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Service-learning outcomes measurement scale (S-LOMS) : the user manual

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Service-Learning Outcomes Measurement Scale (S-LOMS)

The User Manual

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Service-Learning Outcomes Measurement Scale (S-LOMS): The User Manual

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Service-learning originated more than 50 years ago in the USA as a means for universities to build stronger ties with local communities while offering students opportunities for civic engagement. Subsequently, educators discovered the potential of service-learning to foster skills of youth leadership, along with other attributes that cannot readily be learned through classroom activities alone. Since its introduction to Hong Kong around 15 years ago, educators have sought to bring out the full potential of service-learning both as a transformative pedagogy and as an initiative for social development within the unique cultural and institutional context of Hong Kong.

Three years ago, The Hong Kong Polytechnic University joined hands with Lingnan University, Hong Kong Baptist University and The Education University of Hong Kong to launch a collaborative project named “Cross-institutional Capacity Building for Service-Learning in Hong Kong Higher Education Institutions”. This inter-institutional project has adopted a multifaceted approach to support the further development of service-learning as a transformative pedagogy. Our achievements include creating an e-learning platform, establishing a community of practice, developing case studies of good practices, facilitating action research, and supporting the development of collaboratively run courses both in Hong Kong and overseas.

The Service-Learning Outcomes Measurement Scale (S-LOMS) is a product of our inter-institutional project that has been led by investigators from Lingnan University, with strong and valuable support from their peers in the other collaborating universities. This component includes the development of three different instruments for use in conjunction with the evaluation and assessment of service-learning. Besides S-LOMS, we have also developed other measures to assess the community impacts of service-learning, and presence or absence of 'success factors' that are perceived as being conducive to the effectiveness of service-learning.

As explained in this user manual, S-LOMS is a reliable instrument that can be used to assess changes in students in eleven outcome domains after doing service-learning. S-LOMS not only has potential to play a key role in the quality assurance of service-learning programmes at the institutional level, but it can also serve as a tool in research to guide the advancement of the theory and practice of service-learning such as establishing the effectiveness of particular innovations in the design and delivery of service-learning. I therefore encourage investigators to contribute to building a data archive for the eleven subscales and four overarching categories of S-LOMS. Most importantly, I would like to express my sincerest gratitude to colleagues and fellow researchers across the collaborating universities for participating in the development of S-LOMS, which has much value in service-learning research and practice.

PREFACE

Professor Robin Stanley SNELL

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Hong Kong's first undergraduate level service-learning course was introduced in 2005. As of today, all UGC-funded local universities have adopted service-learning, and some of them have even made it a graduation requirement. Service-learning is also gaining a foothold in non-UGC funded universities in Hong Kong.

Service-learning is a well-established experiential pedagogy that originated in the United States, where many studies of its developmental impacts have already been conducted. So why did we create S-LOMS as an instrument for use in Hong Kong? As you will see in this manual, during its localization in Hong Kong, service-learning has evolved to match the unique cultural and institutional features within this jurisdiction. S-LOMS has accordingly been designed to match the goals of service-learning programmes that we typically find here.

While we are strong believers in the value of service-learning as a high-impact educational experience, we also believe that service-learning would lose its power unless its practitioners undertake continuous improvement of their designs, methods, and supporting arrangements, and remain constantly alert to new demands and requirement from both the academic world and the wider community. It is easier to observe the impact of improvements if there is a yardstick to measure the developmental impacts on students. We consider that S-LOMS provides the yardstick that we need in Hong Kong.

S-LOMS comprises a standardised instrument that enables robust before and after measurements to be made to indicate developmental outcomes covering 11

domains, which may arise for students from service-learning experiences. S-LOMS will thus facilitate comparisons across different studies that use the instrument. Another feature of S-LOMS is that because all 11 subscales have been validated, investigators who are exclusively interested in particular outcome domains need only select the corresponding subscales and do not have to use the entire instrument. S-LOMS thus paves the way for further advancement of service-learning, while allowing for flexibility in terms of its administration.

I would like to express my deepest gratitude to the many colleagues from the four collaborating universities (Lingnan University, The Hong Kong Polytechnic University, Hong Kong Baptist University, The Education University of Hong Kong) who contributed various ways to the development of S-LOMS. I also thank the University Grants Committee (UGC) for financial support for the parent project, named “Cross-institutional Capacity Building for Service-Learning in Hong Kong Higher Education Institutions (PolyU4/T&L/16-19)”.

July 2020

TABLE OF CONTENTS

Overview	1
A Brief Review of the Literature	2-6
Service-learning and its development in Hong Kong	3
Student developmental outcomes arising from service-learning	4-6
Scale Construction of S-LOMS	7-13
Item development	8
Deriving developmental domains	9-13
Scale Validation	14-25
Confirmatory factor analysis	15-18
Test-retest validity	19-20
Reliability	21
Differentiation by known-groups	22-23
Pretest-posttest comparisons	24
Cross-cultural validation with a Singapore sample	25
Scale Construct Definitions	26-28
Administration of S-LOMS	29-33
Format and scoring	30
Administration methods	31
Data cleaning	32
Reporting	32
References	34-36
Appendices	37-41
S-LOMS items	38-40
Access for those with special needs or a disability	41

OVERVIEW

The Service-Learning Outcomes Measurement Scale (S-LOMS) is a self-reporting measure designed for students educated in Hong Kong to assess their developmental outcomes arising from service-learning. The developmental outcomes encompass 11 learning domains under four overarching categories, namely knowledge application, personal and professional skills, civic orientation and engagement, and self-awareness.

As well documented in the past literature (see section on "Student developmental outcomes arising from service-learning"), service-learning creates impacts for students in terms of soft skills, attitudes and personal attributes, but these changes are not clearly reflected in their academic performance on a service-learning course. S-LOMS, therefore, aims to capture these developmental impacts by assessing the students' self-perceived changes before and after service-learning experience.

The development of items and subscales for S-LOMS involved rigorous exploration by local service-learning practitioners and researchers, along with an extensive review of relevant research literature. The scale was then subjected to a series of validation tests, to ensure that it is a valid and reliable instrument for measuring developmental outcomes for students.

Since S-LOMS is designed in a standardized format, comparisons across studies are possible. A centralized database for S-LOMS is under construction for benchmarking purposes. Furthermore, practitioners may customize their own assessments by selecting particular subscales for administration according to their needs. We thus expect that S-LOMS will play an important role in supporting the enhancement of service-learning in Hong Kong and beyond.

This user manual explains the theoretical basis of S-LOMS, describes its structure and items, and provides validation results, offers guidelines for administration.

