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The Development and Validation of the Process and Outcomes From Service-Learning (POSL) Questionnaire

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Abstract

This article reports the development and validation of the new Process and Outcomes from Service-Learning (POSL) questionnaire, a self-report measure that assesses students' service-learning experiences as well as their attainment of a comprehensive set of intended service-learning outcomes. The study involved three phases: (a) construct identification and item generation, (b) content and face validation of the draft items through expert judgment and cognitive interviews, and (c) construct validation through exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and reliability analysis. The final instrument consists of two parts. Part 1 comprises 18 items that measure students' service-learning experiences on six dimensions. Part 2 contains 14 items to assess students' learning outcomes from service-learning grouped under four dimensions. Results show that POSL is a highly reliable and reasonably valid measure of students' experiences of and outcomes from service-learning with good psychometric properties. Limitations and implications of the study are also discussed.

Keywords: service-learning, learning outcomes, students' experience, instrument development, scale validation

Service-learning is an experiential pedagogy that allows students to learn from and reflect on service activities that respond to identified community needs through a course-based educational experience (Bringle & Hatcher, 1995; Ramsay, 2017). It has been widely adopted in higher education around the world, and become a subject of research for over three decades. However, as Bringle and Hatcher (2000) pointed out, most of the studies tended to report specific findings from case studies of a single class, program, and institution "without making justified generalizations about practice, theory, and policy" (p. 73). Their observation is, in large part, still true to date. One of the main obstacles is the lack of a reliable and valid measure of students' experience and outcomes of service-learning with demonstrated good psychometric properties, making it difficult to synthesize findings across studies. Reeb and Folger (2013) thus concluded that there is a strong need for "well-validated measures in service-learning research" (p. 402). This study addresses this long-standing gap through the development and validation of a new Process and Outcomes From Service-Learning (POSL) questionnaire that aims to measure students' service-learning experiences as well as their attainment of a comprehensive set of intended service-learning outcomes.

In the remaining parts of the article, we will critically review existing literature on assessing students' experience and outcomes of service-learning, explain the steps we took to develop and validate the POSL questionnaire and the samples we used for the different studies, describe and discuss the main findings and their implications, and explicate on the limitations of the study.

Assessing Service-Learning Outcomes

Steinke and Fitch (2007) argued that quality assessment of service-learning is important because it provides opportunities to demonstrate the powerful impact of this pedagogy on student learning, stimulates dialogue about its potential for improving the quality of undergraduate education, provides feedback to improve the quality of service-learning provisions, and encourages faculty to engage in scholarly service-learning assessment and research.

There is no dearth of research on the impact of service-learning on student learning outcomes (e.g., Astin et al., 2000; Celio et al., 2011; Chan & Ngai, 2014; Chan et al., 2019; Conway et al., 2009; Lau & Snell, 2021; Yorio & Ye, 2012); most researchers have reported significant positive effects on students' learning. However, many existing studies were case studies of a single course, program, or institution (Bringle & Hatcher, 2000). They tended to employ different dependent measures and operationalize service-learning outcomes in many different ways (Toncar et al., 2006), often using instruments created by the faculty themselves (Steinke & Fitch, 2007). There is a lack of a measure that can assess, in a reliable and valid manner, the impact of service-learning on a comprehensive set of learning outcomes relevant to service-learning and that can be implemented across courses, programs, institutions, and regions.

Jacoby (2015) outlined several methods to assess service-learning, encompassing achievement testing, direct assessment of student work, surveys, interviews, focus groups, observations, and more. She highlighted that the most comprehensive approach involves assessing portfolios of student work and reflective outputs. Nevertheless, this method is more appropriate for assessing individual students, courses, or programs, as it is heavily course- or program-specific and demands considerable time for grading. Therefore, it is less suitable for making comparisons across different courses, programs, or institutions.

A number of standardized scales have been developed to assess some of the effects of service-learning, for example, the Common Outcome Measurement (Ma et al., 2019) and the Service-Learning Outcomes Measurement Scale (Snell & Lau, 2020). Both purport to measure students' service-learning outcomes by the changes in their pre-post scores before and after service-learning. Although this approach is considered more rigorous for academic research purposes, it is more prone to response-shift bias (Howard, 1980) and burdensome in administration, as it requires match-paired data collected both before and after the service-learning experience.

Our review of the literature has identified only one rigorously validated instrument that can be used to assess students' service-learning outcomes in a posttest-only design, the Service Learning Benefit (SELEB) scale developed by Toncar et al. (2006). Its final version consists of 12 items on a 7-point Likert scale to measure 12 students' learning benefits under four broad categories: (a) practical skills, (b) citizenship, (c) personal responsibility, and (d) interpersonal skills. However, the instrument has a number of limitations. First, some SELEB items are very broad and generic, covering a wide range of knowledge and skills. For example, "Workplace Skills" is a composite skill, comprising multiple skills such as interpersonal skills, organizational skills, and problem-solving skills. It is therefore hard to discern which outcomes the students are specifically rating when they respond to this item. Second, SELEB focuses on practical and interpersonal skills, as well as citizenship and personal responsibility. It does not measure any intellectual or academic learning that is a key service-learning objective (e.g., Felten & Clayton, 2011). Lastly, it asks students to rate how important each item on the list of knowledge or skills is to them in their educational experience, or how well their class project has provided them with the educational experience, but not how much they have learned with respect to each of the potential service-learning outcomes, which should be the focus of the measure.

Assessing Service-Learning Processes

Research has shown that the impact of service-learning on students is not automatic but, rather, largely determined by their service-learning experience (Billig, 2007; Chan et al., 2019). To ensure achievement of the intended impacts, Melchior and Bailis (2002) that we "look carefully at the quality of the experience we offer young people and . . . pay more attention to program design and implementation (inputs) in our research as well as to outcomes" (p. 219).

However, despite the growing body of research on outcomes of service-learning, research on its process is relatively scant. Only a few studies (e.g., Billig et al., 2005; Moely & Ilustre, 2014; Ngai et al., 2018) have empirically looked into students' experiences of service-learning and how they impact student outcomes. One possible reason for this paucity of research is the lack of a validated instrument with good psychometric properties for assessing students' service-learning experiences regarding a comprehensive set of process variables that are critical to achieving the intended outcomes.

