The Influence of a Tutor’s Ideology and a Student’s Learning Style of Design College on the Achievement of Educational Objectives

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Abstract

This paper explores the potential influence of ideology on the education of design and focuses particularly upon the interaction between tutors and students. Structural Equation Models are constructed to investigate the relationship between the ideological style of the tutor and the learning style of the students and to assess the impact of these variables on the achievement of educational objectives in the field of design education. The results indicate that the potential influence of a tutor’s ideology on the total, cognitive and psychomotor educational objectives must be recognised and carefully considered in the education of design.

Keywords: ideology, design education, learning style, educational goal
設計學院教師意識型態與學生學習風格
對教育目標達成滿意度影響之研究

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摘要

本研究主旨在探討我國設計教育中核心課程教學之教師意識形態類型與學生學習風格對教育目標（認知、情意、技能）滿意度達成，三者間之相關線性模式。其中教師意識形態類型是根據蕭錫錡等之研究為理論基礎，而學生學習風格是以 Kolb 的學習風格為判斷標準，學生學習目標達成是以 Kibler 等人所提教育目標與行為做為理論基礎，並具此展開研究假設與進行實證研究。其方法係採問卷調查法，以分層隨機抽樣方式，依學校地區、屬性、類別與學生學號尾數進行量化問卷研究，最後，經由 LISREL 之適配度分析，共計三個重要模式被建構完成，其相關程度之數值可供學術參考。

關鍵字：意識形態，設計教育，學習風格，教育目標
1. Introduction

This study explores the influence of ideology on the learning performance of industrial design students and attempts to clarify whether it is knowledge or ideology which a tutor teaches to his/her students. In other words, this study attempts to answer the question: Does a tutor consciously or unconsciously impose the facts, beliefs and values which he/she believes to be correct on his/her students? Significantly, the tutor’s view tends to hold a dominant position when his/her opinions of a particular issue differ from those of the students (Hsaio & Cheng 2006). Therefore, it is understood that a tutor’s ideology exerts a considerable influence on the learning performance of his/her students. Potentially, a tutor has a particularly powerful influence on the learning performance of his/her students in the educational setting of industrial design because this type of course typically involves a wide range of studio-oriented and apprenticeship-based tasks, and hence interactions between the tutor and the students are commonplace.

According to the French idealist Antoine Destutt de Tracy (1754-1836), the subjective way of thinking or set of values maintained by an individual represents his or her personal ideology (Servier, 1994). The true meaning of ideology can be further interpreted in terms of assumption, faith, thought, class-consciousness, null consciousness, social determination, Utopia and social practice (Wu, 1998). In the educational context, ideology has been defined as a conventional set of beliefs and values which structure the way in which a tutor’s knowledge of his/her discipline are combined with a personal communicative style and then presented to the students. Thus, subjective cognitions or beliefs delivered from tutors to their students may influence the learning of the student body. In other words, ideology can be interpreted as a form of subjective knowledge (Hsaio & Cheng, 2006).

Figure 1 indicates the evidence of a tutor’s influence on her students’ project designs. It is evident that the design philosophy of ‘form follows fun and emotion’ is a consistent element in these projects. Although no scientific evidence exists to indicate the extent of the influence of the tutor’s ideology on the learning of the student at this stage, these images certainly suggest that the tutor’s ideology has some form of impact in the field of design education.
Fig. 1. Chair design of a female tutor (left) and mosquito catcher design of a male student.

In addition, a student’s attitude, behaviour and learning preferences may also influence the efficiency of his/her learning process. Learning styles are generally reflected in the learner’s attitudes and references, in his or her choice of activities, and in the approach which he or she shows towards performing learning tasks (Kyriacou, 1996). Due to the differences inherent in different individuals, each student is liable to demonstrate different preferences and tendencies when executing the learning process. The particular style shown by an individual is referred to as his/her learning style. A student’s learning style can be also interpreted as the way in which he/she concentrates on, processes, internalises, and remembers new and difficult academic information (Dunn & Griggs, 2000). Therefore, in addition to exploring the potential impact of the tutor’s personal ideology, the present study also investigates the influence of the student’s learning style on the achievement of educational objectives.

