FINAL SCRIPT: APPROVED FOR FILMING

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# Title: Qualitative and Quantitative Validation of Tools with Rating Scales Aimed at Assessing the Quality of University Service-Learning

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# Author Questionnaire

1. **Microscopy**: Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **No**

2. **Software:** Does the part of your protocol being filmed include step-by-step descriptions of software usage? **Yes, all done**

3. **Filming location:** Will the filming need to take place in multiple locations? **No**

**Current Protocol Length**
Number of Steps: 15
Number of Shots: 52

# Introduction

***Videographer: Obtain headshots for all authors available at the filming location.***

1.1. **Roberto Sánchez-Cabrero:** In the emerging field of University Service-Learning, we lack standardized instruments that combine reliability and validity, both qualitative and quantitative, and brief enough to be easily used.

1.1.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

What significant findings have you established in your field?

1.2. **Elena López-de-Arana:** The incorporation of Rating Scales allows for comparison between professionals to evaluate the quality of University Service-Learning. Currently, there is no other instrument that achieves this.

1.2.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera. *Suggested B.roll:2.23.3*

What advantage does your protocol offer compared to other techniques?

1.3. **Roberto Sánchez-Cabrero:** QaSLu is the first instrument created through a rigorous qualitative and quantitative validation process guided by the principle of parsimony. It is brief, but extremely scientifically robust.

1.3.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

How will your findings advance research in your field?

1.4. **Rosario Cerrillo:** This protocol sets the path forward for new scientific instruments that are valid, robust, and practical. Not only for Service-Learning, but also in the field of education in general.

1.4.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

What research questions will your laboratory focus on in the future?

1.5. **Elena López-de-Arana:** We plan to create new rating scales for other different groups and expand the participating sample to improve the validation of QaSLu and make it useful in different contexts.

1.5.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

***Videographer: Obtain headshots for all authors available at the filming location.***

# Protocol

## 2. Development and Validation Workflow for Questionnaire for the Self-Assessment of University Service-Learning Experiences (QaSLu)

**Demonstrator:** Roberto Sánchez-Cabrero, Elena López-de-Arana and Rosario Cerrillo

2.1. To begin, create the first draft of a QaSLU *(Q-A-S-L-U)* on a desktop **[1].** Conduct a content analysis of items from primary tools recognized for evaluating service-learning experiences **[2-TXT]**. Review items from international tools that define standards for quality and from the primary rubrics recognized by the service-learning expert community **[3]**.

2.1.1. WIDE: Talent launches QaSLU on a desktop.

2.1.2. Talent conducts a content analysis of items from primary tools recognized for evaluating service-learning experiences. **TXT: Content analysis of primary tools and rubrics for evaluating service-learning experiences**

2.1.3. Talent review items from international tools that define standards for quality and from the primary rubrics recognized by the service-learning expert community.

2.2. Categorize all items by the phases involved in designing service-learning experience like design, implementation, and evaluation **[1-TXT]**. Then categorize all items by the application of service learning like initial phase, planning, execution, closure and replication **[2]**.

2.2.1. Talent categorizing items as per in design service learning experience. **TXT: Categorise and label item cards as per SL design experience and application phases**

2.2.2. Talent labelling the item cards as per SL experience application phases.

2.3. Select a large sample of experts in university service-learning to evaluate the draft instrument **[1-TXT]**.

2.3.1. Talent filtering names in a spreadsheet of potential experts. **TXT: Filter names of potential experts**
AND
TEXT ON PLAIN BACKGROUND:
Inclusion Criterion
Experience in research/design/implementation of USL: Minimum 4 years
Membership in University Academic Body
Doctoral candidacy/degree

*Video Editor: Please play both shots side by side*

2.4. Configure the final expert group to evaluate the definitive instrument for assessing USL, aiming for a list of experts with academic and professional diversity, geographic diversity and gender diversity **[1-TXT].**