Thus far, we have been able to identify one relevant instrument with demonstrated reliability to assess students' service-learning experience: the Service-Learning Course Quality Scale developed by Furco and Moely (2006; cf. Moely & Ilustre, 2013). However, the scale focused on only three dimensions of students' service-learning experience: value of service, focus on service, and opportunities for reflection. Students' experiences regarding other process variables critical to success in service-learning are not included. Furthermore, although there is evidence of reliability (internal consistency) of the scale, its validity is yet to be demonstrated. It should be also noted that the scale was validated in the United States; therefore, its suitability for other contexts and cultures is still open to question.

Study Objectives

This study aimed to address the above-mentioned research gap by developing and validating a new Process and Outcomes From Service-Learning (POSL) questionnaire, a self-report measure that can be used to assess students' service-learning experiences as well as their attainment of a comprehensive set of intended service-learning outcomes in a reliable, valid, and easy-to-use manner.

Development and Validation of the POSL Questionnaire

We broadly follow the steps recommended by Boateng et al. (2018) in developing and validating the POSL questionnaire: domain identification, item generation, content and face validation, cognitive pretesting, construct validation, and reliability testing. This study was approved by the University's Ethics Committee.

Domain Identification

The underlying dimensions and domains of the potential outcomes of service-learning and the key process factors that affect their attainment are identified based on an extensive literature review.

For the process component, the literature review encompassed the following areas: (a) good practices for service-learning (e.g., Billig, 2007; Eyler et al., 1996; Imperial et al., 2007; National Youth Leadership Council, 2008); (b) key elements leading to successful service projects (e.g., Eyler & Giles, 1997; Preradovic & Stark, 2019; Snell & Lau, 2022; Wade, 1997; Youth Service California, 2006); and (c) evidence-based studies revealing critical factors differentiating good service projects (e.g., Astin et al., 2000; Billig et al., 2005; Hatcher et al., 2004; Mabry, 1998; Ngai et al., 2018). Nine dimensions of student experiences critical to achieving the intended service-learning outcomes were identified and conceptualized: (1) project duration and intensity, (2) linking service to curriculum, (3) meaningful service, (4) students' voice, (5) exposure to diversity, (6) reflection activity, (7) preparation and support, (8) instructor commitment, and (9) team dynamics.

For the outcomes component, we primarily adopted the framework established during the development of the Service-Learning Outcomes Measurement Scale (Snell & Lau, 2020). This scale consists of 56 items designed to assess a range of student service-learning outcomes across 11 domains: knowledge application, creative problem-solving, relationship and teamwork skills, self-reflection skills, critical thinking skills, community commitment and understanding, caring and respect, sense of social responsibility, self-efficacy, self-understanding, and commitment to self-improvement. For the purposes of this study, we categorized these 11 domains into four major dimensions: intellectual, social, civic, and intrapersonal outcomes.

Item Generation

To measure the nine dimensions identified for the process component of POSL, the research team generated 27 items (Table 1) such that each dimension is covered with two to seven items. For all items except Item 1, respondents were asked to rate their level of agreement with the statement on a 10-point Likert scale with 1 as *strongly disagree* and 10 as *strongly agree*.

For Item 1, respondents were asked to indicate the number of hours they put into their service projects, with the choices "below 20 hours," "21 to 40 hours," "41 to 60 hours," "61 to 80 hours," "81 to 100 hours," and "over 100 hours."

The choice of a 10-point scale was made following recommendations from previous work (Preston & Colman, 2000) which found that 10-point scales were more reliable and valid than scales with 5 or fewer response categories, and that they are most preferred by respondents, as it allows them to express their views with adequate nuance.

For the outcomes component, the research team generated one item for each dimension, resulting in a total of 14 items (Table 2). For each of the items, respondents were asked to rate the extent to which the service-learning course/program has increased or improved that particular outcome on a 10-point Likert scale, with 1 as *very little* and 10 as *very much*.

Content Validation Study

To establish validity and internal consistency, the draft POSL questionnaire was put through a series of validation studies. The first was a content validation study to establish its face and content validity, which ensures that elements of the scale are relevant to and representative of the target construct (Haynes et al., 1995). This content validation study adopted the three-stage approach recommended by Almanasreh et al. (2019), consisting of the development stage through literature review; the judgment-quantifying stage, which involves a review panel of experts; and the revision and reconstruction/reformation stage in which individual items are retained, revised, omitted, or added.

Participants and Procedure

We adhered to the guidelines outlined by Grant and Davis (1997) to carefully assemble the panel of experts. To ensure a diverse and qualified panel, we extended invitations to 12 seasoned practitioners and researchers in the field of service-learning to participate in the study. These individuals were chosen from various academic disciplines, institutions, and genders, and possessed local and/or international service-learning backgrounds. Among the 12 panel members, nine were female. Eleven members came from five different universities in Hong Kong, and one member hailed from a university in Singapore. Eight of the panelists possessed over 10 years of service-learning experience, and four had prior involvement in organizing international service-learning initiatives. Table 3 provides an overview of their demographic backgrounds.

The panelists were informed clearly about the study's objective and instructions. They were invited to rate the relevance of each of the proposed items for assessing the underlying dimensions of the service-learning process and outcomes on a 4-point scale (1 = *not relevant at all*, 4 = *highly relevant*). Moreover, they were asked to provide open-ended comments on, and suggest any other crucial dimensions of, any process or outcome of service-learning that had not been incorporated in the proposed items.

Data Analysis

Qualitative and quantitative analyses were conducted on the panelists' responses. The content validity index (CVI; Polit et al., 2007) was derived as the proportion of panelists who rated the item as 3 or 4, and calculated at both item (CVI-I) and scale (CVI-S) levels, with CVI-S as the arithmetic mean of the CVI-Is across all items under each component. The criterion of .78 was adopted at both item and scale level (Lynn, 1986). The panelists' comments and suggestions were also reviewed by the research team, and modifications and changes were made to the draft items as appropriate. New or amended items were sent to the panelists for a second round of review if needed.

