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# Development of an Instrument to Measure Teaching Style in Japan: The Teaching Style Assessment Scale

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**Abstract**

Teaching style has been a popular concept for many years. Teaching style refers to the distinct qualities displayed by a teacher that are persistent from situation to situation regardless of the content. The Principles of Adult Learning Scale (PALS) has been used extensively in the West for measuring teaching style in relationship to the adult education literature, but no version has been available for use in Japan. Therefore, this research used PALS as the foundation for creating a new instrument to measure teaching style in Japan. Following a rigorous translation process, data were collected from a national sample of 1,111 nursing educators. Factor analysis and correlation were used to establish the construct and content validity of the new instrument. Reliability was established with Cronbach's alpha. The new 30-item instrument was named the Teaching Style Assessment Scale and is available in both Japanese and English for use either for personal self-assessment or for research purposes.

## Background

A crucial issue of Japanese nursing education is practicing Evidence-Based Nursing (Ministry of Health, Labor and Welfare, 2008). The amount of research on Evidence-Based Nursing has been increasing since the need for Evidence-Based Nursing was reported (Asakawa, 2011). The nurse practicing Evidence-Based Nursing acquires learning skills such as critical thinking and self-directed learning. These skills are essential for nursing competencies and require a learning environment in which teachers encourage learners to apply the higher-order cognitive skills in Bloom's taxonomy of cognitive behaviors (Heimlich & Norland, 1994).

Critical thinking is essential for Evidence-Based Nursing practice, and developing these skills requires a student-centered approach (Chipas, 1995; Schaeffer & Zygmount, 2003). The National Leagues for Nursing in the USA proposed the necessity for student-centered approaches to learning. This position is congruent with the long history of adult learning theory in the United States in which the learner-centered concepts of andragogy and self-directed learning form the twin pillars (Merriam, 2001).

In his original description of andragogy, Knowles (1970) pointed out that "the behavior of the teacher probably influences the character of the learning climate more than any other single factor" (p. 41). Moreover, research has shown that "teaching does make a difference….Teaching is the human connection between the content and the environment and the learners" (Heimlich & Norland, 1994, p. 109). There are two basic approaches for the teacher

making this human connection with the learners. These are the teacher-centered approach and the learner-centered approach (Conti, 2004). With the teacher-centered approach, "the teacher's role is to design an environment which stimulates the desired behavior and discourages those that have been determined to be undesirable" (p. 77). While the teacher-centered approach focuses upon the actions of the teacher in planning and controlling the learning environment, the learner-centered approach is concerned with the personal development of each individual learner, and the focus therefore is upon the individual learner. "Although a teacher-centered approach is widely practiced in adult education, the learner-centered approach is strongly supported in the field's literature" (p. 78).

"Teaching style refers to the distinct qualities displayed by a teacher that are persistent from situation to situation regardless of the content" (Conti, 2004, pp. 76-77). Teaching style is much broader than the specific teaching strategies and methods that are employed to accomplish a specific instructional objective (Conti, 1989, 2004). Teachers enter the teaching-learning transaction with a definite set of values (Brookfield, 1986), and these in turn influence the teacher's beliefs about the nature of the learner, the purpose of the curriculum, and the role of the teacher in the classroom (Darkenwald & Merriam, 1982). An awareness of one's teaching style is important in order for teachers "to examine their beliefs about teaching and current teaching behavior in depth" (Heimlich & Norland, 1994, p. xi) so they can reflect critically upon their professional practice (Conti, 2004; Heimlich & Norland, 1994). Thus, "a knowledge of teaching style can make a difference in how teachers organize their classroom, how they deal with learners, and how well their students do in learning" (Conti, 1989, p. 3).

The Principles of Adult Learning Scale (PALS) has been used extensively in the field of adult education for measuring teaching style (for example, see Brookfield, 1986; Heimlich & Norland, 1994; Merriam & Bierema, 2013). Since it was developed in 1978, PALS has been used in over 100 research studies and in countless training activities. PALS is a 44-item, summated rating scale that "measures the frequency with which one practices teaching/learning principles that are described in the adult education literature" (Conti, 2004, p. 79).