A BRIEF REVIEW OF THE LITERATURE

SERVICE-LEARNING AND ITS DEVELOPMENT IN HONG KONG

Service-learning has been defined as "a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development" (Jacoby, 1996, p. 5).

In 2004, Lingnan University became the first university in Hong Kong to introduce service-learning into its undergraduate curriculum and in 2006 established an Office of Service-Learning as a centralized supporting unit. Ten years later, Lingnan University adopted the policy of making service-learning a graduation requirement for its undergraduates. As of today, all local public universities and some private universities in Hong Kong have adopted service-learning (for details, please see Ma, 2018; Snell & Lau, 2020; Xing & Ma, 2010).

According to Snell and Lau (2020), in the process of being adapted to the unique institutional and cultural context of tertiary education in Hong Kong, service-learning has acquired four local emphases that are distinct from typical western applications. First, there is greater emphasis on personal and moral development than on the furtherance of democratic ideals. Second, there is a stronger focus on practical and vocational skills. Third, the influence of Confucian values is manifest in concern for self-cultivation and self-reflection. Fourth, the preparation of students and coordination of projects is more consistent with cultural norms of large power distance.

These local characteristics have informed the composition of S-LOMS. In the next section, we shall explain the conceptual framework that underpins the instrument.

STUDENT DEVELOPMENTAL OUTCOMES ARISING FROM SERVICE-LEARNING

Before introducing the conceptual framework that has been adopted for S-LOMS, we shall first explain some frameworks of developmental outcomes that were created on the basis of research on service-learning that has been primarily conducted in the west.

Eyler & Giles (1999) identified four major categories of developmental outcomes for students. These are: understanding and applying knowledge; personal and interpersonal development; cognitive development, including critical thinking, engagement curiosity, reflective practice, and perspective transformation; and citizenship. Eyler, Giles, Stenson, & Gray (2001) adopted a similar typology.

Driscoll, Holland, Gelmon, & Kerrigan (1996) identified three main developmental categories. The first of these is academic achievement. The second is personal development, including communication skills, self-awareness, autonomy and independence, and sense of ownership. The third is civic learning, which comprises awareness of and involvement with community, commitment to service, and sensitivity to diversity. Felten and Clayton (2011) similarly identified academic enhancement, personal growth, and civic learning as outcome categories, arguing that development is driven by a combination of academic material, relevant service and critical reflection.

In summary, our review of pre-existing typologies identified developmental impacts under three major categories: academic enhancement, personal growth, and civic learning. Table 1 provides a summary.

Researchers	Academic Enhancement	Personal Growth	Civic Learning
Eyler and Giles (1999)	Understanding and applying knowledge	Personal and Interpersonal development Critical thinking Reflective practice Perspective transformation Engagement, curiosity	Citizenship
Driscoll et al. (1996)	Academic achievement	Personal development Communication skills Career choices Self-awareness Autonomy/ independence Sense of ownership	Awareness of community Involvement with community Commitment to service Sensitivity to diversity
Eyler et al. (2001)	Enhanced academic results Knowledge application	Interpersonal development Ability to work with others Leadership and communication skills Problem analysis Critical thinking skills Personal efficacy Personal identity Career development Spiritual growth	Moral development Reduced stereotyping and prejudice Enhanced cultural & racial understanding Sense of social responsibility Citizenship skills Commitment to service
Felten & Clayton (2011)	Academic knowledge/skills/ dispositions	Personal growth Teamwork Critical thinking skills Intercultural competence	Civic learning

Table 1. A Preliminary Conceptual Framework for Student Learning Outcomes from Service-Learning.
Source: Snell & Lau (2020)

Taking into consideration the characteristics of service-learning as localized in Hong Kong, five modifications to the framework in Table 1 have been made for the S-LOMS conceptual framework.

First, in response to Hong Kong's more pragmatic orientation, the original personal growth category was relabeled as personal and professional skills, with the addition of more practical and professional skills, such as team development and problem-solving skills. Second, we included the domain of self-reflection skills within this broader category to acknowledge the Confucian educational philosophy prevalent in Hong Kong. Such inclusion is also supported by previous research, indicating that reflection plays a key role for students in service-learning (Bringle & Hatcher, 1999; Eyler & Giles, 1999; Jacoby, 1996). Third, we have created a fresh category concerning self-awareness, comprising the domains of self-understanding, self-esteem and commitment to self-improvement, again in acknowledgement of the local importance of Confucian self-cultivation. Within the domains of civic orientation and engagement, we placed more emphasis on moral development than on participatory democracy. Fifth, we have relabeled the category of academic enhancement to knowledge application based on the argument that subject knowledge is readily assessed through graded assignments within a service-learning course. The resulting conceptual framework for S-LOMS, with 15 domains under four overarching categories, is given in Table 2.

Conceptual Category	Knowledge Application	Personal and Professional Skills	Civic Orientation and Engagement	Self-awareness
Learning Outcome Domain	1. Knowledge application	2. Relationship skills	8. Sense of social responsibility	13. Self-understanding
		3. Team skills	9. Commitment to social betterment	14. Commitment to Self-improvement
		4. Problem-solving skills	1. Understanding community	15. Self-esteem
		5. Critical-thinking skills	11. Respecting diversity	
		6. Self-reflection skills	12. Empathy and caring for others	
		7. Creativity		

Table 2. The Modified Conceptual Framework Specific to Hong Kong Context.
Source: Snell & Lau (2020)

Picture from
the Centre for Innovative
Service-Learning (CISL),
Hong Kong Baptist University.

SCALE CONSTRUCTION OF S-LOMS

ITEM DEVELOPMENT

Subscale selection for S-LOMS was based on a deductive approach, but this was supplemented by the use of an inductive approach for item generation.

The selection and definition of domain constructs was informed by the literature review and consideration of Hong Kong context, as described in the previous section. The service-learning evaluation scales that were already in use by Lingnan University, The Hong Kong Polytechnic University, Hong Kong Baptist University, and The Education University of Hong Kong were examined. Also examined were the Common Outcomes Measurement scale (Ma, Chan and Tse, 2019), the Service Learning Benefit scale (SELEB) (Toncar, Reid, Burns, Anderson and Nguyen, 2006), and the self-esteem scale (Rosenberg, 1965). On this basis, the conceptual framework in Table 2 was finalized.

For the purpose of item generation, a panel was formed of local service-learning practitioners-cum-researchers, consisting of faculty members with service-learning experience from the four local institutions mentioned above. The panel engaged in brainstorming sessions to generate a total of 103 prospective items for a draft S-LOMS instrument. This initial draft was then reviewed by a different group of subject matter experts, who also were experienced in adopting service-learning in Hong Kong, and revisions were made based on their recommendations.

