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A STRUCTURAL EQUATION MODELLING APPROACH TO VALIDATE QUESTIONNAIRE PEER LEARNING USING CONCEPT CARTOONS

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Abstract

Institutions of higher education are facing new challenges in improving their quality of teaching nowadays. Educators believe that effective and quality teaching depend on strategies. Sense of humour is always classified as one of the important element for effective teaching. Concept

cartoons have integrated a sense of humour, concept and daily life that can make the lesson more interesting and lively. The purpose of this paper is to validate the questionnaire by using confirmatory factor analysis. The questionnaire was answered by 392 secondary school students in Malaysia. Structural Equation Modelling was applied to test the model. The results confirmed that the revised model has achieved the minimum requirement of the model fit. The overall goodness of fit of the model has improved. The findings also revealed the two factors (communication and interest) measurement were valid and reliable. Future research on this topic could be carried out with animated cartoon series in various fields.

Keywords

Concept Cartoons, Interest, Communication Skill, Confirmatory Factor Analysis

1. Introduction

Institutions of higher education are facing new challenges in improving their quality of teaching nowadays. Educators believe that effective and quality teaching depend on strategies. Sense of humour is always classified as one of the important element for effective teaching. One of the potential tools for effective teaching is implementing the use of cartoons in the lecture (Normaliza, Hazlina & Roslina, 2014). Concept cartoons have integrated a sense of humour, concept and daily life that can make the lesson more interesting and lively.

With concept cartoons, students can learn from their past learning experience, apply theory and question their knowledge so as to solve cognitive conflicts. Therefore, in this process, students actively use their inquiry learning skills while trying to validate their mental constructs and newly-acquired information (Evrekli, Inel, & Balim, 2011; Bahrani, 2016). The concept cartoons can be used to promote group discussion which can enhance students' formation of ideas (Warren, 2001; Balim, Intel-Ekici&Ozcan, 2016) and communication skills. Group discussion is a good teaching method (NawafAlrashidi, 2016) to enhance students' communication skills. Therefore, the use of cartoons in the classroom discussion enhance communication skills and learning interest as well as provide opportunities for students to share their views.

2. Literature Review

2.1 Vygotsky's Learning Theory

According to Rogoff and Wertsch (1984), Vygotsky's concept of "the zone of proximal development" (ZPD) is a dynamic region of sensitivity in which cognitive development of a person advances". This idea plays the central role in Vygotsky's theory. Vygotsky elaborated the notion of the ZPD and other important elements in the zone of development concerning cognitive learning scientific concepts and spontaneous concepts. In the zone of proximal development, the two kinds of concepts are functioning as two magnetic forces ready to meet one another. Once these two kinds of concepts meet with each other, new knowledge will be generated.

2.2 The Media ZPD Model

Based on Vygotsky Theory (Vygotsky, 1978; Lee, 1997), the Media ZPD Model was built. In this model, the instructional media in both realistic and symbolic representations are carrying messages into learners' Zone of Proximal Development in different kinds of modes such as verbal or nonverbal, auditory or visual, static or dynamic. The messages which functions as learning cues, trigger scientific concepts at potential developmental level and act on spontaneous concepts to the learners' prior knowledge at actual developmental level (Lee, 1997). Consequently, during the up-and down interactive processes, new concepts can be formed.

3. Methodology

3.1 Research Design

This quantitative study employed the descriptive method. The study utilized about 392 Form 4 students in a secondary school of the northern Malaysia. The samples of this study were selected randomly according to group basis, in order to eliminate extraneous variables among the groups.

3.2 Instrument

A set of questionnaire with 45 items was used as the instrument the study. The questionnaire was constructed by the researcher based on the new learning model. The questionnaire consisted of three parts: 5 questions on demographic information, 20 questions on interest and 20 questions on communication skills. Each item was constructed on a 5 point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

3.3 Validity and Reliability Test

Content validity of the questionnaire was established by a team of lecturers in education. The over all reliability of the questionnaire was estimated by calculating the Cronbach alpha coefficient which were at the value of .872 for factor interest and .925 for communication. These result sare in line with the benchmark that an instrument with the coefficient of 0.70 or above has a high reliability standard (Sekeran and Bougie, 2010). Therefore, all the items are reliable and usable. A further investigation using Structural Equation Modelling (SEM) techniques to examine the fitness of the model.