Although PALS has been available for measuring teaching style in English-speaking countries, there has been no scale with which to measure a teacher's teaching style in Japan. Therefore, it was necessary to develop a Japanese version of a teaching style instrument. Because PALS is based on the long-established theory base for adult learning theory, PALS was used as the foundation for this new instrument. The purpose of this research was to develop the Teaching Style Assessment Scale for teachers of nursing in Japan that could be used to identify their teaching style as either student-centered or teacher-centered.

## Research Methods

The development of an instrument involves determining items for the instrument and then collecting validity and reliability data for these items (Gay, Mills, & Airasian, 2009). The Principles of Adult Learning Scale (PALS) was used as the source of items for the Teaching Style Assessment Scale (TSAS). The validity and reliability of these items was inferred from the extensive history and research record associated with PALS and from its use in numerous diverse setting. However, because of the cultural diversity between Japan and the Western countries in which PALS was developed and used, it was necessary to gather data on these items with a sample in Japan.

The first task for making the TSAS was to translate the items in PALS from English to Japanese. This translation was accomplished in three steps. Step 1 was to translate the original English items in PALS to Japanese. Step 2 was to back translate this Japanese translation to English in order to check its accuracy. Step 3 was to combine the individual translations into one scale. All steps were conducted by experts in Japanese, English, and nursing education. To further test the content validity of the translated items, they were examined by three English experts who are native Japanese from three universities. Seven professors, who were not in the nursing field, also

examined the translated version of the instrument for clarity. The final translated version was then pilot tested with 10 Japanese nursing educators from a university (7), a junior college (1), and a nursing diploma school (2) and with 7 teachers from outside the field of nursing.

## Comparing TSAS to PALS

Data were gathered from a national Japanese sample to compare TSAS to the norms for PALS. To obtain a national sample of nursing educators, 2,256 questionnaires were sent to nursing teachers at 363 facilities. From these, 1,111 questionnaires were returned for a 49.2% response rate. Out of 1,111 responses, 679 (61.1%) were from nursing diploma schools, 386 (34.8%) were from the university, and 46 (4.1%) were from junior colleges.

The scores on TSAS were significantly different from the norms for PALS ($t = 84.4$, $df = 1{,}110$, $p < .001$). The mean for TSAS was 114.3 with a standard deviation of 12.5, a median of 114, a mode of 108, and range of 68 to 162. The total score on PALS can be broken down into seven factor scores. The mean scores for the national sample for every factor were significantly lower on the TSAS than the norms for the factors on PALS. Thus, the scores for this sample were very different from the norms for PALS.

Factor analysis was used to investigate the theoretical constructs, or factors, that might underlie the structure of the sample and to determine if it had the same underlying factor structure as PALS. For this analysis, the 44 items from the 1,111 responses on the TSAS were factor analyzed using a principal components analysis with a varimax rotation. Because the results were to be compared to PALS, the number of factors for the analysis was set at seven. In the analysis, all 44 items loaded into 7 factors that explained 44.3% of the variance in the analysis. However, the items in each factor were not the same as those in PALS. Many of the items continued to be correlated with each other in TSAS but in smaller clusters, and these clusters then joined other clusters in forming factors. Consequently, while the factors for TSAS and PALS are similar in the concepts that they represent, they are somewhat different in the items that make up these concepts.

Cronbach's alpha was calculated to determine the internal consistency reliability for the 44 items from the 1,111 responses on TSAS. This procedure produced an alpha of .68 and a standardized item alpha of .70.

## Final Form of TSAS

The comparison of TSAS to norms for PALS indicated that TSAS was similar to PALS in that it was measuring the construct of teaching style in relationship to the adult education literature base but that TSAS was different from PALS. Therefore, the standard instrument construction procedures for establishing validity and reliability were followed for creating the final form of TSAS. This process recognized that "there are different types of evidence of validity" (Wiersma & Jurs, 2005, p. 327) and that "there are multiple ways to establish the various forms of test validity" (Gay & Airasian, 2000, p. 169).

