

Deep or surface learning? Perceptions of Chinese international and local students in Australian universities

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Despite the COVID-19 pandemic, Chinese international students (CIS) still constitute the largest international population in Australian higher education. Yet limited research has examined the lived learning experience of CIS and local students in Australian universities. Underpinned by Biggs, Kember and Leung's (2001) 3P model of learning, this article explores the perceptions of CIS regarding their approaches to learning in Australian universities, as compared with Australian domestic students (ADS). Surveys incorporating the *Revised Study Process Questionnaire* (R-SPQ-2F) were conducted with 156 CIS and 212 ADS from two Australian universities. The findings demonstrated that perceived disparities existed between the two cohorts in terms of their approaches to learning. These disparities, however, did not support the well-documented view of CIS as mainly surface oriented learners but rather as more rounded learners than ADS in their learning approaches. This study gave voice to CIS to reflect on their learning in Australian universities, in conjunction with and supplemented by insights provided by their Australian student counterparts. It also enabled a greater understanding of CIS learning in Western universities, particularly in Australian universities.

Introduction and background review

An established body of literature already exists on “the Chinese learner” (e.g., Grimshaw, 2007; Heng, 2018; Ryan, 2016; Wu, 2015), an umbrella term loosely used to refer to all learners from Chinese-speaking backgrounds or sharing Confucian heritage cultures including students from China (Wu, 2015). For the purposes of this study, Chinese international students (CIS) were defined as native-born who had lived and been educated in mainland China, and who came to Australia to pursue an undergraduate degree in an Australian university. Another requirement was a valid Non-immigrant Student Status Authorisation, with a Chinese dialect as their native tongue. Australian domestic students (ADS), as a comparable cohort in this study, comprised domestic undergraduates in Australian universities, with English as their first language.

With internationalisation commonplace in Australian universities (Tian & Ni, 2018), in 2019 more than 160,000 CIS were enrolled in the higher education sector (Hilton, 2020), which according to Martin (2019), “accounted for 37.3%” of international enrolments in that sector (p. 3). Although the COVID-19 pandemic and associated border closures resulted in a sharp decline, 60,000 CIS are still studying in Australian universities (DESE, 2021). As such, an important consideration is to understand how these students approach their learning in the Australian environment, which differs from the Chinese education system and may prove challenging for some (Brunton & Jeffrey, 2014; Ryan & Dogbey, 2012).

The student approach to learning

The conceptions of learning were first initiated by Saljo (1979), then established by Marton et al. (1993), and expanded by Hattie and Marsh (1996) in a hierarchical category. Marton et al. (1993) categorised five (later extended to six) “qualitatively different” conceptions of learning, through which students are assumed to move from the lower level to a higher stage during their study at university (Haggis, 2003, p. 90), as illustrated in Figure 1.

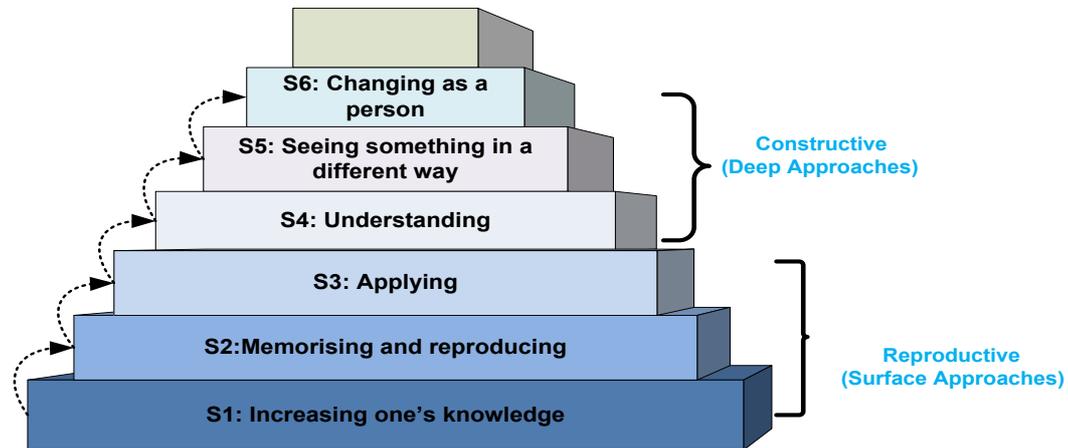


Figure 1: A hierarchy of conceptions of learning

Note: S stands for ‘stage’. Based on Dart and Boulton-Lewis (1998, p. 225).

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These conceptions of learning were further reduced into two categories by Van Rossum and Schenk as “reproductive approach” and “constructive approach” (Dart & Boulton-Lewis, 1998, p. 225), and further identified by Haggis (2003) as ‘surface learning’ and ‘deep learning’, which resonated with Marton and Saljo’s (1976) student approach to learning (SAL) framework. Marton and Saljo (1976) originally identified two learning approaches: deep approach (DA) and surface approach (SA), with an attempt to distinguish learning for meaningful comprehension and for the purpose of reproduction. Biggs (1987) emphasised that a learning approach was a “complex of motivation” on learning, together with students’ selecting “appropriate strategies” to learn (p. 104). According to Marton and Saljo (1976), deep approach invokes learners’ intrinsic intention to comprehend the meaning of learning tasks while surface approach induces learners’ extrinsic intent toward the task itself. Haggis (2003) argued that, when the conception of accumulating, memorising and applying ‘quantitative’ knowledge are adopted, as indicated in the three bottom levels in Figure 1, a surface learning is likely to occur (p. 90).

In contrast, when the conceptions of abstracting, understanding reality, or developing as a person are applied, as illustrated in the top three levels in the hierarchy, a deep learning is more likely to take place. Haggis (2003) suggested that conceptions of learning and approaches to learning are linked by how students perceive their learning context, which is

ultimately related to their learning outcomes. Likewise, one's perceptions of the learning environment impacts on their choice of learning approach, which, conversely, influences how one makes sense of the learning context. Literature highlights the following differences between deep and surface learning as summarised in Table 1.

Table 1: Documented differences between deep learning and surface learning

Differences	Deep learning	Surface learning
Learning intention	Understanding (Baeten et al., 2010)	Reproduction (Biggs, 1987)
Learning strategies	To understand (Biggs, 1987)	To memorise (Biggs et al., 2001)
Learning motivation	Intrinsically motivated (Baeten et al., 2010)	Extrinsically motivated (Baeten et al., 2010)
Learning outcome	Engagement and satisfaction (Biggs, 1988)	Alienation and dissatisfaction (Biggs, 1988)

Although the SAL theory, frequently regarded as “orthodox theories” (Robison, 2018), has been widely employed in education, the deep and surface dichotomy has been critiqued as being “crude” (Marton et al., 1993, p. 283). In Webb’s (1997) view, surface and deep approaches actually form a continuum of learning, progressive, “constant” and “indeterminate” (p. 205). That is, one may commence with surface learning, and move towards deep learning, or vice versa, depending on the dynamics in the teaching-learning environment (Asikainen & Gijbels, 2017; Dolmans et al., 2016). As contended by Webb (1997), the distinction between deep and surface learning is socially and culturally contextualised. According to Biggs (1994), “if deep learning is related to learning the relevant task, then what is ‘relevant’ could only be decided upon how it is culturally defined” (p. 47). Thus, students from different backgrounds might not make sense of learning as intended. Biggs (1988) once warned that, although deep or surface approaches to learning tend to be characteristic of students over time, some ‘situational pressures’, such as tasks presented, teaching methods and workloads, could create a considerable effect on their adoption of a specific approach.

As is evident, the dichotomised categorisation of deep and surface approaches to learning has created a degree of polarisation. Nevertheless, this dichotomisation was considered on balance in this research to be an appropriate method for discerning differences between the two cohorts of learners (i.e., CIS and ADS) that have traditionally been perceived as fitting into this dichotomy.

Chinese international students’ learning

A number of different approaches to learning are evident in the literature on Chinese students studying in Western universities (e.g., Heng, 2018; Ryan, 2016; Wu, 2015). In particular, the phenomenon of the ‘Chinese paradox’ has been well documented (e.g., Biggs, 1994; Tan, 2011). Some scholars (e.g., Heng, 2018; Ryan, 2016) point out that, although students from China constitute the largest international tertiary student population in some Anglophone universities in the USA, the UK and Australia, much discourse around them tends to focus on their apparent lack of particular Western

“academic knowledge and values” (Ryan, 2016, p. 13). Two categorisations of CIS were common in the literature, one focusing on deficiencies and overuse of surface, rote and passive approaches to learning (Beckett, 2012; Ryan, 2016). Wu (2015) also noted that Chinese students have, at times, been described as relying on simplistic, low-cognitive memorisation strategies, resulting in surface learning, characterised by reception, repetition, review and reproduction, suggesting a lack of ‘critical thinking skills’. This perception, however, had been critiqued by scholars, such as Heng (2018) and Ryan (2016), as lacking understanding of Chinese students. A second categorisation highlighted the comparative superiority of CIS, as noted by Grimshaw (2007). For example, Chinese students have been found to outperform their peers in mathematics and science (Biggs, 1994; Mullis et al., 2007), accountancy (Cooper, 2004), reading literacy (Mullis et al., 2007), and even in adoption of higher-level strategies (Brown et al., 2016, Leung et al., 2008). The incompatibility of these two narratives underpins the construct of the ‘Chinese Paradox’, an enigma which has perplexed Western scholars who question how Chinese students can achieve when adopting approaches to learning generally considered inferior by Western educators (Biggs, 1994; Cooper, 2004).

In terms of learning differences between Chinese and Australian students, literature recurrently portrayed them as “exclusive and definable” (Xu, 2016, p. 30), and contrasted their learning approaches as discrete, homogeneous and even unchanging (Ryan & Louie, 2007). Within this binary conceptualisation, the Chinese way of learning has been depicted as ‘passive’, achieved mainly via rote memorising that is predominantly ‘teacher-centred’ (Wong et al., 2015; Wu, 2015), spoon-fed and ‘product-focused’ (Li, 2009). Australian students, on the other hand, are conventionally depicted as individualistic active learners, who are ‘learner-centred’ (Evans & Stevenson, 2010), inquiry-based and ‘self-directed’ (Guan & Jones, 2011), focusing more on the learning process.