Results

Table 1 shows the item- and scale-level content validity index values for the process component of the POSL questionnaire. The CVI-S value was .84. Nineteen out of the 27 draft items obtained a CVI-I value of .83 or above and were therefore retained. The other eight items have CVI-I values below the .78 threshold. They were discussed and reviewed by the research team, taking into consideration the CVI-I values, relevance of the comments and suggestions of the panelists, and importance of the dimensions as revealed in previous research. Item 1 (number of hours) was retained, as it was seen to be a useful absolute quantifying complement to Item 2 (worked hard). Item 10 (interest) was retained, as previous work has suggested that student interest is an important correlator of learning outcome. Item 14 was retained as a mea-

Table 1. Content Validation Study Results for the Process Component of the Draft POSL Questionnaire

Dimensions	No.	Draft items	First CVS[1]		Second CVS[1]	
			CVI-I[1]	Result	CVI-I[1]	Result
Project duration and intensity	1	How many hours did you spend in planning and delivering the service project?	.75	Retained		
	2	I worked hard for the service project.	.83	Retained		
Linking service to curriculum	3	The goals and objectives of the service-learning course/programme were clear to me.	1.0	Retained		
	4	I can see the connection between the service project and the course/programme goals.	1.0	Retained		
	5	The service project required me to apply course content in service planning and delivery.	.92	Retained		
Meaningful service	6	I had many opportunities to interact with the community/service recipients during the service project.	.92	Retained		
	7	I feel that our service was valuable for the community.	.83	Retained		
	8	I feel that our service benefitted the people we served.	.83	Retained		
	9	The service project was challenging.	.67	Revised[2]	1.0	Retained
	10	The service project was interesting to me.	.67	Retained		
	11	The service project gave me a chance to try something new.	.58	Dropped		
	12	The service project required me to apply higher-order thinking skills (e.g., problem-solving, creative thinking).	.83	Retained		
Students' voice	13	The service project merely required me to follow instructions.	.50	Dropped		
	14	I had some say in the design and delivery of the service project.	.75	Retained		
Exposure to diversity	15	The service project enabled me to interact with people from different backgrounds (e.g., socio-economic status, occupations, or culture).	1.0	Retained		
	16	The service project exposed me to different views and perspectives.	1.0	Retained		

Table continued on next page

Table 1. Continued

Dimensions	No.	Draft items	First CVS[1]		Second CVS[1]	
			CVI-I[1]	Result	CVI-I[1]	Result
Reflection activity	17	I was required to reflect regularly during the service project.	1.0	Retained		
	18	I received clear instructions and guidance to reflect on my service experience.	1.0	Retained		
	19	The reflection helped me to re-examine my assumptions and values.	1.0	Retained		
Preparation & support	20	I was well-prepared for the service (e.g., through orientation, briefing, training).	.83	Retained		
	21	I received the support I needed to carry out the service project.	.83	Retained		
Instructor commitment	22	My teachers knew what I was doing in the service project.	.92	Retained		
	23	The teacher/teaching team (instructors, assistants) was enthusiastic about the service project.	.92	Retained		
Team dynamics	24	My service-learning teammates and I were coached to work as a team.	.83	Retained		
	25	There was enough work for everybody in my team.	.50	Dropped		
	26	Everybody in my team did their fair share of the work.	.67	Dropped		
	27	During the service project, I felt that I was part of a bigger effort contributing to the common good.	1.0	Retained		
Feedback (new item)	28	I received regular feedback on my performance during the service project.	N/A		1.0	Retained
		CVI-S[1,3]	**.84**		**.90**	

[1] CVS = Content validity study; CVI-I = Item-level content validity index; CVI-S = Scale-level content validity index.
[2] "Revised" refers to item being retained by revising the wording.
[3] CVI-S for the first CVS was derived by averaging the CVI-Is from all 27 items in first CVS; the CVI-S for the second CVS was derived by averaging the CVI-Is from the items retained in the first CVS and the items tested in the second CVS, totaling 24 items.

Table 2. Content Validation Study Results for the Outcomes Component of the Draft POSL Questionnaire

Dimensions	No.	Draft items	First CVS[1]	
			CVI-I[1]	Result
Intellectual	1	ability to apply the knowledge and skills learned in school to real-life situations	.92	Retained
Intellectual	2	ability to solve problems	1.00	Retained
Intellectual	3	ability to think creatively	.92	Retained
Social	4	ability to establish and maintain good relationships with other people	1.00	Retained
Social	5	ability to work with others in a team to achieve common goals	.92	Retained
Intellectual	6	ability to reflect and learn from your experiences	1.00	Retained
Intellectual	7	ability to analyse issues from multiple perspectives	1.00	Retained
Civic	8	understanding of the needs, assets and potentials of the community that you served	1.00	Retained
Social	9	respect for people with different backgrounds or perspectives	.92	Retained
Civic	10	empathy for disadvantaged people	.92	Retained
Civic	11	commitment to the betterment of society	1.00	Retained
Intrapersonal	12	self-confidence	.83	Retained
Intrapersonal	13	understanding of your own values, strengths and weaknesses	1.00	Retained
Intrapersonal	14	commitment to continued self-improvement	1.00	Retained
		CVI-S[1,2]	.96	

[1] CVS = Content validity study; CVI-I = Item-level content validity index; CVI-S = Scale-level content validity index.
[2] CVI-S for the first CVS was derived by averaging the CVI-Is of all 14 items in the first CVS.

Table 3. Demographic Backgrounds of the Panel of Experts

Member	Gender	University affiliation	Disciplinary background	Years of SL experience	Local or international SL
1	M	HK1	Creative arts	5+	Local
2	F	HK2	Business	5+	Local
3	F	HK3	Business	10+	Local
4	M	HK1	Chinese medicine	10+	Both
5	F	HK4	English	10+	Both
6	F	HK5	Education	10+	Local
7	F	HK1	Education	5+	Local
8	F	HK4	Social work	10+	Both
9	M	HK3	Economics	5+	Local
10	F	HK3	Business	10+	Local
11	F	SG1	Sociology	15+	Both
12	F	HK5	Education	10+	Local

sure of student autonomy, which previous work has often cited as a good practice in service-learning. Conversely, Items 11 and 13 were dropped because of their extremely low CVI score. Item 13 was also redundant with the higher scoring Item 14. Items 25 and 26 were dropped for similar reasons, in addition to the concern that although most service-learning projects were conducted in teams, this was by no means true for *all* service-learning. Item 9 was revised to add the word "stimulating" in response to the concern that "challenging" had a more negative connotation, and Item 28 was added in response to panel members' comments that regular feedback is good practice in teaching and learning, but our original items did not cover that dimension. In summary, three items were retained, four items were dropped, one new item was added, and one item was revised.