The tutors and the students clearly play crucial roles in determining the academic performance. Therefore, the principal aims of this study are as follows:

1. To distinguish the concept of knowledge from that of ideology in the field of design education, and in particular to explore the true significance of the tutor’s ideology in terms of its influence on the achievement of the educational objectives.

2. To identify the influence of the student’s learning style in the field of design education, and in particular to assess its impact on the achievement of the educational objectives.

2. Literature Review

2.1 Knowledge and Ideology and Their Effects

Knowledge is not the same as belief or opinion (Mautner, 1989). A good tutor
knows the importance of differentiating between knowledge and ideology since he/she recognises that these concepts influence students in different ways. In general, knowledge is more objective, while ideology is more subjective. For example, a tutor may say that Post–Modernism has been the most dominant design school over the past decades. This statement reflects the tutor’s personal ideology and others may well disagree with him. In this example, it would be more appropriate for the tutor to state that Post–Modernism has been one of the most dominant design schools over the past decades. This statement reflects the tutor’s knowledge and is more likely to meet with general agreement.

Ideology continues to be criticized and re-examined, it may become epistemic. Therefore, these two approaches need not necessarily oppose one another. Knowledge and ideology are bound by an intimate relationship. Ideology is gradually formed by over-emphasising the certainty and permanency of a knowledge body without being criticized and re-examined (Chen, 1999). Therefore, ideology may be an expression of false or subjective knowledge.

Although the differentiation between knowledge and ideology remains unclear in the industrial design setting, the following descriptions of the two concepts reveal significant differences in terms of their definitions, tenses, natures, approaches, and functions, etc. (Angles, 2000; Audi, 1999; Chang, 1987; Cheng, 2003; The Collins Dictionary, 1989; & Voltaire, 1991)

<table>
<thead>
<tr>
<th>Noun</th>
<th>KNOWLEDGE</th>
<th>IDEOLOGY</th>
</tr>
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<tbody>
<tr>
<td><strong>Definition</strong></td>
<td>1. Concerns the recognition of something.</td>
<td>A set of faiths and thought, or a system of concepts, which are frequently expressed subconsciously or purposely. The influence on others may occur subconsciously or consciously.</td>
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<tr>
<td></td>
<td>2. Due to practical experience, one can familiarize oneself with, or recognise something.</td>
<td>However, ideology is less constrained than hegemony, which is included in ideology.</td>
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<td></td>
<td>3. Something that can be learned.</td>
<td>Hegemony emphasises more the use of legalized and institutionalized ways to influence others.</td>
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<td></td>
<td>4. Ability of tangible precipitation of fact or truth.</td>
<td>In short, ideology creates thought, generates faith and results in strength.</td>
</tr>
<tr>
<td></td>
<td>5. Information and (or) epistemology kept by the civilization world.</td>
<td></td>
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<tr>
<td></td>
<td>6. Kept in the consciousness of one’s mind (faith, concept, fact, image, idea, thought, and opinion) and evaluated as truth by empirical methods.</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Tense | Less restrained and more choice. | More restrained and less choice. |</p>
<table>
<thead>
<tr>
<th>Nature</th>
<th>More objective and scientific</th>
<th>Subjective and characterised by sensibility.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Objective fact, can be empirical</td>
<td>More subjective and cult-like</td>
</tr>
<tr>
<td></td>
<td>True knowledge.</td>
<td>Subjective knowledge.</td>
</tr>
<tr>
<td>Approach</td>
<td>Science or moral-oriented</td>
<td>Faith or value-orientated</td>
</tr>
<tr>
<td>Limitation</td>
<td>Content of justification, can be inducted and reasoned.</td>
<td>Must come from experience.</td>
</tr>
<tr>
<td></td>
<td>Content of generality and certainty.</td>
<td>Lack of justification</td>
</tr>
<tr>
<td></td>
<td>Without doubt and without mistakes.</td>
<td>Lack of generality and certainty.</td>
</tr>
<tr>
<td></td>
<td>Certain and reliable.</td>
<td>Personal cognition and preference.</td>
</tr>
<tr>
<td></td>
<td>Precise and complete.</td>
<td>Particular</td>
</tr>
<tr>
<td></td>
<td>Universal.</td>
<td></td>
</tr>
<tr>
<td>Source/ generation</td>
<td>External perception.</td>
<td>Must come from experience.</td>
</tr>
<tr>
<td></td>
<td>Memory.</td>
<td>Generation: (1) symbolization, (2) desymbolization, and (3) paradigmization.</td>
</tr>
<tr>
<td></td>
<td>Self awareness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rational.</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Knowledge is a non-random encoding which helps the living system which developed it adapt.</td>
<td>To provide infrastructure of cognition</td>
</tr>
<tr>
<td></td>
<td>Thus, for humans, it consists of beliefs or claims which are regarded as potentially true and which help individuals to adapt when used as a basis for action. According to this definition, knowledge can also take a physical form (surviving genes, DNA, etc.). Note also, knowledge in 'objective' form can be axiomatic (expressed in linguistic form: on paper, in speech, etc.).</td>
<td>To provide rules for acting and judging</td>
</tr>
<tr>
<td></td>
<td>To provide tools for organising conflict</td>
<td>To facilitate self-recognition</td>
</tr>
<tr>
<td></td>
<td>To provide power for action</td>
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It is important to consider what students actually learn when taking part in the education of industrial design. Most tutors are of the opinion that they provide their students with knowledge, and schools are indeed tasked with creating a setting within which students can learn knowledge. However, whether or not tutors provide their students only with knowledge, and whether or not schools successfully create an appropriate educational setting to do so is open to debate. According to British sociologists, schools not only ‘process people’, but also ‘process knowledge’. Williams stated that schools act as agents of cultural and ideological hegemony and as agents of selective tradition and cultural ‘incorporation’ (Apple, 1982). Also, Apple (1982) identified the significant influences of ideology and power in the school setting.
However, school reform is generally prompted by a change in social values and ideologies. The aim of implementing academic freedom is to enable the education process to reach its full potential. Therefore, the education process must exist as an entity free of outside influence (Brain, 1996).

