

## Assessing accounting students' performance in "cognitive misfit" condition

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### Keywords

Cognitive Style, Cognitive Strategy, Cognitive Misfit, Accounting Task Performance.

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### Abstract

*This research is built by using the basic of cognitive misfit theory (Chan 1996) which explains that the incompatibility between individuals cognitive style in problem solving and work demands will cause a decrease in performance. The previous research shown that cognitive style can affect the performance in variety of assessment methods (Au 1997) but up until now, not clear, however, is the impact of cognitive style on a student's accounting task performance. Besides, this research proposes that diminished performance will occur when there is incongruence between a student's cognitive style and the cognitive demands of an accounting task. This research used an experimental method, and examined for 60 students using a 2x2 between subjects experimental design. The result of this study shows that student's cognitive style will have no direct impact on his/her accounting task performance, and student's problem solving ability is directly related to his/her accounting task performance, but the effect of cognitive misfit not impacted performance on accounting task.*

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First submission received: 29th January 2017

Revised submission received: 27th March 2017

Accepted: 19th April 2017

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### Background

As an educator, we are always hoping that students can graduate and success in carrying out the lecture. There are many factors that can affect their success, one of the factors is cognitive style in the students. The research about accounting education has shown that cognitive style can affect the performance in variety of assessment methods (for instance, the assessment on comparing multiple choices questions against essay and cases will be different) (Au 1997) and learning methodology (Ott et al. 1990).

Up until now, there is no comprehensive model in accounting education literature that can identify various of determinants of the performance factors, and this can motivate researchers to do a further research in order to acquire the empirical evidence. The results from the previous research showed that cognitive style has an important role in professional auditor's performance. Damai Nasution & Supriyadi (2007) explained that the consideration which had been made by auditors in decision making was based on a strict and systematic phase. Cognitive style is related to the method which is used by individuals to gather, analyze, evaluate, and to interpret data. This cognitive style is likely to be consistent for a long lifetime.

This research is built by using the basic of cognitive misfit theory (Chan 1996) which explains that the cognitive misfit theory (incompatibility cognitive) predicts that the incompatibility between

individuals cognitive style in problem solving and work demands will cause a decrease in performance. Fuller and Kaplan (2004) found that audit result of auditor is determined by how close is the explanation of the task structure in line with the cognitive style of the auditor. They found a significant interaction between the audit task results and the auditor cognitive style in doing task. This is an indication that cognitive misfit affects negatively towards accounting performance. In its principle, accounting task in academic process has always been structured by using a cognitive strategy way which may be parallel or not parallel with the cognitive style of students.

This research is a replication from the research that had been done by Honn & Ugrin (2012) with the title "*The Effect of Cognitive Misfit on Students' Accounting Task Performance*". The research uses a 2x2 between subjects design, where by randomly students are given managerial accounting tasks with a gradually and non-gradually guidance, while students with a sequential cognitive style will give do better if they are given a clear gradual guidance. The research also found that students with sequential (analytic) cognitive style are less vulnerable to the cognitive misfit affect than those with global (intuitive) cognitive style. Therefore cognitive misfit affects negatively towards accounting students' performance. Researchers are interested to re-study this topic, because it is still very rare to do a similar research, especially in assessing accounting students' performance by using Felder & Silverman (1988) learning style.

### **Problems Identification**

Based on the background described above, problems identification can be arranged as follows:

1. Does the accounting students' performance has no direct influence with their cognitive style?
2. Does the accounting students' performance related directly with their ability? (Students with higher ability will show a better result in their accounting task).
3. Does the accounting students' performance will be lower (higher) if they are in the state of cognitive misfit (no cognitive misfit)?

### **Research Purposes**

Based on the problems identification described above, the purposes of the research are:

1. To examine and analyze whether the accounting students' performance is not directly related to their cognitive style.
2. To examine and analyze whether the results of the accounting students' performance is directly related to their ability (students who have a higher ability will show better results in their accounting tasks).
3. To examine and analyze whether the accounting students' performance results will be lower (higher) if they are in a state of cognitive misfit (no cognitive misfit).

### **Review of Literature**

#### **1. Cognitive Style on Accounting Education**

Cognitive style is a psychological dimension that is reflected from the consistency of individuals in collecting and processing information. Cognitive style that is associated with individual methods used to analyze, evaluate and interpret the data, and this cognitive style would normally be consistent for a lifetime (Ausburn & Ausburn, 1978). One of the characteristics of students is reflected in cognitive style, which is reflected in the cognitive style of learning styles of students, in other words cognitive style is a part of learning styles and learning styles are associated with intellectual abilities (Keefe, 1987).