A pilot study was then conducted for the purpose of checking item readability among the target population, namely tertiary education students in Hong Kong. The draft S-LOMS written in English was administered face-to-face in six pilot sessions conducted at the above four local universities, involving a total of 83 students (female: 65.1%; male: 34.9%; mean age: 20.5). In each session the students spent around 40 minutes answering the items, followed by 20 minutes of discussion, during which the students expressed comments regarding language-related issues, such as use of words and item ambiguity, and other. Based on an analysis of the comments, two items were discarded and revisions in wording were made for 35 of the remaining 101 items.

DERIVING DEVELOPMENTAL DOMAINS

The draft version of S-LOMS, written in English, consisting of self-description items on a 10-point Likert scale (from 1 as "strongly disagree" to 10 as "strongly agree") was then validated through exploratory factor analysis (EFA) to discover its underlying dimensionality.

A total of 400 university students from the four abovementioned local universities volunteered for this study. Around two-thirds of them were female (65.0%). The mean age of the students was 20.9, and they were from various academic disciplines (arts: 23.4%; social sciences: 15.6%; business: 22.4%; engineering & science: 27.5%; nursing: 11.1%).

Owing to the relatively small sample size to the number of items in the draft S-LOMS and due to concerns about high levels of association among the developmental domains at the empirical level, four separate EFAs were conducted. These were performed under the four overarching categories: knowledge application; personal and professional skills; civic orientation and engagement; and self-awareness.

The minimum average partials (MAP) test and the MAP program developed by O'Connor (2000) in SPSS were employed in order to indicate the optimal number of factors for guiding the EFAs under the respective overarching categories. The results are given in Table 3.

Category	Optimal Number of Factors
Knowledge Application	1
Personal and Professional Skills	5
Civic Orientation and Engagement	4
Self-awareness	3

Table 3. The MAP Test Results for the Four Overarching Categories. Source: Snell & Lau (2020)

The Principle Components method with oblimin rotation was employed in all four EFAs. In each EFA, the analysis was reiterated with the following three item reduction criteria. First, any items with the highest factor loading lower than .4 in absolute value were removed, because only items were desired that had at least 15% of their variance explained by its matching construct (Stevens, 2009). Second, any double-loaded items were removed. Among the remaining items that had obtained satisfactory factor loadings, some were discarded based on semantic proximity and their item-total correlation.

As a result, the draft S-LOMS was streamlined to 56 items. Moreover, the set of 15 developmental domains in the conceptual framework was reduced to 11, with some higher order domains created by combining pairs of original domains. First, creativity and problem-solving skills were combined to form creative problem-solving skills. Second, relationship skills and team skills were combined to form relationship and team skills. Third, empathy and caring for others was combined with respecting diversity to form caring and respect. Fourth, commitment to social betterment and understanding community were combined to form community commitment and understanding.

Tables 4 to 7 report the EFA results for the four overarching categories, in turn. For the item descriptions, please refer to Appendix 1.

Item	Absolute Value of Factor Loading	Item-Total Correlation
01	.88	.77
02	.87	.75
03	.85	.73
04	.80	.66

Variance explained = 72.4%; Cronbach's alpha = .87.

Table 4. EFA Results for the Items under the Overarching Category of Knowledge Application.

Source: Snell & Lau (2020)

Absolute Value of Factor Loading					
Item	Creative Problem-Solving Skills	Relationship and Team Skills	Self-reflection Skills	Critical Thinking Skills	Item-Total Correlation
05	.87				.61
06	.69				.70
07	.65				.78
08	.64				.75
09	.53				.76
10	.52				.77
11	.51				.72
12	.47				.74
13		.89			.69
14		.73			.69
15		.72			.71
16		.71			.75
17		.65			.73
18		.54			.73
19		.53			.76
20		.47			.76
21			.84		.68
22			.77		.65
23			.63		.65
24			.54		.71
25				.73	.60
26				.65	.66
27				.41	.63
α	.92	.93	.85	.75	

Variance explained = 67.9%; Cronbach's alpha = .96.

Table 5. EFA Results for the Items under the Overarching Category of Personal and Professional Skills. Source: Snell & Lau (2020)

Absolute Value of Factor Loading				
Item	Community Commitment and Understanding	Caring and Respect	Sense of Social Responsibility	Item-Total Correlation
28	.86			.58
29	.82			.72
30	.73			.64
31	.73			.71
32	.73			.73
33	.69			.74
34	.68			.73
35	.61			.72
36		.80		.65
37		.79		.69
38		.75		.74
39		.71		.58
40		.69		.69
41		.48		.75
42		.47		.69
43			.79	.62
44			.75	.68
45			.61	.70
α	.92	.91	.81	

Variance explained = 67.7%; Cronbach's alpha = .95.

Table 6. EFA Results for the Items under the Overarching Category of Civic Orientation and Engagement. Source: Snell & Lau (2020)

Absolute Value of Factor Loading				
Item	Self- efficacy	Self- understanding	Commitment to Self- improvement	Item-Total Correlation
46	.84			.64
47	.83			.69
48	.77			.76
49	.74			.72
50		.90		.64
51		.88		.64
52		.63		.74
53		.53		.70
54			.94	.64
55			.76	.67
56			.66	.74
α	.86	.85	.83	

Variance explained = 72.0%; Cronbach's alpha = .92.
Table 7. EFA Results for the Items under the Overarching Category of Self-awareness. Source: Snell & Lau (2020)

Overall, the EFAs results indicated a satisfactory factor structure with fewer items and domains for S-LOMS, and it was resolve that the 56-item, 11-domain version of S-LOMS would be used in subsequent validation studies.

CONFIRMATORY FACTOR ANALYSIS

The 56-item draft version of S-LOMS was then subjected to confirmatory factor analysis (CFA) so as to confirm the instrument's construct validity. For the details of the analysis, please refer to Lau and Snell (2021). A fresh volunteer sample from the four abovementioned local universities was recruited for the CFA. The sample comprised 629 participants, among them 59.5% were females. The mean age was 20.5, and students came from various academic disciplines (engineering and science: 40.9%; business: 19.9%; social sciences: 14.3%; arts: 12.7%; and healthcare: 12.2%).

The CFA procedure in EQS 6.4 for Windows was employed for the analysis. Results showed acceptable model fit (NNFI=.90; CFI=.91; RMSEA=.05, CI=.05, .05), and confirmed the exploratory factor structure of 11 learning domains without the presence of overarching categories. Tables 8 reports the standardized factor loadings and the inter-factor correlations in the model.