3.4 ResearchProcedure

The teachers and students' preparation for using concept cartoons began way earlier before the implementation of the actual study. Preparation included managing the teachers' relevant skills of new teaching method and orientating students to the new learning environment.

The story line of the concept cartoons was created by there searcher with the element of One Malaysia value. The purpose of in stilling One Malaysia value is to stress national unity and ethnic tolerance. The values of 1 Malaysia are perseverance, a culture of excellence, acceptance, loyalty, education, humility, integrity, and meritocracy. However, the cartoons was drawn by a local cartoonist.

A briefing was given to the teachers during the school semester break at the end of March 2015. A check list and concept cartoons were distributed during the training session. The teachers used the concept cartoon sat the beginning of the induction set lesson. In addition, the teachers employed the concept cartoons during students' group discussion. The students discussed in groups of two and applied what they had learned. A work sheet was distributed to the students to encourage active listening. The concept cartoons are cute and user friendly.

The intervention took eight weeks to complete. The students participated in a self-reported questionnaire which was administered after the interventions. The survey was distributed to all the students.

4. Result and Discussion

Chisquare= 2134.655
df =.739
Normed Chisquare =2.889
CFI =.778
GFI=.736
RMSEA=.076

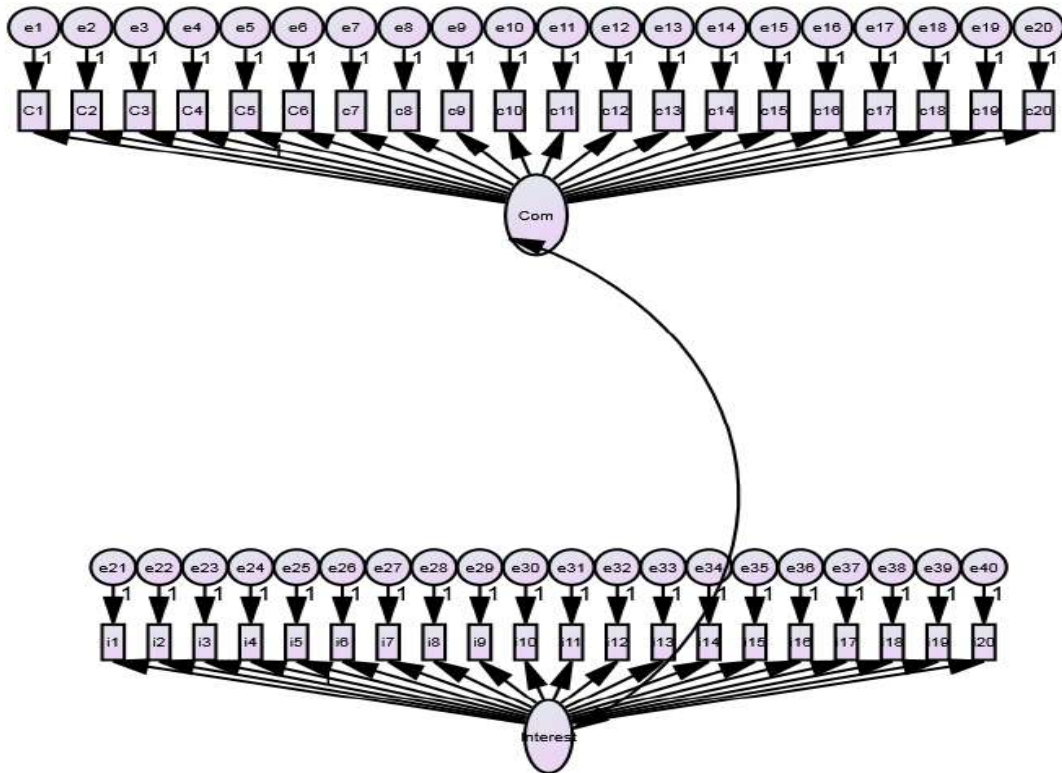


Figure 1: Hypothesized Measurement Model of Peer Learning using Concept Cartoons

4.1 Examining the Hypothesized Model of Peer Learning Using Concept Cartoons

Refer to Figure 1, the confirmatory factor analysis was employed to validate the hypothesized measurement model of peer learning using concept cartoons. There were two hypothesized factors: communication and interest. The measurement of correlation between two factors (communication and interest) is .18. It indicated that the two exogenous constructs are not highly correlated, thus the constructs are not redundant. The discriminant validity is achieved, and the further analysis can be done. On the other hands, the initial confirmatory factor analysis was estimated with 40 items; the items demonstrated a loading between 0.79 and 0.30