### Criterion-Related Validity

Criterion-related validity is determined by comparing a test to a second test or other measure (Gay, Mills, & Airasian, 2009). The steps in creating TSAS from PALS and the analysis of the results of TSAS with a national sample of 1,111 established the concurrent form of criterion-related validity for TSAS by demonstrating that its wording is similar to PALS, both instruments are measuring similar factors, and TSAS is minimally reliable in doing this. Thus, the criterion-related validity of TSAS rests in its construction from PALS and in its comparison to PALS.

### Content Validity

"Content validity is the degree to which a test measures an intended content area" (Gay, Mills, & Airasian, 2009, p. 155). It is concerned with both how relevant the items are to the content area and how well the items sample the overall content area. Content validity is often established by the judgment of experts, but statistical procedures also can be used.

The items in TSAS were translated from PALS;

therefore, the content validity of PALS was inferred for TSAS. The content validity of PALS was established by the testimonies of a local jury and a national jury in the United States. The local jury was made up of three well-established professors of adult education, and the national jury "consisted of 10 professors with a high degree of visibility in the field of adult education, with geographic dispersion throughout the country, and with philosophical heterogeneity" (Conti, 1982, pp. 139-140). These jury members not only made many contributions to the adult education literature base throughout their careers but also served in leadership roles in national organizations and on professional journals. These jury members included distinguished adult educators such as Malcolm Knowles, Alan Knox, and Robert Smith. In the judgment of these distinguished adult education scholars, the items in PALS reflect the "adult education learning principles that are congruent with the collaborative teaching-learning mode....in which authority for curriculum formation is shared by the learner and the practitioner" (pp. 135-136).

Statistical analysis was used to measure the degree to which each item is related to the measurement of the intended content and to which the items sample the overall content being measured (Gay, Mills, & Airasian, 2009). As with PALS, the items in TSAS are summed to produce a total score that represents the degree to which adult education practitioners accept and adhere to learner-centered principles in the adult education literature (Conti, 1982). Content validity addresses how well each of the items in TSAS relates to this total concept of teaching style. In order to establish this content validity, the items were analyzed by examining the correlation between individual item responses and the total score on TSAS. This procedure was used in the original development of PALS, and this procedure is appropriate "because each item is part of the overall concept, and in order for the item to be useful, it must contribute to the total score. In order to do this, it must have a moderate to strong positive correlation" (Nichols-Sharpe, 2004, pp. 127-128).

Several correlations were calculated to examine the relationship between the response on each individual item for the 1,111 participants in the national sample and the individual's total score on TSAS. A stepwise procedure was used that is similar to that used in regression analysis (Kachigan, 1991; Sheskin, 2007); however, this procedure was used for removing items from the original 44 items in TSAS. That is, after each correlation was calculated, the results were examined, and the item with the lowest correlation was removed if it did not have at least a positive .2 correlation with the total score. For the next step, a new total score was calculated without this item. After repeating this procedure 14 times, all items correlated at least at the .2 level with the total score. The following items were removed: 2, 4, 7, 11, 12, 13, 21, 26, 27, 33, 37, 38, 40, and 41; all of these were negative items.

**Construct Validity**

Construct validity "reflects the degree to which a test measures an intended hypothetical construct" (Gay, Mills, & Airasian, 2009, p. 157); for TSAS, this is the construct of teaching style as it relates to support of the collaborative mode in the adult education literature (Conti, 1982). The construct validity was established in two ways.

First, just as with content validity, the construct validity of the items in TSAS can be inferred from PALS. The local and national juries that testified to the content validity of PALS also testified to the construct validity of PALS (Conti, 1982). The positive judgement of these major theorists and of journal editors strongly supports the construct validity of the items from PALS that were used in the final version of TSAS.

Second, factor analysis was used to identify the underlying elements composing teaching style as measured by TSAS. This factor analysis used the responses to the final 30-item form of TSAS. The responses from the 1,111 participants in the national sample were factor analyzed using a principal components analysis with a varimax rotation. Because the analysis produced a solution with 6 factors with eigenvalues greater than 1, separate analyses were run for 2 to 6 factors to explore for the best fit of the data with the final form of TSAS. The 5-factor solution was judged the best fit for the data because it produced the best distribution of items in the factors.

All 30 items loaded into 5 factors that explained 45.3% of the variance in the analysis. The factor loadings ranged from .75 to .33 and were distributed as follows: .70 to .79–5, .60 to .69–9, .50 to .59–8, .40 to .49–7, and .30 to .39–1 (see Table 1).