In another validation exercise, a further volunteer sample of 655 participants from the four abovementioned local universities was recruited to test the 11-domain model for S-LOMS, with and without four overarching categories, using the same CFA procedure with EQS software. The sample comprised 69.5% females. The mean age was 20.7, and students came from various academic disciplines (business: 42.9%; arts: 31.6%; social sciences: 22.4%; engineering and science: 3.1%).

Results show satisfactory goodness-of-fit for both the models without the overarching categories (NNFI=.96; CFI=.97; RMSEA=.03, CI=.03,.03) and the model with the overarching categories (NNFI=.95; CFI=.96; RMSEA=.03, CI=.03,.03).

This indicates that S-LOMS can be viewed either as being composed of 11 separate developmental domains (constructs), or as a structure with four overarching categories subsuming the 11 developmental domains. Tables 9 & 10 report the standardized factor loadings and the inter-factor correlations in the two models.

Domain	Factor Loading Range of the Items	KA	CPS	RTS	SRS	CTS	CCU	CR	SSR	SE	SU	CSI
KA	.64—.78	1.0										
CPS	.61—.78	.86	1.0									
RTS	.63—.80	.94	.97	1.0								
SRS	.66—.80	.82	.96	.91	1.0							
CTS	.76—.78	.77	.85	.83	.98	1.0						
CCU	.59—.80	.81	.91	.89	.92	.87	1.0					
CR	.59—.78	.79	.91	.89	.90	.82	.93	1.0				
SSR	.73—.75	.82	.92	.92	.94	.88	.96	.96	1.0			
SE	.70—.77	.81	.89	.90	.89	.83	.86	.92	.95	1.0		
SU	.66—.79	.77	.85	.88	.90	.86	.89	.90	.94	.96	1.0	
CSI	.78—.84	.74	.82	.82	.84	.84	.85	.83	.92	.85	.90	1.0

Notes: * All item-domain factor loadings are statistically significant at the .05 level.

KA: Knowledge Application; CPS: Creative Problem-solving Skills; RTS: Relationship & Team Skills; SRS: Self-reflection Skills; CTS: Critical Thinking Skills; CCU: Community Commitment & Understanding; CR: Caring & Respect; SSR: Sense of Social Responsibility; SE: Self-efficacy; SU: Self-understanding; CSI: Commitment to Self-improvement

Table 8. Standardized Item-Domain Factor Loadings*. Source: Lau & Snell (2021)

Domain	Factor Loading Range of the Items	KA	CPS	RTS	SRS	CTS	CCU	CR	SSR	SE	SU	CSI
KA	.87—.90	1.0										
CPS	.76—.87	.90	1.0									
RTS	.85—.89	.85	.93	1.0								
SRS	.86—.88	.84	.91	.86	1.0							
CTS	.86—.87	.88	.94	.91	.94	1.0						
CCU	.82—.90	.86	.89	.86	.86	.90	1.0					
CR	.87—.90	.71	.76	.72	.79	.80	.80	1.0				
SSR	.89—.91	.72	.74	.71	.76	.77	.83	.89	1.0			
SE	.83—.90	.84	.86	.84	.81	.84	.89	.67	.73	1.0		
SU	.87—.90	.83	.88	.86	.82	.87	.88	.74	.75	.92	1.0	
CSI	.89—.91	.82	.87	.82	.85	.88	.90	.78	.82	.88	.93	1.0

Notes: * All item-domain factor loadings are statistically significant at the .05 level.
KA: Knowledge Application; CPS: Creative Problem-solving Skills; RTS: Relationship & Team Skills; SRS: Self-reflection Skills; CTS: Critical Thinking Skills; CCU: Community Commitment & Understanding; CR: Caring & Respect; SSR: Sense of Social Responsibility; SE: Self-efficacy; SU: Self-understanding; CSI: Commitment to Self-improvement
Table 9. Standardized Item-Domain Factor Loadings* of the Model without the Overarching Categories. Source: Unpublished manuscript

Domain	Factor Loading Range of the Items of the Domain	Factor Loading of the Domain onto the Overarching Category			
		Knowledge Application	Personal & Professional Skills	Civic Orientation & Engagement	Self-awareness
KA	.79— .89	1.0**			
CPS	.73— .85		.97		
RTS	.82— .87		.93		
SRS	.84— .86		.92		
CTS	.83— .86		.97		
CCU	.79— .89			.97	
CR	.86— .89			.83	
SSR	.88— .90			.85	
SE	.81— .88				.93
SU	.85— .88				.96
CSI	.87— .91				.95
Knowledge Application		1.0			
Personal & Professional Skills		.89	1.0		
Civic Orientation & Engagement		.84	.92	1.0	
Self-awareness		.84	.92	.93	1.0

Notes: * All item-domain factor loadings are statistically significant at the .05 level.
KA: Knowledge Application; CPS: Creative Problem-solving Skills; RTS: Relationship & Team Skills; SRS: Self-reflection Skills; CTS: Critical Thinking Skills; CCU: Community Commitment & Understanding; CR: Caring & Respect; SSR: Sense of Social Responsibility; SE: Self-efficacy; SU: Self-understanding; CSI: Commitment to Self-improvement
** The cognominal category was created above the domain "Knowledge Application" for the sake of providing a clear model structure
Table 10. Standardized Domain-Category Factor Coefficients* and Inter-factor Correlations of the Model with the Overarching Categories . Source: Unpublished manuscript

TEST-RETEST VALIDITY

S-LOMS is expected to be used mainly under a pretest-posttest research design to track the developmental changes of students arising from service-learning. Because of this, the instrument's stability over time is crucial, so that differences between the scores before and after service-learning can be attributed to the service-learning intervention but not to instrument-related factors.

For this purpose, S-LOMS was investigated for test-retest validity by using intra-class correlation coefficients (ICCs). For details of this study, please see Lau and Snell (2020).

A sample of 266 university students was recruited from the four abovementioned local universities. A total of 122 of them (completion rate: 45.9%) completed S-LOMS in both the test and retest phases with an interval of two weeks.

Females constituted a majority of the sample of 122 (75.4%). The mean age was 20.4. The participants came from various academic disciplines (engineering and science: 35.2%; arts: 34.4%; social sciences: 13.9%; business: 10.7%; healthcare: 5.7%).

For the data analysis, the ICCs were generated on a two-way mixed-effects model with absolute agreement by using SPSS version 25, as recommended by Koo and Li (2016). ICC indices of single measures were adopted in the output tables, as recommended by McGraw & Wong (1996) and by Nichols (1998). Cronbach's alpha values were also generated for both the test and retest phases.

Table 11 presents the results. S-LOMS obtained an ICC index of .78, while the ICCs ranged between .67 and .78 for the overarching categories, and between .60 and .77 for the 11 domains. Taking the criteria of Koo and Li (2016), most of the reliability index scores are regarded as moderate (i.e., between .50 and .75) while the others, such as those for the category of civic orientation and engagement and for the domain of caring and respect, may be regarded as good (i.e., between .75 and .90).

