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# Service-learning Outcomes Measurement Scale (S-LOMS): Chinese Translation and Validation

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The Service-Learning Outcomes Measurement Scale (S-LOMS) was developed in Hong Kong and established as a valid and reliable instrument. It is a resource for further advancing service-learning in Hong Kong and potentially across Asia. Since Chinese-speaking regions comprise a major proportion of the population of Asia, the first translation project for S-LOMS was from English into Chinese. This study reports how this was done and how the Chinese version was validated. The Chinese S-LOMS was developed using a back-translation approach and then pre-tested with 11 students, who were interviewed about their understanding of the constituent items. The pre-testing results suggested that the Chinese S-LOMS has good translation validity, equivalent to that of the original English version. An empirical validation exercise with a sample of 106 participants from a Hong Kong local secondary school was conducted with factor analysis and reliability checking. Results indicated good validity and internal consistency.

**Keywords:** student developmental outcomes, measurement scale validation, translation validity, service-learning, Chinese language

## INTRODUCTION

Service-learning has been widely adopted worldwide and particularly during the past 20 years (Ma, 2018; Snell & Lau, 2020; Xing & Ma, 2010). It is an experiential pedagogy aimed at enhancing student learning

by providing opportunities to apply academic knowledge in real situations while serving the community, with guided reflection to connect knowledge and experience (Jacoby, 1996). Despite its extensive presence within higher education across Asia, the body of research studies investigating the impacts of service-learning on various stakeholders, including students, instructors, educational institutions, and community partners, has been limited and weak (Shek & Chan, 2013; Shek et al., 2019; Xing & Ma, 2010). Snell and Lau (2020) argued that the limited number of service-learning-related research studies in Asia has, at least in part, reflected the absence of a standardized and flexible measurement instrument for assessing the developmental outcomes for students arising from service-learning. Hence, they developed the Service-Learning Outcomes Measurement Scale (S-LOMS) to address this research gap (Snell & Lau, 2020).

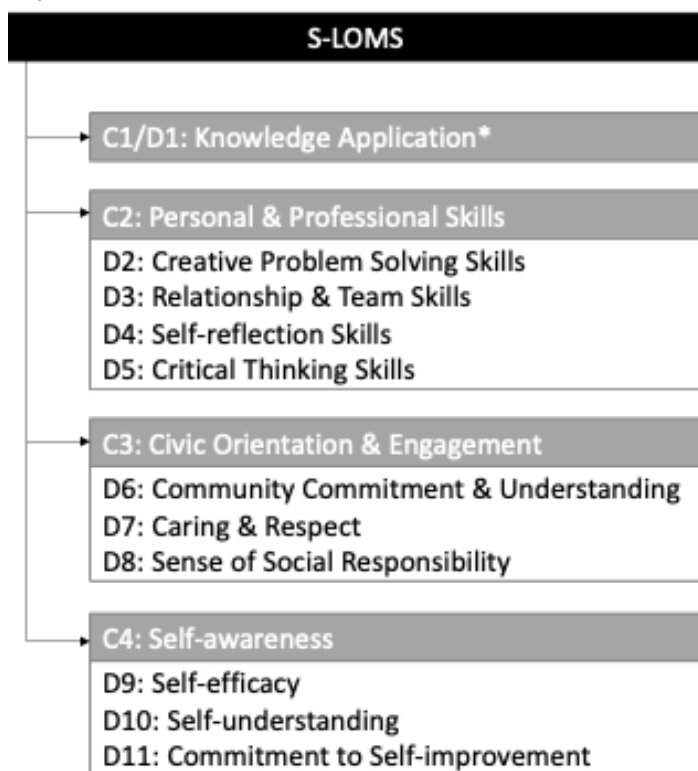
S-LOMS was designed to align with institutional contexts in Hong Kong, which have the following three characteristics (Lee, 2004), reflective of the influence of Confucianism and regarded as different from Western contexts for service-learning (Snell & Lau, 2020). First, the provision of service-learning in Hong Kong aligns closely with the educational philosophy prevalent in Chinese culture of taking a pragmatic approach by focusing on developing students' vocational skills and preparing them for future careers. Second, an emphasis reflects the orientation toward self-cultivation in the Confucian tradition on fostering students' self-awareness and reflection. Third, civic education in Hong Kong adopts a depoliticized approach by focusing on students' moral development rather than promoting democratic values.

S-LOMS covers four overarching categories and 11 learning domains in line with the above contextual characteristics. First is the overarching category of knowledge application and its cognominal learning domain. The second overarching category is personal and professional skills, which comprises the four domains: creative problem-solving skills, relationship and team skills, self-reflection skills, and critical thinking skills. The third overarching category is civic orientation and engagement, which comprises the three domains: community commitment and understanding, caring and respect, and sense of social responsibility. The fourth overarching category is self-awareness, which comprises the three domains of self-efficacy, self-understanding, and commitment to self-improvement (Lau & Snell, 2020).