**Table 1: Items and Factors in the Teaching Style Assessment Scale**

| Load | Item | Description |
|---|---|---|
| **Factor 1: Participation in the Learning Process** | | |
| 0.75 | 23 | gear my instructional objectives to match the individual abilities and needs of the students. |
| 0.75 | 18 | help my students develop short-range as well as long-range objectives. |
| 0.73 | 16 | have individual conferences to help students identify their educational needs. |
| 0.73 | 17 | let each student work at his/her own rate regardless of the amount of time it takes him/her to learn a new concep |
| 0.67 | 25 | allow a student's motives for participating in continuing education to be a major determinant in the planning o earning objectives. |
| 0.64 | 26 | have my students identify their own problems that need to be solved. |
| 0.55 | 1 | allow students to participate in developing the criteria for evaluating their performance in class. |
| 0.53 | 9 | allow students to participate in making decisions about the topics that will be covered in class. |
| 0.42 | 22 | plan activities that will encourage each student's growth from dependence on others to greater independence. |
| **Factor 2: Relating to Experience** | | |
| 0.73 | 30 | teach units about problems of everyday living. |
| 0.64 | 24 | encourage my students to ask questions about the nature of their society. |
| 0.61 | 27 | organize adult learning episodes according to the problems that my students encounter in everyday life. |
| 0.59 | 29 | help students relate new learning to their prior experiences. |
| 0.43 | 8 | plan learning episodes to take into account my students' prior experiences. |
| **Factor 3: Climate Building (Create Learning Climate)** | | |
| 0.65 | 5 | participate in the informal counseling of students. |
| 0.60 | 7 | arrange the classroom so that it is easy for students to interact. |
| 0.52 | 3 | help students diagnose the gaps between their goals and their present level of performance. |
| 0.48 | 15 | accept errors as a natural part of the learning process. |
| 0.47 | 12 | encourage dialogue among my students. |
| 0.45 | 14 | utilize the many competencies that most adults already possess to achieve educational objectives. |
| **Factor 4: Learner-Centered Activities** | | |
| 0.70 | 6 | use lecturing as the best method for presenting my subject material to adult students. |
| 0.68 | 4 | provide knowledge rather than serve as a resource person. |
| 0.55 | 10 | use one basic teaching method because I have found that most adults have a similar style of learning. |
| 0.52 | 20 | use methods that foster quiet, productive deskwork. |
| 0.51 | 21 | use tests as my chief method of evaluating students. |
| 0.49 | 13 | use written tests to assess the degree of academic growth in learning rather than to indicate new directions fo earning. |
| **Factor 5: Personalizing Instruction** | | |
| 0.63 | 2 | allow older students more time to complete assignments when they need it. |
| 0.58 | 19 | allow my students to take periodic breaks during the class. |
| 0.40 | 11 | use different techniques depending on the students being taught. |
| 0.33 | 28 | use different materials with different students. |

The five factors were named based upon their factor loadings. This process was supplemented by comparing the loadings in TSAS to the item distribution in the factors in PALS. The five factors in the final form of TSAS were named as follows: Factor 1: Participation in the Learning Process; Factor 2: Relating to Experience; Factor 3: Climate Building (or Create Learning Climate); Factor 4: Learner-Centered Activities; and Factor 5: Personalizing Instruction. Because of the resemblance of the TSAS factors to the PALS factors, the TSAS factors were named the same as five of the PALS factors.

**Reliability**

Cronbach's alpha was used to establish the reliability of the 30-item form of TSAS. It was calculated by using the 30 items from the 1,111 responses on TSAS. This procedure produced an alpha of .86 and a standardized item alpha of .87. These coefficients indicate strong internal consistency reliability for the final form of TSAS and are similar to the high reliability coefficients found in research with PALS.

**Norms for TSAS**

As a result of the development and validation process, TSAS is a 30-item summated rating scale that measures the frequency with which one practices teaching/learning principles that are described in the adult education literature. In order to provide a reference for interpreting the total score on TSAS and its factors, the means and standard deviations were calculated for TSAS and its five factors (see Table 2). These descriptive statistics provide norm-referenced scoring based on the normal distribution against which a person's performance on TSAS can be compared to that of the 1,111 participants in the national sample (Gay, Mills, & Airasian, 2009).