Furthermore, ideology can help tutors recognise how the culture of the dominant class can become embedded in the hidden curriculum; a curriculum which is informed by the ideological view, which silences the students, and structurally reproduces the dominant cultural assumptions and practices which thwart democratic education. Having said that, Darder et al. (2002) pointed out that ideology provides a useful framework for tutors to ask themselves questions which will enable them to critically evaluate their teaching performance (Bartolomé, 2004).

In classroom terms, tutors of design education must recognise that achieving an excellent quality of design education depends upon maintaining a good ideological quality of the presentation and delivery processes (Hsiao & Cheng, 2006). An over-manipulation of ideology may result in hegemony. For example, if a tutor imposes his/her values or preferences for a particular design school on the students, hegemony may result and the focus on the students as the subjects of the learning process may be lost. From the viewpoint of educational sociology, a delicate and subtle inter-relationship exists between the tutor and the students in the industrial design setting. Choice and diversification were identified by Kenneth Baker, the former British Secretary of State for Education, as two key factors in improving the quality of education in the Pan-London district (Apple & Whitty, 1997). Clearly, the strategies of choice and diversification directly contradict the hegemonistic scenario described above.

2.2 Ideological Styles of Tutors

A tutor’s ideology and beliefs can influence his/her manner of teaching (DeVoogd, 2000). In the educational setting of industrial design, the tutor’s ideology is manifested in his/her design faith and beliefs and may be influenced by his/her cognition of the school and its values. Each tutor is likely to exhibit a personal ideology since each has his/her own sets of preferences, likes and dislikes. In some cases, even Utopian thinking may exist in the mind of the tutor. The purpose of prescribing educational activities is to guide the values of the students. In Taiwan, the design education curriculum has yet to be fully unified, and therefore each tutor is responsible for designing the curriculum for his/her students. As a consequence, it is inevitable that the tutor’s personal ideology will be communicated to his / her students to some extent. Therefore, the curriculum itself can be regarded as a presentation of
values.