The overall conceptual structure of S-LOMS, as described above and depicted in Figure 1 below, is consistent with earlier scholars' frameworks, all of which include academic enhancement, personal growth, and civic learning as key developmental outcomes of service-learning (Driscoll et al., 1996; Eyler & Giles, 1999; Felten & Clayton, 2011). It is also aligned with the classic service-learning definition as a "course-based, credit-bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of civic responsibility" (Bringle & Hatcher, 1995, p. 112).

**Figure 1**

*The conceptual structure of S-LOMS*



Note: Knowledge Application is both an overarching category and the only domain within that category

C1-C4: overarching categories; D1-D11: domains

S-LOMS has been designed as a self-reporting questionnaire for students to answer before and after their service-learning experience. It comprises 56 items, each rated on a 10-point Likert scale. For the list of items and their corresponding domains and overarching categories, see the Appendix.

The reliability and validity of S-LOMS for use in English have been rigorously established through studies conducted in Hong Kong. Snell and Lau (2020) employed exploratory factor analysis and reliability analysis on a sample of 400 university students to uncover the instrument's underlying dimensionality as described above. The factor structure received further validation support through another study that used confirmatory factor analysis on a sample of over 600 university students (Lau & Snell, 2021a). In two further studies, Lau and Snell (2019, 2020) established the test-retest and criterion validity of S-LOMS. All of these studies indicated a satisfactory level of sub-scale reliability with almost all Cronbach's alpha values higher than .80.

The satisfactory levels of validity and reliability of S-LOMS in English allow practitioners the freedom to select only those domains that interest them if they do not wish to administer the entire S-LOMS instrument. However, they are encouraged to do the latter. One of the main objectives of developing S-LOMS has been to establish a centralized database for recording the developmental outcomes for students arising from service-learning. We thus envisage that S-LOMS can serve as a springboard for cross-jurisdictional, comparative studies of the developmental outcomes of service-learning across Asia.

Whether S-LOMS is reliable and valid for use in other Asian jurisdictions besides Hong Kong remains open to question. As the first step to addressing this issue, Lau and Snell (2021b) conducted a cross-jurisdictional comparison between Hong Kong and Singapore regarding student development outcomes arising from service-learning, as assessed by S-LOMS in English. As a background analysis for their study, they conducted a literature review that identified many commonalities between the goals, designs, and implementation processes of service-learning in Hong Kong and Singapore, which reflected close similarities in cultural contexts, educational philosophies, and educational policies. Their quantitative study confirmed that S-LOMS has good validity and reliability in Singapore to measure the

developmental outcomes arising from service-learning.

The above findings encourage researchers to conduct further investigations on the applicability of S-LOMS in other Asian jurisdictions. However, the language medium of the original instrument may constitute an obstacle to conducting research with student samples in locations where English is not a first or second language and where the students are not yet sufficiently proficient in English.

We considered, therefore, that it would be appropriate and beneficial to translate S-LOMS into other languages as a tool for supporting the development of service-learning across Asia, as a means for cross-jurisdictional comparative research, and as a further step towards the establishment of a centralized database. We also considered it appropriate to begin by developing a Chinese version, since Chinese is used by a large segment of the population in Asia, including but not confined to people in the PRC, Hong Kong, and Taiwan. The current study thus reports on the translation of S-LOMS from English into Chinese, along with the procedures adopted to validate the Chinese version and the results obtained regarding translation validity.

## **TRANSLATION AND VALIDATION**

The current research adopted back-translation, pre-testing, and empirical validation. The approach that we adopted for translation-cum-validation, explained below, has several merits, as Maneesriwongul and Dixon argued (2004). First, this approach enabled us to verify semantic equivalence between the source and target language versions. Second, the data enabled us to conduct reliability and validity tests. Third, we could observe whether the target language version was appropriately administered. Fourth, we could detect any discrepancies between responses to the source and target language versions.

### **Six Initial Rounds of Back-Translation**

For additional rigor, we adopted a modified version of a procedure for back-translation, with the first two steps performed as recommended by Brislin (1970, 1986). For the first step in the first round of the procedure, we

arranged for a bilingual expert to assume the role of forward translator. This paper's first author is proficient in English and Chinese and is experienced in service-learning. He performed the initial translation of all 56 items in S-LOMS from English into Chinese.