Overarching Category/ Domain	Test-retest ICC (95% confidence interval)
Knowledge Application	.67 (.56, .76)
Personal & Professional Skills	.73 (.63, .80)
Creative Problem-solving Skills	.72 (.62, .80)
Relationship & Team Skills	.74 (.64, .81)
Self-reflection Skills	.60 (.47, .70)
Critical Thinking Skills	.68 (.57, .77)
Civic Orientation & Engagement	.78 (.70, .84)
Community Commitment & Understanding	.75 (.66, .82)
Caring & Respect	.76 (.67, .83)
Sense of Social Responsibility	.70 (.59, .78)
Self-awareness	.73 (.64, .80)
Self-efficacy	.72 (.63, .80)
Self-understanding	.66 (.55, .75)
Commitment to Self-improvement	.62 (.48, .72)
S-LOMS	.78 (.70, .84)

Table 11. The ICCs Results. Source: Lau & Snell (2020)

RELIABILITY

Table 12 summarizes the Cronbach's alpha scores obtained from the research reported in the preceding sections, comprising the EFA, CFA and test-retest validity studies.

	Study Sample Size	EFA 400	CFA 629	CFA 655	Test –Retest 122	
Overarching Category/ Domain					Test	Retest
Knowledge Application		.87	.87	.93	.86	.90
Personal & Professional Skills		.96	.96	.98	.96	.96
Creative Problem-solving Skills		.92	.91	.95	.92	.93
Relationship & Team Skills		.93	.91	.96	.92	.92
Self-reflection Skills		.85	.82	.93	.80	.88
Critical Thinking Skills		.75	.79	.90	.79	.80
Civic Orientation & Engagement		.95	.95	.98	.94	.95
Community Commitment & Understanding		.92	.92	.96	.90	.91
Caring & Respect		.91	.91	.96	.92	.92
Sense of Social Responsibility		.81	.79	.93	.75	.80
Self-awareness		.92	.92	.97	.91	.93
Self-efficacy		.86	.84	.93	.84	.88
Self-understanding		.85	.81	.93	.83	.85
Commitment to Self-improvement		.83	.81	.93	.74	.82
S-LOMS		.98	.98	.99	.98	.98

Table 12. The Cronbach's Alpha scores for S-LOMS in the EFA, CFA and test-retest validity studies

DIFFERENTIATION BY KNOWN-GROUPS

Known-group analysis was employed to confirm the criterion validity of S-LOMS through a study that tested whether S-LOMS is able to differentiate between three groups of participants with different amounts of service-learning experience. Group A consisted of 383 participants without any service-learning experience. Group B was composed of 758 participants, who either had previously completed a service-learning course or who were currently taking a service-learning course. Group C comprised 923 participants, all of who had just completed a service-learning course. Participants were recruited from the four abovementioned local universities and from The Hang Seng University of Hong Kong. Table 13 summarizes the demographics of the three groups.

	Group Sample Size	A. No S-L Exp 383		B. Previous S-L Exp or Currently Taking S-L 758		C. Just after S-L 923	
		N	%	N	%	N	%
Gender							
Male		143	38.0	272	36.4	317	34.3
Female		233	62.0	475	63.6	606	65.7
Age							
Mean		20.3		20.8		20.8	
Std. Deviation		2.71		1.83		1.58	
Academic Backgrounds							
Arts		52	13.8	162	21.5	254	27.8
Social Sciences		61	16.1	106	14.1	169	18.5
Business		92	24.3	131	17.4	379	41.4
Engineering & Science		170	45.0	231	30.6	89	9.7
Healthcare		3	0.8	124	16.5	24	2.6

Table 13. Demographics of the Three Groups in the Known-group Analysis

One-way analyses (ANOVA) with post-hoc comparison when results were significant were employed in the analysis. Table 14 reports the results. Group C, comprising students who had just completed service-learning courses, obtained the highest scores. The next highest scores were obtained by Group B with participants who either had completed a service-learning course or who were currently taking a service-learning course. The lowest scores were obtained by Group A, comprising students with no service-learning experience at all. These results provided evidence of the criterion validity of S-LOMS. Further details of the study are reported in Lau & Snell (2020a).

	A. No S-L Exp				B. Previous S-L Exp or Currently Taking S-L				C. Just after S-L				Mean Differences		
	N	Mean	s.d.		N	Mean	s.d.		N	Mean	s.d.		B-A	C-B	C-A
Knowledge Application	383	6.53	1.20		758	6.98	1.17		923	7.47	1.38		.45**	.49**	.94**
Personal & Professional Skills	383	6.73	1.13		758	7.10	1.06		923	7.59	1.23		.37**	.49**	.86**
Creative Problem-solving Skills	383	6.70	1.22		758	7.08	1.13		923	7.57	1.28		.38**	.49**	.87**
Relationship & Team Skills	383	6.57	1.36		758	7.03	1.18		923	7.56	1.29		.46**	.53**	.99**
Self-reflection Skills	383	7.01	1.28		758	7.25	1.20		655	7.76	1.22		.25*	.51**	.75**
Critical Thinking Skills	383	6.88	1.26		758	7.16	1.14		655	7.72	1.21		.28**	.56**	.84**
Civic Orientation & Engagement	383	7.01	1.15		758	7.29	1.06		923	7.97	1.15		.28**	.68**	.95**
Community Commitment & Understanding	383	6.61	1.22		758	7.02	1.14		655	7.71	1.12		.41**	.69**	1.10**
Caring & Respect	383	7.54	1.33		758	7.63	1.13		923	8.10	1.19		.10	.47**	.56**
Sense of Social Responsibility	383	6.87	1.44		758	7.21	1.31		923	7.93	1.26		.34**	.72**	1.06**
Self-awareness	383	6.72	1.22		758	7.14	1.12		923	7.68	1.21		.42**	.54**	.97**
Self Efficacy	383	6.45	1.46		758	6.98	1.26		655	7.64	1.25		.53**	.66**	1.19**
Self Understanding	383	6.86	1.33		758	7.26	1.19		923	7.70	1.25		.40**	.44**	.84**
Commitment to Self Improvement	383	6.89	1.38		758	7.20	1.24		655	7.73	1.21		.31**	.53**	.84**
S-LOMS	383	6.81	1.09		758	7.16	1.03		923	7.73	1.12		.36**	.57**	.93**

Table 14. The One-way ANOVA Results
Remark **: significant at the .01 level; *: significant at the .05 level. Source: Lau & Snell (2020a)

PRETEST-POSTTEST COMPARISONS

A pretest-posttest comparison study aimed to provide further evidence of the criterion validity for S-LOMS. Responses from the participants in Group C in the study reported in the previous section were analyzed. As a course requirement, they had answered S-LOMS just before (pretest) and just after (posttest) taking their respective service-learning courses. Paired-sample t-tests were used to identify any statistically significant differences among the pretest-posttest scores. Table 15 indicates the results, which show that all the posttest scores were significantly higher than in the pretest. These results provide further evidence of the criterion validity of S-LOMS. Further details of this study are reported on Lau & Snell (2020a).