Academic studies have identified a number of different ideological styles. For instance, Harris categorised ideological styles as different types of dictatorship or democracy and identified the existence of subjective ideology (Harris, 1994). According to Apple, ideology exists in all subjects (note that in this study, the subject is the tutor) (Apple, 2000). Moreover, Davies divided educational ideology into conservative, revisionist, romantic, and democratic ideology. Reitman also categorised ideology into conservative, liberal/reform, and radical/reconceptualist (Wang, 1991).

![Figure 2: Semantic differentiation of ideological styles](image)

Source: Cheng 2003

Ideology manifests itself at the level of both thought and practice. In terms of the educational setting, a tutor’s ideology reveals itself in his linguistic tendencies and in his interactions with students. Ideological styles are ambiguous in terms of their categories and boundaries. Indeed, human behaviour tends to be quite changeable over time. Moreover, the systemic model of mankind’s behaviour is characterized by complication and depth. It is virtually impossible to develop a complete description of mankind’s ideologies by simply adopting a few ideological styles and then using these styles to sketch out its entire appearance. However, it is nevertheless worthwhile defining several styles of ideology in order to facilitate communication and identification. These classifications of ideology merely sketch the outline profile of the tutor’s behaviour and do not in themselves imply any particular value or moral issues. From the classification presented in figure 2, five typical ideological styles can be described as authoritative ideology, scientific ideology, democracy ideology and religionary ideology (Hsiao & Cheng, 2006).

2.3 Learning Styles of Students

Kolb and Mainemelis (2001) reported that ‘judged by the standards of construct validity Experiential Learning Theory has been widely accepted as a useful
framework for learning-centred educational innovation, including instructional design, curriculum development, and lifelong learning. Throughout more than twenty years, Kolb has been improving and adding to his model of learning styles, yet the dimensions, modes and styles that compose his model have remained stable (Jordanov, 2001).

Kolb (1984) defines learning styles as one’s preferred methods for perceiving and processing information. This definition evolves through his fore-stage experiential learning cycle, as depicted in figure 3. He further gives the working definition of experimental learning as the process whereby knowledge is created through the transformation of experience. Effective learners must be open to learning from new experience, reflect upon what they observe in these experiences, integrate their conclusions into workable theories, and apply their theories in new situations (Chen & Toh, 2005)

Fig. 3. Kolb’s experiential learning cycle
Source: Kolb 1984

Kolb (1984) identified for types of learning style as figure 4 and follows:
2.4 Educational Objectives

The taxonomy of educational objectives can be regarded as one of the most fundamental contributions to the field of education in the past century (Chien, 2005). Mager described performance objective of learning as the learner will be like upon successful completion of a learning experience (Hedges, 1995). The taxonomy of the three domains can be presented as follows:

(1) Cognitive domain

Includes those performances that require knowledge of specific information; e.g., the principles, concepts, and generalizations necessary to problem solving. The primarily concern here is that the students have the knowledge required to perform the task.

(2) Affective domain

Measures the performance required to demonstrate feelings, attitudes, or sensitivities toward other people, idea, or things. Concern here is that the students will do the task after learning to do it.

(3) Psychomotor domain

Measures the skill performance of the student and, therefore, the performance required will involve the manipulation of objects, tools, supplies, or equipment. Concern here is that the students have the necessary neuromuscular coordination to perform the task.

Although teaching is often regarded as an art or a craft, it is most often studied as
The Influence of a Tutor’s Ideology and a Student’s Learning Style of Design College on the Achievement of Educational Objectives

if it were, or aspired to be, a science (Eisner, 1982). The educational evaluation require higher levels of educational connoisseurship, the ability to see what is significant yet subtle. Having said that, the cognitive, affective and psychomotor educational domains remain the basis of the taxonomy of educational objectives when examining the extent of an individual’s knowledge up to date.

3. Empirical Research

Null hypotheses
Neither the student’s perception of the tutor’s ideology nor the student’s learning style exerts a significant influence on their achievement of the overall cognition, affective, or psychomotor educational objectives, and therefore the acquired path model does not provide an acceptable fit to the data. (Notes overall: null hypothesis 1, cognition: null hypothesis 2, affective: null hypothesis 3 and psychomotor: null hypothesis 4)

Current research framework

Adopting the research framework illustrated in figure 5, the current latent variable path analysis was performed by using the full LISREL model to combine the measurement and structural considerations. The measurement variables provided statistical data for testing the path coefficients and the goodness-of-fit of the structural equation model between the latent variables and the observed variables.