The researchers have criticized the model of cognitive styles used in assessing the performance of the previous accounting students, debating that the model is developed for social and interpersonal domains (Duff 1997). Therefore, this research is using the index of learning styles according to Felder-Solomon (ILS), which is an assessment tool that has never been used in assessing the performance of the previous accounting students.

## 2. Assessing Cognitive Style

Felder & Silverman (1988) divided the learning styles into five, which are active-reflective learning style, inductive-deductive learning style, visual-verbal learning styles, sensing-intuitive learning styles and sequential-global learning styles.

- Active-reflective learning Styles

Active learning style tend to try to understand the information with its activity which is to ask, discuss, and explain to others, so that active learners prefer learning in groups. While the reflective learning style tend to understand and reflect and think carefully, so they prefer to learn on their own.

- Inductive-deductive learning style

Inductive learning style is trying to process the information from the specific to the general, while deductive learning style is trying to process the information from the general to the specific.

- Visual-Verbal Learning Style

Visual learning style would be easier for them to grasp on the information which are delivered visually, such as through images, PowerPoint slides, films, etc. While the verbal learners are more easily to absorb the information that comes from the sound, such as an explanation of peer learning and lecturers and tutorial learning system.

- Sensing-Intuitive learning Styles

Sensing learning style is easier to learn something based on facts, while the intuitive learning style is easier to obtain information by discovering possibilities and relationships through interpretation.

- Sequential-Global learning Styles

Sequential learning style is easier to understand through structured measures, while global learning style is easier to understand if they get the description material.

Collectively, the five dimensions of learning styles by Felder-Silverman (Sensing-Intuitive, Visual-Verbal, Active-Reflective, Inductive-Deductive, and Sequential-Global) is a basic mental process used to learn and solve problems. However, the sequential-global dimension is considered by some experts to be the most relevant with assessing the learning style (Schmeck, 1988). This research is trying to provide a solid foundation for understanding the cognitive process used by students in solving accounting problems. Sequential-Global learning styles differentiate that learners with sequential learning style will gain a better understanding if they get the systematic and structured steps, while the global type will understand the description and to be able to solve complex problems by getting the description. Sequential and global students can generally be described as follows (Felder 1993):

### Sequential Students

- Use coding "consecutively" to regulate the temporal information.
- Gain an understanding of the material in small quantities, pieces of connection
- Solve problems with an incomplete understanding of the material.
- Generate solutions which are well-ordered and easy to follow.

### Global Students

- Use coding simultaneously
- Synthesize small units of information into a relational quasi-spatial organization.
- Gain an understanding of the material in large quantities "holistic" leap.
- Works on all models until they understand the "whole description" of the material.

### 3. Framework and Hypothesis Development

#### Cognitive Style Relation to the Ability of Accounting Students

Kogan (1973) showed that the ability that determines the skill level, (ie, response speed, spatial ability) and learning styles are ways and forms of cognitive (ie, perception, mental representation formation). Thus, cognitive style affects on how information is acquired, stored, modified, and used for problem solving, and cognitive skills determine how well one has done and solve a problem.

Chan (1996) explained that the cognitive style refers to how people choose the model that corresponds to their ability to succeed in problem solving. Felder-Silverman suggests that cognitive-selection strategy is the result of the use of the coding sequence or simultaneously from individual to organize information and solve problems. Overall, this theory suggests that cognitive style is a function of coding and problem-solving strategies, but does not directly affect a person's level of proficiency in solving problems.

This research is different from a previous research of assessing the performance of accounting students for treating cognitive styles and cognitive abilities as a separate construction to be in line with its effect on the performance of accounting tasks. Although the higher / lower ability may be associated with a higher / lower performance, there is no reason to expect that students will perform better / worse in certain accounting tasks simply because they have sequential and global learning styles. Therefore, the difference in performance on the task of accounting between the students with sequential learning style and students with global learning styles may be the result of differences in the ability (or differences in other individual factors), but it is unlikely to be caused by differences in cognitive styles (Honn & Ugrin 2012). Based on the description above, the research hypothesis can be defined as follows:

**H1:** students' cognitive style does not directly affect the performance results of their accounting tasks.

**H2:** The performance results of accounting students are directly related to their ability. (Students with a higher / low ability will perform better / worse in their accounting tasks.)