For the second step, we arranged for another bilingual expert to assume the role of back-translator. The third author is proficient in both languages and is knowledgeable about service-learning. This person conducted a "blind" translation of the full Chinese version back into English without seeing the original English version.

For the third step, in back-translation exercises that follow Brislin (1970, 1986), a meeting is typically arranged between the forward translator and the back-translator to identify, discuss, and resolve any discrepancies between the original and back-translated English versions. As an alternative step in our exercise, we arranged for the second author, a native English speaker and service-learning veteran, to serve as an English vetter. That person compared the original and back-translated English versions and identified semantic discrepancies in 17 items where the original and back-translated English versions were not equivalent.

The second round of back-translation was then arranged. The forward translator reviewed all the items that the English vetter had identified as having semantic discrepancies and then revised the corresponding Chinese forward translations. These revised items were passed to the back-translator, whose English versions were sent to the English vetter for further comparisons. Moreover, the English vetter identified five items whose two versions were not equivalent. In the third round, he identified two items where there were still discrepancies. Finally, the English vetter determined that all the original and back-translated English items were semantically equivalent on the fourth round.

We then added a further step beyond the procedure recommended by Brislin (1970, 1986). The Chinese version of S-LOMS derived from the abovementioned procedure was passed to a bilingual vetter, a native Chinese speaker and a translation professor, who has experience in service-learning. This bilingual expert compared the Chinese version against the original English version and checked for semantic discrepancies between the two versions. The bilingual language vetter suggested revisions to 39 items in the Chinese version for consideration by the forward translator,

who, after considering these, then initiated two more rounds of back-translation.

The English vetter rejected only one item because of semantic inequivalence in the fifth round. In the sixth round, this remaining item was further revised by the forward- and back-translators, and the revised item was then considered satisfactory by the English vetter. Following this, the procedure was paused, pending the pretesting phase described below.

### **Arrangements and Procedures for the Pre-testing Sessions**

As Brislin (1986) proposed, pre-testing is a means for bridging the gap between professional translators, who are extremely well-versed in the formal use of language, and the target respondents, who may be somewhat less proficient in the formal use of words and means of expression. Accordingly, the Chinese version, refined through the first six rounds of back-translation, was then subjected to pre-testing. To keep within our budget, this involved a convenience sample of 11 full-time undergraduate students from Lingnan University (10 female & 1 male; mean age: 21.0), each of whom spoke Chinese as their mother tongue and had service-learning experience. Prior consent of all the surveyed students was obtained. They all attended one of the two pre-testing sessions and each one received an incentive in the form of a HK\$ 50 supermarket coupon upon completion of the tasks assigned to them.

In the pre-testing sessions, the students were first asked to complete the Chinese version of S-LOMS. Next, they were invited to identify any language-related issues associated with the Chinese version, such as their doubts, difficulties, and areas of confusion regarding the various items. Finally, the students were asked three questions about the Chinese version. These three questions were designed to capture the students' overall ratings on two language-related issues and one service-learning relevancy issue, using a ten-point Likert scale (from score 1: strongly disagree to score 10: strongly agree). The first question was about readability: "To what extent do you agree or disagree that the Chinese in this questionnaire is easily read?" The second question was about interpretability: "To what extent do you agree or disagree that the meaning of the items in this questionnaire is easily understood?" The third question was about relevance to service-

learning: “To what extent do you think this questionnaire captures the student learning outcomes arising from service-learning?” The purpose of these three questions was to provide indications of the face validity of the questionnaire.

## Findings Arising from the Pre-testing Sessions

During the pre-testing sessions, a total of 46 student comments were received, with 26 items covering issues and concerns about the Chinese version of S-LOMS. Most of the comments referred to three types of issues. First, students expressed the need for the sentence structure to be simplified for better readability. Second, the students suggested the use of different Chinese words in order to represent the intended meaning more clearly. Third, students indicated that they were unsure about the actual meaning of some items. For example, item 16: “I can easily establish effective relationships with people” caused uncertainty among many students, reflecting a Chinese translation of the word “effective” that was considered a strange way to characterise interpersonal relationships.

Ten out of the eleven students who participated in the pre-testing sessions answered the three additional questions described above. Notwithstanding the issues expressed by the students during the pre-testing sessions, their responses to these three questions indicated a high degree of face validity for the version of the Chinese S-LOMS that was presented to them. Thus, the mean score for the readability question was 8.00 (SD: 2.14), while for the interpretability question, it was 8.36 (SD: 1.69), and for the relevancy to service-learning question, it was 7.45 (SD: 2.25). These scores indicated that the Chinese version of S-LOMS presented to the students participating in the pre-testing sessions, albeit requiring some revisions, was broadly suitable for their Chinese reading and comprehension ability and was broadly appropriate for assessing developmental outcomes arising from service-learning.

