Analysis of Structural Relations among Perceptions on Good Instruction, Course Satisfaction, and Academic Achievement

Yeonhee So (yukgam91@kyungnam.ac.kr)
Department of Education, Kyungnam University, Masan, 631-701, South Korea

Abstract

The purpose of present study was to develop an instrument to measure perceptions on good instruction for middle and high school students and to evaluate the scale's construct and criterion-related validity. The participants were 998 8th and 11th graders. I performed exploratory and confirmatory factor analysis for construct validity and analyzed and structure equation modeling among perspectives on good instruction, course satisfaction, and academic achievement for criterion reference validity. I found that the final version of PGI(perceptions good instruction scale) consisted of a five-factor solution (relationship, transmission, constructivist, product, and interest) and 30 items. Results of structure equation modeling revealed that perceptions on good instruction had direct and indirect effects on academic achievement mediated by course satisfaction.

Keywords: perceptions on good instruction, academic achievement, course satisfaction

Introduction

Korean education focuses on strong competition for success of the college entrance exam and learning outcomes such as high scores or grades. One aspect of this emphasis on performance is that Korean students and parents concentrate on private education, and disregard public education. Cho et al (2001) investigated the case studies of good instruction in subjects such as Math and Science.

However, some previous studies did not consider the concrete definition of good instruction. Lee et al. (2001) surveyed what constitutes good instruction in a sample of middle school students and teachers. Many participants responded that good instruction was "interesting instruction" and "well understood instruction". Seo (2004) reported various perspectives on good instruction and divided them into transmission, constructivist, relationship, and product after analyzing interview data with teachers and students. Nevertheless, predictors of perspectives on good instruction have not been identified in improving effects of instruction. Furthermore few scales related to good instruction have been developed.

In order to assess perspectives on good instruction, we should first determine what constitutes good instruction. However there is actually little general agreement about what good instruction is. Although good instruction includes supporting cognitive, motivational, and emotional characteristics, considering the strengths of students, teaching basic knowledge and high-order skills, guiding self-regulated learning, sustaining interest, and instilling respect and responsibility (Astleitner, 2000), the definitions of good instruction have not been simple. Zemelman et al. (1998) described the special features of good instruction to be student-centered, experiential, holistic, authentic, expressive, reflective, collaborative, constructivist, and challenging. According to Seo (2004), perspectives on good instructional practice can be classified into four perspectives in Korean school settings: transmission, constructivist, relationship, and product based on the data interviewed. There were different perspectives on good instruction among grade levels or between teachers and students For instance, teachers might perceive the definitions of good instruction with constructivist and cognitive perspectives, whereas students probably regarded good instruction as interest or attaining high test scores (Tuckman, 2002). However, few empirical studies have directly examined how these elements are to be measured and the relationship of perspectives on good instructions and instruction effectiveness.

In fact, in Korea, constructivist-oriented educational innovations have recently been applied to encourage creative ability, practical application, and deep understanding (Cho et al., 2002). Nevertheless, direct or teacher-centered instruction based on transmission and product is actually performed in the Korean classroom for raising test scores (So, 2006). The reasons of this phenomenon probably do not reflect students' needs such as characteristics of development or perspectives on instruction. Namely, for example, if students want transmission-oriented instruction, but teachers perform constructivist-oriented instruction, there will be little effective instruction. Thus, it is necessary that teachers create a classroom environment based on data that reflects students' perspectives on good instruction.

The products of good instruction are generally course interest, academic achievement and transfer. When teachers provide students with a classroom environment, they should focus on goals of the students' course interest and academic achievement (So, 2006). In particular, according to instruction researchers (Seo, 2004; Lee et al., 2001), student's perceptions on good instruction are regarded as important predictors of course satisfaction or academic achievement.

The primary purpose of this study was to develop and validate an instrument to measure perspectives on good instruction. First I developed a questionnaire designed to measure good instruction based on previous studies (Lee et al., 2001; Seo, 2004). Next the validation of the instrument was assessed by factorial structure and structure equation modeling. To test the structure equation model, I hypothesized that one model was that perspectives on good instruction directly influenced course satisfaction and academic achievement (Seo, 2004). Another model was that perspectives on good instruction directly affected course satisfaction (Murphy, 2004) and academic achievement and also indirectly impacted academic achievement by mediating course satisfaction simultaneously. In particular, I measured perspectives on good instruction in the context of mathematics, because compared to other subjects, Korean students showed low interest and course satisfaction in math (Yoon & Kim, 2003; So, 2008)

Method

Participants

The participants were 448 8th graders (220 girls and 228 boys) and 550 11th graders (248 girls and 302 boys) from two public middle schools and two public high schools in Kyungnam, South Korea.