#### 4. Cognitive Misfit Influence

Past researches have discussed a lot about the students and the cognitive styles and success in their learning. However, this research focuses on comparing the difference between the performance of students with different cognitive styles. Ho and Rodgers (1993) showed that the cognitive strategies are the results of a multi-way interaction between the individual's cognitive style, ability, and environmental tasks. Based on that, the indirect effects of cognitive style on the performance of the accounting task will likely be revealed through the interaction of all the tasks that require different cognitive strategies. Recent research that involves professional accountants shows that task factors can interact with cognitive styles to affect the performance of accounting tasks (Fuller and Kaplan 2004).

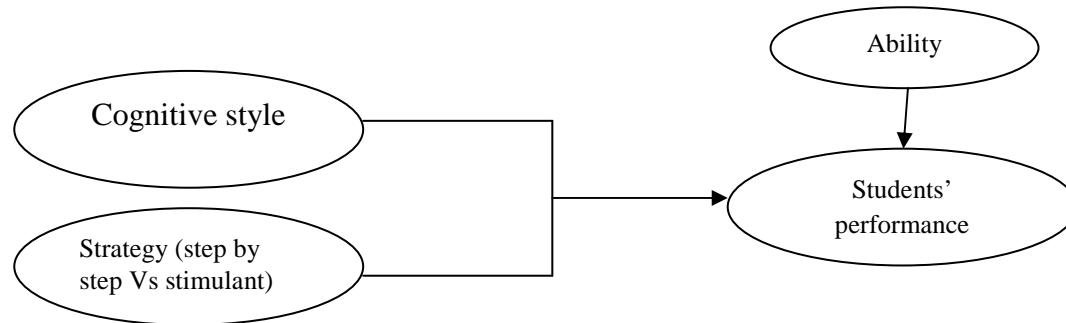
Fuller and Kaplan (2004) gave an overview of cognitive style influence on the work results of accountants. Fuller & Kaplan hypothesis is based on the theory of cognitive mismatch developed by Chan (1996). Cognitive mismatch theory predicts that the incompatibility between the cognitive styles of individuals in solving the problems and demands from the working context style will cause performance degradation. The contribution of the research Fuller and Kaplan (2004) provides empirical evidence that cognitive mismatch reduces the productivity of professional accountants, but it is not clear whether these results will be the same for students in performing accounting tasks with specific academic atmosphere. Because cognitive style is a characteristic trait that is stable and remained relatively the same in the early days of adulthood, so it can be assumed that the impact of cognitive mismatch found by Fuller and Kaplan can also happen to the students.

Furthermore Honn & Ugrin (2012) conducted a similar research by using a Felder-Silverman model on 138 students. The research used cognitive mismatch theory(Chan, 1996) to predict that the accounting students' performance will drop if there are incompatibilities between the cognitive styles

of students with the cognitive demands of the accounting task. Learning Styles Index of Felder-Solomon is used to classify students as global cognitive style or sequential. Research results indicate that the effect of a cognitive mismatch gives negative effects on students' managerial accounting performance, and the effect was the most prominent for students with a global cognitive style.

By using the same basis of research from Honn & Ugrin (2012), we also use the Felder-Silverman model, where this research assumes that students with their each cognitive will process information better step-by-step or simultaneously, depending on the style of their each cognitive (sequential / global). The processes of encoding in class define students' strategies to choose which they are going to apply because they evaluate the information and find an appropriate solution to complete accounting tasks. Sequential students prefer to use cognitive strategies step-by-step and global students choose to use cognitive strategies simultaneously. This research predicts that when accounting tasks are organized in a way that requires specific cognitive strategies (step-by-step/simultaneous) and conflict strategies with cognitive styles of students (global/sequential), the results of accounting students' performance will reflect cognitive effects mismatch. Based on the description above, the research hypothesis can be defined as follows:

**H3:** Students' performance on accounting tasks will be lower (higher) in cognitive mismatch condition (no cognitive mismatch).



**Diagram: Research Model**

## Research Method

### Population and Sample

This research is an experimental research by using the 2x2 method, in which every respondent will be manipulated for double time. The manipulation itself has been analyzed within sixty sophomore year accounting students in one of the private colleges in Indonesia. The data collection is performed by using the survey method (distribution of accounting problems and exercises) within class. The research instrument that was developed by Darla D. Honn & Joseph C. Ugrin (2012) is used in the research to measure the thinking dimensions of college students whether they are the global-thinking type or the sequential thinking type.

### Data Analysis Technique

The data analysis technique that was used in this research is ANCOVA analysis technique using the SPSS software. ANCOVA double-regression is an equation regression model in which the independent variables are consisted of mixed scales, namely interval, ratio, with either nominal or categorical, while the dependent variables are ratio-scaled or interval-scaled. Therefore, an ANCOVA double regression analysis consisted of different variables between the independent variables and the dependent variables (<http://putuartayasa.blogspot.com/2011/05/regresi-berganda-ancova.html>).