## Four Further Rounds of Back-Translation

Following the pre-testing sessions, the forward translator reviewed items that attracted concerns from students in the pre-testing sessions and determined



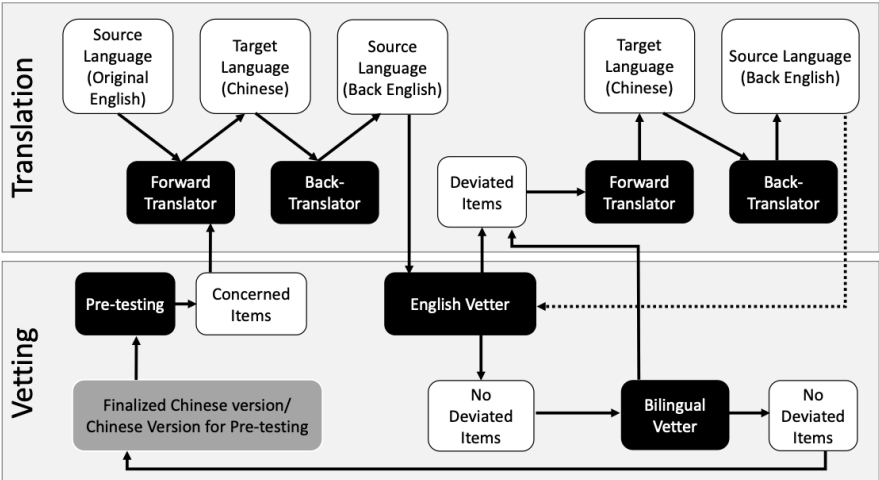
the need to revise 17 of the 26 items commented on by the students. The forward translator then made these revisions independently, except for discussing item 16 with the English vetter. Both parties were co-authors of the original English version of S-LOMS. The English vetter explained to the forward translator that the connotation of “effective relationships” in English stemmed from its usage in popular managerial texts such as a classic book by Covey (1989). The forward translator then revised item 16, based on the understanding that effective relationships are based on mutual trust, respect, and open communication.

After the forward translator made changes that they deemed necessary, the 17 modified items were then subjected to further rounds of back-translation and English vetting. The items modified by the forward translator were passed to the back-translator to adjust the English back-translation, wherever necessary. There were four more rounds of back-translation and review involving the English vetter before the latter indicated complete satisfaction. The refined Chinese version was then presented to the expert bilingual vetter, who indicated approval.

Figure 2 represents the entire translation and validation framework.

**Figure 2**

*The translation and validation procedures employed in the study*



## EMPIRICAL VALIDATION WITH A SAMPLE OF SECONDARY SCHOOL STUDENTS

Next, we approached a local secondary school in Hong Kong to invite their students to answer the revised Chinese version of S-LOMS in an empirical validation exercise. We tested the scale there because we wanted to extend the use of S-LOMS into the secondary school setting, where Chinese is often the medium of instruction. The school invited 120 students from all four of their Form five classes to complete our questionnaire during class time.

We chose this group of students for three reasons. First, since these students are currently being educated in the Chinese language, they prefer answering the Chinese version of S-LOMS rather than the English version. Second, many secondary students of senior levels, such as Form five and six, in Hong Kong are likely to be preparing themselves for further university education, and most of them are likely to be on the verge of gaining admission to a university. Hence, their academic background and study experience can be regarded as comparable to the key demographic characteristics of the university students who participated in previous validation studies of the English version of S-LOMS (Snell & Lau, 2020; Lau & Snell, 2020, 2021a). Third, testing the Chinese version of S-LOMS with secondary students can shed light on whether the measurement tool can be applied to a new population of students undertaking service-learning to increase the applicability and generalizability of S-LOMS.

The first author prepared a standard administration script for the class teachers to brief their students and provided an online video for students to view beforehand to understand how to complete the questionnaire. The students participated on a voluntary basis, with the incentive of a HK\$ 20 McDonalds cash coupon upon completion. The questionnaire comprised all 56 items of S-LOMS in Chinese language using a ten-point Likert scale (from score 1: strongly disagree to score 10: strongly agree). It also had a few questions asking about student background information, including gender, age, and whether they had any prior service-learning and/or community service experience. Completed questionnaires were collected by the class teachers and returned to the research team for analysis with confidentiality assured. Prior consent of the school and all the surveyed students were obtained.

Altogether 118 students completed the questionnaire, and 106 questionnaires were retained after data cleaning. Females comprised 63.2% of the sample. The participants’ age ranged between 16 and 18, with a mean of 16.4 (SD=.50). Among participants, over 71.7% had prior community service experience, and 11.3% had prior service-learning experience, with 8.5% having had both. Table 1 provides the details.