The revised and new items were sent to the panel for a second round of review. All panelists rated the items favorably, resulting in CVI-I values of 1.0 for both items. Both items were therefore included in subsequent validation studies. The CVI-S value of the second-round study reached .90, suggesting that the draft process component achieves good face and content validity, with 24 items remaining in the pool.

Table 2 presents the CVI-I of the draft items of the outcomes component. The CVI-I scores for all items were above .78, with eight items at 1.0, five items at .92, and one item at .83. The comments and suggestions of the panel were reviewed and discussed, but no change was made to any of the items, and all 14 items of the draft outcomes component were retained without modification. The CVI-S value was .96, indicating that the draft outcomes component is highly face- and content-valid.

Cognitive Pretesting

The next step in the process was cognitive pretesting, which determined whether the target respondents interpret the items as intended.

Participants and Procedure

To ensure the instrument's relevance to university students, we recruited 11 undergraduate students (six female and five male) from two Hong Kong universities to participate in four sessions of semistructured group interviews. Each ses-

sion lasted around 1.5 hours, in which the participants completed both components of the draft POSL questionnaire, and elucidated item by item their comments regarding interpretation and understanding of each item, as well as any language issues, with modification suggestions.

Results

All participants from the cognitive pretesting interpreted the items in the draft POSL questionnaire as intended. The analysis and discussion by the research team on the participants' comments resulted in language revisions for clarity in seven items in the process component and two items in the outcomes component.

Construct Validation Study

The next steps in the process were a series of construct validation studies to establish the psychometric properties of the instrument, including its construct validity, criterion validity, and internal consistency.

The context in which the POSL questionnaire was developed is a bilingual environment, where English is the medium of instruction and both English and Chinese are used in everyday life. For ease of comprehension and to ensure that all respondents understood the meaning of the items correctly, a Chinese translation was developed.

Translation/back-translation was used to ensure semantic equivalence between the original (English) and translated (Chinese) items. Professional translators were employed for both forward and (blind) back translations. The back-translated version was compared with the original English version, and identified discrepancies were returned to the forward and back translators for another round of translation and comparison. In total, two rounds of translation were involved before the Chinese version was deemed equivalent to the original English version. In this process, the wording of one item in the English version of the process component was further revised.

The English and Chinese versions of the draft POSL questionnaire were then combined into a bilingual version for validation. The draft questionnaire consisted of 37 items, with 23 items for the process component and 14 items for the outcomes component (Appendix A).

Participants and Procedure

All students who were enrolled in credit-bearing service-learning courses during the Fall semester of 2021 at the three participating universities were invited to participate in the study. Toward the end of their service-learning courses, they were asked to complete the draft bilingual POSL questionnaire online, at their own time, place, and pace. The administration of the questionnaire was coordinated by the service-learning offices at each respective university. Participation in the study was completely voluntary, and participants were assured that their responses would remain confidential, with no negative consequences resulting from their involvement. In addition to the POSL items, demographic information such as gender, age, academic discipline background, and year of study was also collected. A total of 530 responses were eventually received.

Data Cleaning and Analysis

For the process component, we first cleaned the data by removing 28 cases (5.3%) in which the respondent gave the same extreme rating (1 or 10) for all items, leaving 502 cases in the final sample. Table 4 presents the demographic distributions. Exploratory factor analysis (EFA) was then used to identify the latent constructs from the measured variables manifested by the data as follows (Watkins, 2018): First, the minimum average partials (MAP) test and the scree plot were used to decide the number of factors to be extracted. Common factor analysis was used as the model and selected principal axis (PA) with oblimin rotation as the estimation method. Item reduction was then performed based on the following three criteria: (1) discarding items that loaded onto a single-item factor, (2) eliminating items with communalities below .60, and (3) removing items that loaded on more than one factor. The EFA was run under the SPSS (Version 26.0) environment; the MAP test was run with the syntax developed by O'Connor (2000).

The resultant factor model was then verified by randomly splitting the final sample into two halves. Another EFA was used to replicate the results on the first half, and the second half was examined by confirmatory factor analysis (CFA), with the resultant factor model structure. We anticipated that both analyses would yield a reliable and stable resultant model structure, which would demonstrate the construct validity of the instrument.

Table 4. Demographics of the Participants in the Construct Validation Study

	Outcomes component		Process component	
	Freq.	**%**	**Freq.**	**%**
University				
A	418	82.6	414	82.5
B	49	9.7	49	9.8
C	39	7.7	39	7.8
Gender				
Male	246	48.6	243	48.4
Female	211	41.7	210	41.8
Not disclosed	49	9.7	49	9.8
Academic discipline background				
Arts	112	22.1	111	22.1
Business	119	23.5	118	23.5
Engineering	91	18.0	90	17.9
Medical & health care	49	9.7	49	9.8
Science	109	21.5	108	21.5
Social sciences	5	1.0	5	1.0
Journalism & communication	16	3.2	16	3.2
Not disclosed	5	1.0	5	1.0
Year of Study				
1	14	2.8	14	2.8
2	43	8.5	44	8.8
3	108	21.3	106	21.1
4	276	54.5	273	54.4
5	5	1.0	5	1.0
Not disclosed	60	11.9	60	12.0
	Mean	**SD**	**Mean**	**SD**
Age	21.0 yrs	1.45 yrs	21.0 yrs	1.45 yrs

Note. Some percentages do not total 100 due to rounding.

For the CFA, EQS (Version 6.4) was used. Preliminary checking of data found that the sample violated the assumption of multivariate normality; therefore, the maximum likelihood method with robust correction was adopted, as recommended by Bentler (2006). Such correction provided the scaled chi-square (i.e., the Satorra-Bentler [S-B] χ^2) and other adjusted indices for assessing the goodness of fit indices for the models. In testing the CFA model, given that the model chi-square value tends to reject well-fitted models (Thompson, 2004), other goodness-of-fit indices, including CFI, NNFI, and RMSEA, were also employed in assessment (Tabachnick & Fidell, 2013), with the benchmarks CFI ≥ .95, NNFI ≥ .95, and RMSEA ≤ .06 (Bentler, 2006; Hu & Bentler, 1999).