respectively. All the items loaded their factors were significant at $p < .001$. The results indicated the mean between 2.4772 to 4.0030. Table 1 below showed the factor loadings of the items.

Even the overall results can only meet the minimum criteria of the fitness of the model, however, the results of the analysis of the fitness of the model are not encouraging. The value of CFI and GFI is lower than .9, therefore the model needs to revise in order to present the statistical significant discrepancies.

Table 1: Statistical Analysis of Item

		Loadings
1.	I present my ideas anytime.	.47
2.	I can accept my peer's idea.	.46
3.	I accept difference opinion from my peer.	.41
4.	I always discuss out of topic from the given concept cartoons.	.61
5.	I can create new ideas from the given concept cartoons.	.52
6.	I always lead the discussion.	.56
7.	I show respond to my peer even I disagree with her/his answer.	.43
8.	I always argue back with my peer if I have different answer from her/him.	.42
9.	I understand what my peer's feeling by reading her/his facial expression.	.43
10.	I always try to make my peer understand my ideas.	.30
11.	I will interpret with different example if my peer cannot understand what I meant.	.41
12.	I always ask if I cannot understand what my peer are trying to communicate.	.40
13.	I can discuss with different peer.	.48
14.	I am open to criticize or negative comment.	.79

15.	I am prepared by organizing what I want to say with my peer.	.31
16.	I encourage my peer to give comments when she/he does not respond.	.40
17.	I know how to build a good communication situation.	.46
18.	I always listen carefully before I give comment to my peer.	.42
19.	I can improve my communication skills through peer learning.	.43
20.	I can guess the answer from my peer with her/his body language.	.78
1.	I have great interest in learning Economics by using concept cartoon.	.47
2.	I know about concept cartoons.	.40
3.	My interest towards this subject has increased after engaging with concept cartoons.	.44
4.	I spend more time in learning after engaging with concept cartoons.	.58
5.	I try to discuss with my friend with concept cartoons.	.71
6.	I always hope to learn with concept cartoons again.	.43
7.	It's easier to learn Economics with concept cartoons.	.33
8.	I can understand most of the message poses in the concept cartoons.	.43
9.	I hate to learn with concept cartoons.	1.34
10.	It's fun to learn with concept cartoons and discuss with peer.	.40
11.	I can understand the economics concept better.	.44
12.	I like to use concept cartoons for other subjects.	.63
13.	I don't feel anything benefit me learning with concept cartoons.	1.53
14.	I feel to learn with concept cartoons.	.34
15.	I am looking forward to learn new Economics concept.	.58

16.	I spend more time in learning Economics.	.55
17.	The concept cartoons are attractive.	.52
18.	I like the message poses in the cartoons because is related to our daily life.	.46
19.	The content is relevant.	.37
20.	Overall, I like this learning method.	.44

4.1 The Revised Model of Peer Learning Using Concept Cartoons

Figure 2 showed the hypothesized model was revised in order to present overall adequacy. Item 3,7,10,12,15 and 16 from the factor communication and item 2,7,9,10,13,14 and 19 from factor interest were excluded since the item were having low variance. Item 9 and 19 for factor interest were negative items, therefore they had factor loadings more than 1.

From the findings, the overall goodness of fit of the model has improved, Chi-square/df = 2.782, CFI =.856, GFI =.871, RMSEA =.074. Even though the CFI and GFI still less than .9 but researcher did not revised the model again. CFI less than .9 not necessary shows that this is a poor model. According to Raykov (2000, 2005) CFI is not effective if most of the correlations between variables approach 0--because less covariance to explain. Furthermore, he argues that CFI is a biased measure, based on non-centrality. To illustrate, in a field in which previous models generate CFI values of .70 only, a CFI value of .85 represents progress and thus should be acceptable (Bollen, 1989). On the other hand, deleting too many items may not show the whole picture of the research.