**Table 1**  
*Respondents’ Demographics*

Variable	Frequency	Percentage
Gender		
Male	39	36.8
Female	67	63.2
Prior Relevant Experience*		
Service-Learning	12	11.3
Community Service	76	71.7
Both	9	8.5
None	27	25.5

	Mean	Standard Deviation
Age	16.4	.50

Note: The summation of the percentage of “service-learning”, “community service” and “none” exceeds 100% because a respondent can have both prior service-learning and community service experience.

Due to the small sample size of barely over 100 and the relatively large number of S-LOMS items (56 items), we employed individual exploratory factor analysis (EFA) for each of the 11 underlying domains to satisfy the commonly accepted sample size requirement of at least ten subjects per one indicator (Nunnally, 1978). The method of principle components (PC) with oblimin rotation in SPSS 26.0 was utilized. Our justification is that if the design of S-LOMS permits the independent use of the items of one single dimension, the items for one domain should converge to a single factor solution in their individual EFA with satisfactory levels of the total variance explained and item factor loadings. Limitations are that due to insufficient subjects, we were unable to test validity for the overarching categories, namely personal and professional skills, civic orientation and engagement, and self-awareness, nor for S-LOMS overall. To some extent these limitations

were offset by calculating Cronbach's alpha for each domain, overarching category, and the S-LOMS overall as indicators of reliability.

Tables 2 and 3 exhibit the EFA results. For the individual EFAs, ten out of the 11 domains received single-factor solutions. The exception was Caring and Respect, which yielded a two-factor solution with 72.9% of the total variance explained. In that two-factor solution, the two factors contained the items of the domain's original sub-domains (see Snell & Lau, 2020), namely 1) Respect for Diversity (item 36 to 39) and 2) Empathy and Caring for Others (item 40 to 42) with item factor loadings of .70 or above. These two factors had a correlation of .49. In order to test whether the items for Caring and Respect could form a single factor, another EFA with a single-factor solution was performed. Results showed close to a satisfactory level of 56.7% total variance with all item factor loadings at .70 or above, except for item 42, which had a factor loading of .58.

Nine of the other ten domains obtained over 60% of the total variance, which is interpreted as satisfactory (Hair et al., 2018). The exception was for Creative Problem-Solving Skills, which obtained 53.3% of the total variance explained. As with Caring and Respect, Creative Problem-Solving Skills is a higher-order domain, originally composed of two domains, namely 1) Creativity and 2) Problem Solving Skills (see Snell & Lau, 2020). An additional EFA for the items of Creative Problem Solving was performed with a two-factor solution, and this obtained a satisfactory level of the total variance explained (65.7%) with item factor loadings at .70 or above, except for items 9 and 12, where the factor loadings were .42 and .60 respectively. The resultant two factors also contained their corresponding original items of Creativity (item 5, 6, 9, and 11) and Problem-Solving Skills (item 7, 8, 10, 12). The two factors had a correlation of .53.

**Table 2**  
*Individual EFA Results of the S-LOMS' Domains with Single-factor Solutions*

		Factor Loading									
		PPS				COE			SA		
Item	KA	CPS	RTS	SRS	CTS	CCU	CR*	SSR	SE	SU	CSI
V%	65.3	53.3	63.4	67.1	65.7	60.1	56.7	73.6	70.3	61.9	71.1
01	0.75										
02	0.88										

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03	0.83		
04	0.77		
05		0.60	
06		0.77	
07		0.69	
08		0.80	
09		0.63	
10		0.80	
11		0.71	
12		0.80	
13		0.81	
14		0.89	
15		0.82	
16		0.83	
17		0.75	
18		0.80	
19		0.66	
20		0.79	
21		0.88	
22		0.83	
23		0.87	
24		0.69	
25		0.86	
26		0.80	
27		0.77	
28			0.76
29			0.65
30			0.83
31			0.74
32			0.79
33			0.77
34			0.79
35			0.86
36			0.83
37			0.81
38			0.81
39			0.79

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40	0.73	
41	0.70	
42	0.58	
43	0.86	
44	0.87	
45	0.84	
46		0.78
47		0.85
48		0.87
49		0.86
50		0.87
51		0.83
52		0.78
53		0.65
54		0.90
55		0.76
56		0.86

n=106

Notes: For this EFA the domain CR was set to be a single-factor solution

V%: The total variance explained in percentage

KA: knowledge application; PPS: professional and personal Skills; CPS: creative problem-solving skills; RTS: relationship and team skills; SRS: self-reflection skills; CTS: critical thinking skills; COE: civic orientation and engagement; CCU: community commitment and understanding; CR: caring and respect; SSR: sense of social responsibility; SA: self-awareness; SE: self-efficacy; SU: self-understanding; CSI: commitment to self-improvement.