Ryan (2013) attributed these stereotypes to Western academics’ misinterpretations of CIS’ specific behaviours during their initial adjustment to the new learning contexts and expectations in Western universities. Wang (2013) identified the misunderstandings of Chinese students as “Confucian confusions” (p. 61), and stressed the dynamic changes happening in Chinese educational contexts. The terminologies of ‘Chinese’ or ‘Asian’ learners have, in fact, been rejected by some scholars as “outmoded” and “unhelpful” in characterising Chinese students’ learning (Ryan, 2016, p. 11) and grounded on the flawed assumption of homogeneity.

While Chinese students’ learning needs and characteristics have received particular research attention (Heng, 2018; Perry, 2015; Xu, 2019), limited research has examined the lived learning experience of CIS and their Australian counterparts in Australian universities (Wang et al., 2015). As such, this study aimed to address the following questions:

1. What typifies Chinese international students’ approaches to learning in Australian universities as compared with their Australian peers?
2. Do CIS report using mainly deep or surface learning approach?
3. How does this compare with ADS?

It was anticipated that this study could assist CIS to better understand how they learned in comparison to their Australian peers so they could not only survive, but thrive, in Australian higher education.

Methodology

Theoretical lens of presage-process-product (3P) model

This study was underpinned by Biggs et al.'s (2001) 3P model of learning. According to Biggs (1993), student learning is composed of three stages that are relational. The presage stage, consisting of students' personal factors and the contextual environments in which they are situated, determines the process stage, namely how students approach their learning, which ultimately determines the product stage, i.e., the quality of students' learning outcomes. Ak (2008) interpreted approaches to learning in the 3P model as a combination of "preferred, ongoing and contextual" approaches (p. 714). A preferred approach, as asserted by Ak (2008), involves "how individuals differ within a given teaching context (presage)", while ongoing approaches are concerned with "how specific tasks are handled by students (process)", and contextual approaches deal with "how teaching contexts differ from each other (product)" (p. 714).

The 3P model highlights that student approaches to learning are determined by a number of variables, and that learning approaches, as a mediating link between the presage and the product, are influenced by student characteristics, learning environment, and learning outcomes. The implication is that "if proper strategies are applied, it might be possible to move students' learning approaches from a surface to a deep orientation" (Ak, 2008, p. 717).

Surveys as research tool

Surveys were adopted to collect data regarding CIS' and ADS' learning approaches. The surveys comprised four parts. Part A involved demographics while Part B was an adapted version of Biggs et al.'s (2001) *Revised Two-factor Student Process Questionnaire (R-SPQ-2F)*. Part C investigated CIS' (Appendix A) and ADS' (Appendix B) perceptions about the approaches to learning adopted by their counterparts highlighting differences outlined in the literature between Chinese and Australian students. Part D included open-ended questions. The CIS survey (Appendix A) was prepared bilingually so that respondents could choose their preferred language (Mandarin or English) to respond.

Ethics approval was granted from the Human Research Ethics Committee (HREC) of Federation University Australia with approval reference number 18-144A. One of the conditions of the ethics application was that the two Australian universities involved in the study would remain anonymous. The rationale for this decision was to attempt to protect the identities of lecturers or students who were interviewed. Consistent with this decision, some cited references which include the name of either university have been amended to 'Metro University' or 'Regional University' ('MetroUni' or 'RegionalUni').

Participants in this research were recruited from one “Group of Eight” metropolitan university (“MetroUni”), and one regional university (“RegionalUni”). The two universities were selected for their large number of internationals, with around 40% (40,442) internationals in 2020 in MetroUni, contrasting with 60% (45,482) of domestic students (Metro University, 2021), and 51% (8,467) in 2020 in RegionalUni, contrasting with 49% (8155) of local students (Regional University, 2021). A ‘purposive sampling method’, as termed by Teddlie and Yu (2007), was adopted to recruit participants, because this method helps “achieve representativeness or comparability” of data (p. 81). The research was conducted using the online platform *LimeSurvey*, over a period of one university year (from March 2019 to February 2020) involving two cohorts of undergraduates (CIS and ADS) aged over 18. This timing was scheduled considering that students, especially CIS, who had completed at least one full semester in an Australian university, could adequately report their lived learning experience, and use periods of university campus closures due to COVID 19 to reflect on their approaches to learning.

A total of 368 valid survey responses were utilised, 156 being from CIS and 212 from ADS participants, of which 226 (61.4%) were female and 142 (36.8%) were male. A range of disciplines was represented as outlined in Table 2 and there was representation from a range of year levels, with most (64%) participants in the first or second year of their undergraduate degrees. Of the 212 ADS respondents, only 45 (21.2%) had ever been to China, and just over half of the cohort (114 or 53.8%) reporting that they had CIS in their university classes, although 138 (65.1%) reported previous educational experience involving CIS.

Data analysis and findings

The R-SPQ-2F validation

The R-SPQ-2F is a self-report questionnaire consisting of 20 items measuring four subscales, namely deep motive (DM), deep strategy (DS), surface motive (SM) and surface strategy (SS). Each subscale contains five items with the statement describing a particular learning behaviour, to which participants were asked to rate themselves on the scale indicating the degree of their agreement or disagreement with particular statements ranging from 1= ‘Never true of me’ to 5= ‘Always true of me’.

Data were entered into *SPSS 25* software, and the principal component analyses with varimax rotation were performed to validate the reliability of the R-SPQ-2F for the CIS and ADS sample respectively (Appendices C and D). It was found that the two-factor construct of the R-SPQ-2F had a good fit for both samples, with each containing 10 items in the two overall dimensions of deep approach (DA) and surface approach (SA), consistent with Biggs et al.’s (2001) validation of those scales. However, further validation discovered none of the four subscales of DM, DS, SM and SS included matching items for comparison between the two student cohorts.

The coefficients for the CIS sample were .80 for DA and .77 for SA, and for ADS were .78 and .74, with all meeting the requirement for acceptability proposed by Pallant (2016).

Therefore, the construct of the DA and SA dimensions in the current study was considered reliable for both samples. This implies that the two-construct of the R-SPQ-2F fits better with the current two samples than the one with sub-constructs of learning motivation and learning strategies, supporting earlier research by Justicia et al. (2008) and Xie (2014). As a result, it was decided to compare the learning differences between the two cohorts using the two broad categories of DA and SA in the following analysis.

Differences in learning approach between CIS and ADS

To determine whether differences existed between CIS and ADS regarding their perceptions about deep or surface learning in relation to their own learning, independent-samples *t*-tests were conducted to compare the mean scores of the two cohorts in the R-SPQ-2F. Preliminary testing ensured that assumptions relating to normality and homogeneity were met. Notably, CIS and ADS did not differ significantly in scores for DA between the CIS sample ($M=29.24$, $SD=5.89$) and the ADS sample ($M=29.00$, $SD=5.75$) with $t(366)=.387$ and two tailed $p=.70 >.05$. However, the result revealed that the two cohorts were significantly different in terms of SA (CIS: $M=35.62$, $SD=5.90$; ADS: $M=33.68$, $SD=5.81$, $t(366)=3.15$, and $p=.002 <.05$, two tailed), indicating an observable disparity. The calculated effect size was $d=.33$, which indicated a medium difference between the SA scores for the two cohorts. As such, this *t*-test indicated a moderate degree of difference between CIS and ADS in terms of utilisation of a surface approach to their learning but no real difference in terms of use of a deep approach.

Differences in learning approach between students from different universities

In this study, 147 respondents were recruited from RegionalUni (31 CIS and 116 ADS), and 221 from MetroUni (125 CIS and 96 ADS). To examine whether disparity existed in learning approaches between CIS and ADS from the two universities, multivariate analysis of variance (MANOVA) was conducted. Prior to MANOVA, assumptions were checked for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted. A one-way between groups MANOVA was conducted with DA and SA as dependent variables and universities (MetroUni and RegionalUni) and student cohorts (CIS and ADS) as independent variables. The analysis illustrated a statistically significant difference between student cohorts on the combined variables, i.e., learning approaches (DA and SA) and Australian universities with $F(2, 363)=4.20$, $p=.016$, Wilk's Lambda=.98, partial eta squared=.023. This result demonstrated that students (with CIS and ADS combined) in the two universities under investigation were disparate in their use of learning approaches (with DA and SA combined), although the difference was only small (with $p=.016 <.05$, and $(\eta^2)=.023 <.2$). However, when the dependent variables (DA and SA) were assessed individually, the only disparity to reach statistical significance was SA with $F(1, 364) = 8.13$, $p=.005 <.05$. Employing a Bonferroni adjusted alpha level of $.05/2=.025$, the partial eta squared=.022 was smaller, which, as suggested by Pallant (2016), indicated students in the two universities were specifically different in term of SA yet with no obvious difference found in terms of DA. A closer inspection of the mean scores implied that surface learning made a slightly bigger difference for MetroUni ($M=34.58$, $SD=5.70$) compared with RegionalUni ($M=34.38$, $SD=6.26$).

While statistical difference did exist in learning approach among students in the two universities, this analysis indicated it was only in relation to students' use of a surface approach to learning, supporting the *t*-test results.

Differences in learning approach between students studying different degrees

To determine whether discipline had an impact on learning approach, a MANOVA was conducted based on their discipline areas, which were collapsed into five broad discipline areas for conformity with university descriptors. Table 2 demonstrates the breakdown of discipline areas by student cohort with double degrees recorded as a single discipline based on their first degree in the faculty.

Table 2: Students' degrees sorted by schools or faculties

Participant	HASS	BCM	STEM	HS	ED	Total
CIS	10	109	26	1	8	154
ADS	71	47	47	35	10	210
Total	81	156	73	36	18	364

Note: HASS: Humanities, Arts and Social Sciences; BCM: Business, Commerce and Management; STEM: Science, Technology, Engineering and Mathematics; HS: Health Sciences; ED: Education.