**Table 2: Mean and Standard Deviation for TSAS and Factors**

| Statistic | TSAS | Factor | | | | |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| Mean | 81 | 22 | 17 | 23 | 10 | 9 |
| Std. Dev. | 15 | 7 | 3 | 3 | 4 | 3 |

**Scoring TSAS**

TSAS is a 30-item summated rating scale. Although PALS uses a 6-point Likert-type scale ranging from Always to Never (Conti, 2004, p. 79), the scale has been reversed for TSAS because most of the negative items from PALS have been removed through the validation process, and reversing the scale greatly reduces the number of items that need to be rescored. Therefore, the 6-point Likert-type scale for TSAS is as follows: 0–Never, 1–Almost Never, 2–Seldom, 3–Often, 4–Almost Always, and 5–Always.

The first step in scoring TSAS is to rescore the negative items. Items number 4, 6, 10, 13, 20, and 21 are negative items. For these negative items, the following values are assigned: Always=0, Almost Always=1, Often=2, Seldom=3, Almost Never=4, and Never=5. Omitted items are assigned a neutral value of 2.5; this value puts the response in the middle of the scale and does not skew the overall score toward either the teacher-centered or learner-centered side.

After the negative items are rescored, the total score is obtained by summing the values of the responses to all 30 items. Scores above the mean of 81 indicate a tendency toward the learner-centered mode while scores below 81 imply support of the teacher-centered approach. Factor scores are computed and interpreted in a similar fashion.

## Discussion

Teaching style has been a popular concept in the educational literature for many years. A primary reason for this is that teachers are professionals and care deeply about what they are doing in the teaching-learning transaction. Moreover, many teachers of adults have not had the formal training in education that brings them into contact with the field's literature base. Valid and reliable instruments such as the PALS provide an objective tool for teachers to assess their classroom practices and their beliefs about these practices.

For many years, PALS has been a proven instrument for measuring teaching style for the teachers of adults. However, a new valid and reliable instrument, TSAS, now exists. TSAS was derived from PALS and consequently carries with it the long history of validity and reliability of PALS.

TSAS is similar to PALS but has some important differences. It is 31.8% shorter and contains 2 fewer factors. The items in TSAS combine in a slightly different fashion to form five similar factors to those in PALS. The poles of the scale have been reversed in TSAS, and because TSAS contains less negative items than PALS, it is easier to score.

TSAS can be used for either self-assessment or as a research tool. TSAS not only provides an overall score that indicates how teachers relate to the concepts in the adult education literature base, but it also provides five factor scores that identify specific classroom behaviors that make up this style. By critically analyzing their responses to each item in each of the factors, teachers can reflect upon their classroom actions related to that style and upon consistency in their style. This can then be related to adult learning theory.

TSAS can also be used in research. As with PALS, TSAS can be used in a variety of situations and settings that involve adult learners. In studies using PALS, "60.2% have been descriptive in nature while 39.8% were relational studies" (Byrd, 2010, pp. 91-92). Descriptive studies are needed to supply a baseline for organizations and agencies to provide a better understanding of current practices before professional development activities are undertaken; past research indicates that this research can be very diverse. Relational studies examine the relationship of teaching style to other variables, and PALS relational studies have addressed variables such as beliefs, distance, and student outcomes. TSAS can be used in similar ways as well as in studies that examine the relationship of PALS and TSAS to each other in various settings and in studies that further confirm the norms for TSAS.

Thus, TSAS is a new, valid, and reliable instrument that can be used for measuring teaching style practices both at the individual and organizational level. The stimulus for its development was the need to assess the teaching style of nursing educators in order to design professional development activities based on adult learning theory that foster critical thinking skills to implement Evidence-Based Nursing in Japan. However, the result has been the development of a statistically strong instrument that can be used in any situation involving the adult teaching-learning transaction. Adult education practitioners are encouraged to use TSAS in their daily practice and in their research. Such use can contribute to improved professional practice and to expanding the adult education knowledge base.

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