**Table 1.**

*The Items of Student Library Use Survey included in the Analysis*

|  |  |  |  |
| --- | --- | --- | --- |
| **Subdimensions** | **Item numbers** | **Item wording** | **Scale** |
| Library visits |  | Last semester, how often did you visit the library? |  |
|  | Q17\_1 | In person | Never=1  Once a month=2  Once a week=3  Multiple days in a week=4  Daily=5 |
|  | Q17\_2 | Online |
| Library space satisfaction |  | How satisfied are you with the library spaces below at your library? |  |
|  | Q18\_1 | Quiet study spaces | Very dissatisfied=1  Dissatisfied=2  Satisfied=3  Very satisfied=4 |
|  | Q18\_2 | Collaborative study spaces |
|  | Q18\_3 | Group study rooms |
|  | Q18\_4 | Computer areas |
| Library resource use |  | Last semester, how often did you use each of the library resources below? |  |
|  | Q20\_1 | Journal articles | Never=1  Once a month=2  Once a week=3  Multiple days in a week=4  Daily=5 |
|  | Q20\_2 | Subject specific databases |
|  | Q20\_3 | Print books from the stacks |
|  | Q20\_4 | Textbooks on reserve |
|  | Q20\_5 | Electronic books |
|  | Q20\_6 | Library subject & course guides |
|  | Q20\_7 | Special collections & University archives |
|  | Q20\_8 | Digital Images |
|  | Q20\_9 | Steaming media |
|  | Q20\_10 | DVDs on reserve |
|  | Q20\_11 | Patient care tools |
| Importance of library resources and services |  | Please indicate the relative importance of each of the library resources/services for your research or coursework. |  |
|  | Q21\_1 | Journal articles | Not at all important=1  Somewhat important=2  Important=3  Very important=4 |
|  | Q21\_2 | Subject specific databases |
|  | Q21\_3 | Print books from the stacks |
|  | Q21\_4 | Textbooks on reserve |
|  | Q21\_5 | Electronic books |
|  | Q21\_6 | Library subject & course guides |
|  | Q21\_7 | Special collections & University archives |
|  | Q21\_8 | Digital images |
|  | Q21\_9 | Steaming media |
|  | Q21\_10 | DVDs on reserve |
|  | Q21\_11 | Patient care tools |
|  | Q21\_12 | University Blackboard |
|  | Q21\_13 | Library instruction arranged by your professor |
|  | Q21\_14 | Library workshops that you self-selected to attend |
| Easy to use Library website |  | How easy is it to use the University library website for the services below? |  |
|  | Q22\_1 | Finding journal articles using the search box on the library home page | Very difficult=1  Difficult=2  Easy=3  Very easy=4 |
|  | Q22\_2 | Finding an e-book using the search box on the library home page |
|  | Q22\_3 | Finding a print book using the search box on the library home page |
|  | Q22\_4 | Accessing a database to search for articles and other scholarly materials |
|  | Q22\_5 | Requesting a print book from another library |
|  | Q22\_6 | Requesting an article from another library |
|  | Q22\_7 | Logging into my library account to renew a book |
|  | Q22\_8 | Asking for help from a librarian by IM/chat |
|  | Q22\_9 | Using library subject & course guides to access materials by subject |
|  | Q22\_10 | Finding media (e.g., films, videos, online images, etc) |
|  | Q22\_11 | Booking a group study room online |
| Likelihood of recommending library services |  | How likely are you to recommend the following library services to another student” |  |
|  | Q23\_1 | One on one research consultation with a librarian | Very unlikely=1  Unlikely=2  Likely=3  Very likely=4 |
|  | Q23\_2 | Library workshops about library research (e.g., finding recourses, requesting materials, etc) |
|  | Q23\_3 | IM/online chat research help |
|  | Q23\_4 | E-mail research help |

*Note.* “I do not use this service or tool” was dropped from the survey responses.

