Qualitative research (e.g., focus groups) could be held with students who registered the same degree of confidence or lower confidence after the sessions. That way their thoughts could be better elicited, and pedagogical strategies introduced based on those findings. The perceptions of those at the highest level of confidence in the pre-test could also be better ascertained as the pre-post-test scale did not allow for analysis of improvements for this group. Finally, this study was conducted with students on campus. As a result of Covid 19, most classes involving international students are now facilitated online, so it would be insightful to analyse online international students' responses to the embedded program to determine whether they find it similarly useful or whether different pedagogical approaches are needed with this cohort.

Appendix A. Focus Group Questions

1. Did you attend the ALC sessions? Why/why not?

2. What do you think was the was aim of the ALC sessions and how did you feel about being part of the ALC sessions?

3. What did you feel about the number and duration of the ALC sessions (too many, too long, too few?

The embedded sessions aimed to improve your academic skills; for example, understanding of questions, planning, writing paragraphs, paraphrasing and referencing:

4. Which skills do you feel improved most? How did the sessions develop your skills?

5. Which skills do you feel more confident about? How did the sessions improve your confidence?

6. Which skills did you feel were not improved? Why not?

The following questions are divided into 2 sections. Firstly, your perceptions of the activities done in class. The second questions are related to resources made available to you on the ALS Moodle site, connected to your unit, that you could use in your own time.

The ALC sessions used different activities in class; for example, reading a journal article and answering questions about it, or finding instruction, key words and limiting words in a question.

7. Which of these activities did you find most useful/engaging? Why/why not?

8. Was the ALS Moodle site related to your unit useful? Why/why not? How did it help you perform better in the assignment/develop your skills?

9. Do you think the embedded sessions helped to improve your grade in your written assignment? How? Which aspects?

The ALC Moodle site had different resources: for example, PowerPoints, information sheets and quizzes.

10. Which of these resources did you find most useful in completing the assessment task? Why? How did they help you with complete the assignment/develop your skills?

11. Were the resources and materials focused enough on unit content? Why/Why not?

12. Did you make a follow-up appointment with the ALC about your assignment during or after the embedded sessions? Why/why not?

13. What suggestions do you have to improve the program -sessions, resources, activities?

14. Would you recommend the ALC embedded sessions to new students in this unit or to students in units who do not have them? Why/Why not?

Appendix B. Figures 1 to 9: Changes in pre- and post-ratings for students' perceptions of their academic literacy skills

The figures below show changes in pre- and post-ratings in students' perceptions of their academic literacy skills. A detailed explanation is given for Figure 1 which can be then applied to all other figures.

Figure 1 corresponds to Perception 1: *I am able to write a plan for assessment tasks*. Four students recorded a pre-level rating of 1 (*not confident*). After the embedded sessions, one student gave a rating of 2, two students registered a rating of 3 and one student recorded a rating of 4. This indicates that all students identified positive changes for this perception after the intervention. Thirty-seven students recorded a pre-level rating of 2 (*hardly confident*). After the embedded sessions: one student gave a rating of 2; 23 students registered a rating of 3 and 2 students recorded a rating of 4. This shows that only one student remained at the same confidence level, while all others gained in confidence after the intervention. 114 students recorded a pre-level rating of 3 (*moderately confident*). Ten students gave a post-level rating of 2; 86 students gave a post-level rating of 3 and 31 students recorded a post-level rating of 4. This shows that 10 students declined in confidence, while the majority (86) remained the at the same level and 31 perceived an increase in their confidence with this skill. When the pre-level rating is 4, we find that three students declined to a post-level confidence rating of 2; 25 students dropped to a post-level rating of 3 and 18 students remained at the same rating of 4.

Essentially, the higher the bars for a post-level rating of 2, 3 and 4, the higher the improvement when the pre-level rating is 1. For a pre-level rating of 2, the higher the bars for the post- level rating of 3 and 4, the higher the improvement. The higher the bars for a post-level rating of 4, the higher the improvement if the pre-level rating is 3.