Of the 368 survey participants, 154 CIS and 210 ADS data were valid for MANOVA analysis. A one-way MANOVA was conducted after assumption checks, with DA and SA as dependent variables, and disciplines (i.e., HASS, BCM, STEM, HS and ED) and student cohorts (CIS and ADS) as independent variables. This analysis demonstrated a statistically meaningful difference between student cohorts on the combined variables, namely learning approaches (DA and SA combined) and disciplines, $F(2, 353)=8.45$, $p<.01$, Wilk's Lambda=.95, partial eta squared=.046. The results indicated that students studying different disciplines were discrepant in their use of learning approaches. However, when DA and SA were assessed individually, significant differences were found in both disciplines and student cohorts only in the terms of SA, with no significant difference in terms of DA, by employing a Bonferroni adjusted alpha level of $0.05/2=.025$, with $F(4, 354)=2.93$, $p=.021$, partial eta squared=.032 on disciplines, and $F(1, 354)=16.89$, $p<.01$, partial eta squared=.046 on student cohorts. That is, students studying various disciplines differed in the adoption of a surface approach. A closer look into the mean scores implied that disciplines made a slightly bigger difference in the SA score with CIS ($M=35.66$, $SD=5.91$) than ADS ($M=33.68$, $SD=5.83$). However, these results need to be interpreted cautiously due to the vast majority of participants being associated with BCM disciplines and unbalanced number of participants in different disciplines.

Learning characteristics perceived by counterparts

Part C of the surveys investigated how CIS and ADS mutually perceived their learning approaches. A 4-point Likert scale, ranging from 1 = strongly disagree to 4 = strongly agree, was utilised to rate 11 items. As previously mentioned, of the 212 ADS who participated in the survey, 138 (65.1%) reported having classroom experience with CIS

during their education while 74 (34.9%) reported having no such experience. Thus, independent-samples *t*-tests were first conducted, and demonstrated that ADS who had reported no prior experience of working with CIS had significantly different perceptions of how CIS approached their learning. Therefore, in order to enhance the accuracy of this study, it was decided to only include ADS who reported having some educational experience with CIS in the subsequent analysis. Consequently, 156 CIS and 138 ADS were included in a second round of *t*-tests, with results presented in Table 3.

Table 3: *t*-tests of learning characteristics perceived by counterparts

Item	Participant	Mean	SD	<i>t</i>	df	Sig. (2-tailed)	<i>d</i> value	MD
1. Highly motivated in career path	CIS	2.77	.87	-4.07	292	.000	.48	-.38
	ADS	3.16	.75					
2. Rare use of rote learning	CIS	2.37	.91	-.48	292	.63	-	-.05
	ADS	2.41	.78					
3. Use of memorising	CIS	2.60	.92	-2.80	281	.01	.32	-.26
	ADS	2.86	.66					
4. Inquisitive learning	CIS	2.69	.97	-2.06	291	.04	.24	-.21
	ADS	2.91	.81					
5. Critical learning	CIS	2.42	.91	.70	292	.49	-	.07
	ADS	2.36	.74					
6. Self-directed learning	CIS	2.78	.93	1.29	292	.20	-	.13
	ADS	2.64	.80					
7. Interest guided learning	CIS	2.83	1.00	3.52	289	.00	.41	.37
	ADS	2.46	.79					
8. Preference for student-centred learning	CIS	2.86	.99	4.00	282	.00	.46	.40
	ADS	2.46	.73					
9. Activeness in questioning	CIS	2.85	1.05	6.44	291	.00	.75	.72
	ADS	2.12	.88					
10. Engagement in group discussions	CIS	2.81	1.00	6.00	292	.00	.70	.66
	ADS	2.15	.87					
11. Confidence in challenging lecturers	CIS	2.78	.99	5.18	292	.00	.60	.57
	ADS	2.21	.88					

Notes: MD (Mean difference) = Mean (CIS) - Mean (ADS); *d* value refers to Cohen's *d*

As demonstrated in Table 3, four items (Items 2, 5 and 6) had *p* values higher than .05, indicating no statistically significant differences in these items. The MDs of the four items were between .05 to .13, which were very small, further indicating no significant disparity between CIS and ADS in these respects. However, seven items (Items 1, 3, 4, 7, 8, 9, 10 and 11) had statistically significant differences in ratings as highlighted in bold in Table 3. The *p* values were between .00 to .04, signifying that CIS and ADS had significantly discrepant perceptions towards each other in these items. Effect sizes for these seven items ranged from small (above .2) for items 1, 3, 4, 7 and 8 to medium (above .5) for Items 9, 10 and 11, but none could be considered large (above .8).

As such, shared perceptions of each other were evident in relation to reliance on rote learning, critical learning and self-directed learning. However, CIS and ADS perceived differences between themselves in terms of motivation for career path, use of memory in learning, inquisitive learning, interest guided learning, preference for student-centred learning, activeness in questioning, engagement in group discussions and confidence in challenging lecturers. Table 4 summarises the main differences in learning characteristics between them based on the *t*-tests.

Table 4: Summary of differences in learning characteristics between CIS and ADS

Item in Table 3	CIS	ADS	Effect size of disparity
1. Highly motivated in career path		More	Small ($d=.48$)
3. Use of memorising	More		Small ($d=.32$)
4. Inquisitive learning	More		Small ($d=.24$)
7. Interest guided learning		More	Small ($d=.41$)
8. Preference for student-centred learning		More	Small ($d=.46$)
9. Activeness in questioning		More	Medium ($d=.75$)
10. Engagement in group discussions		More	Medium ($d=.70$)
11. Confidence in challenging lecturers		More	Medium ($d=.60$)

Note: *d* refers to Cohen's *d*

Perceptions of each cohort in relation to aspects of learning associated with the other cohort indicated a shared understanding that CIS tended to use memory more in learning and were more likely to be inquisitive learners, but effect sizes in each instance were small. ADS were perceived as having more of the other six characteristics (1, 7, 8, 9, 10, 11) in Table 4, all with effect sizes that were either medium or close to medium. As such, there appeared to be an acknowledgment amongst the student cohorts that there were differences in how they learned.

Learning difference perceived by each other

Open-ended questions in the surveys examined students' shared perceptions of learning differences, resulting in 102 responses from the 156 CIS participants and 152 responses from the 212 ADS. Thematic analysis using *NVivo12* software was utilised to identify themes and sub-themes as outlined in Table 5.

As evident in Table 5, the greatest disparity in the mutual perceptions about learning difference between CIS and ADS lies in the depth of learning. CIS were perceived by ADS as being more memory-based, focusing more on 'textbook reading', and 'likely memorising information such as lecture notes'. Similarly, ADS were reported by CIS as tending to process more deeply, 'digesting content in a variety of ways, i.e., reading, audio, hands on/ practice', possibly due to their advantage of studying in their native tongue.

Table 5: A summary of learning differences perceived by each other

Theme	Subtheme	CIS' learning perceived by ADS		ADS' learning perceived by CIS	
			Mentioned by ADS		Mentioned by CIS
Learning style	Interactive /group learning	Individual learning: solitary study, going alone; less collaboration	33	Group learning: many discussions and interactions; learning socially; more collaborative with peers	25
	Participation in class activity	Less active learning: keeping reticent; seldom challenging others	32	More active learning: switched on; engaged in classroom activities	21
	Effort put into learning	Focused learning: dedicating much time to course work with longer study hours; more stressed	29	Relaxed learning: laid back in learning with less time put on study; leading a more flexible life	14
	Technology-based learning	Less online learning: less excited about online learning	7	More virtual learning: adept at learning online	7
Learning approach	Depth of learning	More memory-based learning: likely memorising information; more language-focused	40	More understanding learning: seeking a thorough understanding; digesting content in varied ways	21
	Motivation in learning	More outcome-oriented: less attending learning process; less applicable to real life	8	More interest-/practice-based learning: learning out of interest; learning more for real use	10
Learning outcome	Learning efficiency	Comparatively less efficient for language barrier.	3	More efficient in study, spending less time on course learning	4

As one CIS respondent from RegionalUni reported:

Because ADS do not have language problems, they could easily understand what teachers have taught. Therefore, they tend to explore more deeply what they have learnt. We [CIS] have to first try to understand what is being taught.

The second greatest difference between the two cohorts related to interactive/group learning. CIS were reported by ADS as being more solitary learners, whilst ADS were perceived by CIS as more interactive and engaging in group work and discussions. This factor of group learning, or 'community learning' as termed by some CIS, was, in fact, the most mentioned response by CIS as the biggest difference with ADS. Mention was made by CIS of how 'local students preferred studying in communities' with abundant discussions while Chinese students like studying 'individually' or 'studying alone'.

The third distinction related to participation in class activities, with ADS noting that CIS seemed to be reluctant participants in classroom conversations. A RegionalUni ADS participant stated:

As an Australian student, I have been raised to interact and challenge my peers and teachers and to ask questions about things I am unsure of. My understanding of Chinese culture, especially in the more traditional sectors of the society, is that this is the exact opposite.

Similarly, the CIS also recognised ADS as active and communicative learners, with more interactions, offering answers, asking questions and challenging lecturers or peers. As one CIS participant from MetroUni wrote, 'domestic students are switched on in class, and happy to air their opinions even if they might be wrong', and they tend to 'challenge lecturers more than CIS'.

Another difference noted by the two cohorts related to the degree of effort put into learning, with both reporting CIS would occasionally experience language barriers in their study, and thus were more focused in learning while ADS were comparatively more relaxed. As one CIS from MetroUni commented, 'they [ADS] usually had a better time schedule and work-life balance. Not like most Chinese, including me, who took all the availability of time to study and ignored other activities'.

Additionally, motivation, technology use, and learning efficiency were also raised as differences between the two cohorts. ADS were perceived by CIS as interest-and/ or practice-based learners, with a greater acceptance of virtual learning, while CIS were noted by ADS as outcome-based learners who were less adept at 'technology-based learning'. One CIS respondent from RegionalUni stated:

Most ADS are primarily interest-oriented in their learning. In China, students are more exam-focused, where we [CIS] learnt to get a better ranking at school while in Australia, it is more important to integrate knowledge into life.

Discussion

CIS' learning approach: Deep or surface learning?