2.4.1. Talent editing out some experts in the previous list. **TXT: Send out an email to experts with template to assess items from first draft**

2.5. Once the data from the experts in Round 1 has been received, calculate Kendall's coefficient of concordance for relevance by sequentially clicking on **Analyse**, **Nonparametric Tests**, **Legacy Dialogs** and **K Related Samples [1]**. Choose **Kendall's W** under **Test Type [2]**, then Select all responses from the experts regarding relevance and clarity **[3-TXT].**

2.5.1. SCREEN: 68648_screenshot_4.mp4 00:01-00:14

2.5.2. SCREEN: 68648_screenshot_4.mp4 00:15-00:21

2.5.3. SCREEN: 68648_screenshot_4.mp4 00:22-00:29
**TXT: Do this separately, first for relevance and then clarity**

2.6. Move items to **Test Variables List** and click **OK** to run the analysis **[1-TXT]**.

2.6.1. SCREEN: 68648_screenshot_4.mp4 000:30-00:32
**TXT: Remove irrelevant items and send email report to expert group**

2.7. After receiving the Round 2 expert feedback, reassess Kendall's coefficient of concordance as done earlier **[1]** and remove items rated as highly irrelevant **[2]**. Reformulate items considered highly relevant but unclear to improve wording and precision to yield the final version of the Questionnaire for the Self-Assessment of University Service-Learning Experiences QaSLU-45 *(Q-A-S-L-U 45)* **[3-TXT]**.

2.7.1. SCREEN: 68648_screenshot_4.mp4 00:58-01:10

2.7.2. SCREEN: 68648_screenshot_4.mp4 01:17-01:19

2.7.3. SCREEN: 68648_screenshot_4.mp4 01:21-01:34
**TXT: Send an email invite to authors experienced in USL**

2.8. Once sufficient completed questionnaires have been obtained, assess the internal consistency of the questionnaire using **statistical software package 1 [1].** Click on **Analyze,** followed by **Scale** then **Reliability Analysis [2]**. Choose Alpha in the dialogue box then transfer all relevant variables into the **Reliability Analysis** dialog box and click **OK** to generate the output **[3]**.

2.8.1. SCREEN: 68648_screenshot_6.mp4 00:05-00:11

2.8.2. SCREEN: 68648_screenshot_6.mp4 00:12-00:22

2.8.3. SCREEN: 68648_screenshot_6.mp4 00:22-00:45

2.9. Perform exploratory factor analysis in statistical software package 1 by opening **Analyse**

then click on **Dimension Reduction** followed by **Factor [1]**. In the **Factor Analysis** dialog, transfer all questionnaire items into the Variables box **[2]**, then press **Descriptives**, and **KMO and Bartlett's Test of Sphericity** and select **Univariate Descriptives [3]**. Click **Continue [4].**

2.9.1. SCREEN: 68648_screenshot_7.mp4 00:04-00:12

2.9.2. SCREEN: 68648_screenshot_7.mp4 00:13-00:22

2.9.3. SCREEN: 68648_screenshot_7.mp4 00:23-00:34

2.9.4. SCREEN: 68648_screenshot_7.mp4 00:34-00:35

2.10. Next, press **Extraction** and select **Principal Components** as the extraction method **[1]**. Check the options for **Unrotated Factor Solution** and **Scree Plot**, then click **Continue**, and press **OK** to generate the output **[2]**.

2.10.1. SCREEN: 68648_screenshot_7.mp4 00:37-00:44

2.10.2. SCREEN: 68648_screenshot_7.mp4 00:45-00:56

2.11. Identify the items for removal that show an inverse relationship with the principal component. Using the Component Matrix obtained in the results of the exploratory factor analysis, flag items with negative loadings on the principal factor and exclude them from the reduced, optimized single-factor version of QaSLu **[1]**.