According to the explanation above, this research is using the ANCOVA double-regression analysis, in which the independent variable has a categorical quantitative-natured style and strategy, and a co-variate variable (control) namely quantitative-natured ability (interval or ratio). As for the dependent variable namely student's performance is quantitative -natured (interval or ratio)

## Operational Variables

The independent variable (x) in this research is cognitive style, strategy (step by step vs. simultaneous) and ability. As for the dependent variable (y) is accounting student's performance.

### Cognitive Styles

In this research, cognitive style became one of the independent variables. Cognitive style in the students is measured by using Felder-Solomon Index of Learning Styles (ILS) that can be accessed on Web Index of Learning Style Questionnaire. The result from questionnaires can be categorized based upon their scale/s scores. The scale score measured from -3 up to -11 is classified as sequential, while from scale score +3 up to +11 is classified as global. According to the result of questionnaires from 60 students, there are only 50 people whom scores can be classified in sequential or global. 29 persons or 58% of the students categorized as sequential type while the other 21 persons or 42% of the students are categorized as global type.

### Cognitive Strategy Manipulation

In this research, students with different cognitive types were manipulated by observing each way of accounting problems with different instructions. The first instruction is a simultaneous-natured in which asking them only to determine the ending balance of BOP and the difference (more/less) without any further specific instructions. In the next week, the same class is asked to do the same cost accounting problem with a different instruction that has a step-by-step instruction, while providing them a very detailed work instruction to determine the ending balance of BOP and the difference.

The strategy is used to manipulate the cognitive style of students. The goal from this manipulation is to know whether the given strategy could affect the results from student's performance. The case to manipulate student's cognitive strategy was taken from Honn & Ugrin's research (2012).

### Student Performance

Valuation of student's performance is measured by using the result from their work in previously-stated cost accounting problem, where for every student will have two separate grades for each problems. One for the problem with the minimum instructions provided, and another one for the problem with the detailed step-by-step instructions. As for the valuation for students' ability is based on their GPAs.

## Result & Discussion

### Descriptive Statistics

#### Descriptive Statistics

Dependent Variable: KINERJA

KOGNITIF_STYLE	KOGNITIF_STYLE	Mean	Std. Deviation	N
Simultaneous	Sequential	39,2500	17,41016	12
	Global	17,7500	7,50000	4
	Total	33,8750	18,05501	16
Step By Step	Sequential	26,8235	16,06329	17
	Global	20,0588	16,14183	17
	Total	23,4412	16,22417	34
Total	Sequential	31,9655	17,47341	29
	Global	19,6190	14,75627	21
	Total	26,7800	17,35616	50

Table 1. Descriptive Statistics

Table 1 explains that from every respondent there are 29 students whom are having sequential cognitive style, and 21 students are having global cognitive style. Next, a number of 12 students that have the sequential cognitive style are able to solve the problem with simultaneous-strategy, and only 4 of the global-cognitive style students are able to solve the problem with the simultaneous-strategy. As for the problem with step-by-step strategy can be solved by 17 students with global cognitive style and 17 students with sequential style.

### Hypothesis Testing

**Correlations**

		KOGNITIF_STRATEGI	ABILITY	PERFORMANCE	KOGNITIF_STYLE
KOGNITIF_STRATEGI	Pearson Correlation	1	-,131	-,283*	,236
	Sig. (2-tailed)		,366	,046	,099
	N	50	50	50	50
ABILITY	Pearson Correlation	-,131	1	,466**	-,846**
	Sig. (2-tailed)	,366		,001	,000
	N	50	50	50	50
PERFORMANCE	Pearson Correlation	-,283*	,466**	1	-,355*
	Sig. (2-tailed)	,046	,001		,011
	N	50	50	50	50
KOGNITIF_STYLE	Pearson Correlation	,236	-,846**	-,355*	1
	Sig. (2-tailed)	,099	,000	,011	
	N	50	50	50	50

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

**Table 2. Correlation Matrix**

Table 2 shows the correlations between variables, from performance & strategy variable shows correlations but negative in equal to -0.283 ( $p < 0.05$ ), as for the performance and cognitive style variable shows the same as stated before but negative in equal to -0.355 ( $P < 0.05$ ). The relationship between performance & ability (GPA) shows an unidirectional relationship in equal to 0.466 ( $P < 0.01$ ).