This study demonstrated that Chinese students, irrespective of their universities or disciplines in Australia, were noted to adopt more of a surface approach to learning than Australian students but also were virtually identical in terms of utilising a deep approach to learning. This finding contradicts previous research that identifies Chinese students as surface learners in comparison with Australian students. Watkins et al. (1991) found that Chinese students were predominantly perceived by their Australian lecturers as rote learners characterised by a heavy reliance on memorising and lack of insight and understanding. This result also differs from Biggs' (1994) studies, in which he identified Chinese students (Hong Kong sample) as displaying lower surface yet higher deep and achieving approaches to learning than Australian students. However, this finding resonates with the study of Brown et al. (2016), which discovered significant differences in the use of a surface, but not deep, approach to learning between Australian and Chinese students (once again a Hong Kong sample).

Leung et al. (2008) also found that Chinese students had a higher inclination to adopt both surface and deep approaches to learning in comparison with their Australian counterparts, demonstrating greater balance in their learning process. Similarly, Watkins (2000) contended that Chinese students were capable of combining memorising and understanding strategies to achieve desired outcomes. This finding also accords with the argument of Dinsmore and Alexander (2012) and Xie (2014) that Chinese learners may adopt any learning approach rather than a single one in order to achieve the most in their study.

In fact, the binary descriptions previously popularised among CIS and ADS have been criticised as being simplistic, or even “misleading” for the neglect of the complexities and diversity of philosophies of education within and between the two educational systems (Ryan & Louie, 2007, p. 404). Scholars like Wong et al (2015) and Xu (2016, 2019) evidenced that Chinese students’ learning approaches and preferences are personally predisposed, culturally determined, and situationally modified, and these potentially contrast with Australian students’ learning approaches. Wu (2015) challenged the common assumptions about Chinese students in Western higher education by uncovering the underlying reasons for their learning behaviours, asserting that Chinese students’ approach to learning is a complex composite with external factors such as socio-historical, cultural, and academic contexts, interacting with internal factors such as each student’s previous experience, aspirations and motivation for learning.

CIS’ memorisation

Discourse on Chinese students’ learning approach often focuses on the function of memorisation in their learning process (Heng, 2018). The current study implies that Chinese students do resort to the mechanism of memorisation more often than Australian local students, which seems consistent with much of the literature (e.g., Biggs, 1996; Heng, 2018; Li, 2015; Wu, 2015). Indeed, Chinese students have been widely observed employing strategies which appear to be rote, and from a Western framework, such strategies are associated with a surface approach (Kember et al., 1999). However, the current study highlighted that CIS tend to incorporate the memorising strategy with understanding. This finding was ascertained by the *t*-tests on students’ mutual perceptions of their learning approach, where no difference was found in rote learning (Item 2, Table 3) and critical thinking (Item 5, Table 3) when CIS’ responses to the survey were compared with that of ADS.

While explaining the guiding principle of the ‘surface approach’ in SAL theory, Biggs (1993) pointed out that a surface approach was conceptually based on the intention that is “extrinsic to the real purpose of the task”, whose strategy arises from “‘satisficing’, instead of ‘satisfying’ task demands by investing minimal time and effort consistent with appearing to meet requirements” (p. 6). Biggs remarked on the common assumption that the presence of memory *per se* means the adoption of a SA is incorrect, which, according to him, “depending on context, may be part of a deep or an achieving approach” (Biggs, 1993, p. 7). He further commented that Chinese students tend to believe that understanding comes through memorisation, and clearly this intention is “to deepen

understanding, [and] a memorisation strategy in this case becomes part of a deep approach” (Biggs, 1993, p. 7).

The current study thus points to the peculiarity of memory use in CIS’ learning approach. As argued by Entwistle and Entwistle (2003), there exists ‘an interface’ of memorising and understanding in the Chinese learning structure, which affords them the capability to combine the two strategies to deepen their learning. McMahon (2011) further highlighted that the strategy of memorising has long been enclaved into Chinese culture, and deviates from the Western conception of ‘rote learning’. Cooper (2004), in his study of Chinese accounting students, suggested the Chinese tradition of memorisation is a way to consolidate understanding and achieve high levels of academic performance. Wong (2012) also argued that Chinese repetitive learning functions differently from the Western notion that memorisation can obstruct understanding, which actually leads to deep learning. This viewpoint concurs with the arguments by Tan (2011) and Cooper (2004), which unanimously argued that memorisation was a significant part of learning in the Confucian culture as a typical strategy to further understanding, and thus should not be deemed as rote learning.

As such, the current study confirms what is implicated in much of the literature that Chinese students rely more on the mechanism of memorisation than their Western counterparts (e.g., Biggs, 1996; Li, 2015; Tan, 2011; Wong et al., 2015; Wu, 2015; Xu, 2016). However, as pointed out by Conrad and Dunek (2012), frequently Chinese students are found to utilise memorisation in their process of learning, but this does not mean they are surface learners.

Limitations

There were some limitations associated with this study, as it only provided a single snapshot in time of perceptions of CIS and Australian local students. The main limitation relates to the limited number of universities (two) involved, meaning representation was definitely bounded. While efforts were made to include more universities, it was not possible to attain the required consent to meet the ethics requirements of the granting university. Thus, any future study should involve a more representative sample of Australian institutions. Similarly, while the survey sample size was sufficient for statistical analyses, higher numbers could have improved the accuracy of the analytical procedure. The unbalanced sample size between CIS and ADS, particularly in terms of different disciplines, limited the findings in relation to specific disciplinary differences in students’ learning approaches. Another limitation was the absence of analysis of participant diversity, such as CIS’ birth locale and prior experience of Australian education, due to limited and uneven participant numbers. A final limitation related to the inability to examine the subscales within the R-SPQ-2F due to the factor analysis identifying validity issues for the current data sets yet inclusion of the four subscales is likely to enhance the explanatory power of the study’s analytical procedures.

Conclusion

This study investigated how CIS and ADS perceived their approaches to learning in Australian universities. Although a number of discrepancies were evident in their approaches to learning, they did not support the notion associated with ‘Chinese learners’ in previous literature. Rather than relying heavily on surface approaches, CIS demonstrated use of a combination of surface and deep approaches, suggesting that their approach is more rounded than current literature suggests.

This study contributes to the literature, first, by enriching understandings around SAL theory. By examining the nature of deep and surface learning practised by CIS, this study confirms that the mechanism of memorising, which originally was assumed into the category of ‘surface learning’, can be subsumed into either ‘deep or surface learning’, depending on its relationship with understanding. Second, this study provided a voice to current Chinese students but also sought the opinions of local students to provide comparative points of view. It enables both CIS and ADS the opportunity to reflect on possible cultural impacts on learning, hopefully improving their capacities to act as effective global citizens.

Furthermore, while this research sheds light on how CIS approach their learning in Australian higher education, it is anticipated that the findings would be more broadly applicable to Western higher education in general. Such an understanding is imperative for institutions, such as those in Australia, that have experienced a dramatic decline in international student numbers, particularly CIS, during the COVID-19 global pandemic. As Martin (2020) proposed, “now is the time to take decisive action to shape perceptions of the international student experience in Australia to support market recovery post-crisis” (p. 3). The CIS’ insider perceptions of their learning experiences informs Australian educational institutions with a deeper understanding of how to create a more welcoming and supportive university environment for future commencing international students.

Acknowledgement

Boli Li was supported by a tuition-fee scholarship from the Faculty of Education and Arts, later the School of Education, Federation University Australia.

References

- Ak, S. (2008). A conceptual analysis on the approaches to learning. *Educational Sciences: Theory & Practice*, 8(3), 707-720. <https://files.eric.ed.gov/fulltext/EJ837764.pdf>
- Asikainen, H. & Gijbels, D. (2017). Do students develop towards more deep approaches to learning during studies? A systematic review on the development of students’ deep and surface approaches to learning in higher education. *Educational Psychology Review*, 29, 205-234. <https://doi.org/10.1007/s10648-017-9406-6>

- Baeten, M., Kyndt, E., Struyven, K. & Dochy, F. (2010). Using student-centred learning environments to stimulate deep approaches to learning: Factors encouraging and discouraging their effectiveness. *Educational Research Review*, 5(3), 243-260.
<https://doi.org/10.1016/j.edurev.2010.06.001>
- Beckett, G. (2012). Teaching in north-western China under a neoliberal market economy: Opportunities and challenges. *Canadian and International Education*, 41(2), 51-70.
<https://www.proquest.com/scholarly-journals/teaching-northwestern-china-under-neoliberal/docview/1355923409/se-2>
- Biggs, J. (1987). *Study Process Questionnaire manual*. Australian Council for Educational Research. <https://files.eric.ed.gov/fulltext/ED308200.pdf>
- Biggs, J. (1988). The role of metacognition in enhancing learning. *Australian Journal of Education*, 32(2), 127-138. <https://doi.org/10.1177/000494418803200201>
- Biggs, J. (1993). What do inventories of students' learning processes really measure? A theoretical review and clarification. *British Journal of Educational Psychology*, 63(1), 3-19.
<https://doi.org/10.1111/j.2044-8279.1993.tb01038.x>
- Biggs, J. B. (1994). Asian learners through Western eyes: An astigmatic paradox. *Australian and New Zealand Journal of Vocational Education Research*, 2(2), 40-63.
<http://hdl.voced.edu.au/10707/90377>
- Biggs, J., Kember, D. & Leung, D. (2001). The revised two-factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology*, 71, 133-149.
<https://doi.org/10.1348/000709901158433> [R-SPQ-2F is available also at https://www.johnbiggs.com.au/pdf/ex_2factor_spq.pdf and at https://www.mededportal.org/doi/10.15766/mep_2374-8265.9385]
- Brown, T., Fong, K. N. K., Bonsaksen, T., Lan, T. H., Murdolo, Y., Gonzalez, P. B. & Beng, L. H. (2017). Approaches to learning among occupational therapy undergraduate students: A cross-cultural study. *Scandinavian Journal of Occupational Therapy*, 24(4), 1-11.
<https://doi.org/10.1080/11038128.2016.1229811>
- Brunton, M. & Jeffrey, L. (2014). Identifying factors that influence the learner empowerment of international students. *International Journal of Intercultural Relations*, 43(B), 321-334. <https://doi.org/10.1016/j.ijintrel.2014.10.003>
- Conrad, C. & Dunek, L. (2012). *Cultivating inquiry-driven learners*. Johns Hopkins University Press. <https://www.press.jhu.edu/books/title/12399/cultivating-inquiry-driven-learners>
- Cooper, B. J. (2004). The enigma of the Chinese learner. *Accounting Education*, 13(3), 289-310. <https://doi.org/10.1080/0963928042000273780>
- Dart, B. & Boulton-Lewis, G. (Eds.) (1998). *Teaching and learning in higher education*. Australian Council for Educational Research.
- Department of Education, Skills and Employment (DESE) (2021, March). *Connected, creative, caring: Australian strategy for international education twenty 2021-2030, Consultation paper*. <https://www.dese.gov.au/download/11143/australian-strategy-international-education-consultation-paper/21501/australian-strategy-international-education-consultation-paper/pdf>
- Department of Education, Skills and Employment (DESE) (2019, December). *End of year summary of international student data 2019*. <https://internationaleducation.gov.au/research/International-Student-Data/Documents/MONTHLY%20SUMMARIES/2019/December%202019%20End%20of%20year%20summary.pdf>

