Highest six eigenvalues and the proportion of variance accounted for by factor analysis with varimax rotation.

Factor and Cluster Analysis of Learning Orientation Questionnaire

Kimberly R. Dinsmore and L. Lee Glenn

College of Nursing, East Tennessee State University, Johnson City, Tennessee 37604

Introduction

The purpose was to evaluate the psychometric properties of a 25-item questionnaire on learning orientation in a nursing educational program. The questionnaire is a standardized instrument used in industry and universities but this is the first time its psychometric properties were assessed in a nursing students. Learning orientation is a vital aspect that includes elements such as: desire to learn, an outreaching toward the goal, and seriousness in using instructional resources provided.

Methods

A quantitative, non experimental, one-group, correlation design was used. The measurement instruments were a short demographic questionnaire and the Learning Orientation Questionnaire (LOQ) developed by Martinez (2005). The Learning Orientation Questionnaire consists of 25 items with response values that range from one to seven :

Very Uncharacteristic of Me — Very Characteristic

1 2 3 4 5 6 7

Four hundred and seventy-two undergraduate nursing students at the first semester junior level at East Tennessee State University completed the Learning Orientation Questionnaire online. The data were imported into an R language processor (Version 3.3.1) for plotting and statistical analysis. This first step was manual (subjective extraction to identify correlations between items and group them into categories using cluster analysis. The second step was the automatic extraction of factors with the *factanal* function in the R language.

Instrument Items

I push myself to accomplish personal learning goals beyond those expected by the instructor.

I enjoy learning.

The instructor is the best person to monitor, evaluate, and determine how well I learn.

I look for additional information sources that help me learn about new topics.

The instructor helps me stay on task and meet course objectives.

I use learning as a vital resource in accomplishing my professional or personal goals.

I avoid learning situations if I can.

I do well on a course if I rely on the instructor.

My personal goals have priority over the instructor's course objectives.

I like to learn and feel comfortable learning for any reason.

I learn best if I personally manage my learning goals, strategies, and tasks.

I carefully plan out my learning goals, strategies, and expected outcomes before I do a learning task.

Learning helps me achieve challenging personal goals.

I avoid courses if the objectives are challenging or difficult.

I use learning to improve the quality of my life.

Monitoring my own progress helps me manage and improve my learning and professional performance.

I set and accomplish personal learning goals beyond the stated course objectives.

I do not try to set risky or challenging learning goals.

I enjoy discovering new topics that help me achieve personal learning goals.

I rely on the instructor to assess my learning achievement.

I continually assess my progress and determine how to improve my learning ability.

I know that the instructor can show me the best way to evaluate achievement of my learning goals.

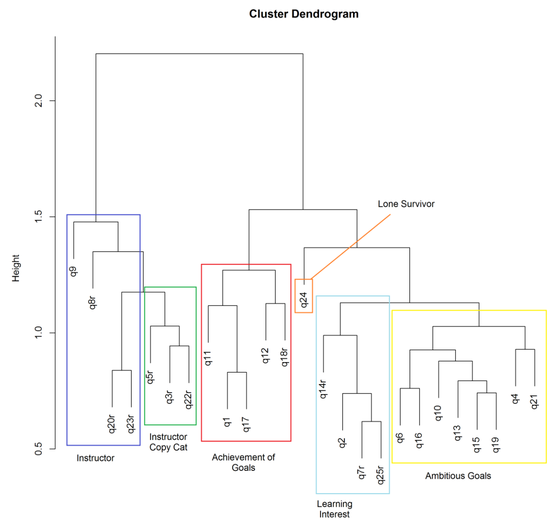
The instructor can plan my best learning approach for accomplishing training objectives.

I know what to do if I am not doing well in a course.

Learning is not an enjoyable or comfortable process for me..

Findings

Six clusters of questionnaire items were found by cluster analysis on the themes that we named: learning interest, ambitious goals, instructor, instructor copy cat, achievement of goals, and lone survivor



Factor Analysis

Factor Loadings For Largest Six Eigenvalues. (Extracted by Automatically in R Statistical Language).

	1	2	3	4	5	6
Eigen-values	6.910	2.668	1.394	1.193	.998	.957
Propor-tion of Variance	.291	.104	.079	.025	-	-

In the automatic factor extraction in R , four factors were extracted rather than six (four factors had eigenvalues greater than one. The automatic extraction combined the factors learning interest and ambitious goals together and removed the lone survivor factor. The lone survivor factor contained one question (q24) with a low eigenvalue of (0.3). This question was deemed both minor and irrelevant to the topic of the questionnaire and therefore is proposed to be removed from the questionnaire.

Discussion

The result of the factor and cluster analyses in nursing students was compared to that of a previous study (Martinez, 2005) that used a heterogeneous sample of both high school and university students of many different majors. The differences in the results were substantial. Martinez (2005) found three extracted factors in her research in comparison to the current research of four factors. Martinez (2005) factor analysis grouped our main two factors into a single factor, which means that the factors for learning interest, ambitious goals, and instructor influence were a single factor in that study.

The factor structure indicates that the 25 item instrument can be reduced to 8 and still retain much of the explanatory power of the original survey (77% to 93% of variance accounted for in original factors).

Conclusion

(1) The factors extracted in nursing students in the present study do not correspond closely to those of the sample used by Martinez (2005) and this might be explained by the greater focus on applied practice in nursing education.

(2) The current questionnaire could be reduced in size to from twenty-five to eight questions while maintaining strong measurement quality.