**Table 2.**

*Variance Decomposition of the Responses for the Items*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Empirical** | | | **Modeled** |
| Total raw variance in observationsa | = | 95.5 | 100.0% |  | 100.0% |
| Raw variance explained by measuresb | = | 50.5 | 52.9% |  | 52.5% |
| Raw variance explained by personsc | = | 19.9 | 20.9% |  | 20.7% |
| Raw Variance explained by itemsd | = | 30.6 | 32.0% |  | 31.8% |
| Raw unexplained variance (total)e | = | 45.0 | 47.1% | 100.0% | 47.5% |
| Unexplned variance in 1st contrastf | = | 4.0 | 4.2% | 8.8% |  |
| Unexplned variance in 2nd contrast | = | 3.5 | 3.7% | 7.7% |  |
| Unexplned variance in 3rd contrast | = | 3.2 | 3.4% | 7.2% |  |
| Unexplned variance in 4th contrast | = | 2.5 | 2.7% | 5.6% |  |
| Unexplned variance in 5th contrast | = | 2.3 | 2.4% | 5.0% |  |

*Legend.*

1. Total raw variance in observations: Total raw-score variance in the responses

2. Raw variance explained by measures: Raw-score variance in the responses explained by all parameters estimated in the model

3. Raw variance explained by persons: Raw-score variance in the observations explained by the person parameters estimated in the model

4. Raw variance explained by items: Raw-score variance in the observations explained by the Rasch item parameters

5. Raw unexplained variance (total): Raw-score variance in the observations not explained by the Rasch model estimated parameters

6.Unexplained variance in 1st, 2nd, ... contrast: Variance that is not explained by the Rasch model estimated parameters and that is decomposed into Principal Component Analysis

**Table 3.**

*Standardized Residual Loadings for Item (Produced by WINSTEPS)*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Con-Trast | Load-ing | Meas-ure | InFit  MNSQ | OutFit  MNSQ | Entry  # | Item | G  R | Load-ing | Meas-ure | InFit  MNSQ | OutFit  MNSQ | Entry  # | Item | G  R |
| 1 | 0.62 | -0.09 | 1.06 | 1.06 | A 7 | Q20 1 | 3 | -0.48 | 0.45 | 1.24 | 1.32 | a 4 | Q18 2 | 2 |
| 1 | 0.53 | 0 | 1.01 | 1.04 | B 2 | Q17 2 | 1 | -0.44 | 0.14 | 1.3 | 1.36 | b 5 | Q18 3 | 2 |
| 1 | 0.53 | -0.24 | 0.91 | 0.89 | C 8 | Q20 2 | 3 | -0.38 | 0.44 | 1.18 | 1.27 | c 6 | Q18 4 | 2 |
| 1 | 0.46 | 1.56 | 1.28 | 1.41 | D 18 | Q21 2 | 4 | -0.37 | 0.51 | 1.46 | 1.58 | d 1 | Q17 1 | 1 |
| 1 | 0.4 | 0.7 | 0.73 | 0.71 | E 32 | Q22 1 | 5 | -0.37 | 0.8 | 1.28 | 1.42 | e 3 | Q18 1 | 2 |
| 1 | 0.39 | 0.64 | 0.76 | 0.75 | F 35 | Q22 4 | 5 | -0.33 | -0.09 | 1.15 | 1.19 | f 42 | Q22 11 | 5 |
| 1 | 0.36 | -0.66 | 0.96 | 0.96 | G 11 | Q20 5 | 3 | -0.28 | 0.01 | 0.84 | 0.8 | g 44 | Q23 2 | 6 |
| 1 | 0.36 | 1.26 | 1.14 | 1.15 | H 19 | Q21 1 | 4 | -0.28 | -0.04 | 0.86 | 0.81 | h 46 | Q23 4 | 6 |
| 1 | 0.34 | 1.06 | 0.95 | 1 | I 22 | Q21 6 | 4 | -0.27 | 0.1 | 0.98 | 1.02 | i 43 | Q23 1 | 6 |
| 1 | 0.33 | 0.43 | 0.78 | 0.74 | J 33 | Q22 2 | 5 | -0.25 | -0.2 | 0.88 | 0.82 | j 41 | Q22 10 | 5 |
| 1 | 0.31 | 0.72 | 1.01 | 1.11 | K 20 | Q21 4 | 4 | -0.24 | -0.16 | 1 | 1 | k 31 | Q21 14 | 4 |
| 1 | 0.26 | 0.25 | 0.85 | 0.83 | L 34 | Q22 3 | 5 | -0.23 | 0.28 | 1.04 | 1.08 | l 30 | Q21 13 | 4 |
| 1 | 0.24 | 0.58 | 0.85 | 0.9 | M 23 | Q21 3 | 4 | -0.19 | 0.06 | 0.92 | 0.87 | m 45 | Q23 3 | 6 |
| 1 | 0.21 | -1.12 | 0.98 | 0.9 | N 9 | Q20 3 | 3 | -0.18 | -2.44 | 1.32 | 0.92 | n 16 | Q20 10 | 3 |
| 1 | 0.21 | 0.01 | 0.82 | 0.77 | O 36 | Q22 5 | 5 | -0.17 | -1.62 | 1.15 | 0.91 | o 14 | Q20 8 | 3 |
| 1 | 0.2 | 0.54 | 1.37 | 1.56 | P 28 | Q21 12 | 4 | -0.16 | 1.91 | 1.62 | 2.03 | p 29 | Q21 7 | 4 |
| 1 | 0.19 | 0.88 | 0.99 | 1.01 | Q 21 | Q21 5 | 4 | -0.14 | -1.44 | 1.37 | 1.28 | q 15 | Q20 9 | 3 |
| 1 | 0.19 | -0.04 | 0.8 | 0.75 | R 37 | Q22 6 | 5 | -0.08 | 0.03 | 0.98 | 0.92 | r 39 | Q22 8 | 5 |
| 1 | 0.16 | 0.29 | 0.74 | 0.74 | S 24 | Q21 8 | 4 | -0.07 | -1.67 | 1.06 | 0.8 | s 13 | Q20 7 | 3 |
| 1 | 0.14 | -0.02 | 0.91 | 0.86 | T 38 | Q22 7 | 5 | -0.02 | -1.2 | 1.03 | 1.02 | t 10 | Q20 4 | 3 |
| 1 | 0.12 | -1.1 | 1.03 | 0.96 | U 12 | Q20 6 | 3 | -0.01 | -0.01 | 0.84 | 0.78 | u 40 | Q22 9 | 5 |
| 1 | 0.12 | 0.4 | 0.93 | 0.95 | V 26 | Q21 10 | 4 |  |  |  |  |  |  |  |
| 1 | 0.09 | -0.11 | 0.86 | 0.94 | W 27 | Q21 11 | 4 |  |  |  |  |  |  |  |
| 1 | 0.08 | -1.82 | 1.7 | 1.74 | v 17 | Q20 11 | 3 |  |  |  |  |  |  |  |