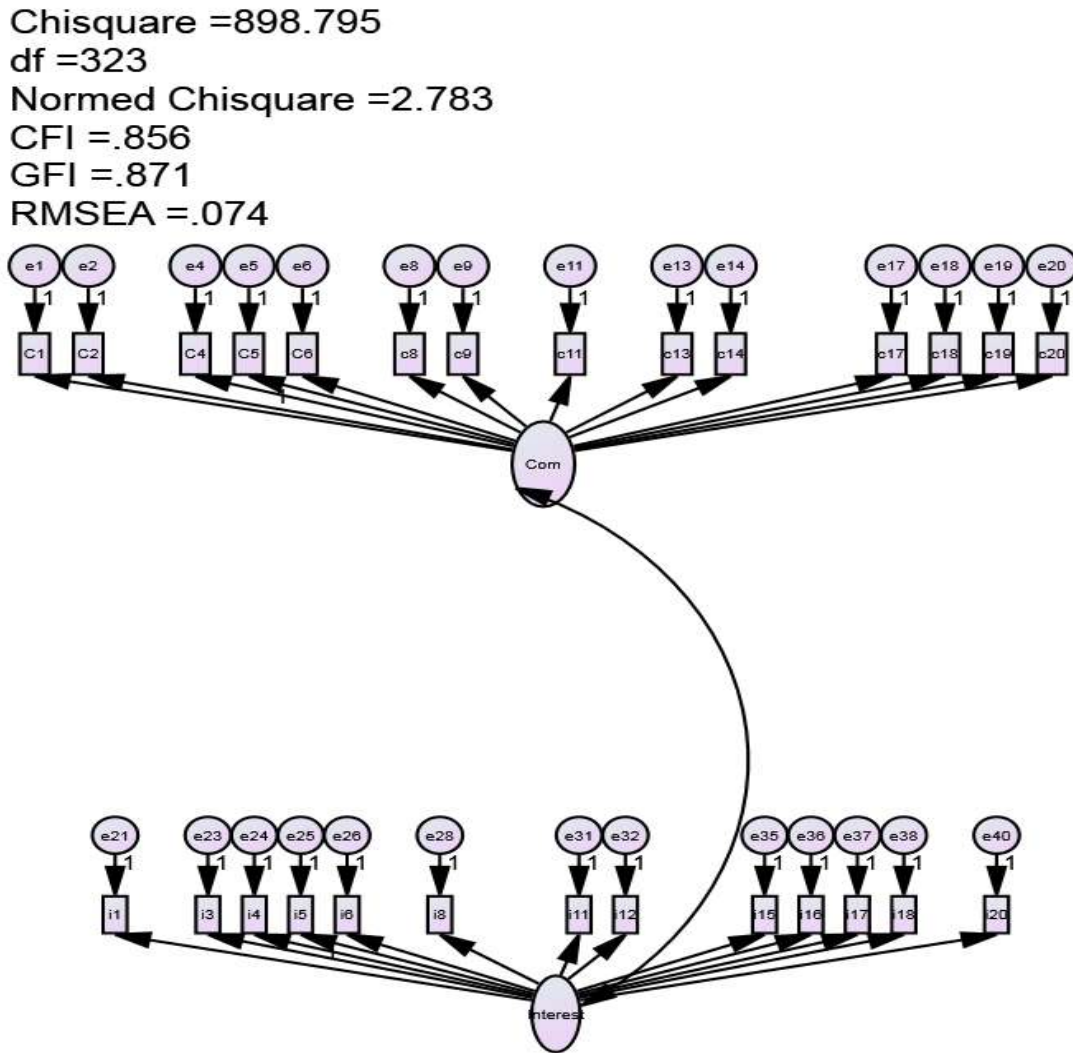


Figure 2: Revised Model of Peer Learning using Concept Cartoons

5. Conclusion

This paper concludes by proposing a structural equation model. Further research will be carried out based on this model. The present study used a questionnaire developed by the researcher as one of the instruments. The validity and reliability of the questionnaire has been proven. This model should become a guide to the teachers to design suitable cartoons for use during teaching and learning activities.

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