- Dinsmore, D. L. & Alexander, P. A. (2012). A critical discussion of deep and surface processing: What it means, how it is measured, the role of context, and model specification. *Educational Psychology Review*, 24(4), 499-567. <https://doi.org/10.1007/s10648-012-9198-7>
- Dolmans, D. H. J. M., Loyens, S. M. M., Marcq, H. & Gijbels, D. (2016). Deep and surface learning in problem-based learning: A review of the literature. *Advances in Health Sciences Education*, 21(5), 1087-1112. <https://doi.org/10.1007/s10459-015-9645-6>
- Entwistle, N. & Entwistle, D. (2003). Preparing for examinations: The interplay of memorising and understanding, and the development of knowledge objects. *Higher Education Research and Development*, 22(1), 19-41. <https://doi.org/10.1080/0729436032000056562>
- Evans, C. & Stevenson, K. (2010). The learning experience of international doctoral students with particular reference to nursing students: A literature review. *International Journal of Nursing Studies*, 47(2), 230-250. <https://doi.org/10.1016/j.ijnurstu.2009.05.025>
- Grimshaw, T. (2007). Problematizing the construct of 'the Chinese learner': Insights from ethnographic research. *Educational Studies*, 33(3), 299-311. <https://doi.org/10.1080/03055690701425643>
- Guan, X. Y. & Jones, G. (2011). Unlearning and relearning: Chinese students in a New Zealand first year undergraduate class. *The New Zealand Journal of Teachers' Work*, 8(2), 208-219. <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.461.4432&rep=rep1&type=pdf>
- Haggis, T. (2003). Constructing images of ourselves? A critical investigation into 'Approaches to Learning' research in higher education. *British Educational Research Journal*, 29(1), 89-104. <https://doi.org/10.1080/0141192032000057401>
- Hattie, J. & Marsh, H. W. (1996). The relationship between teaching and research: A meta-analysis. *Review of Educational Research*, 66(4), 507-542. <https://doi.org/10.3102/00346543066004507>
- Heng, T. T. (2018). Different is not deficient: Contradicting stereotypes of Chinese international students in US higher education. *Studies in Higher Education*, 43(1), 22-36. <https://doi.org/10.1080/03075079.2016.1152466>
- Hinton, T. (2020, June 12). *Number of Chinese student enrolments in Australia 2010-2019 by education sector*. [since July 2021 showing 2012 to 2021] <https://www.statista.com/statistics/430276/number-of-chinese-students-in-australia-by-education-sector/>
- Johnson, R. B. & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher*, 33(7), 14-26. <https://www.jstor.org/stable/3700093>
- Justicia, F., Pichardo, M. C., Cano, F., Berbén, A. B. GV. & De la Fuente, J. (2008). The Revised Two-Factor Study Process Questionnaire (R-SPQ-2F): Exploratory and confirmatory factor analyses at item level. *European Journal of Psychology of Education*, 28(3), 355-372. <https://doi.org/10.1007/BF03173004>
- Kember, D., Wong, A. & Leung, D. Y. P. (1999). Reconsidering the dimensions of approaches to learning. *British Journal of Educational Psychology*, 69(3), 323-343. <https://doi.org/10.1348/000709999157752>
- Leung, D. Y. P., Ginns, P. & Kember, D. (2008). Examining the cultural specificity of approaches to learning in universities in Hong Kong and Sydney. *Journal of Cross-Cultural Psychology*, 39(3), 251-266. <https://doi.org/10.1177/0022022107313905>

- Li, B. L. (2009). Process-centered teaching and its implication in English teaching in China. *English Language Teaching*, 2(1), 24-30. Canadian Centre of Science and Education (CCSE). <http://files.eric.ed.gov/fulltext/EJ1082230.pdf>
- Li, L. (2015). Cultural learning styles – “Is there such a thing?” in W. M. Chan, S. K. Bhatt, M. Nagami, I. & Walker (Eds.), *Culture and foreign language education: Insights from research and Implications for the practice* (pp. 265-378). De Gruyter Mouton. <https://doi.org/10.1515/9781501503023-013>
- Martin, F. (2020). *Chinese international students' wellbeing in Australia: The road to recovery*. Melbourne, Australia: The University of Melbourne. <http://hdl.handle.net/11343/240399>
- Marton, F. & Saljo, R. (1976). On qualitative differences in learning: I—Outcome and process. *British Journal of Educational Psychology*, 46(1), 4-11. <https://doi.org/10.1111/j.2044-8279.1976.tb02980.x>
- Marton, F., Dall'Alba, G. & Beaty, E. (1993). Conceptions of learning. *International Journal of Education Research*, 19, 277-300.
- McMahon, P. (2011). Chinese voices: Chinese learners and their experiences of living and studying in the United Kingdom. *Journal of Higher Education Policy and Management*, 33(4), 401-414. <https://doi.org/10.1080/1360080X.2011.585739>
- Metro University (2021). MetroUni at a glance.
- Mullis, I. V. S., Martin, M. O., Kennedy, A. M. & Foy, P. (2007). *PIRLS 2006 international report: IEA's progress in international reading literacy study in primary schools in 40 countries*. Boston College. https://timssandpirs.bc.edu/pirls2006/intl_rpt.html
- Pallant, J. (2016). *SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS* (6th ed.). Allen & Unwin. [7th ed.] <https://www.routledge.com/SPSS-Survival-Manual-A-step-by-step-guide-to-data-analysis-using-IBM-SPSS/Pallant/p/book/9781760875534>
- Perry, C. J. (2015). Book Review — Learning patterns in higher education: Dimensions and research perspectives by D. Gijbels, V. Donche, J. T. E. Richardson & J. D. Vermunt. *New Horizons in Adult Education & Human Resource Development*, 27(3), 56-58. <https://search.proquest.com/openview/1d60cf7e8f4e3917269e86f295735c40/1?pq-origsite=gscholar&cbl=40225>
- Robinson, P. (2018). Affective underpinnings of surface approaches to learning and their relationship with sensation seeking. *Issues in Educational Research*, 28(2), 453-469. <http://www.iier.org.au/iier28/robinson.pdf>
- Ryan, J. (2013). Comparing learning characteristics in Chinese and Anglophone cultures: Pitfalls and insights. In L. X. Jin, & M. Cortazzi (Eds.), *Researching cultures of learning: International perspectives on language learning and education*. Palgrave Macmillan.
- Ryan, J. (2016). ‘Asian’ learners or ‘internationalised’ learners? Taking advantage of international cultural academic flows. *East Asia*, 33(1), 9-24. <https://doi.org/10.1007/s12140-015-9246-2>
- Ryan, J. & Louie, K. (2007). False dichotomy? ‘Western’ and ‘Confucian’ concepts of scholarship and learning. *Educational Philosophy and Theory*, 39(4), 404-417. <https://doi.org/10.1111/j.1469-5812.2007.00347.x>
- Ryan, J. G. & Dogbey, E. (2012). Seven strategies for international nursing student success: A review of the literature. *Teaching and Learning in Nursing*, 7(3), 103-107. <https://doi.org/10.1016/j.teln.2012.01.007>

- Saljo, R. (1979). *Learning in the learner's perspective: 1. Some common-sense conceptions*. No. 76. Reports from the Institute of Education, University of Gothenburg, Sweden. [abstract only] <https://eric.ed.gov/?q=Saljo&pg=2&id=ED173369>
- Tan, P. L. (2011). Towards a culturally sensitive and deeper understanding of “rote learning” and memorisation of adult learners. *Journal of Studies in International Education*, 15(2), 124-145. <https://doi.org/10.1177/1028315309357940>
- Teddlie, C. & Yu, F. (2007). Mixed methods sampling: A typology with examples. *Journal of Mixed Methods Research*, 1(1), 77-100. <https://doi.org/10.1177/1558689806292430>
- Tian, J. & Ni, H. (2018). Marianne A. Larsen: Internationalization of higher education: An analysis through spatial, network, and mobilities theories. *Higher Education*, 76, 187-189. <https://doi.org/10.1007/s10734-017-0198-x>
- Wang, C. C. & Greenwood, K. M. (2015). Chinese nursing students' culture-related learning styles and behaviours: A discussion paper. *International Journal of Nursing Sciences*, 2(3), 253-258. <https://doi.org/10.1016/j.ijnss.2015.07.009>
- Wang, J. J. (2013). Understanding the Chinese learners from a perspective of Confucianism. In M. Cortazzi & L. X. Jin (Eds.), *Researching cultures of learning: International perspectives on language learning and education* (pp. 61-79). Palgrave Macmillan. https://doi.org/10.1057/9781137296344_4
- Watkins, D. (2000). Learning and teaching: A cross-cultural perspective. *School Leadership & Management*, 20(2), 161-173. <https://doi.org/10.1080/13632430050011407>
- Watkins, D. A., Regmi, M. & Astilla, E. (1991). The-Asian-learner-as-rote-learner stereotype: Myth or reality? *Educational Psychology*, 11(1), 21-34. <https://doi.org/10.1080/0144341910110102>
- Webb, G. (1997). Deconstructing deep and surface: Towards a critique of phenomenography. *Higher Education*, 33, 195-212. <https://doi.org/10.1023/A:1002905027633>
- Wong, G. S. P. (2012). *Learning context in Australian Universities: Perceptions of Chinese accounting students*. Unpublished doctoral thesis, Deakin University, Australia. <https://dro.deakin.edu.au/eserv/DU:30052954/wong-learningcontext-2012A.pdf>
- Wong, G., Cooper, B. J. & Dellaportas, S. (2015). Chinese students' perceptions of the teaching in an Australian accounting programme - An exploratory study. *Accounting Education*, 24(4), 318-340. <https://doi.org/10.1080/09639284.2015.1050678>
- Wu, Q. (2015). Re-examining the “Chinese learner”: A case study of mainland Chinese students' learning experiences at British universities. *Higher Education*, 70(4), 753-766. <https://doi.org/10.1007/s10734-015-9865-y>
- Xie, Q. (2014). Validating the Revised Two-Factor Study Process Questionnaire among Chinese university students. *The International Journal of Educational and Psychological Assessment*, 16(1), 4-20. https://www.academia.edu/57537934/Validating_the_Revised_Two_Factor_Study_Process_Questionnaire_among_Chinese_University_Students
- Xu, J. (2016). *Becoming a Chinese student: A practice-based study of Chinese students' learning in an Australian university*. PhD thesis, University of Wollongong, Australia. <http://ro.uow.edu.au/theses/4808>
- Xu, J. (2019). A practice-based study of Chinese students' learning - putting things together. *Journal of University Teaching & Learning Practice*, 16(2), article 5. <https://ro.uow.edu.au/jutlp/vol16/iss2/12>

