# The Development and Psychom
# Testing of the Cognitive o
# Information Literacy (CIL) Inve
# for Nursing Students


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# Scope of the Problem

- With the focus of preparing students for lifelong learning, self-directed learning has been increasingly applied in the context of higher education.

- To be lifelong learners, students must have information literacy competence.

- The evaluations of information literacy have produced mixed criteria and findings, some questionnaire are very specific or very heavy for the students.

# Purpose of the Study

- The purposes of this study were to develop an instrument to measure the cognition of information literacy of nursing students and to test the validity and reliability of this instrument.

# Methodology

- Four phases
  - Phase I: Develop a new instrument based on the literature
  - Phase II: Two round Delphi study
  - Phase III: Test construct validity of the CIL
  - Phase IV: Test the reliability of the CIL

# Methodology
# Phase I

- Develop a new instrument for measurement of SDL
  - Literature search
  - Develop 3 instruments:
    - Knowledge of information literacy
    - Cognitive of information literacy
    - Attitude toward information literacy
  - Develop preliminary items for the new instrument

# Methodology
# Phase II

- Test content validity
  - Conduct Delphi study:
    - Form an expert panel
    - Three experts in Nursing Informatics and 4 experts in information management.
  - Assess the appropriateness, representativeness and explicitness of the CIL's items and content: two rounds of Delphi study

# Methodology
# Phase III

- Test construct validity of the CIL inventory
  - Using exploratory factor analysis
  - Subjects recruited from one national university with two nursing programs (4-year BSN program and 2-year RN-to-BSN program) in Taiwan (N=646)

| | X(SD) | N (%) |
|---|---|---|
| **Age** | 20.37 (2.30) | |
| **Program** | | |
| RN to BSN | | 127(19.7%) |
| 4-year BSN | | 519(80.3%) |
| **Sex** | | |
| Male | | 52 (8%) |
| Female | | 583 (90.2%) |
| Missing | | 11 (1.7%) |
| **Having computer at home?** | | |
| Yes | | 630 (97.5%) |
| No | | 4 (.6%) |
| Missing | | 12 (1.9%) |
| **Average using computer time per week?** | 8.77(2.86) | |
| **Average using internet time per week?** | 8.15(9.85) | |

# Methodology
# Phase IV

- Test the internal consistency and reliability of the SDLI
  - Cronbach's alpha

# Results
# Phase I

- Reviewed the content of information literacy and related questionnaire.
- Develop a new instrument based on The Information Literacy Competency Standards for Higher Education. Available at: http://www.ala.org/acrl/standards/informationliteracycompetency.

# Results
# Phase II

- Phase II began with a 15-item preliminary instrument and ended with a 14-item instrument after a two-round Delphi study.

- Summarized results of the Delphi rounds

| Round | Total items | Items deleted | Items retained | Items modified | Items added |
|---|---|---|---|---|---|
| 1 | 15 | 1 | 9 | 5 | 0 |
| 2 | 14 | 0 | 14 | 0 | 0 |

# The CIL inventory

- The CIL inventory contained 2 domains with 14 items.
- Two domains:
  - Knowledge of information literacy (8 items)
  - Skills of information literacy (6 items)