For the outcomes component, data cleaning resulted in 24 cases (4.5% of 530 participants) being removed and a final sample of 506 cases. Demographics of this sample are shown also in Table 4. The final sample was then tested with CFA using the same procedure described above to establish the construct validity of the measure. It was expected that four factors would be found with the same items loaded on the respective four factors.

For establishing the internal consistency, Cronbach's alpha values were calculated for each component of the POSL questionnaire, and their constituent constructs under each component. An alpha value of .80 and above is regarded as reliable (Lance et al., 2006).

Results

Validating the process component began with examining the bivariate correlations between its 23 items. Results showed that all items are moderately to highly correlated with each other except item 1, which was hence dropped in subsequent analyses. The Kaiser-Meyer-Olkin measure of sampling adequacy (KMO = .97) and the Barlett's test of sphericity ($p < .01$) confirmed the factorability for the remaining 22 items. Next, the MAP test indicated that the number of factors to be extracted was two, whereas the scree plot showed three. Given that MAP tends to underextract, and that one or even two factors above or below the scree plot results would be considered (Zwick & Velicer, 1986), we examined the models with two, three, four, and five factors for a model that is meaningful and interpretable.

The EFA results suggested a five-factor solution (see Table 5) with four items removed. The remaining 18 items achieved above .65 for communalities, and above .40 for factor loadings. The solution explained over 80% of variance, which is regarded as satisfactory (Hair et al., 2018). An analysis of the factors suggested the following interpretations:

- "Reflection and Support" for Items 17, 18, 19, 20, 21, 23, 24, & 28;
- "Meaningful Service" for Items 7 & 8;
- "Exposure to Diversity" for Items 15 & 16;
- "Goals and Objectives" for Items 3, 4, & 5; and
- "Challenge and Interest" for Items 9, 10, & 12.

The model verification EFA identified five factors on the first half of the data, with an almost identical factor structure, communalities, factor loadings, and total variance explained to those obtained from the overall sample (Table 5).

For the model verification CFA on the second half of the data, we specified the initial model with the five corresponding factors loaded onto the 18 items (Figure 1). We further created two subfactors subsumed under the factor "Reflection and Support," namely "Reflective Activities" (Items 17, 18, & 19) and "Preparation and Support" (Items 20, 21, 23, 24, & 28), as they refer to two conceptually different dimensions of students' experience of service-learning. The CFA for the model indicated satisfactory model fit (S-B $x^2 = 170.89$, $df = 123$, $p < .01$; NNFI = .97; CFI = .98, RMSEA = .04, confidence interval: .02, .05), with significant and high factor loadings and interfactor correlations for all items and between factors respectively (Figure 1). The factor "Reflection and Support" loaded very highly on the two subfactors (>.980), indicating that the two factors can be merged; however, we argue that they should be considered theoretically distinctive constructs that are also implemented differently in practice.

To conclude, the split-half analyses supported a five-factor (or a six-factor if reflection and support are considered two subfactors) solution model as stable and valid. The internal consistency, in terms of Cronbach's alpha values, for the process component is high (the entire scale: .97; and for its constituent factors: .92 [Goals and Objectives], .92 [Meaningful Service], .88 [Challenge and Interest], .86 [Exposure to Diversity], .95 [Reflection and Support], .89 [Reflective Activities], and .93 [Preparation and Support]).

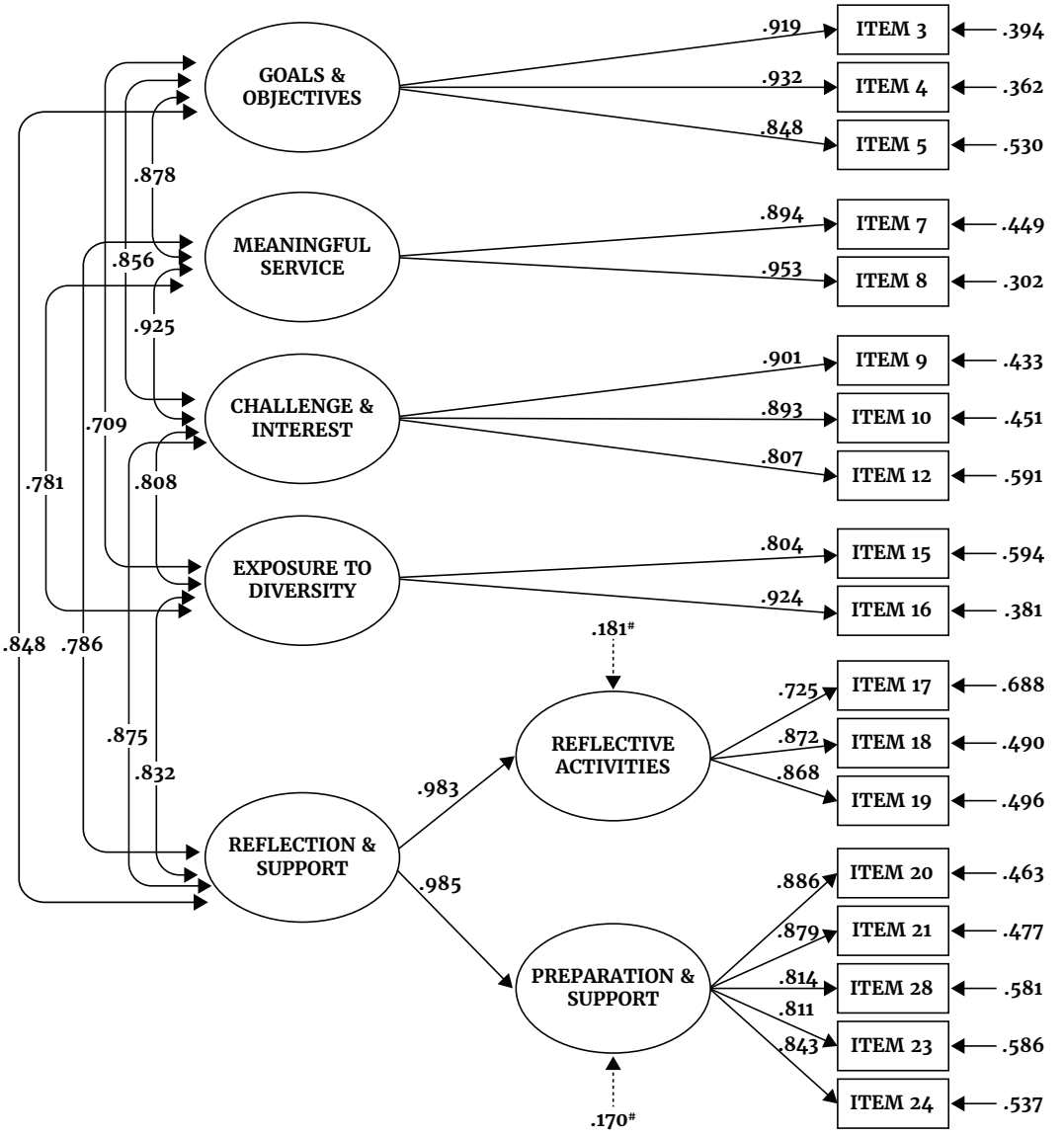
For the outcomes component, CFA was used to test the hypothesized measurement model of the instrument. Initial analysis revealed acceptable yet less than satisfactory results (S-B $x^2 = 219.51$, $df = 71$, $p < .01$; NNFI = .92; CFI = .94, RMSEA = .06, confidence interval: .06, .07). To enhance the model fit, two covariance suggested by the Lagrange multiplier tests were added. They were the error covariance (.46) between Items 1 and 2 and the error covariance (.46) between Items 4 and 5. The modified model (see Figure 2) obtained satisfactory model fit (S-B $x^2 = 157.18$, $df = 69$, $p < .01$; NNFI = .95; CFI = .96, RMSEA = .05, confidence interval: .04, .06). The internal consistency, measured by Cronbach's alphas, is also high (.96 for the entire outcomes component; .92, .86, .87, and .89 for the intellectual, social, civic, and intrapersonal development outcomes, respectively).