Measures

Perspective on Good Instruction Scale (PGI). A measure for perspective on good instruction was developed in the present research. First of all, I made open-ended questionnaires on good instruction by referring to Seo (2004) and Tuckman (2000)'s reports and then conducted a survey with these questionnaires with 201 secondary school students. I made closed-ended questions of 45 items for measuring good instruction based on the survey results. Pilot testing with 198 secondary school students confirmed the adequacy of the items and overall structure of this scale. A panel comprising 3 experts in effective instruction and 6 middle and high school teachers also reviewed the items for content validity. Based on feedback from the panel and the pilot testing, I deleted or reworded several items to give an item pool of 40 items.

Course Satisfaction Inventory (CSI). Math course satisfaction was assessed using a scale of So's (2008) course interest. I revised words of the scale to make it more suitable for math classes. This scale comprised of 30 items and subscales of satisfaction of learning environment,

teaching method, motivational support, and learning guide (e. g. "My teacher provides students with autonomy support in math class"). CSI was measured using a 5 point rating scale. The reliability coefficient of this scale was Cronbach's alpha =.79.

Academic achievement. For measuring academic achievement we used the grade of midterm examination in math.

Results

Factor analysis

Exploratory factor analysis

To examine the underlying factor structure of the PGI Scale, exploratory factor analysis (EFA) [principal components, varimax rotation] with a PGI scale was performed. First of all, KMO(Kaiser-Meyer-Olkin) and Bartlett's Test were performed to verify the suitability of factor analysis with the data collected. KMO Measure of Sampling Adequacy was .86, and Bartlett's Test was $p<.001$ (χ^2=7541.322, df=435). A five-factor solution accounting for 45.58% of the variance was extracted. I deleted two items which had low reliability, six items loaded below .40 and two items loaded on incorrect factors. As a result, the perspective on good instruction inventory consisted of five factors (relationship, transmission, constructivist, product, and interest) and all 30 items (see Table 1). Their respective variances were 14.99%, 8.76%, 8.36%, 7.22%, and 6.24% of the total test score variance. The composite score of the PGI has high internal reliability (alpha=.85) with the subscale internal consistency estimates ranging from .77(relationship) to .70(constructivist and interest). The means, standard deviations and correlation matrix between all factors, internal reliabilities are shown in Table 2.

Table 1. Items and Factor Structure Loading for Perspectives on Good Instruction

	Factors				
	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅴ
A. Relationship(Factor1)					
14. I think that good instruction is to be concerned about students' feelings.	**.77**	**.22**	**.11**	**.01**	**.10**
13. I think that good instruction is to respect and trust students in class.	**.71**	**.25**	**.12**	**.02**	**.10**
15. I think that good instruction is to accept students' suggestions .	**.67**	**.19**	**.07**	**.02**	**.07**
16. I think that good instruction is to strengthen human relations between teachers and students.	**.63**	**.08**	**.09**	**.14**	**.23**

	Factors				
	Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅴ
17. I think that good instruction helps students to feel relaxed.	.62	.04	.06	.22	.38
12. I think that good instruction helps students interact with their teachers dynamically	.41	.20	.24	.05	.05
B. Transmission*(Factor2)*					
2. I think that good instruction is to explain contents in greater detail.	.26	.67	.09	.19	.00
3. I think that good instruction is to inform students of key points of contents.	.11	.63	.01	.30	.18
4. I think that good instruction conveys contents' meaning to students exactly.	.16	.61	.05	.05	.08
1. I think that good instruction helps students comprehend contents completely.	.40	.61	.04	.00	.01
28. I think that good instruction is to answer students' questions very well.	.23	.46	.25	.05	.25
C. Constructivist*(Factor3)*					
8. I think that good instruction helps students find and solve problems voluntarily.	.13	.16	.67	.05	.11
27. I think that good instruction is when students can ask teachers many questions.	.12	.25	.60	.08	.10
7. I think that good instruction happens when students are vigorously engaged in learning activities.	.25	.13	.60	.01	.01
11. I think that good instruction encourages students' curiosity.	.05	.15	.52	.04	.02
9. I think that good instruction focuses on small group activities such as problem-based learning and cooperative learning.	.06	.04	.50	.16	.29
10. I think that good instruction allows students to take the initiative in class.	.02	.39	.45	.10	.16
6. I think that good instruction explains contents related to real life for transfer.	.16	.23	.40	.07	.18
D. Product*(Factor4)*					
20. I think that good instruction emphasizes students' academic achievement.	.02	.02	.18	.76	.07
21. I think that good instruction is to focus on preparing for the examination absolutely.	.12	.07	.03	.74	.02
19. I think that good instruction is to concentrate on attaining learning goals	.15	.16	.13	.69	.05
18. I think that good instruction is to get high score or grade.	.32	.21	.13	.60	.19
Interest*(Factor5)*					
24. I think that good instruction is to present contents in a gossipy manner to enhance comprehending contents in math class.	.17	.01	.04	.06	.74
25. I think that good instruction makes use of various multimedia (e. g. video, movie) in math class	.04	.09	.17	.06	.73
29. I think that good instruction includes teachers' humor in math class.	.33	.14	.03	.06	.65
26. I think that good instruction focuses on the interests of students.	.33	.36	.24	.01	.42