Overarching Category/ Domain	Pretest			Posttest			Post-Pre
	N	Mean	s.d.	N	Mean	s.d.	
Knowledge Application	923	6.84	1.30	923	7.47	1.38	.63**
Personal & Professional Skills	923	6.94	1.25	923	7.59	1.23	.65**
Creative Problem-solving Skills	923	6.95	1.27	923	7.57	1.28	.62**
Relationship & Team Skills	923	6.87	1.36	923	7.56	1.29	.70**
Self-reflection Skills	655	7.08	1.35	655	7.76	1.22	.68**
Critical Thinking Skills	655	7.00	1.33	655	7.72	1.21	.72**
Civic Orientation & Engagement	923	7.46	1.26	923	7.97	1.15	.50**
Community Commitment & Understanding	655	6.99	1.28	655	7.71	1.12	.72**
Caring & Respect	923	7.68	1.33	923	8.10	1.19	.42**
Sense of Social Responsibility	923	7.41	1.37	923	7.93	1.26	.52**
Self-awareness	923	7.11	1.32	923	7.68	1.21	.57**
Self Efficacy	655	6.90	1.38	655	7.64	1.25	.74**
Self Understanding	923	7.13	1.36	923	7.70	1.25	.56**
Commitment to Self Improvement	655	7.21	1.39	655	7.73	1.21	.52**
S-LOMS	923	7.15	1.17	923	7.73	1.12	.58**

Table 15. The Paired-Sample T-Test Results

Remark **: significant at the .01 level. Source: Lau & Snell (2020a)

CROSS-CULTURAL VALIDATION WITH A SINGAPORE SAMPLE

As a starting point for testing whether S-LOMS can be validly applied in other Asian societies, another series of CFA was conducted for confirming the construct validity and reliability for S-LOMS with a Singapore sample (N=330). Data were collected from students at the Republic Polytechnic of Singapore. The sample comprised 68.8% females. The mean age was 19.4, and students came from various academic disciplines (engineering and science: 43.9%; healthcare: 37.3%; social sciences: 13.0%; business: 4.5%; arts: 1.2%).

As with the research reported in the previous section, the CFA procedure in EQS 6.4 for Windows was employed for the analysis. Results showed acceptable model fit for the Singapore sample on both the 11-domain model without four overarching categories (NNFI=.91; CFI=.92; RMSEA=.05, CI=.04, .05) and the 11-domain model with overarching categories (NNFI=.90; CFI=.90; RMSEA=.05, CI=.05, .05). The results confirmed that S-LOMS may also be applied in other Asian societies.

This chapter provides the construct definitions for the four overarching categories and 11 learning domains, as reference points for service-learning practitioners and researchers when selecting categories and domains for their own investigations.

No	Category/ Domain	Abb	Construct Definition
I (1)	Knowledge Application	KA	The extent to which a student can apply subject knowledge to practical, real-life situations and problems.
II	Personal & Professional Skills	PPS	The extent to which a student possesses soft skills which cannot be easily learnt from lectures and books alone, but which are conducive to personal and professional development.
2	Creative Problem Solving Skills	CPS	The extent to which a student can adopt a flexible, open-minded and creative approach to solving problems.
3	Relationship & Team Skills	RTS	The extent to which a student is competent and confident in establishing and maintaining interpersonal relationships, and in working effectively with others to establish and achieve common goals.
4	Self-reflection Skills	SRS	The extent to which a student is willing and able to examine his or her own task effectiveness and personal conduct on a regular basis.
5	Critical Thinking Skills	CTS	The extent to which a student is able to appreciate nuances by analyzing issues from multiple perspectives.
III	Civic Orientation & Engagement	COE	The extent to which a student cares about well-being in the broader community and seeks to engage constructively in community affairs.
6	Community Commitment & Understanding	CCU	The extent to which a student can identify and appreciate the needs, assets and potential of a community and is committed to helping to bring about necessary improvements.
7	Caring & Respect	CR	The extent to which a student can respect and develop empathy for the needs and values of people from diverse backgrounds.
8	Sense of Social Responsibility	SSR	The extent to which a student believes and accepts that it is his or her civic duty to participate in improving conditions for those in need.

No	Category/ Domain	Abb	Construct Definition
IV	Self-awareness	SA	The extent to which a student is aware of his or her own strengths and weaknesses in terms of abilities and personal attributes.
9	Self-efficacy	SE	The extent to which a student recognizes and values his or her own personal qualities and capabilities.
10	Self-understanding	SU	The extent to which a student understands his or her own personal inclinations and potential.
11	Commitment to Self-improvement	CSI	The extent to which a student is alert and committed to the ongoing need to acquire new skills and knowledge.

CVS_D0 ID for matching _____

CVS_D1 Gender ☐ Male ☐ Female

CVS_D2 Age _____

CVS_D3 Area of Study ☐ Arts ☐ Business ☐ Education ☐ Engineering
☐ Law ☐ Medical & Healthcare ☐ Science ☐ Social Science
☐ Journalism and Communication ☐ Others (please specify) _____

CVS_D5 Mode of Study ☐ Under-grad ☐ Post-grad

CVS_D6 Current Year of Study _____

CVS_D7 Are you studying full-time or part-time? ☐ Full-time ☐ Part-time

CVS_D8 Have you had any service-learning/ community service experience while at your university? ☐ None of them ☐ Service-learning ☐ Community Service

Question Items

Please choose the appropriate scores (1= strongly disagree, 10= strongly agree) to indicate how much you agree or disagree with the following statements.

	strongly disagree	1	2	3	4	5	6	7	8	9	strongly agree
CVS_001 I know how to apply what I learn in class to solve real-life problems.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_002 I am able to apply/integrate classroom knowledge to deal with complex issues.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_003 I know how to transfer knowledge and skills from one setting to another.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_004 I can make connections between theory and practice.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_005 I am not afraid of trying new things.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_006 I am able to generate original ideas.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_007 I am able to solve challenging real-life problems.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_008 I feel confident in dealing with a problem.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_009 When necessary, I can think of alternatives.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_010 I feel confident in identifying the core of a problem.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
CVS_011 I am able to look at an issue from a fresh	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

ADMINISTRATION OF S-LOMS

FORMAT AND SCORING

S-LOMS comprises 56 self-description items to be rated on a 10-point Likert scale, from 1 point as "strongly disagree" to 10 point as "strongly agree".