The final version of the POSL questionnaire (see Appendix B) consists of two parts. Part 1 (18 items) measures students' service-learning experiences on six dimen-

Table 5. Results of Exploratory Factor Analysis for the Process Component With Full Sample and Split-Half Sample

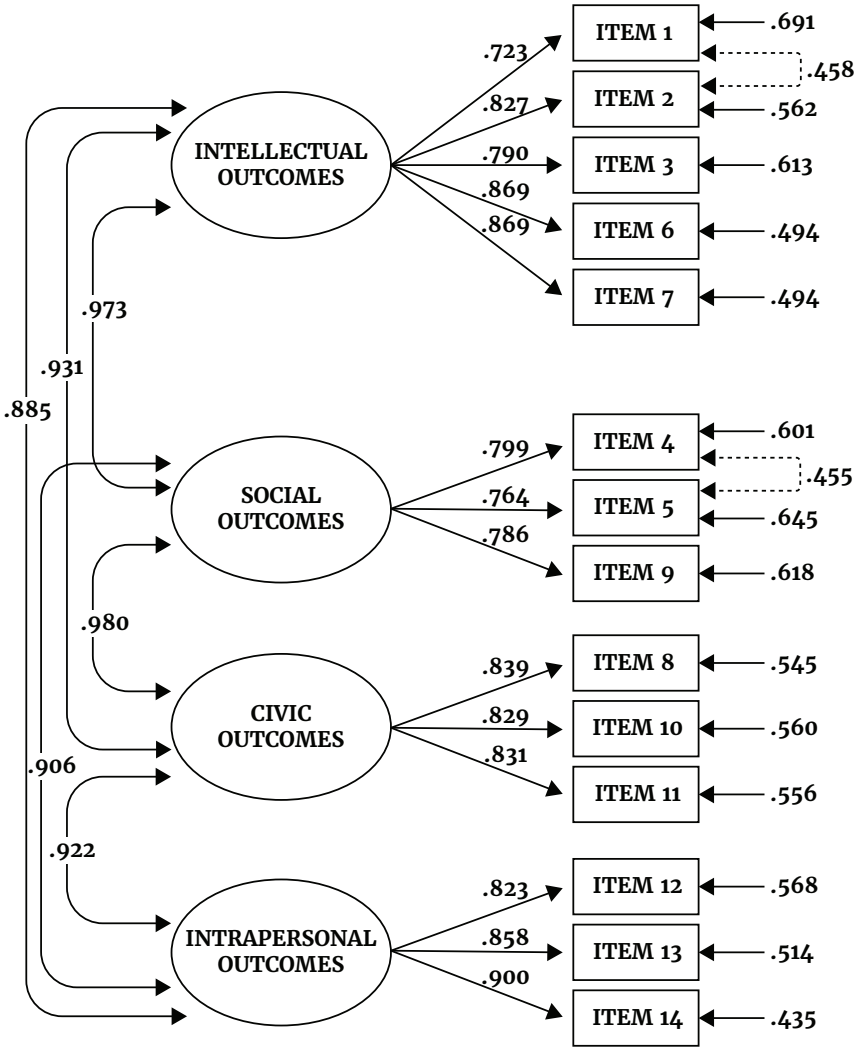
		Full sample (N = 502)					Split-half sample (N = 251)				
Total variance explained		81.8%					82.0%				
		Factor					Factor				
		1	2	3	4	5	1	2	3	4	5
Item no.	Communalities	Absolute factor loading					Communalities	Absolute factor loading			
2	Dropped						N/A				
3	.796				.795		.726			.657	
4	.910				.919		.947			.889	
5	.711				.513		.713			.471	
6	Dropped						N/A				
7	.833		.813				.834	.720			
8	.867		.838				.854	.829			
9	.688					.538	.609				.520
10	.796					.441	.811				.411
12	.666					.596	.634				.500
14	Dropped						N/A				
15	.676			.574			.680		.534		
16	.839			.633			.859		.661		
17	.611	.677					.716	.734			
18	.771	.827					.796	.767			
19	.723	.693					.721	.630			
20	.776	.879					.762	.819			
21	.778	.851					.773	.852			
28	.696	.764					.752	.772			
23	.684	.698					.704	.708			
27	Dropped						N/A				
24	.699	.786					.661	.589			

Figure 1. Results of Confirmatory Factor Analysis for the Process Component With Split-Half Sample



Note. # = loading not significant at .05 level (n = 251).