Appendix A: Survey for Chinese international undergraduates (bilingual version)

Thank you for taking the time to complete this survey. 您好！感谢您参与此问卷调查！

This survey is an essential constituent of the project titled *Approaches to learning: Perceptions of Chinese international undergraduates and their lecturers in Australian Universities*, which is currently being conducted as part of a PhD thesis [text redacted]. This research seeks to investigate how Chinese international undergraduates approach their learning in Australian universities.

此问卷为课题《中国留澳本科生学习方法之调查》的一个重要组成部分，此研究系澳大利亚联邦大学教育学院的李伯利的博士论文的一部分，其导师是 [text redacted] 副教授和 [text redacted] 副教授。此问卷旨在调查中国在澳留学生的学习方法。

Your participation is voluntary and anonymous. However, upon completion of the survey, an opportunity to win one of ten gift cards (Coles Group & Myer) will be available if you provide your email address for this purpose only.

您的参与是自愿、匿名的，然而在您完成问卷时，如若您愿意留下邮件地址，您将有机会获得一张Coles Group & Myer礼品券，总共十张。

This survey is conducted for academic purposes. The information you provide in the survey will help inform our understandings about the learning and teaching of undergraduates in Australian universities, particularly in relation to the learning and teaching of Chinese international students. 本调查仅为研究所用。您提供的信息将有助于了解澳洲高校关于本科生的教育与学习情况，尤其是关于中国留学生学习与教学情况。

All information will be kept confidentially. Please complete it according to your real thoughts.

所有信息将严格保密！请根据您的真实想法作答！

Part A: Background information

1. Your age range: 您的年龄段 Below 18 (not including) years 18岁以下(不包括)
Over 18 years (including) 18岁以上(含)

2. Your gender: 您的性别

Female 女性 Male 男性 Other 其他

3. Where are you from? 您来自哪里？

Mainland China 中国大陆 (please specify which province or city of China you are from 请注明来源省份或城市) _____

Hong Kong 香港 Macao 澳门

Other 其他 (please specify where you are from 请注明您来自哪里) _____

4. What is your first language? 您的第一语言？

Mandarin 普通话 Other 其他 (please specify 请注明) _____

5. What is/are your chief reason(s) for studying in an Australian university? (you can choose more than one option) 您来澳洲学习的主要原因是什么? (可以多选)

Promising job prospects 工作前景 High quality of teaching 优质教学

Friends' recommendation 朋友推荐 Parents' expectation 父母安排

Other 其他 (please specify 请注明) _____

6. Which university do you currently attend in Australia? 您现在就读的澳洲大学名称?

7. Have you attended any other universities in Australia prior to the current one?

If so, which University/ies? 您以前就读过其他澳洲大学吗? 如果是的话, 以前的大学名称是什么?

8. What degree are you currently pursuing in Australia? 您现在正在攻读的学位是什么?

Bachelor of Arts 文学学士 Bachelor of Commerce 商务学学士

Bachelor of Science 科学学士 Bachelor of Nursing 护理学士

Bachelor of Education 教育学士 Bachelor of Business 商科学士

Bachelor of IT 信息技术学士 Bachelor of Management 管理学士

Other 其他 (Please specify 请注明) _____

9. In which year did you first enrol in your current course of study? (Select one option)

您现在就读课程的入学年份?

2019 2018 2017 2016

Other _____

10. Did you complete an English language program in Australia before or at the beginning of your course? 当前课程之前, 您是否在澳洲参加过英语课程培训?

Yes 是 No 否

If YES, when? And what was the name of the course?

如果是的话, 何时参加的? 课程名称又是什么?

11. What is your situation for studying in an Australian university?

您来澳洲学习的主要途径是什么?

Full fee international students 自费留学生 Exchange program student 交流项目生

Scholarship student 奖学金生 University joint program student 校际合作项目生

Self-application 个人申请 Other 其他 (please specify 请注明) _____

Part B: Your learning approaches in Australian universities

澳洲大学的学习方法调查

For each question, please tick (✓) the one which best applies to you.

请勾选最符合您学习状况的选项

Never true of me 我从不这样	Sometimes true of me 我有时这样	True of me half the time 我一半时间这 样	Frequently true of me 我经常这样	Always true of me 我总是这样

1. I find that studying gives me a feeling of deep personal satisfaction
我发现学习时常带给我一种深深的满足感。
2. I find that I have to do extra work on a topic so that I can form my own conclusions before I am satisfied.
我发现要在一个学习内容上花费很多功夫才能得出自己的结论，最终让自己感到满意。
3. My aim is to pass the course while doing as little work as possible.
我的学习目标是尽可能少费功夫却能通过课程考试。
4. I only study seriously what is given out in class or in the course outlines.
我只认真学习课堂或课程指定的内容。
5. I feel that virtually any topic can be highly interesting once I get into it.
我觉得只要我肯投入，几乎任何话题都会变得很有趣。
6. I find most new topics interesting and often spend extra time trying to obtain more information about them.
我发现大多数新内容都有趣，所以常常另外花时间学习，以求学得更多东西。
7. I do not find my course very interesting so I keep my work to a minimum.
我并不认为我的课程有趣，所以我尽可能少花力气来学习课堂内容。
8. I learn some things by rote, going over and over them until I know them by heart even if I do not understand them.
我是靠死记的方式来学习，一遍又一遍地背诵，直到我能牢记为止，即使我对所学的东西并不理解也是如此。
9. I find that studying academic topics can at times be as exciting, for example, as a good novel, movie or video game.
我发现研究学术性问题有时就如同一本小说或一部电影一般，让人感到兴奋。
10. I test myself on important topics until I understand them completely.
在重要学习内容上，我会反复检验，直到完全搞懂为止。
11. I find I can get by in most assessments by memorising key sections rather than trying to understand them.
我发现即使不理解所学内容，但通过记忆关键章节，大多考试也能过关。

12. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.

我认为没有必要花时间精力来学习额外的内容，因此我通常会只学习指定的内容。

13. I work hard at my studies because I find the material interesting.

我认为我所学的东西有趣，所以我就努力学习。

14. I spend a lot of my free time finding out more about interesting topics which have been discussed in different classes.

在不同课堂上讨论过的课题，只要是有趣的，我都会花很多空余时间去进一步学习。

15. I find it is not helpful to study topics in depth. It confuses me and wastes time, when all you need is a general knowledge about the topics.

当仅需对某内容有肤浅的了解即可时，我认为深入研究的话，对我来说不但没有帮助，反而会使我混淆且浪费时间。

16. I believe that lecturers should not expect students to spend significant amounts of time studying material everyone knows won't be examined.

我认为老师不应指望学生花大量时间来学习那些与考试无关的内容。

17. I come to most classes with questions in mind that I want the answers for.

我时常是带着问题去上课，以求课堂上得以解决。

18. I make a point of looking at most of the suggested readings that go with the lectures.

大部分与课堂有关的阅读资料我都会认真去读。

19. I see no point in learning material which is not likely to be in the examination.

我认为学习与考试无关的内容没有意义。

20. I find the best way to pass examinations is to try to remember answers to likely questions. 我认为考试过关最好的办法是记住可能会考的题目的答案。

Part C Your perceptions about the approaches to learning adopted by your Australian domestic peers 您对澳洲本地学生学习方法的认识

Please tick (✓) the one you think best fits your perceptions about Australian domestic students (ADS). 请勾选您对澳洲本地学生学习方法表述的赞同度。

Your perceptions about Australian students 您对澳洲本地学生学习方法的了解	Strongly disagree 非常反对	Disagree 反对	Agree 赞成	Strongly agree 非常赞成
1. ADS are highly motivated in learning towards their career paths. 澳洲学生有强烈的学习职业规划动力。				
2. ADS rarely rely on rote learning (i.e., memorising without understanding). 澳洲学生很少使用死记硬背的学习方法。				
3. ADS moderately use the strategy of memorising where applicable in their learning. 澳洲学生在学习适当地使用记忆策略。				

4. ADS are inquisitive learners who seek deep understanding. 澳洲学生是探究式的学习者，学习时追求深层理解。				
5. ADS are critical learners who are not willing to accept whatever they have been told. 澳洲学生思辨能力强，不愿意被动接受教授内容。				
6. ADS are self-directed in choosing their paths and levels of participation in learning activities according to their interests. 澳洲学生的学习是自我引导式的，他们自主选择学习路径及参与学习活动。				
7. ADS' learning is strongly based on their interests. 澳洲学生的学习很大程度上是基于他们的兴趣。				
8. ADS prefer student-centred, communicative teaching. 澳洲学生喜欢以学生为中心的交互式教学模式。				
9. ADS are active in asking and offering answers in the classroom. 澳洲学生课堂活跃，提问及回答问题都很积极。				
10. ADS are active in group discussion. 澳洲学生小组讨论积极活跃。				
11. ADS are confident enough to challenge their lecturers. 澳洲学生自信，敢于对教师质疑。				

Part D: Your perceptions about your own learning in Australian universities

您的澳洲大学学习认识

Please answer the following questions in words 请用文字回答下面几道题

1. Does the university you are currently studying at meet your expectations?

您现在就读的大学在是否达到您的期望？

Yes 是 (please explain 请解释) _____

No 否 (please explain 请解释) _____

2. What sorts of supports have been provided to you by the university you currently studying at?

您现在就读的大学给您提供过何种帮助吗？请详细说明。

3. What sort of things would you think Australian universities should offer more to facilitate international students' working and living in Australia?