Samples
Although not immediately apparent, structural equation modeling is very much a large
sample technique. The estimation methods (e.g. the maximum likelihood method) and
the tests of model fitness (e.g. the $\chi^2$ test) are both based on the assumption of large
samples. Boomsma (1983) recommended a sample size of approximately 200 for
models of moderate complexity. Adopting an alternative approach, Bentler and Chou
(1987) suggested that the ratio of the sample size to the number of estimated
parameters should lie between 5:1 and 10:1 (Kelloway, 1998). The stratified random
sampling method has been used to select samples since it is the best way to acquire
representative samples (Wang, 1996). In this study, a total of 567 questionnaires were
issued to six universities in Taiwan, representing 21.8 percents of the total population.
The questionnaires were mailed to the coordinator of each target school. After a round
of follow-up phone calls, a total of 392 completed questionnaires were returned. Of
this number, only 300 were considered to be valid, i.e. 92 questionnaires were rejected
on the grounds of being excessively extreme or furnishing incomplete answers.

Tools
Initially this study constructed a scale to identify the ideological style of the tutor in
accordance with the categories illustrated in figure 5. Six individuals with expert
knowledge of ideology or design education were invited to join the current study team
and a pilot study was performed to assess the validity of the questionnaire items for
the tutor’s ideological style. A Cronbach’s $\alpha$ value of .9654 was obtained, thereby
confirming the validity and reliability of the research tool. Students were then
requested to indicate their perception and anticipation of a tutor’s ideological style by
evaluating each questionnaire item using a 5-point Likert scale.

This study then applied Kolb’s (1984) Learning Style Inventory (LSI) to
investigate the learning style of the students in the second part. The LSI consists of 36
words divided into 9 groups of 4 words each. The student was asked to rank each of
the sets of words on a scale of 1 to 4, with 1 equating to least like themselves and 4
being most like themselves. Eventually, four types of learning styles were categorised
into divergers, assimilators, convergers, and accommodators (Kolb, 1984). In this
study, the data relating to the student learning style measurement variable were
acquired by means of LSI analysis. After a pilot study, the range of Cronbach $\alpha$ was
found to vary between .8235 and .6184. These values are higher than the lowest level
of .60 suggested by DeVellis (DeVellis, 1991; Wu, 1999). Therefore, the reliability of
the questionnaire was confirmed.

In the third part of the questionnaire, a scale was constructed to identify the
achievement of the design educational objectives. Accordingly, Simpson proposed a
revised version of the taxonomy, as summarized as: cognitive domain, affection
domain, and psychomotor domain (Chien, 2005). The scale was defined in terms of the taxonomy of educational objectives and specified infinitives and objects were applied into the contents of scale (Kibler, 1974). Also, the validity and reliability were confirmed together with the first part of scale.

**Data analysis**

The current path coefficients and goodness-of-fit of the Structural Equation Model (SEM) were obtained by applying LISREL (Linear Structural RELation) version 8.52 software developed by Jöreskog and Sörbom to the measured data. This software has the significant advantage that the researcher can program the language such that it can be adapted to different research scenarios in order to obtain more accurate data (Chang, 2000).

Several indices can be used to assess the goodness-of-fit of the structural equation model as follows (Xu, 2005):

1. Jöreskog and Sörbom (1989) suggested that the ratio of the chi-square statistic to the number of degrees of freedom of the model provides a better measure of the fit and reported that a value of less than 3 is acceptable.
2. The Goodness-of-Fit Index (GFI) is another measure suggested by Jöreskog and Sörbom (1989) for assessing the overall fit of a model. This measure is based on the ratio of the sum of the squared discrepancies to the observed variances, thus allowing for scale. A GFI value of .90 or more generally indicates a good fit.
3. The Root Mean Square Error of Approximation (RMSEA) compensates for the effects of model complexity by dividing the discrepancy function by the number of degrees of freedom of the model. This measure penalizes model complexity and tends to favor parsimonious models. An RMSEA value of .05 or less indicates a reasonable approximation error.