Figure 2. Results of Confirmatory Factor Analysis for the Outcomes Component



Note. The error covariance paths (dotted lines) were added to the finalized model.

sions: Goals and Objectives, Meaningful Service, Challenge and Interest, Exposure to Diversity, Reflective Activities, and Preparation and Support. Part 2 (14 items) assesses students' self-perceived learning gains grouped under four major dimensions: intellectual, social, civic, and intrapersonal learning outcomes. Our results show that POSL is a highly reliable and reasonably valid measure of students' experiences of and outcomes from service-learning, with good psychometric properties.

Discussion

Service-learning has been well demonstrated to be effective at nurturing a diversity of student learning outcomes in various contexts and cultures. However, to ensure and *improve* student learning from service-learning, it is important not only to understand *what* has been impacted, but also *how* these impacts have come about.

The literature includes some principles on "good practices" (Honnet & Poulsen, 1989; National Youth Leadership Council, 2008), and many of these practices are commonly accepted to be universal and followed faithfully by teachers and practitioners. However, even though it is agreed that student learning from service-learning is not automatic and needs to be facilitated, there has been little research into the processes from which students learn.

This issue becomes much more serious as service-learning gains more popularity and acceptance outside the North American context, which has hosted much of the previous work in service-learning, and where most of the guidelines and principles were developed. Stigler and Hiebert (1999) argued that teaching is a "cultural activity" and should be "understood in relation to the cultural beliefs and assumptions that surround [it]" (p. 88). Furthermore, studies have revealed culture-specific differences in teaching effectiveness (e.g., Herbert et al., 2022). In other words, the "good principles" that work for one culture may not work for another, or at the very least, they may need to be adapted to work within that context. This also applies to service-learning, and we would argue that in fact, this is particularly true for service-learning, as it involves affective learning outcomes pertaining to students' preconceptions, attitudes, and beliefs, which are often very culture and context specific. An example can be taken from previous work. One oft-cited good practice is that of "youth voice," which advocates for student autonomy and ownership—in essence, teachers are encouraged to involve students in the development and implementation of service-learning projects. This aspect was investigated in a large-scale study (Ngai et al., 2018) involving over 2,000 Hong Kong university students across a diversity of service-learning subjects from different disciplines, as an item asking students whether they carried out tasks that were mainly designed by them, rather than simply following directions. The study found that although student autonomy was a minor albeit statistically significant predictor of the intellectual learning outcomes, it was not a statistically significant predictor of the other learning outcomes. In contrast, "perceived benefits to people served" and "preparation for service," both of which are seldom mentioned as impactful factors, were found to be key determinants of student learning. We postulate that at least part of the reason behind this phenomenon lies in the different ways students learn across different cultures and educational systems. This study is just one example, but it illustrates why it is important for teachers and practitioners to study and analyze their programs, in order to better understand and improve their own practices, rather than simply taking the "accepted facts" in the literature as gospel, especially if these findings were derived from a context distinct from their own. POSL was designed to facilitate such evaluations. Furthermore, since it is standardized and validated, it enables evaluation and comparison of findings across programs, which may open the door to other emerging competencies or impactful processes.

The design of POSL takes into consideration ease of administration. POSL is intentionally designed to be a postexperience-only measure, which, though not considered quite as rigorous for research purposes, is easier to administer and more sensitive to changes, especially for student affective and attitudinal learning. It can therefore be easily used by individual teachers or practitioners, even without sophisticated statistical analysis or processing. That said, our study shows that POSL is a reliable and valid measure of students' service-learning experience and outcomes. We therefore recommend its use by individual teachers and practitioners to assess and improve their programs or courses, for institutions to monitor and ensure quality, and for researchers to study and compare the impacts of different service-learning programs, pedagogical practices, or background contexts.

Our results indicate that the major constructs for students' service experience and learning outcomes confirmed by the factor structure of the POSL questionnaire dovetail with previous theoretical frameworks and empirical findings. We also observe high correlations between the factors, suggesting that different types of students' learning outcomes interact with and influence each other. In practice, this correlation suggests that different characteristics of service experience for students should be considered holistically in planning and execution.

This study is subject to several limitations. First, the POSL questionnaire was designed as a self-assessment questionnaire that collects responses from the student's perspective only. Since service-learning relies on multiple stakeholders, future research should also capture perspectives from those stakeholders. Teachers' assessment on students' performance can also serve as an objective reference to further validate the outcomes component. Second, this study illustrates the relationship between students' service experience and learning outcomes, but not the underlying mechanism. Third, despite extensive literature review and rigorous validation, the POSL questionnaire may still not include all the constructs of students' service experience

and learning outcomes, in particular in contexts where service-learning is emerging and little research has been conducted. We foresee future research may result in further addition or revision to the POSL items. Finally, the POSL questionnaire was tested only in Hong Kong universities, limiting its generalizability in other contexts. More validation studies should be conducted in other geographical, educational, and cultural contexts.

Conclusion

The current study set out to respond to a long-standing research gap in service-learning—the lack of a valid and comprehensive measurement questionnaire that captures students' learning experience from service-learning alongside their learning outcomes. The resulting POSL questionnaire is backed up by extensive literature review and has been rigorously validated to establish psychometric properties, while also being easy to administer. It is hoped that wider use within the service-learning community will be conducive to comparisons and research synthesis across different programs, regions, cultures, and settings, and provide a clearer picture of student learning from service-learning.

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Appendix A. The Draft Process and Outcomes From Service-Learning (POSL) Questionnaire for Construct Validation

Process Component

Please state how much you agree with each of the following statements regarding your experience with the service-learning course/programme and service project (1= *strongly disagree*, 10 = *strongly agree*).