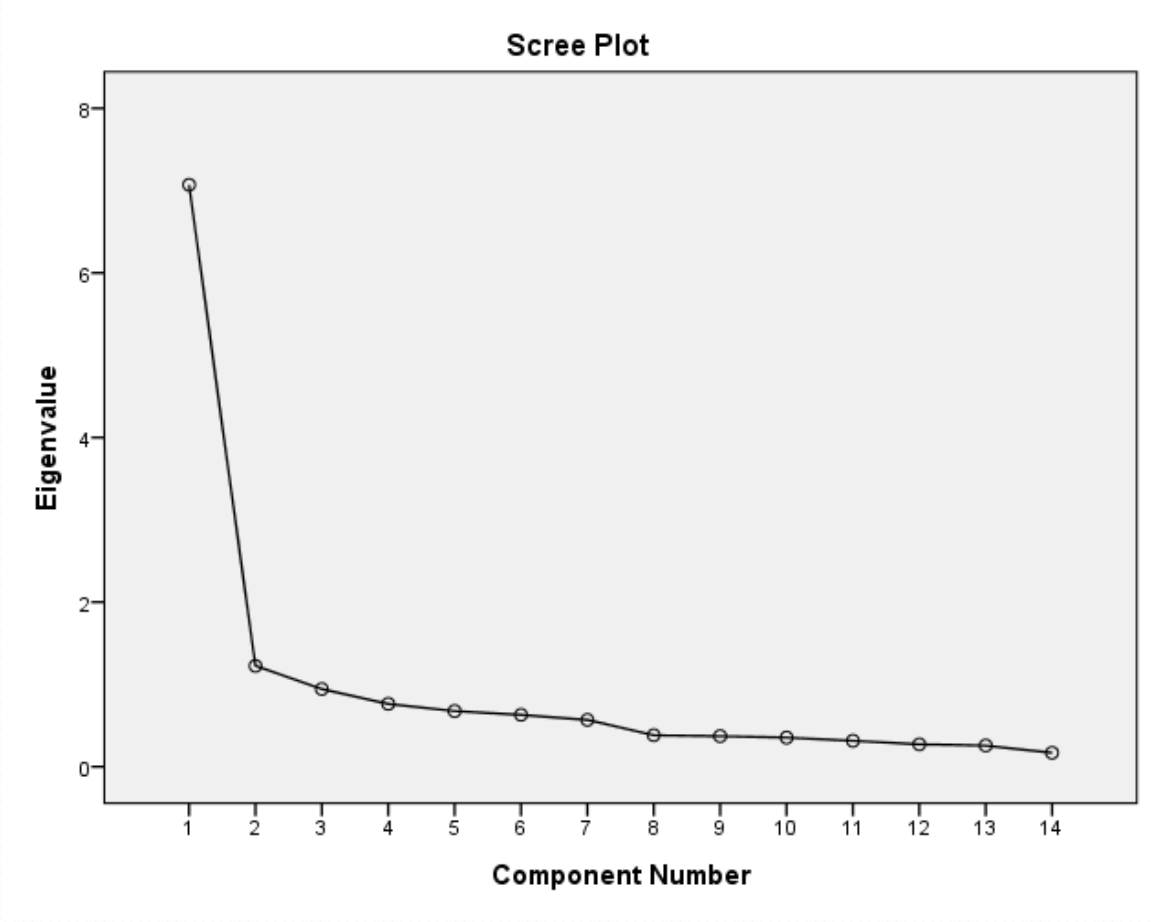
# Results
# Phase III

- A 14-item CIL was assessed using EFA (exploratory factor analysis). The varimax rotation was used.
- Criteria:
  - KMO > .90
  - Bartlettes' test: $p < .05$
  - It indicates appropriateness to use factor analysis.

# CIL inventory

- KMO= .926
- Bartlettes' test of sphericity
  - Chi-square = 5109.398
  - df = 91
  - P < .000

# Screen plot for CIL inventory



# Factor structure matrix

| CIL | Factor loading | |
|---|---|---|
| Factors | Knowledge of IL | Skill of IL |
| Item 1 | .606 | |
| Item 3 | .629 | |
| Item 4 | .532 | |
| Item 10 | .850 | |
| Item 11 | .847 | |
| Item 12 | .810 | |
| Item 13 | .701 | |
| Item 14 | .643 | |
| Item 2 | | .525 |
| Item 5 | | .536 |
| Item 6 | | .803 |
| Item 7 | | .784 |
| Item 8 | | .832 |
| Item 9 | | .622 |
| Explained variances | 50.511 | 8.750 |
| Total variances | 59.261 | |

# Results
# Phase IV

- The value of Cronbach's α for the total item pool was .92, and for the F1 domain was .906, and F2 was .826.

# Scoring of the CIL inventory

- This paper-and-pencil instrument takes around 10 min to complete. All items of CIL inventory are positively stated.
- A 5-point Likert scale ranging from 1 (“no confidence”) to 5 (“strong confidence”).
- The total possible score on the CIL inventory ranges from 14 to 70.

# Discussion and Conclusion

- This study is unique because the sample was selected from two different types of nursing programs from one school in Taiwan.
- The instrument developed in this study help nursing educators to better understand students' CIL abilities and implement appropriate teaching strategies, such as problem-based learning.

- Both educator and students can use the CIL inventory throughout the process of nursing education to identify students' competences of information literacy, learning obstacles and seek relevant counseling and support.

- Future studies may use the CIL to explore the CIL of students across different types of programs, schools, regions and cultures.

- The data collected from this study may also be used to develop a pedagogy and curriculum aimed at enhancing students' CIL abilities.

# Poster presentation

- **Date: July 30, 2012**
- **Title:** Attitude Toward Information Literacy Inventory (ATILI): Development and Psychometric Testing
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Thank you very much.