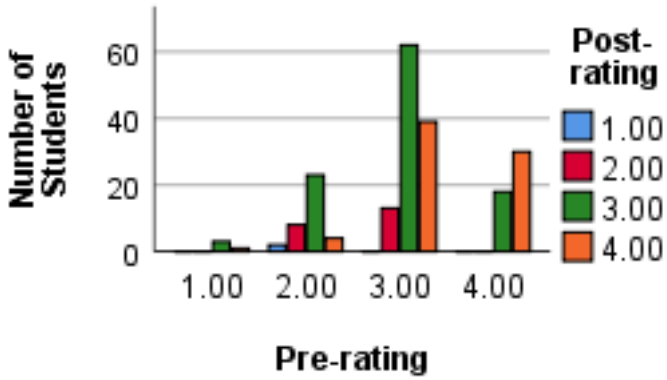

Figure 1. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception *"I am able to write a plan for an assessment task (P1)"*

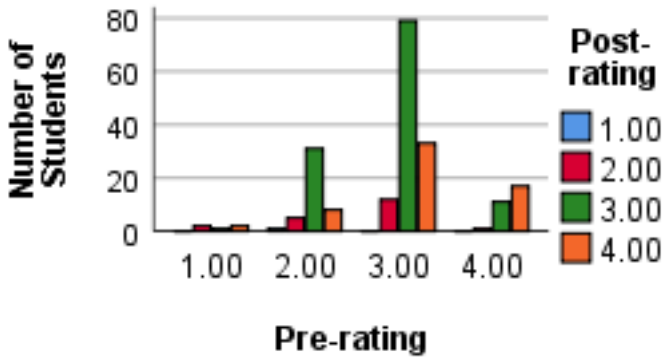

Figure 2. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I can write academic paragraphs using topic sentences and academically credible resources (P2)"*

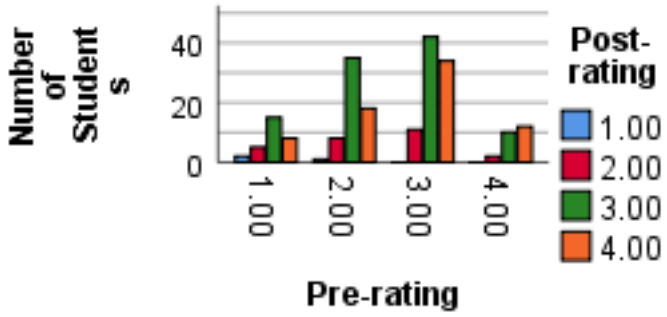

Figure 3. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "I can cite resources in-text using the university approved reference guide within an academic paragraph (P3)"

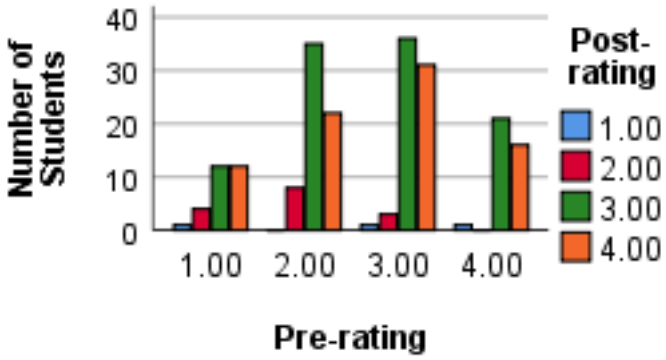

Figure 4. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I am able to write a reference list using the university approved reference guide (P4)"*

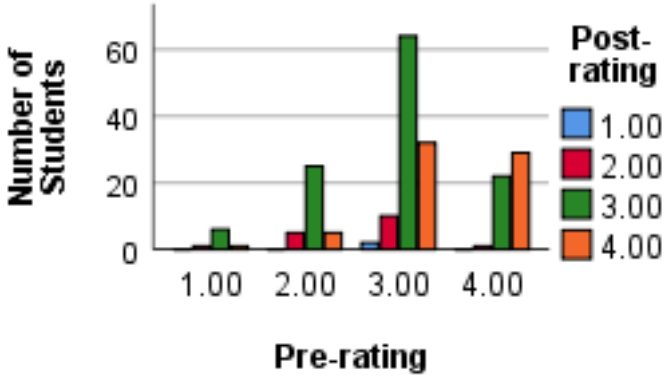

Figure 5. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I have an effective method of notetaking (P5)"*