The scoring of S-LOMS follows the unweighted mean approach. All higher-level scores, including domains, overarching categories, and the entire S-LOMS scale, are derived by averaging the scores of those items falling under their corresponding groups. Missing items are excluded from the computation. Two examples are given, below.

Item	Description	Score
46	I am satisfied with my achievement so far.	7
47	Most things I do, I do well.	8
48	I have many good qualities.	4
49	I am positive about myself.	9
The score for self-efficacy = $(7 + 8 + 4 + 9) / 4$		7.0

Example 1. Scoring for the domain of self-efficacy

Item	Description	Score
46	I am satisfied with my achievement so far.	7
47	Most things I do, I do well.	8
48	I have many good qualities.	4
49	I am positive about myself.	9
50	I know my strengths and weaknesses.	6
51	I have a clear picture of what I am like as a person.	3
52	I have a clear understanding of my own values and principles.	Missing
53	I know what I need in my life.	9
54	I look out for new skills or knowledge to acquire.	6
55	I am always motivated to learn.	10
56	I always keep my knowledge and skills up to date.	5
The score for self-awareness = $(7+8+4+9+6+3+9+6+10+5) / 10$		6.7

Example 2. Scoring for the overarching category of self-awareness

ADMINISTRATION METHODS

In the context of evaluating the impacts of service-learning courses, it is recommended that S-LOMS should be administered to the target respondents before any service-learning activities have commenced (pretest) and then after all such activities have finished (posttest). This procedure captures developmental changes in the respondents through differences in the pretest-posttest scores.

The pretest-posttest design normally requires administrators to obtain identifier information from the target respondents in order that their pretest and posttest responses can be compared. Administrators are thus advised to provide assurances of data confidentiality without claiming that the survey is anonymous, in order to encourage the respondents to answer S-LOMS authentically.

S-LOMS may also be administered on a one-off basis, independent to service-learning interventions, as a means for obtaining the baseline scores of a target population.

Since S-LOMS is designed in a standardized yet flexible way, instead of using the entire S-LOMS instrument, investigators can select particular domains (from the set of 11) or overarching categories (from the set of four), according to their specific needs and interests.

Instead, the practice of comparing developmental gains across separate domains or overarching categories is encouraged. For example, in relation to a service-learning project about social innovation, it may be useful to measure developmental gains for the separate domains of creative problem-solving skills, of critical thinking skills, and of self-reflection skills, along with developmental gains for the overarching category of knowledge application and for the overarching category of civic orientation and engagement. Comparisons can then be made to identify the areas where the project has the greatest developmental impacts.

Finally, although S-LOMS can be administered alongside other measurement instruments, it is advised not to change the 10-point Likert scale for the administration, since S-LOMS has not been validated for use with other rating formats.

DATA CLEANING

S-LOMS is easy to administer and is suitable for direct completion by the target respondents. However, due to fatigue or other reasons, unreliable answers may be obtained. Researchers are thus advised to adopt necessary data screening and cleaning procedures after data collection, in order to increase the reliability of the sample responses prior to subsequent statistical analysis.

Suggested cleaning approaches include identifying and excluding cases with the same responses for all or most items, or with recurring patterns of answers. Respondents finishing the survey within an unusually short or long time period may also be eliminated from the sample. Please refer to DeSimone, Harms, and DeSimone (2015) for additional methods for data screening and cleaning.

REPORTING

It is recommended that results obtained through S-LOMS are to be reported according to domain scores, overarching category scores and/or the overall score for the entire instrument. The practice of including scores for individual items in reports is not recommended unless authors are particularly interested in the specific behavior or attribute described by the respective item.

It is also recommended that results obtained through S-LOMS should be reported in conjunction with benchmark scores for comparison. The latter may, for example, consist of the benchmarks obtained for the academic units that provide the service-learning courses or for students from particular majors. Such comparisons may provide insights about the self-perceived developmental impacts among different groups, so that any apparent strengths and areas for improvement of the associated service-learning courses can be identified for potential follow-up action.

Long-term tracking of S-LOMS scores across a series of cohorts of students undertaking service-learning may provide indicative feedback on the impact of policy changes about service-learning at the institutional level. Such policies may include, for example, adopting online training packages to introduce service-learning to students (and faculty), or increasing the number of required service-hours on service-learning courses.

S-LOMS could be used as a tool for guiding the development of individual students, who are selected by an office of service-learning to serve as teaching assistants, acting as mentors or facilitators of other students undertaking service-learning. Scorecards could be produced to enable such service leaders to track their own development, in conjunction with appropriate benchmarks. For individual cases of this kind, a spider web is one means for visualizing an S-LOMS profile and how it may change over time.

REFERENCES

REFERENCES

- Bringle, R. G., & Hatcher, J. A. (1999). Reflection in service-learning: Making meaning of experience. *Educational Horizons*, 179–185. Retrieved from <https://digitalcommons.unomaha.edu/slceeval/23>.
- DeSimone, J. A.; Harms, P. D.; & DeSimone, A. J. (2015). Best practice recommendations for data screening. *Journal of Organizational Behavior*, 36(2): 171–181.
- Driscoll, A., Holland, B., Gelmon, S., & Kerrigan, S. (1996). An assessment model for service-learning: Comprehensive case studies of impact on faculty, students, community and institutions. *Michigan Journal of Community Service Learning*, 3, 66–71.
- Eyler, J. S., & Giles, D. E. (1999). *Where's the learning in service learning?* San Francisco, CA: Jossey-Bass.
- Eyler, J. S., Giles, D. E., Stenson, C. M., and Gray, C. J., (2001). *At a glance: What we know about the effects of service-learning on college students, faculty, institutions and communities, 1993–2000*. (3rd ed.) Nashville, Tenn.: Vanderbilt University Press.
- Felten, P., & Clayton, P. H. (2011). Service-Learning. *New Directions for Teaching and Learning*, 128, 75–84. <https://doi.org/10.1002/tl.47>.
- Jacoby, B. (1996). *Service-Learning in higher education: concepts and practices*. San Francisco: Jossey-Bass.
- Koo, T.K., & Li, M.Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155–163.
- Lau, K. H., & Snell, R. S. (2021). Confirmatory factor analysis for the service-learning outcomes measurement scale (S-LOMS), *Metropolitan Universities*, 32(1), 3–34.
- Lau, K. H., & Snell, R. S. (2020). *Test-retest reliability and validity testing of the service-learning outcomes measurement scale (S-LOMS)*. Manuscript submitted for publication.
- Lau, K. H., & Snell, R. S. (2020a). *Assessment of developmental outcomes of students arising from service-learning*. Manuscript submitted for publication.