**Table 3**

*Individual EFA Results of the S-LOMS' Domains with Two-factor Solution*

	Factor Loading			
	CPS*		CR†	
Item	Problem Solving Skills	Creativity	Respect for Diversity	Empathy and Caring for Others
V%	65.7		72.9	
05		0.84		
06		0.87		
07	0.92			
08	0.85			

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09		0.42	
10	0.77		
11		0.70	
12	0.60		
36			0.86
37			0.83
38			0.91
39			0.83
40			0.70
41			0.77
42			0.93

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n=106

V%: The total variance explained in percentage

Notes: For this EFA the domain CPS was pre-set to be two-factor solution

† For this EFA the number of factors for the domain CR was not pre-set

CPS: creative problem-solving skills; CR: caring and respect.

The reliability analysis (see Table 4 for details), indicated by satisfactory Cronbach's alpha scores, further confirmed S-LOMS as a reliable instrument for the current sample. Alpha values ranged between .74 and .92 for the 11 domains and between .81 to .95 for the four overarching categories. The alpha value for the whole S-LOMS was .97.

For the two domains of Creative Problem Solving and Caring and Respect, results illustrated not-so-satisfactory yet acceptable single-factor solutions, and satisfactory two-factor solutions were obtained by splitting the items into their original sub-domain, for which the alpha values ranged between .77 and .89. Thus, these two domains and their sub-domains can be administrated independently at the practical level.

**Table 4**  
*Reliability Results*

Scale/ Overarching Category/ Domain/ Sub-domain	Cronbach's Alpha
<b>S-LOMS</b>	<b>0.97</b>
<b>KA</b>	<b>0.81</b>
<b>PPS</b>	<b>0.95</b>
CPS	0.87
Creativity	0.77
Problem Solving Skills	0.86
RTS	0.92
SRS	0.83
CTS	0.74
<b>COE</b>	<b>0.92</b>
CCU	0.90
CR	0.86
Respect for Diversity	0.89
Empathy and Caring for Others	0.77
SSR	0.82
<b>SA</b>	<b>0.89</b>
SE	0.86
SU	0.78
CSI	0.79

n=106

Notes. KA: knowledge application; PPS: professional and personal skills; CPS: creative problem-solving skills; RTS: relationship and team skills; SRS: self-reflection skills; CTS: critical thinking skills; COE: civic orientation and engagement; CCU: community commitment and understanding; CR: caring and respect; SSR: sense of social responsibility; SA: self-awareness; SE: self-efficacy; SU: self-understanding; CSI: commitment to self-improvement.

To sum up, we argue that the EFA results were satisfactory in terms of total variance explained and item factor loadings. Moreover, the Cronbach's alpha values mentioned above confirmed the Chinese version of S-LOMS as a reliable instrument. The final set of the Chinese items of S-LOMS vis-à-vis their original English items is listed in the Appendix.

**CONCLUSIONS**

The current study involved developing and validating a Chinese version of the original English text of S-LOMS. This represents an attempt to promote the use of S-LOMS as a tool for measuring the outcomes of service-learning among Chinese-speaking students in Asia, including mainland China,



Macau, and Taiwan. We also consider that in Hong Kong, the Chinese S-LOMS can be administered at the secondary education level, where Chinese is the primary medium of instruction for most students. Thus, the Chinese S-LOMS may constitute a tool for informing the improvement and further development of service-learning in Asia at secondary and tertiary education levels.

In conducting translation and back-translation to develop the Chinese version of S-LOMS and its initial validation through pre-testing, we sought to enhance the procedures proposed by Brislin (1970, 1986). For example, we considered that involving both a native English vetter, who is a service-learning veteran, and a professional bilingual vetter, who is a specialist translator in the back-translation procedure would be more rigorous and conducive to achieving quality assurance than solely relying on discussions between ordinary bilingual forward and back-translators for establishing translation equivalence. In the revised procedure that we adopted for the first six rounds of back-translation, the steps involving the back-translator were conducted “blind,” and there was no dialogue between the various parties in the process, which might otherwise have constituted a source of bias, thereby detracting from the translation quality.

The results of the pre-testing sessions with local university students with Chinese as their mother tongue established strong face validity of the Chinese S-LOMS in terms of readability and interpretability. Moreover, the respondents rated the items highly in terms of service-learning relevancy. These results provided strong preliminary confirmation of the validity and relevancy of the Chinese version of S-LOMS for our target population of Chinese-speaking students engaging in service-learning.