您认为您澳洲大学还应该多做点什么以便留学生在澳更好地学习、生活？

4. Have you noticed any differences in the way that you learn in your university course compared with your Australian domestic peers? Please describe the differences.
您是否注意到在大学课程学习中，您和您的澳洲本土同学的学习方法有什么不同？请描述。

5. Please describe the characteristics you associate with Australian domestic students' way of learning. 请您描述一下澳洲本土学生的学习特点。

6. Do you have some recommendations for newcomers from China?
对于即将从中国来到澳洲学习的中国学生，您有什么建议吗？

7. (Optional question) As a potential participant who has already completed this survey, you are further invited to participate in a **follow-up interview** regarding Chinese international students' learning and teaching in Australian universities by leaving either your email address, or directly contact the researchers.

(非必选题) 您是否愿意继续参加有关中国留学生在澳高校学习的后续访谈。如果愿意，请留下您的邮件地址，或请直接与本课题研究者联系。

Do you wish to participate in further interview? 您愿意继续参加采访吗？

Yes 愿意 (please leave either your email address 请留下您的邮件地址) _____

No 不愿意

8. (Optional question) This question is only for those who wish to enter into the raffle to WIN the opportunity of one of 10 Cole & Myers gift cards.

(非必选题) 该问题仅限于那些愿意参加Coles & Myers礼品券抽奖活动的调查者。

Do you wish to enter into the raffle? 您愿意参与抽奖活动吗？

Yes 愿意 (please leave either your email address 请留下您的邮件地址) _____

No 不愿意

This is the end of this survey. 问卷结束！

Thank you for your contribution, and wish you a prosperous life.

感谢您的参与！祝您生活美满！

Appendix B: Survey for Australian domestic students

Thank you for taking the time to complete this survey.

This survey is an essential constituent of the project titled *Approaches to learning: Perceptions of Chinese international undergraduates and their lecturers in Australian Universities*, which is currently being conducted as part of a PhD thesis [text redacted]. This survey seeks to investigate what typifies Australian domestic undergraduates' approaches to learning, to serve as a baseline for a comparison to be made with Chinese international students in Australian universities.

Your participation is voluntary and anonymous. However, upon completion of this survey, an opportunity to win one of ten gift cards (Coles Group & Myer) will be available if you provide your email address for this purpose only.

This survey is conducted for academic purposes. The information you provide will help inform our understandings about the learning and teaching of undergraduates in Australian universities. All information will be kept confidentially. Please complete it according to your real thoughts.

Part A Background information

1. Your age range:

Below 18 years Over 18 years

2. Your gender:

Female Male Other

3. Your nationality:

Australian Other (please specify) _____

4. What is your first language?

English Other (please specify) _____

5. Which university do you currently attend in Australia?

6. What degree are you currently studying in Australia?

Bachelor of Arts Bachelor of Commerce

Bachelor of Science Bachelor of Nursing

Bachelor of Education Bachelor of Business

Bachelor of IT Bachelor of Management

Other (Please specify) _____

7. In which year did you first enrol in your current course of study?

2019 2018 2017 2016

Other (please specify) _____

8. Have you ever been to China? Yes No

If yes, for what purpose?

School trip Holiday

Study Other (please specify) _____

9. Are there any Chinese international students in your current classes?

Yes No

10. Have you had any experience with Chinese International students throughout your education?

Yes No

Part B: Your learning approaches in Australian universities

For each question, choose the one which best applies to you from the following:

Never true of me	Sometimes true of me	True of me half the time	Frequently true of me	Always true of me

1. I find that studying gives me a feeling of deep personal satisfaction.

2. I find that I have to do extra work on a topic so that I can form my own conclusions before I am satisfied.

3. My aim is to pass the course while doing as little work as possible.

4. I only study seriously what is given out in class or in the course outlines.

5. I feel that virtually any topic can be highly interesting once I get into it.

6. I find most new topics interesting and often spend extra time trying to obtain more information about them.

7. I do not find my course very interesting so I keep my work to the minimum.
8. I learn some things by rote, going over and over them until I know them by heart even if I do not understand them.
9. I find that studying academic topics can at times be as exciting, for example, as a good novel, movie or video game.
10. I test myself on important topics until I understand them completely.
11. I find I can get by in most assessments by memorising key sections rather than trying to understand them.
12. I generally restrict my study to what is specifically set as I think it is unnecessary to do anything extra.
13. I work hard at my studies because I find the material interesting.
14. I spend a lot of my free time finding out more about interesting topics that have been discussed in different classes.
15. I find it is not helpful to study topics in depth. It confuses me and wastes time, when all you need is a passing acquaintance with topics.
16. I believe that lecturers should not expect students to spend significant amounts of time studying material everyone knows will not be examined.
17. I come to most classes with questions in mind that I want answers for.
18. I make a point of looking at most of the suggested readings that go with the lectures.
19. I see no point in learning material that is not likely to be in the examination.
20. I find the best way to pass examinations is to try to remember answers to likely questions.

Part C: Your perceptions about the approaches to learning adopted by your Chinese International peers

Please tick (✓) the one you think best fits your perceptions about Chinese international students (CIS).

Your perceptions about Chinese students	Strongly disagree	Disagree	Agree	Strongly agree
1. CIS are highly motivated in learning towards their career paths.				
2. CIS rarely rely on rote learning (i.e., memorising without understanding).				
3. CIS moderately use the strategy of memorising where applicable in their learning.				
4. CIS are inquisitive learners who seek deep understanding.				
5. CIS are critical learners who are not willing to accept whatever they have been told.				
6. CIS are self-directed in choosing their paths and levels of participation in learning activities according to their interests.				
7. CIS' learning is strongly based on their interests.				
8. CIS prefer student-centred, communicative learning.				
9. CIS are active in asking and offering answers in the classroom.				
10. CIS are active in group discussion.				

11. CIS are confident enough to challenge their lecturers.				
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Part D: Your perceptions about CIS' learning and supports in Australian universities

Please answer the following questions in words.

1. Please describe the characteristics you associate with Chinese international students' way of learning.
2. Please describe the general differences in the ways you learn in your university course with that of your Chinese peers.
3. Do you think Australian universities have provided enough supports for Chinese international students' learning in Australia? Please state your reasons.
4. Are there more strategies that you think would be useful to help Chinese international students to study in Australian universities? Please explain your answers.
5. This question is only for those who wish to enter into the raffle to WIN the opportunity of one of 10 Coles & Myers Gift Cards.
Do you wish to enter into the raffle?
Yes (please leave either your email address) _____ No

This is the end of this survey.

Thank you for your contribution, and I wish you a prosperous life.

Appendix C: Validation of R-SPQ-2F subscales with the CIS sample

Analysis of deep approach (DA) subscales with the CIS sample

The aim of the DA subscale in the R-SPQ-2F was to examine the depth to which the participants handled their learning in order to meet requirements in specific context. In the current study, the participants were asked to report how they approached their learning incorporated with 'predominantly deep' motives and strategies (Biggs et al., 2001, p. 137).

Both KMO and BTS tests were conducted, with the KMO value (.83 > .60), and the BTS (354) test significant ($p < .01$), suggesting the suitability of the data for factor analysis. The total variance demonstrated two factors with an eigenvalue of 3.64 and 1.18 (exceeding 1.00), explaining a cumulative of 48.15% of the variance. The scree plot also supported a two-factor settlement of this scale. However, the results of parallel analysis, with free eigenvalues of 1.41 and 1.27, seemed to support one-component classification of the DA subscale. Nevertheless, the component matrix of two components was .413 (above .30), signifying the existence of two components, though they were highly correlated. It further confirms a justification for the use of oblique rotation (Pallant, 2016).

After Direct Oblimin rotation with Kaiser Normalisation, the component matrix indicated that six items (6, 13, 5, 1, 9, 14), which are listed based on the order of loadings, could be subsumed into one component while the remaining four items (17, 10, 18, 2) could be categorised into another component. The component correlation matrix was .40 (above .3), suggesting a strong correlation between the two components. However, a closer inspection revealed that Item 6 with a loading of

.76, which was supposed to be part of DM, which was an item within DS, differed from the original classification provided by Biggs et al. (2001) and other researchers such as Xie (2014).

Therefore, another round of PCA with Oblimin rotation was performed with a reduction of Item 6. In the same way, a third and fourth round of PCA with Oblimin rotation were conducted, and the pattern and structure matrix was illustrated in Table 1.

Table 1: Pattern and structure matrix for PCA with oblimin rotation of the DA subscale on CIS sample

Item	Pattern coefficients		Structure coefficients		Communalities
	Component 1	Component 2	Component 1	Component 2	
B1	.67	.06	.69	.28	.48
B2	-.14	.85	.13	.80	.66
B5	.85	-.28	.76	.00	.64
B9	.63	.16	.68	.36	.49
B10	.28	.54	.46	.64	.48
B13	.63	.18	.69	.39	.51
B14	.39	.54	.57	.67	.58

As outlined in Table 1, four items (1, 5, 9 and 13) were included in DM, while three items (2, 10 and 14) were in DS. These items fit with the classification of DM and DS subscales by Biggs et al. (2001), as depicted in Figure 4.3, illustrating the particular fit for the current CIS sample.