2.11.1. SCREEN: 68648_screenshot_8.mp4 00:00-00:56

2.12. Next, perform confirmatory factor analysis with statistical software package 2 to assess the goodness of fit of the one-factor model **[1]**. Select **Read Data**, click **Browse** in the **Sample** dialog, and select the previously created ASCII data file **[2].** Verify that the number of participants and variables is displayed in green in **Size of Data Matrices [3]**.

2.12.1. SCREEN: 68648_screenshot_9.mp4 00:02-00:08

2.12.2. SCREEN: 68648_screenshot_9.mp4 00:09-00:25

2.12.3. SCREEN: 68648_screenshot_9.mp4 00:26-00:28

2.13. Now press **Open Single Group Dataset** and return to the main menu **[1].** Click **Configure Analysis** in the Main Menu **[2].** Then check **Confirmatory Factor Analysis** in the Dialog Menu and click **Confirm [3].**

2.13.1. SCREEN: 68648_screenshot_9.mp4 00:29-00:36

2.13.2. SCREEN: 68648_screenshot_9.mp4 00:37-00:41

2.13.3. SCREEN: 68648_screenshot_9.mp4 00:42-00:49

2.14. In the **CFA: Factor Analysis Configuration** *(C-F-A-Factor-Analysis-Configuration)* window, accept the default settings and click **Confirm** to return to the main menu **[1].** When the message "**Confirmatory Factor Analysis Ready**" appears, click on the **Compute** button and wait for the results **[2].**

2.14.1. SCREEN: 68648_screenshot_9.mp4 00:50-00:53

2.14.2. SCREEN: 68648_screenshot_9.mp4 00:54-01:08

2.15. Next, open the statistical software package 2, to perform a Robust Unweighted Least Squares exploratory factor analysis **[1].** Select **Read Data**, then click **Browse** in the Sample dialogue box, and choose the previously created ASCII file **[2].** The number of participants and variables will be displayed green in the **Size of Data Matrices** section **[3].**

2.15.1. SCREEN: 68648_screenshot_10.mp4 00:03-00:08

2.15.2. SCREEN: 68648_screenshot_10.mp4 00:09-00:21

2.15.3. SCREEN: 68648_screenshot_10.mp4 00:22-00:26

2.16. Now, click on the **Open Single Group Dataset** icon to return to the main menu **[1]**. In the Main Menu, click on **Configure Analysis** then select **Explorative Factor Analysis** in the **Dialog** menu and click the **Confirm** button **[2].**

2.16.1. SCREEN: 68648_screenshot_10.mp4 00:27-00:32

2.16.2. SCREEN: 68648_screenshot_10.mp4 00:33-00:44

2.17. In the **Exploratory Factor Analysis Configuration** Menu, choose the items identified as having an inverse relationship to the principal component and move them to the excluded variables box **[1]**.

2.17.1. SCREEN: 68648_screenshot_10.mp4 00:45-01:18

2.18. Now, check the **Pearson Correlation Matrix** and **Parallel Analysis** options, set **Number of Factors/Components** *(Factors-or-components)* to 1, and select **Robust Factor Analysis [1]**. Click **Confirm** to return to the main menu and then click **Compute** to generate the results **[2]**.

2.18.1. SCREEN: 68648_screenshot_10.mp4 01:20-01:40

2.18.2. SCREEN: 68648_screenshot_10.mp4 01:47-02:06

2.19. To identify items for removal that have a Measure of Sampling Adequacy or MSA score below 0.49, review the results obtained from the RULS Exploratory Factor Analysis with statistical software package 2, specifically the **Item Location and Item Adequacy Indices** and exclude them from the reduced, optimized single-factor version of QaSLu **[1].**

2.19.1. SCREEN: 68648_screenshot_11.mp4 00:04-01:10

2.20. Create a new variable in statistical software package 1 without the eliminated items by selecting the **Transform Menu** and pressing **Compute Variable [1]**. Name the new variable as SUM27 *(Sum-twenty-seven),* then select the **Sum** function and complete the