The subsequent empirical validation provided further evidence for the Chinese version of S-LOMS in terms of validity and internal consistency. The factor structure of each scale domain was confirmed by assigning all items of a domain in the individual EFAs. The EFA analysis also discovered that the items under the four sub-domains, namely Creativity, Problem Solving Skills, Respect for Diversity, and Empathy and Caring for Others, can be handled and administered independently. Reliability indices in terms of Cronbach’s alpha achieved satisfactory results at the sub-domain, domain, overarching category, and the entire scale levels.

The above findings are consistent with the previous validation of

S-LOMS with samples composed of Hong Kong university students. For example, Lau and Snell (2021a) confirmed the 11 domains of S-LOMS by using factor analysis, demonstrated its stability over time with test-retest reliability (2020), and provided evidence for its criterion validity by known-group differentiation (2020). Furthermore, our successful validation of S-LOMS with a sample of secondary school students legitimizes the instrument for deployment in the secondary school setting. The empirical validation exercise found that only a small proportion of students had prior service-learning experience (11.3%) compared to community service (71.7%, see Table 1), which suggests that there is much room for service-learning to be further developed in Hong Kong secondary schools.

Regarding theoretical implications, the current study confirmed that students' developmental outcomes arising from service-learning could be conceptualized as four constructs, comprising academic learning through knowledge application, development of professional and personal skills, civic orientation and engagement, and self-awareness.

The Chinese version of S-LOMS underwent rigorous back-translation and language vetting procedures. Furthermore, the pre-testing and empirical validation exercises provided strong empirical confirmation of the scale as a valid and reliable measurement instrument for assessing students' developmental outcomes arising from service-learning.

## Limitations and Further Research

Although much work has been reported in this study, there are several limitations and pointers to further research. First, the small sample size constrained the empirical validation exercise, preventing us from performing more sophisticated methods, such as factor analysis at the overarching category or entire scale level, from confirming the factor structure at those levels. Future research would therefore benefit from a larger validation sample.

Second, the current study collected data from one university and one secondary school only, limiting the generalizability of the findings and hence the applicability of the translated scale. It would be desirable to extend the research to multiple secondary and tertiary educational institutions to provide additional convergent evidence of validity and reliability.

Third, the current study was bounded within the Hong Kong soil. We have already extended the use of S-LOMS in English to Singapore (Lau & Snell, 2021b), and validation studies of the Chinese version of S-LOMS can be undertaken in other Chinese-speaking jurisdictions, such as mainland China and Taiwan. Translating S-LOMS into other Asian languages, such as Japanese and Korean, may also be considered. With S-LOMS in different languages, a centralized database across Asia and beyond facilitate the cross-cultural comparisons on student developmental outcomes and cross-institutional collaboration on service-learning across Asia.

Fourth, more validation work should be done to confirm additional types of validity for the Chinese version of S-LOMS. Test-retest reliability could be established by administering the instrument with the same group of participants under a given time interval (e.g., two weeks) to assess its stability over time. Known-group differentiation analysis may be undertaken, in which the domain scores of distinct groups of participants are compared to see if their scores differ in the expected directions to confirm criterion validity. High correlations between the domain scores of S-LOMS and other scales measuring similar constructs would constitute evidence of external validity.

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## APPENDIX

### S-LOMS ITEMS IN ENGLISH AND CHINESE

Item	Domain	Sub-domain	English Item	Chinese Translation
01	KA		I know how to apply what I learn in class to solve real-life problems.	我可以在生活中應用課堂學到的知識，以解決實際問題。
02	KA		I am able to apply/integrate classroom knowledge to deal with complex issues.	我可把課堂知識用以應付複雜問題。
03	KA		I know how to transfer knowledge and skills from one setting to another.	我知道如何在不同處境靈活運用知識及技能。
04	KA		I can make connections between theory and practice.	我知道如何把理論及實踐結合。
05	CPS	Creativity	I am not afraid of trying new things.	我不怕嘗試新事物。
06	CPS	Creativity	I am able to generate original ideas.	我有創新意念。
07	CPS	Problem Solving Skills	I am able to solve challenging real-life problems.	我可以解決生活上的棘手難題。
08	CPS	Problem Solving Skills	I feel confident in dealing with a problem.	我處理問題時充滿信心。
09	CPS	Creativity	When necessary, I can think of alternatives.	必要時，我也可以想出其他方案。
10	CPS	Problem Solving Skills	I feel confident in identifying the core of a problem.	我對指出問題的核心充滿信心。
11	CPS	Creativity	I am able to look at an issue from a fresh perspective.	我能以嶄新角度考慮問題。
12	CPS	Problem Solving Skills	I often modify my strategies to solve a problem when the situation changes.	當情況有變，我經常能夠調整策略以解決問題。
13	RTS		I am good at keeping in touch with people.	我善於與人保持聯繫。
14	RTS		I am good at building relationships between people.	我善於與人建立關係。
15	RTS		I can build long-term relationships with people.	我能與人建立長久關係。