In Biggs et al.'s (2001) study, Cronbach alpha coefficients were derived of .62, .63, .72, and .57 respectively for DM, DS, SM, and SS, and they argued that these coefficients were "acceptable" (p. 133) given the fact that each subscale was composed of five items. Scholars differ in the acceptance threshold of alpha coefficients (Schmitt, 1996; Xie, 2014). Some such as Pallant (2016) and Wu (2010) regard .70 as the cut-off value of acceptance while others argue that a value of .50 may not fatally affect the validity of a scale (Schmitt, 1996). According to Pallant (2016) and Xie (2014), alpha coefficients are likely to be dependent, first, on the number of the items on a scale, and second, on the multi-dimensionality of a scale. Fewer items (fewer than 10) of a dimension usually give rise to a small alpha coefficient. If a scale is multidimensional yet with fewer items, the reliability of a scale tends to be underestimated by the alpha value (Schmitt, 1996). In such an instance, it may be appropriate to measure and report the mean inter-item correlation for the items (Pallant, 2016). As recommended by Briggs and Cheek (1986), an optimal mean inter-item correlation values ranging from .2 to .4 is considered accepted.

In the current research, the renewed items of DM and DS were put for reliability individually. With the mean inter-item correlation value of .36 and .32 respectively, both were above the cut-off of .2, indicating that the renewed DM and DS subscales were reliable and valid with the CIS sample. Particularly given that the DM subscale in this study merely consists of four items and DS contains only three, it was reasonable to deem such coefficients generated were acceptable.

Analysis of surface approach (SA) subscales with the CIS sample

The SA subscale in Biggs et al.'s (2001) R-SPQ-2F aimed to identify whether participants handled their learning superficially with surface motives and surface strategies to reproduce the tasks

presented to them. This subscale is made up of ten items, with surface motives to meet the learning requirement with minimum efforts demanded, and surface strategies to restrain the study scope of material studied and to reproduce it through rote learning (Biggs et al., 2001).

In the same way, the other 10 items were subjected to PCA for factor analysis. KMO and BTS tests were performed and the suitability of factor analysis was met with the KMO value of .78 and the significant BTS ($p < .01$). The total variance explained the emergence of three factors exceeding 1.00 with an eigenvalue of 3.35, 1.24, and 1.00, explaining a cumulative of 56% of the variance. However, the scree plot test indicated a mere two-component labelling of the SA subscales. Parallel analysis also supported the two-component labelling of the SA subscale.

After oblimin rotation with Kaiser Normalisation, the structure matrix displayed that six items (8, 20, 7, 19, 11, 3) were included into Component 1 while the remaining four items, (12, 4, 15, 16) were entailed in Component 2. However, based on previous research on the identification of SA, Items 8 and 20 were supposed to be included into SS instead of SM, and Item 15 was supposed to be subsumed into SS rather than SM. Since Item 8 had a higher loading (.81), it was decided to reduce it for further analysis. Consequently, a second run of PCA with Varimax was performed with the movement of Item 8. In the same way, Item 20, Item 19 and Item 15 were removed, and thus another three rounds of PCA with oblimin rotations were performed. Table 2 outlines the pattern and structure matrices for the last round of PCA with oblimin rotation of the SA subscale with the CIS sample.

Table 2: Pattern and structure matrices for PCA with oblimin rotation of SA subscale with the CIS sample

Item	Pattern matrix		Structure matrix		Communalities
	Component 1	Component 2	Component 1	Component 2	
B11	.76	.15	.71	-.08	.53
B7	.66	-.18	.72	-.38	.55
B3	.66	-.09	.68	-.29	.48
B4	-.23	-.89	.04	-.82	.72
B12	.29	-.68	.50	-.77	.67
B16	.22	-.56	.39	-.63	.44

Table 2 demonstrates that the final components of the SA subscales for the CIS sample was made up of SM and SS, with each constituting three items instead of five, as initially classified by Biggs et al. (2001). That is, the current research validated that SM was composed of Items 3, 7 and 11, while SS was made up of Items 4, 12 and 16. This finding validated a more parsimonious item inclusion of SM and SS subscales. However, this result was coordinated with the classification of SM and SS as originally defined by Biggs et al. (2001) in the R-SPQ-2F.

In the current research, the renewed subscales of SM and SS were put into SPSS for reliability checking. With the mean inter-item correlation value of .29 and .34 respectively, it indicates that the altered SM and SS subscales had an internal consistency among the CIS sample.

Appendix D: Validation of R-SPQ-2F subscales with the ADS sample

Analysis of deep approach subscales with the ADS sample

The two-factor DA and SA subscales of the R-SPQ-2F instrument were validated for the ADS sample, with each consisting of ten items as confirmed by Biggs et al. (2001). In order to assess the reliability and validity of these two subscales for the ADS sample, factor analysis was performed. Principal components analysis was run on the 10 items of the DA subscale. The suitability of the data were assessed through the KMO test (.86), and the BTS test, which reached statistical significance ($p < .01$), confirming the factorability of the data set. The PCA demonstrated the presence of two factors, with the first factor, with an eigenvalue of 3.43, explaining 34.26% of the total variance of eight items (1, 10, 13, 2, 6, 17, 18, 14) and the second factor, with an eigenvalue of 1.06, explaining 10.61% of the variance of two items (5, 9). The scree plot also supported a two-factor labelling of this subscale. However, only one random value of the parallel analysis (1.36) was smaller than the two eigenvalues of the total variance exceeding 1, suggesting a possible overlap of the two-factor solution of this subscale. With a component correlation of .257, it signified that the two components were correlated in some way.

An examination of the first component found that Item 1, with a loading of .68, was misplaced in the DS subscale. Hence, a second round of PCA with oblimin rotation was conducted with the deletion of Item 1. Similarly, Items 17 and 13 were found misplaced in another subscale, and removed by PCA followed by oblimin rotations. The results demonstrated five items (2, 18, 10, 6, 14) were entailed in DS with two items in DM (5, 9), which, according to Pallant (2016), Tabachnick et al. (2013), and Wu (2010), was unaligned with the minimum requirement of a dimension (more than 3 items). PCA was again performed with addition of previously deleted Item 1. Table 3 displays the results of the PCA with oblimin rotation and the communal variance of each item.

Table 3: Pattern and structure matrix for PCA with oblimin rotation of DA subscale of the R-SPQ-2F with the ADS sample

Item	Pattern coefficients		Structure coefficients		Communalities
	Component 1	Component 2	Component 1	Component 2	
B1	.74	-.05	.73	.21	.53
B2	.73	-.08	.70	.17	.49
B10	.69	-.01	.69	.23	.47
B18	.58	.04	.60	.24	.36
B6	.50	.36	.63	.54	.51
B5	-.21	.89	.11	.82	.71
B9	.22	.56	.42	.64	.45
B14	.35	.41	.50	.54	.40

As such, the DA subscale for the ADS sample was made up of two subscales, with DM consisting of three items (5, 9, 14) and DS consisting of five items (1, 2, 6, 10, 18).

It was noted that Item 14 in the DM, which was originally validated as an item in DS, and Item 1 in the DS, which was an item of DM, as asserted by Biggs et al. (2001), were ratified into different

dimension with the ADS sample. This finding was divergent from what was initially presumed in the R-SPQ-2F. Although an inter-item mean correlation value of .25 and .33 for DM and DS respectively (between .2 to .4), indicated an acceptable reliability of the DA subscales with the ADS sample, they did not match the items that were validated in the DA subscales for the CIS sample, and therefore were not comparable to each other.

Analysis of surface approach subscales with the ADS Sample

Similarly, the two-factor components analysis was conducted on the 10 items of SA on ADS sample. The KMO test presented a result of 0.73, and the BTS test was statistically significant ($p < .01$), indicating the factorability of the data. The total variance demonstrated three factors in the SA subscales with the ADS sample. The first factor with an eigenvalue of 3.09 explained 30.85 % of the variance while the second factor with an eigenvalue of 1.33 explained 13.31 % of the variance, and the third with an eigenvalue of 1.12 explained 11.18% of the variance. The scree plot aligned with a two-factor structure of this SA subscale. Two random values of the parallel analysis (1.36 and 1.28) were smaller than the first two eigenvalues of the total variance, further confirming a categorising of two- factor solution of the SA subscale on ADS sample

PCA with oblimin rotation discovered six items (7, 12, 15, 3, 19, and 4) were classified into the SM subscale while the other four items (8, 11, 20, and 16) were grouped into the SS subscale. However, a careful reading would find that Item 12, which was originally subsumed in the SS subscale, fell into the SM class. Hence, another run of PCA, accompanied by varimax again, was processed with Item 12 removed

In the same way, Items 11 and 19 were also discovered misplaced into different labelling from their original validation and thus another two rounds of PCA with varimax rotation were performed. It was noted that four items (16, 8, 20, 4) were entailed in one component, and three (7, 15, 3) in the other. Nevertheless, a further inspection at the communal variance discovered that Item 4 was lowest in coefficient ($.25 < .30$), which, according to Pallant (2016), could be removed in order to increase the total variance explained. Therefore, a final run of PCA with oblimin rotation was conducted. Table 4 demonstrates the result of pattern and structure coefficients for PCA with varimax rotation, together with communal variance of the items.

Table 4: Pattern and structure matrix for PCA with oblimin rotation of SA subscale of the R-SPQ-2F with the ADS sample

Item	Pattern coefficients		Structure coefficients		Communalities
	Component 1	Component 2	Component 1	Component 2	
B7	.87	-.13	.84	.06	.72
B15	.67	.24	.72	.39	.58
B3	.66	.01	.66	.15	.43
B8	-.27	.83	-.09	.77	.66
B16	.18	.63	.32	.67	.48
B20	.15	.57	.27	.60	.38

As illustrated in Table 4, the SA subscale was made up of two components, which could be defined as SM and SS (Biggs et al., 2001), with the former consisting of three items (3, 7, 15) while the latter also consisted of three items (8, 16, 20). The reliability check was conducted on these two new subscales. The mean of their inter-item correlations was 0.35 for SM and 0.22 for SS. According to

Briggs and Cheek (1986), an optimal inter-item correlation is between .20 to .40. Therefore, the SA subscales are considered valid and reliable with the ADS sample. However, they were not aligned with the items that were validated in the SA subscales for the CIS sample, and thus were not comparable to each other.

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Please cite as: Li, B., Burke, J. & Plunkett, M. (2022). Deep or surface learning? Perceptions of Chinese international and local students in Australian universities. *Issues in Educational Research*, 32(1), 149-181. <http://www.iier.org.au/iier32/li.pdf>