**Numeric Expression** with the optimized item list **[2].** Click **OK** to generate the new variable **SUM27 [3]**.

2.20.1. SCREEN: 68648_screenshot_12.mp4 00:02-00:07

2.20.2. SCREEN: 68648_screenshot_12.mp4 00:08-00:44

2.20.3. SCREEN: 68648_screenshot_12.mp4 00:45-00:51

2.21. Calculate percentiles for **SUM27** by selecting **Analyze** followed by **Descriptive Statistics** and **Frequencies [1]**. Move **SUM27** into **Variable(s)** *(variables)* box then click on the **Statistics** icon **[2].** Select **Percentile(s)** *(percentiles)*, and add 1, 5, 15, 25, 35, 45, 55, 65, 75, 85, 95, and 99 **[3].** Click on **Continue**, then **OK** to generate percentiles [**4**].

2.21.1. SCREEN: 68648_screenshot_13.mp4 00:02-00:09

2.21.2. SCREEN: 68648_screenshot_13.mp4 00:11-00:20

2.21.3. SCREEN: 68648_screenshot_13.mp4 00:22-00:50

2.21.4. SCREEN: 68648_screenshot_13.mp4 01:12-01:19

2.22. Repeat the percentile procedure for each rating scale by clicking on **Split File** icon and choosing each relevant variable **[1].** Then select **Organize Output by Groups**, click the arrow button, and press **OK** to generate grouped percentiles for **SUM27 [2]**.

2.22.1. SCREEN: 68648_screenshot_14.mp4 00:02-00:16

2.22.2. SCREEN: 68648_screenshot_14.mp4 00:17-00:24

2.23. To create a table for each rating scale, first add a title row and rows for the levels Low, Medium/Low *(Medium-low)*, Medium, Medium/High *(Medium-high)*, and High with the specified percentile sub-rows **[1]**. In the title row, add a **Level** column, a **Percentile** column, and additional columns for the conditions of the selected variable **[2]**. Complete each table with score ranges mapped to the calculated percentiles **[3].**

2.23.1. SCREEN: 68648_screenshot_15.1.mp4 00:03-00:30

2.23.2. SCREEN: 68648_screenshot_15.2.mp4 00:01-00:12

2.23.3. SCREEN: 68648_screenshot_15.3.mp4 00:01-00:12, 00:23-00:29

**AND**

TEXT ON PLAIN BACKGROUND:
Score Range/Percentiles:
Percentile 1 = 0 - Percentile 4
Percentile 10 = Percentile 5 - Percentile 14
Percentile 20 = Percentile 15 - Percentile 24
Percentile 30 = Percentile 25 - Percentile 34
Percentile 40 = Percentile 35 - Percentile 44
Percentile 50 = Percentile 45 - Percentile 54
Percentile 60 = Percentile 55 - Percentile 64

Percentile 70 = Percentile 65 - Percentile 74
Percentile 80 = Percentile 75 - Percentile 84
Percentile 90 = Percentile 85 - Percentile 94
Percentile 99 = Percentile 95 -Percentile 99
*Video Editor: Please play both shots side by side*

# Results

## 3. Results

3.1. The results obtained from the participating sample are presented to establish comparisons based on the rating scales used in the study. **[1]**.

3.1.1. LAB MEDIA: Tables 1–4. *Video editor: Display all four tables clearly in sequence.*

3.2. The different ranks for each category were made up of the intermediate points between them, for example, the 50th percentile were obtained from the scores of the 45th percentile and the 54th percentile **[1]**.

3.2.1. LAB MEDIA: Tables 1–4. *Video editor: Highlight all "Percentile" rows showing the 50th percentile*

3.3. All ranks, except the 1st and 99th percentile, show perfectly bounded ranges corresponded to the 4th and 95th percentiles plus any possible score adjustments **[1]**. Each of these scales allows comparing the scores of each prospective user by selecting the appropriate rating scale according to their characteristics **[2]**.