No.	Item
1	How much time did you spend in planning, preparing for and delivering the service project of your service-learning course/programme?
2	I worked hard for the service project.
3	The goals and objectives of the service-learning course/programme were clear to me.
4	I can see the connection between the service project and the course/programme goals.
5	The service project required me to apply course content in service planning and delivery.
6	I had many opportunities to interact with the community members/people we served during the service project.
7	I feel that our service was valuable for the community/people we served.
8	I feel that our service benefitted the community/people we served.
9	The service project was challenging and motivating.
10	The service project was interesting to me.
12	The service project required me to apply higher-order thinking skills (e.g., problem-solving, creative thinking).
14	My teacher(s) allowed us students to have some say in the design and delivery of the service project.
15	The service project enabled me to interact with people from different backgrounds (e.g., socio-economic status, occupations, or culture).
16	The service project exposed me to different views and perspectives.
17	I was required to reflect regularly during the service project.
18	I received clear instructions and guidance on how to reflect on my service experience.
19	The reflection helped me to re-examine my assumptions, values, and beliefs.
20	The teaching team (teachers, assistants) prepared me well to carry out the service (e.g., through orientation, briefing or training).
21	I received the support I needed to carry out the service project.
23	The teaching team (teachers, assistants) was enthusiastic about the service project.
24	The teaching team (teachers, assistants) coached me and my teammates to work effectively together.
27	During the service project, I felt that I was part of a bigger effort to create a better society.
28	I received regular feedback on my performance during the service project.

Outcomes Component

Please choose the appropriate score (1 = *very little*, 10 = *very much*) to indicate your learning gains from the service-learning course/programme.

To what extent do you think the service-learning course/programme increased or improved your . . .

No.	Item
1	ability to apply the knowledge and skills learned at university/in school to real-life situations
2	ability to solve problems
3	ability to think creatively
4	ability to establish and maintain good relationships with other people
5	ability to work with others in a team to achieve common goals
6	ability to reflect on and learn from your experiences
7	ability to analyse issues from multiple perspectives
8	understanding of the needs, potentials, and resources of the community that you served
9	respect for people with different backgrounds or perspectives
10	empathy for disadvantaged people
11	commitment to creating a better society
12	self-confidence
13	understanding of your own values, strengths and weaknesses
14	commitment to continued self-improvement

Appendix B. Final Version of the Process and Outcomes From Service-Learning (POSL) Questionnaire

Process Component

Please state how much you agree with each of the following statements regarding your experience with the service-learning course/programme and service project (1= *strongly disagree*, 10 = *strongly agree*).

		Strongly Disagree									Strongly Agree
Goals and objectives (α = .92)											
1	The goals and objectives of the service-learning course/programme were clear to me.	1	2	3	4	5	6	7	8	9	10
2	I can see the connection between the service project and the course/programme goals.	1	2	3	4	5	6	7	8	9	10
3	The service project required me to apply course content in service planning and delivery.	1	2	3	4	5	6	7	8	9	10
Meaningful service (α = .92)											
4	I feel that our service was valuable for the community/people we served.	1	2	3	4	5	6	7	8	9	10
5	I feel that our service benefitted the community/people we served.	1	2	3	4	5	6	7	8	9	10
Challenge and interest (α = .88)											
6	The service project was challenging and motivating.	1	2	3	4	5	6	7	8	9	10
7	The service project was interesting to me.	1	2	3	4	5	6	7	8	9	10
8	The service project required me to apply higher-order thinking skills (e.g., problem-solving, creative thinking).	1	2	3	4	5	6	7	8	9	10
Exposure to diversity (α = .86)											
9	The service project enabled me to interact with people from different backgrounds (e.g., socio-economic status, occupations, or culture).	1	2	3	4	5	6	7	8	9	10
10	The service project exposed me to different views and perspectives.	1	2	3	4	5	6	7	8	9	10
Reflective activities (α = .89)											
11	I was required to reflect regularly during the service project.	1	2	3	4	5	6	7	8	9	10
12	I received clear instructions and guidance on how to reflect on my service experience.	1	2	3	4	5	6	7	8	9	10
13	The reflection helped me to re-examine my assumptions, values, and beliefs.	1	2	3	4	5	6	7	8	9	10
Preparation and support (α = .93)											
14	The teaching team (teachers, assistants) prepared me well to carry out the service (e.g., through orientation, briefing or training).	1	2	3	4	5	6	7	8	9	10
15	I received the support I needed to carry out the service project.	1	2	3	4	5	6	7	8	9	10
16	I received regular feedback on my performance during the service project.	1	2	3	4	5	6	7	8	9	10
17	The teaching team (teachers, assistants) was enthusiastic about the service project.	1	2	3	4	5	6	7	8	9	10
18	The teaching team (teachers, assistants) coached me and my teammates to work effectively together.	1	2	3	4	5	6	7	8	9	10

Outcomes Component

Please choose the appropriate score (1 = *very little*, 10 = *very much*) to indicate your learning gains from the service-learning course/programme.

To what extent do you think the service-learning course/programme increased or improved your . . .

		Very Little									Very Much
Intellectual outcomes (α = .92)											
1	ability to apply the knowledge and skills learned at university/in school to real-life situations	1	2	3	4	5	6	7	8	9	10
2	ability to solve problems	1	2	3	4	5	6	7	8	9	10
3	ability to think creatively	1	2	3	4	5	6	7	8	9	10
4	ability to reflect on and learn from your experiences	1	2	3	4	5	6	7	8	9	10
5	ability to analyse issues from multiple perspectives	1	2	3	4	5	6	7	8	9	10
Social outcomes (α = .86)											
6	ability to establish and maintain good relationships with other people	1	2	3	4	5	6	7	8	9	10
7	ability to work with others in a team to achieve common goals	1	2	3	4	5	6	7	8	9	10
8	respect for people with different backgrounds or perspectives	1	2	3	4	5	6	7	8	9	10
Civic outcomes (α = .87)											
9	understanding of the needs, potentials, and resources of the community that you served	1	2	3	4	5	6	7	8	9	10
10	empathy for disadvantaged people	1	2	3	4	5	6	7	8	9	10
11	commitment to creating a better society	1	2	3	4	5	6	7	8	9	10
Intrapersonal outcomes (α = .89)											
12	self-confidence	1	2	3	4	5	6	7	8	9	10
13	understanding of your own values, strengths and weaknesses	1	2	3	4	5	6	7	8	9	10
14	commitment to continued self-improvement	1	2	3	4	5	6	7	8	9	10