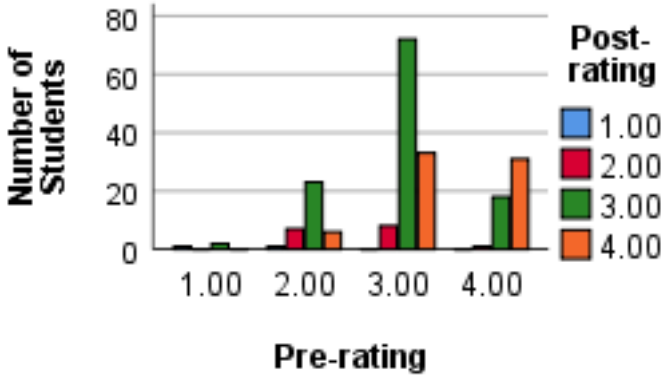

Figure 6. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I am able to write grammatically correct sentences (P6)"*

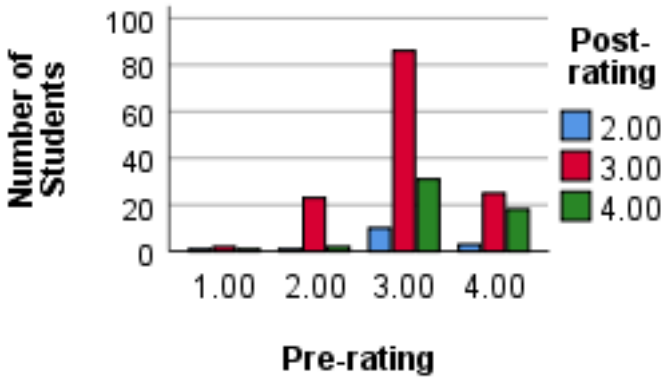

Figure 7. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I feel confident to write academically (P7)"*

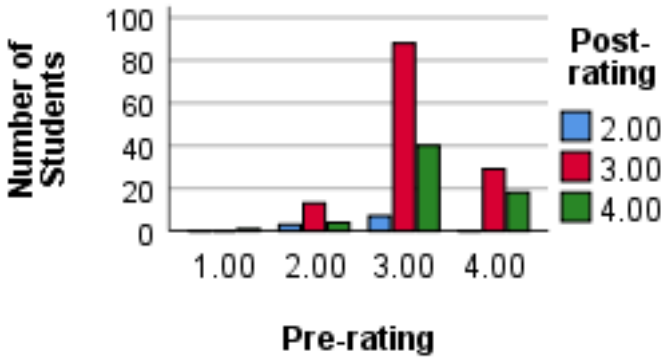

Figure 8. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I am confident at reading and analysing an assessment question (P8)"*

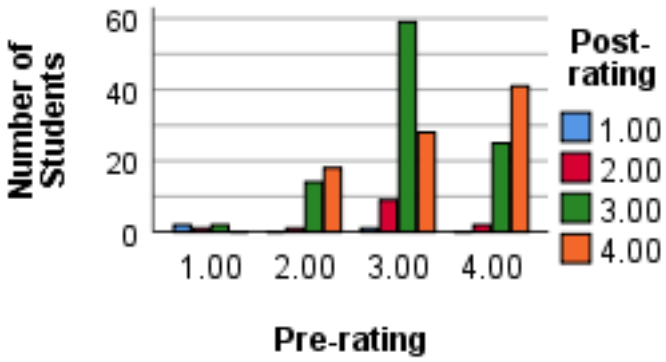

Figure 9. Changes in pre- and post-ratings in students' perceptions of their academic literacy skills for the perception "*I am confident at finding academic resources using the relevant search engines and databases (P9)"*

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