Table 2. Mean, Standard Deviation, and Correlations among Perspectives on Good Instruction

	M(SD)	RP	TP	CP	PP	IP
RP	3.91(.74)	*.77*[a]				
TP	3.95(.66)	.55*	*.72*[a]			
CP	3.05(.59)	.30*	.27*	*.70*[a]		
PP	3.27(.78)	.22*	.31*	.19*	*.71*[a]	
IP	3.60(.78)	.51*	.40*	.30*	.18*	*.70*[a]

Note. RP: relationship perspective; TP: transmission perspective; CP: constructivist perspective; PP: Product perspective; IP: interest perspective; *a* : *internal reliability.*

* *p<.01*

Confirmatory factor analysis

Structure equation model (SEM) technique was employed to conduct confirmatory factor analysis on the PGI scale based on the result of Exploratory factor analysis. The Confirmatory factor analysis of model on five factors of perspectives on good instruction provided fit, χ^2=699.76(*df*=134), *p*<.001, GFI=.95, AGFI=.92, RMSEA=.06, TLI=.90, NFI=.91. Namely, I found the fit of the five factor model of perspectives on the good instruction scale.

Perspectives on good instruction differences The 8th and 11th grade was compared in perspectives on good instruction (see Table 3). Result showed that 8th graders had higher scores in relationship and constructivist perspectives, in contrast 11 graders displayed higher scores in transmission, product, and interest perspectives.

Table 3. Perspective on Good Instruction differences between 8 th and 11the grade students

Perspectives on Good Instruction	8th grade (N=448)		11th grade (N=550)		t
	M	SD	M	SD	
Relationship	3.86	.82	3.60	.69	5.39*
Transmission	3.73	.62	3.97	.68	-5.71*
Constructivist	3.25	.58	2.92	.50	9.48*
Product	3.19	.69	3.46	.81	-5.64*
Interest	3.56	.88	3.31	.71	4.66*

** p<.01*

Criterion reference validity

In order to test the criterion validity of PGI, I investigated the relationship between perspectives on good instruction, course satisfaction, and academic achievement. The intercorrelation matrix between five factors of perspective on good instruction scale course satisfaction, and academic achievement is shown in Table 4. Course satisfaction was moderately corrected with transmission and product perspective, and weakly related to the interest perspective. Academic achievement was moderately associated with constructivist and product perspectives. Course satisfaction displayed a positive association with academic achievement.

Table 4. Mean, Standard Deviation, and Correlations among Perspectives on Good Instruction

PGI	Course Satisfaction	Academic Achievement
RP	.17**	.14**
TP	.22**	.19**
CP	.17**	.22**
PP	.21**	.21**
IP	.13**	.13**
Total PGI	.27**	.26**
CS	--	.63**
M(SD)	3.18(.63)	62.8(12.5)

Note. PGI: perspective on good instruction; RP: relationship perspective; TP: transmission perspective;CP: constructivist perspective; PP: product perspective; IP: interest perspective; CS: course satisfaction

I hypothesized that the first model depicted the direct relations between perspective on good instruction and course satisfaction or academic achievement. The second model displayed that perspectives on good instruction had direct and indirect effects on academic achievement mediated by course satisfaction. The models were examined via SEM using the maximum likelihood. Results showed that first model didn't display a good fit to the data, χ^2=1225.88 (*df*=14), *p*<.001, GFI=.88, AGFI=.76, RMSEA=.19, TLI=.51, NFI=.67. In contrast, second model appeared to adequately fit the data, (see figure 1.) χ^2=198.911 (*df*=13), *p*<.001, GFI=.98, AGFI=.95, RMSEA=.07, TLI=.92, NFI=.95(see Fig. 1). Moreover, PGI accounted for 7.2% of course satisfaction, and PGI and course satisfaction accounted for 40.2% of academic achievement.