*Note.* The loadings can be interpreted similar to the factors in conventional factor analysis. The sign (+ or -) of the loadings show two opposing factors.

**Table 4.**

*Items Listed by Rating Scale Structure*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Criteria** | **Grouping1 (Q17\_1 ~ Q17\_2)** | **Grouping2**  **(Q18\_1~ Q 18\_4)** | **Grouping 3 (Q20\_1~**  **Q20\_11)** | **Grouping 4 (Q21\_1~**  **Q21\_14)** | **Grouping 5 (Q22\_1~**  **Q22\_11)** | **Grouping 6 (Q23\_1~**  **Q23\_4)** |
| At least 10 observations at each response category | Yes | Yes | Yes | Yes | Yes | Yes |
| Average person measures advance monotonically | Yes | Yes (13, .47, .81. 1.46) | Yes  (-1.33, -.98, -.55,-.01) | Yes (-.03,.55,.95,1.79) | Yes (-.16, .45, .88, 1.70) | Yes (-.28, .26, .61, 1.38) |
| Outfit MNSQ < 1.4 | Yes | Yes | Yes | Yes | Yes | Yes |
| Category thresholds increase monotonically | Yes (-2.29, -.86, -.05, .82, 2.46) | Yes ( -2.36, -.88, .62, 2.78) | Yes ( -1.83, -.79, -.15, .65, 2.33) | Yes (-2.27, -.54, .87, 2.08) | Yes (-2.47, -.91, .68, 2.85) | Yes (-2.15, -.74, .55, 2.46) |
| Thresholds increase more than 1.4 logits | Not met for thresholds from 1 to 2 and thresholds from 2 to 3 | Yes | Not met for thresholds from 2 to 3 | Yes | Yes | Not met for thresholds from 2 to 3 |