<b>Corrected Model</b>	46666,199 <sup>a</sup>	4	116,550	5,200	0,002
<b>Intercept</b>	271,140	1	271,140	1,209	0,277
<b>Ability</b>	1706,031	1	1706,031	7,605	0,008 H2 accepted
<b>Strategy</b>	412,723	1	412,723	1,840	0,182
<b>Cognitive Style</b>	85,278	1	85,278	0,380	0,541 H1 accepted
<b>Strategy*Cognitive Style</b>	453,839	1	453,839	2,023	0,162 H3 Rejected
<b>Error</b>	100094,381	45	224,320		
<b>Total</b>	50619,000	50			
<b>Corrected Total</b>	14760,580	49			

**Tabel 3. ANCOVA**

Table 3 shows the result of ANCOVA test. ANCOVA research model has proved to be statistically significant, as shown in F value in equal to 5.200, with significance rate of  $P < 0.01$ , with  $R^2$  in equal to 0.316, so that this model can be used to predict the hypothesis 1, hypothesis 2, and hypothesis 3.

Hypothesis 1 indicates students cognitive styles does not directly affect the result from their performance on the accounting problem mentioned before. Research result in table 3 shows F value = 0.380,  $P > 0.05$ , and this indicates that there is no significant differences on student's performance based on their cognitive styles, namely the sequential cognitive style (Mean = 31.9655, Standard Deviation = 17.47341), and global-cognitive style (Mean = 19.6190, Standard Deviation = 14.75627). Therefore, hypothesis one is accepted, and that means student's accounting-problem-solving performance is not directly affected by student's cognitive styles.

Hypothesis 2 indicates student's accounting-problem-solving result is directly connected with their ability (Students with higher/lower ability will perform better/worse on their accounting problems). Table 3 indicates that student's GPA (ability) directly affects on their performance in their accounting problem solving. This is shown in F value = 7.605,  $p < 0.01$ ). Therefore, the hypothesis 2 is accepted, and that means accounting student's performance is directly affected by their ability.

Hypothesis 3 predicts is student's performance on their accounting problems will be lower (higher) on cognitive discrepancy condition (no cognitive discrepancy). Research result in table 3 indicates that there is no interaction or differences on cognitive styles with cognitive strategy. Therefore, hypothesis 3 is rejected, and that means there is no difference on performance in solving accounting problems, even if under cognitive discrepancy condition.

## **Discussion**

### **The relationship between student's cognitive styles against accountant student's performance**

According to the above research result, it is can be explained that accounting student's performance is not directly affected by student's cognitive styles, which means there is no significant differences on the result of accounting assignment performance result between students with sequential-cognitive style as well as students with global-cognitive style. The result of this research supports Honn & Ugrin (2012) research result.

### **The relationship between student's ability with accounting problem performance**

According to the above research result, it is can be explained that student's accounting performance is directly affected by their own ability, and that means students with high ability (having high GPA) shows good performance on their accounting problem as well. The result of this research supports Honn & Ugrin (2012) research result.

### **The relationship between students' performances with cognitive discrepancy condition.**

According to the above research result, it is can be explained that there is no interaction or differences between cognitive styles with cognitive strategy on solving their accounting problems. It means that student's performance (with each corresponding cognitive styles) is not affected by cognitive strategy, or in other words, the student's performance is not affected by the discrepancy of cognitive strategic condition. This research result does not support Honn & Ugrin (2012) research, seeing that the student with high ability will keep working to show good performance no matter the cognitive strategy being used.

## **Conclusion and Suggestion**

### **Conclusion**

According to above research, it can be concluded:

1. Hypothesis one is accepted with F value = 0.380,  $p > 0.05$  indicates that there is no significant difference on student's performance, based on their cognitive style; which means the problem-solving performance of the accounting student is not directly affected by the student's cognitive style.

2. Hypothesis two is accepted with F value = 7.605, p < 0.01 indicates that the student's GPA (ability) will affect directly towards the problem-solving of accounting student. So therefore, the performance will directly be affected by their ability.
3. Hypothesis three is not accepted, it means that there are no difference on the problem-solving performance of accounting students, even though in the cognitive discrepancy condition. This is resulted by the high ability student will keep working to show high performance, no matter the cognitive strategy being used.

### Suggestion

As for the suggestion for the following researcher:

1. Adding another variable that can increase effect of cognitive style toward the accounting problem solving performance, such as student interest variable toward the following matter.
2. Expanding the research sample, and comparing it with another universities in purpose of obtaining the generalization of research result.

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