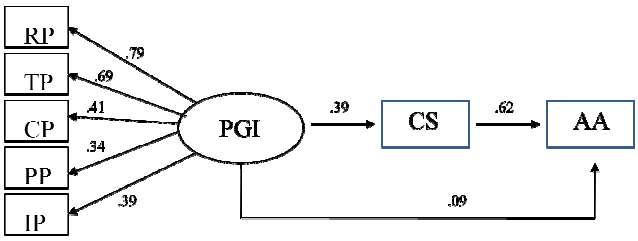

Fig.1. Associations among Perspectives on good instruction, course satisfaction, and academic achievement. Significant path coefficients are presented. All path coefficients are statistically significant at p<.05

Note. PGI: perspective on good instruction; RP: relationship perspective; TP: transmission perspective; CP: constructivist perspective; PP: product perspective; IP: interest perspective; CS: course satisfaction; AA: academic achievement

Discussion

The main purpose of the present research was to develop and validate perspectives on good instruction. To accomplish this aim, I performed exploratory and confirmatory factor analysis for construct validity and analyzed correlation analysis and path analysis via structure equation modeling among perspectives on good instruction, course satisfaction, and academic achievement for criterion reference validity. Additionally, I compared 8th with 11th graders in perspectives on good instruction for differential validity.

I found that the final version of PGI (perspective good instruction scale) consisted of a five factors solution (relationship, transmission, constructivist, product, and interest) and 30 items. These factors were consistent with perspectives displayed from previous studies (e. g. Seo, 2004). The differential validity of the PGI was also investigated in this study. 8th graders were compared with 11th graders in terms of perspectives on good instruction. These two groups were differentiated across five subscales of PGI. While 8th grade students had higher scores in relationship, constructivist, and interest perspectives, 11th grade students exhibited higher scores in transmission and product perspectives. I interpreted these results to indicate that 11th graders focused on cognition and lots of knowledge for getting good scores and that they especially preferred acquiring knowledge via summary and easy explanation rather than through various teaching methods and multimedia, because compared with 8th graders, they might feel that a university entrance examination is near at hand. In particular, this finding reflected the Korean educational situation. Classes in Korean schools generally have a strong teacher-centered orientation in which the instruction is

conducted unilaterally with the whole class orientation dominated by the teacher (Kim, 2002; Bong, 2003). Furthermore, as the main goal of most Korean students is to obtain high scores for entering high-ranking universities, high school students, more than middle school students, concentrate almost exclusively on gaining good marks and excellent grades, even if their teachers emphasize the importance of students' interest and the learning process. In contrast, 8th grade students probably focus on student-centered or motivational and emotional perspectives such as relationship, constructivist, and interest.

This finding is consistent with previous work showing that middle school students showed higher course interest and motivational factors such as self-efficacy and goal orientation than high school students (Bong, 2003)

I explored two models. The first model assumes direct effects of perspectives on good instruction on course satisfaction and academic achievement. The second model incorporates the direct effects of the first model and indirect effect of perspectives on good instruction on academic achievement mediated by course satisfaction. The main variables related moderately to course satisfaction were transmission and product perspectives and to academic achievement were constructivist and product perspective. Course satisfaction had the highest correlations with academic achievement. Results of structural equation modeling based on these two hypotheses showed that perspectives on good instruction had direct effects on course satisfaction and academic achievement and indirectly affected academic achievement mediated by course satisfaction simultaneously. These results appeared a similar pattern to previous studies (Tuckman, 200; Zemelman, Danieksm, & Hyde,1998) and demonstrated that the effect of course interest differentiated across students' perception on teaching and also course interest had direct impact on academic achievement(So, 2006).

The present findings have educational implications. Teachers should take into consideration the students' perspectives on instruction which should be considered at both middle and high school levels to increase course satisfaction comprised of learning environment, teaching method and motivational support and academic achievement. For instance, teachers striving for good instruction should use clear and easy teaching methods for effective content transmission and effective strategies to assist students to gain a good understanding of the subject contents and to obtain high scores for high school students. Teachers have to design a classroom environment based on students' interest and spontaneous involvement for middle school students.

The present research had several limitations and poses directions for future research. The present data were collected from middle and high schools without classifying concrete graders and various subjects. Longitudinal investigations should be conducted to analyze perspectives on good instruction across grade levels, multiple school years and multiple subjects. I tested two hypothesized models. Future research needs to examine various hypothesized models constructed based on instruction theories and previous research.

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