16	RTS	I can easily establish effective relationships with people.	我能與人建立可靠互信的關係。
17	RTS	I am good at resolving conflicts.	我善於化解衝突。
18	RTS	I am confident in leading others toward common goals.	我對領導別人邁向共同目標充滿信心。
19	RTS	I participate effectively in group discussions and activities.	我投入小組討論和活動。
20	RTS	I have the necessary skills for making groups or organizations function effectively.	我具備領導小組或組織有效運作的必要技能。
21	SRS	I will evaluate myself after completing a task.	完成工作後，我會評估自己的表現。
22	SRS	I reflect on myself regularly.	我會不時自我反省。
23	SRS	I always think how I can improve myself.	我總是思考如何改善自己。
24	SRS	I consider circumstances when reflecting on how well I have performed.	當我評估自身表現時，會考慮當時處境。
25	CTS	I can analyze an issue comprehensively.	我可透徹分析問題。
26	CTS	I often look at complex issues from different angles.	我經常以不同角度審視複雜的問題。
27	CTS	I can understand others' viewpoints when we are making decisions together.	當共同決策時，我體察別人的觀點。
28	CCU	I always actively discuss possible improvements for our community.	我總是積極討論如何改善社區。
29	CCU	I can identify useful resources of a community.	我可指出社區裡有用的資源。
30	CCU	I think about how I can serve the community after graduating.	我思考畢業後我能如何服務社區。
31	CCU	I can identify challenges in the community.	我可指出社區面對的挑戰。
32	CCU	I can investigate the challenges faced by people in need in a community.	我可查找出社區中需受助人士所面對的挑戰。

33	CCU		I will contribute my abilities to make the community a better place.	我會盡力利用自己的才幹建設更好的社區。
34	CCU		I can identify issues that are important for a disadvantaged community.	我可指出弱勢社區所面對的重大問題。
35	CCU		I will play my part to reduce social problems.	我會盡本份，舒緩社會的問題。
36	CR	Respect for Diversity	I respect the needs of people from different backgrounds.	我尊重不同背景人士的不同需要。
37	CR	Respect for Diversity	I appreciate the ideas of people from different backgrounds.	我欣賞來自不同背景人士的意見。
38	CR	Respect for Diversity	I am willing to try to understand people whose background is different from mine.	我願意嘗試了解與我背景相異的人士。
39	CR	Respect for Diversity	I can respect people whose background is different from mine.	我尊重不同背景的人士。
40	CR	Empathy and Caring for Others	I consider others' points of view.	我會考慮別人的觀點。
41	CR	Empathy and Caring for Others	I care about others.	我關心別人。
42	CR	Empathy and Caring for Others	I observe others' feelings and emotions.	我可察覺別人的感受及情緒。
43	SSR		I believe that everybody should be encouraged to participate in civic affairs.	我認為每個人都應積極投入公共事務。
44	SSR		I believe that taking care of people who are in need is everyone's responsibility.	我認為每個人均有責任幫助需受助人士。
45	SSR		I feel obligated to help those who are less fortunate than me.	對於比我不幸的人，我很願意伸出援手。
46	SE		I am satisfied with my achievement so far.	我滿意目前的成就。
47	SE		Most things I do, I do well.	我大致上做得不錯。
48	SE		I have many good qualities.	我有很多優點。



49	SE	I am positive about myself.	我對自己評價正面。
50	SU	I know my strengths and weaknesses.	我知道自身的長處和短處。
51	SU	I have a clear picture of what I am like as a person.	我了解自己是怎樣的一個人。
52	SU	I have a clear understanding of my own values and principles.	我了解自身的價值觀和原則。
53	SU	I know what I need in my life.	我知道我的人生需要甚麼。
54	CSI	I look out for new skills or knowledge to acquire.	我致力吸收和掌握知識技能。
55	CSI	I am always motivated to learn.	我有學習的動力。
56	CSI	I always keep my knowledge and skills up to date.	我總是不斷確保自己的知識及技能與時並進。

Notes. KA: knowledge application; CPS: creative problem-solving skills; RTS: relationship and team skills; SRS: self-reflection skills; CTS: critical thinking skills; CCU: community commitment and understanding; CR: caring and respect; SSR: sense of social responsibility; SE: self-efficacy; SU: self-understanding; CSI: commitment to self-improvement.