- Ma, C. (2018). Service-learning development in higher education in Hong Kong. In T. W. Lim & W. X. Li (Eds), *Studying Hong Kong: 20 years of political, economic and social developments* (pp. 43–61). New Jersey: World Scientific. https://doi.org/1.1142/9789813223554_0004.
- Ma, H. K. C., Chan, C. W. F., Tse, P. H.. (2019). A common outcomes measurement for service-learning in Hong Kong. *Journal of Higher Education Outreach and Engagement*, 23(3), 3–19.
- McGraw, K. O., & Wong, S. P. (1996). Forming inferences about some intraclass correlation coefficients. *Psychological Methods*, 1, 30–46.
- Nichols, D. P. (1998). *Choosing an intraclass correlation coefficient*. Retrieved from: <https://stats.idre.ucla.edu/spss/library/spss-library-choosing-an-intraclass-correlation-coefficient/>.
- O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers*, 32(3), 396–402. <https://doi.org/10.3758/bf03200807>.
- Rosenberg, M. (1965). *Society and the adolescent self image*, Princeton. NJ: Princeton University Press. <https://doi.org/1.1515/9781400876136>.
- Snell, R. S., & Lau, K. H. (2020). The development of a service-learning outcomes measurement scale (S-LOMS). *Metropolitan Universities*, 31(1), 44-77. doi:1.18060/23258.
- Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences (5th ed.)*. New York: Routledge. <https://doi.org/1.4324/978020384313>.
- Toncar, M. F., Reid, J. S., Burns, D. J., Anderson, C. E., & Nguyen, H. P. (2006). Uniform assessment of the benefits of service learning: the development, evaluation, and implementation of the SELEB scale. *The Journal of Marketing Theory and Practice*, 14(3), 223–238. <https://doi.org/1.2753/mtp1069-6679140304>.
- Xing, J., & Ma, C. (2010). *Service-learning in Asia: Curricular models and practices*. Hong Kong University Press. <https://doi.org/1.5790/hongkong/97898888028467.001.0001>.

APPENDICES

S-LOMS ITEMS

Item	Domain	Description
Knowledge Application		
01	KA	I know how to apply what I learn in class to solve real-life problems.
02	KA	I am able to apply/integrate classroom knowledge to deal with complex issues.
03	KA	I know how to transfer knowledge and skills from one setting to another.
04	KA	I can make connections between theory and practice.
Personal & Professional Skills		
05	CPS	I am not afraid of trying new things.
06	CPS	I am able to generate original ideas.
07	CPS	I am able to solve challenging real-life problems.
08	CPS	I feel confident in dealing with a problem.
09	CPS	When necessary, I can think of alternatives.
10	CPS	I feel confident in identifying the core of a problem.
11	CPS	I am able to look at an issue from a fresh perspective.
12	CPS	I often modify my strategies to solve a problem when the situation changes.
13	RTS	I am good at keeping in touch with people.
14	RTS	I am good at building relationships between people.
15	RTS	I can build long-term relationships with people.
16	RTS	I can easily establish effective relationships with people.
17	RTS	I am good at resolving conflicts.
18	RTS	I am confident in leading others toward common goals.
19	RTS	I participate effectively in group discussions and activities.
20	RTS	I have the necessary skills for making groups or organizations function effectively.
21	SRS	I will evaluate myself after completing a task.
22	SRS	I reflect on myself regularly.
23	SRS	I always think how I can improve myself.
24	SRS	I consider circumstances when reflecting on how well I have performed.

Item	Domain	Description
Personal & Professional Skills		
25	CTS	I can analyze an issue comprehensively.
26	CTS	I often look at complex issues from different angles.
27	CTS	I can understand others' viewpoints when we are making decisions together.
Civic Orientation & Engagement		
28	CCU	I always actively discuss possible improvements for our community.
29	CCU	I can identify useful resources of a community.
30	CCU	I think about how I can serve the community after graduating.
31	CCU	I can identify challenges in the community.
32	CCU	I can investigate the challenges faced by people in need in a community.
33	CCU	I will contribute my abilities to make the community a better place.
34	CCU	I can identify issues that are important for a disadvantaged community.
35	CCU	I will play my part to reduce social problems.
36	CR	I respect the needs of people from different backgrounds.
37	CR	I appreciate the ideas of people from different backgrounds.
38	CR	I am willing to try to understand people whose background is different from mine.
39	CR	I can respect people whose background is different from mine.
40	CR	I consider others' points of view.
41	CR	I care about others.
42	CR	I observe others' feelings and emotions.
43	SSR	I believe that everybody should be encouraged to participate in civic affairs.
44	SSR	I believe that taking care of people who are in need is everyone's responsibility.
45	SSR	I feel obligated to help those who are less fortunate than me.

Item	Domain	Description
Self-awareness		
46	SE	I am satisfied with my achievement so far.
47	SE	Most things I do, I do well.
48	SE	I have many good qualities.
49	SE	I am positive about myself.
50	SU	I know my strengths and weaknesses.
51	SU	I have a clear picture of what I am like as a person.
52	SU	I have a clear understanding of my own values and principles.
53	SU	I know what I need in my life.
54	CSI	I look out for new skills or knowledge to acquire.
55	CSI	I am always motivated to learn.
56	CSI	I always keep my knowledge and skills up to date.

KA: Knowledge Application; CPS: Creative Problem-solving Skills; RTS: Relationship & Team Skills; SRS: Self-reflection Skills; CTS: Critical Thinking Skills; CCU: Community Commitment & Understanding; CR: Caring & Respect; SSR: Sense of Social Responsibility; SE: Self-efficacy; SU: Self-understanding; CSI: Commitment to Self-improvement

ACCESS FOR THOSE WITH SPECIAL NEEDS OR A DISABILITY

Administrators of S-LOMS should ensure that all those who wish to provide their responses can do so. Some standard administration procedures may be unsuitable for those with special needs or a disability. For example, some individuals may not have access to a computer or electronic device for answering S-LOMS, while some with a visual disability may be unable to read the printed questionnaire. There may also be language barriers. Processes of administration may need to be adapted to accommodate such individuals.

Possible measures for widening accessibility include providing an interpreter for those who cannot understand the language medium adopted for S-LOMS, and offering braille copies of the questionnaire for those who are visually impaired. Administrators should note that the issues mentioned here are not exhaustive. It is recommended they seek salient advice and information from student services offices (or their equivalent) and programme management offices within their institutions.