Indices mentioned above are used to test the path models of the effects of tutor’s ideology and student’s learning style on the achievements of educational objectives as shown in figure 5.

**4. Results and Discussion**

As an example, path model 1 as shown in figure 6 estimates the effects of the ideological style of the tutor and the learning style of the student on the achievement of the overall educational objectives. The LISREL analysis estimates that (1) The Chi-Square ($\chi^2$) goodness-of-fit index has a value of 25.69 and $P=0.53564$ (the ratio
of $\chi^2 / df$ is equal to $25.69/27=0.95$, and is thus less than 3), which is statistically significant. (2) Meanwhile, the GFI value is 0.98, which is larger than 0.90 (Maximum= 1), and (3) the RMSEA value is 0.000, which is less than 0.05 and is clearly the optimal value.

The error variances are all less than 0.30, which indicates that the interpretive volume reaches the level of statistical significance. Therefore, figure 6 shows that the Goodness of Fit Index (GFI) is highly significant and suggests that the acquired path model provides an acceptable fit to the data and can therefore be used to interpret the observed variables (i.e. the total educational objectives).

**Model test**

![Diagram](image)

**Fig. 6.** Path model for effects of ideological style of tutor and learning style of student on the achievement of total educational objectives.

Notes: Chi-Square= 25.69, df= 27, P-value= 0.53564, GFI= 0.98, AGFI= 0.97, RMSEA= 0.000

The test steps described above were also used to evaluate other path models, indicating that only model 3 has not reached significant level yet. However, other path models are all used in the interpretation of the observe variables as shown in table 2. The details of each model in the direct effect of tutor’s ideological styles and student’s learning style on the achievement of the overall and other domains are discussed as follows.

**Model 1**

According to the present LISREL analysis in model 1 as shown in table 2, the statistics indicates that the Goodness of Fit Index (GFI) is highly significant and suggests that the acquired path model provides an acceptable fit to the data. In addition, the acquired data are clearly the optimal values ($\beta = 0.32, p<0.05$). Therefore, the tutor’s ideology has a significant influence on a student’s achievement.
of the overall educational objectives. In other words, tutors not only provide their students with knowledge, but also affect them with their personal ideology. In this sense, the present results are consistent with those reported by Peca (2000), who identified the ideological influence through both objective and subjective methodologies, i.e. an empirical study and a case study. Therefore, in the educational setting of industrial design, the potential effects of the tutor’s ideology must be taken into account.

Model 2
In the present results of cognition domain, the statistics show that the Goodness of Fit Index (GFI) reaches the level of significance and suggests that the acquired path model provides an acceptable fit to the data. In addition, the acquired data demonstrate that the values are clearly optimally ($\beta =0.39$, $p<0.05$). Therefore, the tutor’s ideology has a significant influence on a student’s achievement of the cognitive educational objectives. That is to say, students are not only affected by their tutors’ knowledge, but also ideology in the cognitive domain. It is possible to conclude that tutors not only provide their students with knowledge, but also affect them with their personal ideology. The learning of cognition (knowledge) is dramatically impacted by tutors’ personal preferences. In comparison with other domains, the concept of ideology has the strongest impact on the thought of students, especially, in the domain of cognition (knowledge).

Model 3
In the present results of affective domain, it is observed that the Goodness of Fit Index (GFI) has not reached the level of significance yet (the ratio of $\chi^2/\text{df}$ is equal to 6.15, and is thus larger than 3) and suggests that the acquired path model can not provide an acceptable fit to the data, although, the acquired data express optimal value ($\beta =0.29$, $p<0.05$). The poor path model, as judged by the GFI, results from the fact that some factors were not correctly scaled or interpreted (Greening & Dollinger, 1993). One key reason is the abstract nature of affective domain (attitudes), and it is difficult for students to measure themselves when filling out the scale. Nevertheless, this model merits further examination in a future study.