3.3.1. LAB MEDIA: Tables 1–4. *Video editor: Highlight the 1st percentile row and the 99th percentile row*

3.3.2. LAB MEDIA: Tables 1–4. *Video editor: Please highlight the levels Low, Medium/Low, Medium, Medium/High and High, in sequence*

**Pronunciation Guide:**

1. **Qualitative**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/qualitative**
- **IPA: /ˈkwɑːlɪˌteɪtɪv/**
- **Phonetic Spelling: kwah-li-tay-tiv**
2. **Quantitative**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/quantitative**
- **IPA: /ˈkwɑːntɪˌteɪtɪv/**
- **Phonetic Spelling: kwan-ti-tay-tiv**
3. **Validation**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/validation**
- **IPA: /ˌvælɪˈdeɪʃən/**
- **Phonetic Spelling: val-i-day-shun**
4. **Rating scale / Rating scales**
- **"Scale" is simple; "rating" might need clarity.**
- **Pronunciation link (rating): https://www.merriam-webster.com/dictionary/rating**
- **IPA: /ˈreɪtɪŋ/**
- **Phonetic Spelling: ray-ting**
5. **Instrument (in the context of questionnaires / measurement tool)**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/instrument**
- **IPA: /ˈɪnstrəmənt/**
- **Phonetic Spelling: in-struh-ment**
6. **Parsimony**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/parsimony**
- **IPA: /ˈpɑːrsɪˌmoʊni/**
- **Phonetic Spelling: par-si-mo-nee**
7. **Reliability**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/reliability**
- **IPA: /rɪˌlaɪəˈbɪlɪti/**
- **Phonetic Spelling: ree-lye-uh-bi-li-tee**
8. **Validity**
- **Pronunciation link: https://www.merriam-webster.com/dictionary/validity**
- **IPA: /vəˈlɪdɪti/**
- **Phonetic Spelling: vuh-lid-i-tee**
9. **Kendall's Coefficient of Concordance (Kendall's W)**
- **Pronunciation link for Kendall: https://www.merriam-webster.com/dictionary/kendall**
- **For "coefficient": https://www.merriam-webster.com/dictionary/coefficient**
- **For "concordance": https://www.merriam-webster.com/dictionary/concordance**
- **IPA: /ˈkɛndəlz koʊˈɪfɪʃənt əv kənˈkɔrdəns/**
- **Phonetic Spelling: ken-dalz koh-if-ish-ent uhv kun-cor-dance**
10. **Factor Analysis**
- **Pronunciation link for "factor": https://www.merriam-webster.com/dictionary/factor**

- For “analysis”: https://www.merriam-webster.com/dictionary/analysis
- IPA: /ˈfæktər əˈnæləsɪs/
- Phonetic Spelling: fak-ter uh-nal-uh-sis

11. Exploratory Factor Analysis
- “Exploratory”: https://www.merriam-webster.com/dictionary/exploratory
- IPA: /ɪkˈsplɔːrəˌtɔːri/
- Phonetic Spelling: ik-splaw-ruh-tor-ee

12. Confirmatory Factor Analysis
- “Confirmatory”: https://www.merriam-webster.com/dictionary/confirmatory
- IPA: /kənˈfɜːrmətɔːri/
- Phonetic Spelling: kun-fur-muh-tor-ee

13. Unweighted Least Squares
- Unweighted: https://www.merriam-webster.com/dictionary/unweighted
- Least: /liːst/ (common English)
- Squares: /skwɛərz/
- Phonetic Spelling: un-wey-ted leest skwairs

14. Goodness of Fit
- Pronunciation link for “goodness”: https://www.merriam-webster.com/dictionary/goodness
- Fit is simple /fɪt/
- Phonetic Spelling: good-ness of fit

15. Service-Learning
- Pronunciation link for “service”: https://www.merriam-webster.com/dictionary/service
- Learning: /ˈlɜːrnɪŋ/
- Phonetic Spelling: ser-vis ler-ning