Model 4
The present LISREL analysis results have shown that the path models constructed for the psychomotor (skills) domain has highly significant GFI. This suggests that the path models provide acceptable fits to the data and should therefore be used to interpret the observed variables. The coefficient correlations identified in the models provide significant data ($\beta =0.26$, $p<0.05$) On the basis of these data, the influence of ideology on the psychomotor domain has to be taken into account seriously, although,
it is not as strong as the overall and cognitive domains. According to the above analysis, one may reason that the impact of ideology on the learning of skill is weaker than the impact of knowledge. That is to say, the concept of ideology has a more substantial influence on the learning of abstract knowledge than concrete skills do.

Table II Results of structural equation models for null hypotheses

<table>
<thead>
<tr>
<th>Models and paths</th>
<th>β</th>
<th>S.E. (ε)</th>
<th>t-value</th>
<th>Std. β</th>
<th>goodness-of-fit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1: ideology- learning style- overall educational objectives</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ideology→ overall</td>
<td>0.32*</td>
<td>0.026</td>
<td>12.34*</td>
<td>0.69</td>
<td>χ²/df 0.95</td>
</tr>
<tr>
<td>learning style→ overall</td>
<td>-0.030</td>
<td>0.021</td>
<td>-1.39</td>
<td>-0.06</td>
<td>GFI 0.98</td>
</tr>
<tr>
<td>Ideology ←→ learning style</td>
<td>◎0.07</td>
<td>0.06</td>
<td>1.03</td>
<td>0.07</td>
<td>RMSEA 0.000</td>
</tr>
<tr>
<td><strong>Model 2: ideology- learning style- cognition educational objectives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ideology→ cognition</td>
<td>0.39*</td>
<td>0.031</td>
<td>12.53*</td>
<td>0.7</td>
<td>χ²/df 0.91</td>
</tr>
<tr>
<td>learning style→ cognition</td>
<td>-0.039</td>
<td>0.026</td>
<td>-1.47</td>
<td>-0.07</td>
<td>GFI 0.98</td>
</tr>
<tr>
<td>Ideology ←→ learning style</td>
<td>◎0.07</td>
<td>0.06</td>
<td>1.16</td>
<td>0.07</td>
<td>RMSEA 0.000</td>
</tr>
<tr>
<td><strong>Model 3: ideology- learning style- affective educational objectives</strong></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ideology→ affection</td>
<td>0.29*</td>
<td>0.038</td>
<td>7.67*</td>
<td>N.A.</td>
<td>χ²/df 6.15</td>
</tr>
<tr>
<td>learning style→ affection</td>
<td>-0.051</td>
<td>0.060</td>
<td>-0.85</td>
<td>N.A.</td>
<td>GFI 0.89</td>
</tr>
<tr>
<td>Ideology ←→ learning style</td>
<td>◎0.37*</td>
<td>0.04</td>
<td>10.30*</td>
<td>N.A.</td>
<td>RMSEA 0.13</td>
</tr>
<tr>
<td><strong>Model 4: ideology- learning style- psychomotor educational objectives</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ideology→ psychomotor</td>
<td>0.26*</td>
<td>0.035</td>
<td>7.44*</td>
<td>0.45</td>
<td>χ²/df 1.05</td>
</tr>
<tr>
<td>learning style→ psychomotor</td>
<td>-0.042</td>
<td>0.031</td>
<td>-1.38</td>
<td>-0.07</td>
<td>GFI 0.98</td>
</tr>
<tr>
<td>Ideology ←→ learning style</td>
<td>◎0.07</td>
<td>0.06</td>
<td>1.08</td>
<td>0.07</td>
<td>RMSEA 0.013</td>
</tr>
</tbody>
</table>

p<0.05 ◎: Coefficient of correlation  N. A.: Not available

In general, based upon the results of the current analysis, none of the domains have reached a significant level between the learning styles and educational objectives. Hence, it is impossible to predict the substantial effects of different learning styles on the achievement of all educational objectives. These results are consistent with those reported by Rafe and Manley (1997) in their study of distance learning curricula for engineering students. However, the present results disagree with those presented by Rasmusse et al. (1998), who conducted a questionnaire-based survey and concluded that different learning styles and different levels of learning control imposed on the students result in different learning achievements. Having said that, the learning styles of design students simply reflect
their personal preferences for learning and do not have a substantial influence on their achievement of the educational objectives in this study.

5. Conclusion and Recommendations

(1) The potential influence of a tutor’s ideology on the total, cognitive and psychomotor educational objectives must be recognised and carefully considered in the education of industrial design.

A tutor must perform frequent self-examinations of his/her design ideology and translate their ideology into knowledge, due to the design itself as an expression of ideology (included value judgment or reference). An over-presentation or delivery of ideology may result in hegemony (i.e. an institutional or legalized ideology). If a tutor consistently imposes his/her ideology when assessing a student’s project work (for example), the student may have no choice but to conform to the tutor’s opinions and expectations if they are to receive a higher score. This situation may result in a unified style but fixed ideology among those students. Therefore, it can be concluded that the responsibility of a good tutor in the educational setting of industrial design is not only to provide his/her students with knowledge, but also to avoid imposing their own subjective influence.

(2) A tutor should not play an authoritarian role in judging the truth or otherwise of different issues, but should act instead as a facilitator in helping his/her students to judge each case for themselves.

A tutor should be aware that the term “ideology” is a neutral noun (Bocock, 1994). Indeed, as Plamenatz claimed, ideology is a group of ideas (Plamenttz, 1970). A tutor should not be too self-centred. The role of the tutor is to process knowledge properly and to prevent it from being hegemonic. Moreover, the tutor should avoid playing the role of an authority figure in judging the truth or otherwise of different issues (as frequently occurs in the educational setting). This observation is reflected in a Chinese saying which states that ‘people with higher official rank shall have more knowledge’. Although this saying may not actually be borne out in reality, it is nevertheless widely regarded as a fact in a bureaucratic culture. The concept of ideology is similar to that of a knife in that it can both cure and harm an individual. Hence, a proper processing of knowledge (objective knowledge) and ideology (subjective knowledge) in the educational setting is required if the quality of design education is to be enhanced.

(3) The stronger the ideology imposed from outside or expressed by the tutor, the more narrow the view of the student.
According to Balch and Warren (1996), the encroaching pressure of ideology born outside academia has narrowed the scope of academic freedom (Ayers, 1996). Tunnel vision may be imposed on the students as a result of strong ideology originating from outside or from the tutors themselves. A tutor must remember that it is the students who are the subject of the education process. The goal of design education is to encourage a student to think and to create, and a student must learn how to carry out their designs independently. Furthermore, individual differentiations and preferences will almost inevitably exist between a tutor’s students. A good design education tutor must provide diversified choices and suggestions to different students in order to facilitate their individual learning processes and to reduce the negative effects of radical or fanatical ideology.

(4) Students should be discouraged from blindly following the style of their tutor and should strive to create their own unique style instead. In other words, students should learn to explore knowledge independently rather than passively accepting the tutor’s ideology as truth.

Yuyu Yang, a well-known Taiwanese master of sculpture, once told his apprentices not to imitate his style because he believed that developing original creativity was the core value of an artist. It is commonly held that the disciplines of design and the arts enjoy the same core values. In other words, students should learn to create their own ways on tackling design problems. Furthermore, any tutor engaged in the instructional processes of design education must carefully distinguish between knowledge and ideology. A good tutor should motivate his/her students to criticize or re-examine their practical experiences and then to convert them into new knowledge. Also, students should be encouraged to recognise the difference between knowledge and ideology by consistently asking questions. In striving to obtain a better quality of design education, the tutor must realize that transferring knowledge is a more appropriate strategy than imposing his/her ideology.

(5) Design education is a process of discovery or exploration, not a prescribed tour itinerary.

The characteristics of design offer unlimited possibilities. There is no such thing as a perfect design or a standard answer and there is always room for improvement. The greater the interaction between the tutor and the student, the better the quality of education which can be achieved. A good tutor should play a leading role in creating different scenarios for the student to act out and should provide the students with opportunities to explore the integrated knowledge which he/she has acquired. The design discipline comprises multiple knowledge drawn from multiple disciplines. Obtaining an excellent quality of design education is impossible if the student
receives only subjective knowledge (ideology) or partial knowledge (hegemony).

Therefore, dealing with ideology in a really open minded learning area can give students orientation (here I am) and help them to find their own way (were do you want to go) and can help to prevent them inventing the wheel again.

References

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