Research on total teacher effectiveness: conception strategies

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Based on the conception of total teacher effectiveness, aims to develop strategies for conceptualizing teacher effectiveness research. From the new conception, the units of research on teacher effectiveness are cell, array and layer. The strategies advanced for conceptualizing research include the individual unit description strategies, the within-layer relationship strategies, the between-layer relationship strategies, and the whole structure strategy. Based on the conception strategies, teacher effectiveness research can be shifted from traditional simplistic one-dimensional conception to sophisticated multidimensional conception and can have various research alternatives for different research purposes and contexts. Hopefully, these strategies can provide a new direction for studying and improving teacher effectiveness in particular and school effectiveness in general.

In current school reform movements in different parts of the world, there is a great demand for research on teaching, teachers, and teacher education with an understanding that teachers are the key element for the success of school education (Carnegie Forum, 1986; Cooper and Conley, 1991; Education Commission, 1992; Russell and Unny, 1992). In the last two decades, in order to improve the performance of teachers, policymakers, teacher training institutions and schools, a great number of innovations in teaching techniques, methodologies and supervision were designed and implemented. Although a huge amount of resources had been invested into educational reforms initiated by a number of educational policies, the performance of students as a whole was declining at a significant rate in Hong Kong as well as other developed countries in the world. The policy makers and the public began to be aware of the importance of teacher performance to students’ educational outcomes and try to make policy efforts for improving teacher quality and effectiveness (Education Commission, 1992; Elliott, 1993; Grace and Lawn, 1991; Gideonse et al., 1991).

Traditional concepts of teacher effectiveness research focus mainly on individual teachers, particularly about instruction in a classroom context, and ignore the complexity of the school organizational environment that can influence the role and performance of teachers at both individual and group levels. Inevitably, there is a serious conceptual barrier limiting the effectiveness of any school reforms developed for improving education quality and teacher effectiveness in a changing educational environment.

Some scholars gradually found that school restructuring alone would not improve teaching (Elmore, 1992). This is because teaching cannot be reduced to a few relatively straightforward “generic” and robust behaviors which can be applied across different subjects and different groups of students in different schools. In short, educators, researchers and policy makers must rethink about how to acquaint school management with the complex teaching process needed to improve teaching and learning effects. Inevitably, there is an urgent need to understand the complex nature of school processes and teacher effectiveness from a broader perspective and develop new management strategies to improve them if we want to achieve better students’ learning outcomes (Cheng, 1996a,b). Based on Cheng and Tsui’s (1996) conception of total teacher effectiveness, this paper aims to develop new strategies for conceptualizing teacher effectiveness research, that can facilitate more studies in this area and shift them from the traditional simplistic one-dimensional conception to sophisticated multidimensional conceptions. Hopefully, these strategies can provide a new direction for studying and improving teacher effectiveness in particular and school effectiveness in general.

I Conceptual framework of total teacher effectiveness

Taking the limitations of the traditional concepts into consideration, Cheng and Tsui (1996) developed a new conceptual framework of total teacher effectiveness that can be summarized as follows (please refer to the original article for the detail).

Levels of teacher effectiveness

Individual teachers, groups of teachers, and all teachers as a whole in the school represent different levels or organizational units of teachers who can play different roles and make different contributions to the functioning of the school, including educational processes and management processes. Therefore there are three levels of teacher effectiveness including the individual level, the group level, and the school level. Individual-level teacher effectiveness refers to the effectiveness of individual teachers in performing...
their own assigned tasks such as teaching in classroom, evaluating students’ educational outcomes, and managing students in their classes, etc. The traditional studies often focus on teacher effectiveness at this level. Group-level teacher effectiveness refers to the effectiveness of a group or team of teachers in performing their group tasks and achieving group objectives. To different functional groups, their group tasks may be different. For example, discipline committee, extra-curricular activities committee, staff development, science subjects panel, mathematics panel, and English language panel are typical groups of teachers. It is believed that the “synergy” of a group is potentially greater than the sum of energy of its member (Karp, 1980; Kormanski and Mozenter, 1987). Similarly, teacher effectiveness at the school level refers to the effectiveness of all teachers as a whole in performing school activities and achieving school aims and objectives. Recently, the whole school approach is strongly emphasized in student guidance and counselling or moral and civic education. It holds that when all teachers act congruently as a whole, they may have a better chance to change the internal and external constraints and achieve educational tasks. All these above types of teacher effectiveness are important in research.

Domains of teacher effectiveness
In the teaching process, the teacher’s performance in affective, cognitive, and behavioral domains can directly affect the students’ learning process and their affective, cognitive, and behavioral development. Therefore, the consideration of teacher effectiveness should include the quality of teacher competence and teacher performance in these domains and their effects on students’ developments in these domains.

Total teacher effectiveness
Taking the above three domains and the three levels into consideration, the nature and characteristics of teacher effectiveness can be studied at multi-levels and multi-domains. The conceptual framework of total teacher effectiveness for investigating the complicated nature of teacher effectiveness is illustrated in Figure 1 (Cheng and Tsui, 1996).

This framework assumes that teacher effectiveness is inevitably related to the teacher’s teaching process and the student’s learning process. Therefore, the conception of teacher effectiveness involves two important categories of actors (teachers and students) at three different levels (individual, group, and school). The processes and effects of teaching and learning may happen in the behavior, affective, and cognitive domains of different actors at different levels. Specifically, teacher effectiveness should involve the behavioral, affective, and cognitive performance of all teachers and students at individual, group, and school levels. This structure of teacher effectiveness is different from the traditional thinking that focuses mainly on the individual level of teacher or student and ignores the multiplicity of performance of teachers and students. The new concept is called total teacher effectiveness because it can provide a holistic picture of the nature of teacher effectiveness.

Layers of teacher effectiveness
As shown in Figure 1, teacher effectiveness is related to the teaching and learning process involving the teacher competence layer, teacher performance layer, student experience layer, and student learning outcomes layer. The teacher competence layer is the total behavioral, affective, and cognitive competence of teachers at the individual, group, and school levels. This layer represents the total static quality of teachers. The teacher performance layer is the total performance of teachers in the three domains at the three levels. It represents the dynamic quality of teachers in the teaching process. In addition, the relationship between these two layers can be moderated by the influence of the external teaching context (e.g. organizational factors, leadership, and school environment, etc.).

The student experience layer represents the total learning experience of students in the three domains at the individual, group, and school levels. And the student learning outcomes layer represents the total learning outcomes of students in the three domains at the three levels. In general, the quality of the teacher performance layer as a whole has a positive impact on the quality of the student learning experience layer and the latter has a positive relationship with the quality of the student learning outcomes layer. Again, these relationships may be affected by the characteristics of the internal teaching context (including student subculture, classroom climate, student ability grouping, learning environment, etc.) and pre-existing student characteristics (such as IQ, family background, etc.). The assessment of total teacher effectiveness is mainly based on the quality of the student learning experience layer and student learning outcomes layer, taking the teacher competence layer and teacher performance layer into consideration. There may be feedback loops during assessment from the latter layers to the former layers.
Units of research and research strategies

The conception of total teacher effectiveness can provide a powerful framework for conceptualizing research and developing research strategies. Since the conception of teacher effectiveness is different from traditional thinking, the implications and strategies advanced for research may be more comprehensive and sophisticated.

As shown in Figure 1, the structure of teacher effectiveness is comprised of four layers and each layer could be broken down into three arrays. And each array could be further divided as three individual cells such that the total teacher effectiveness structure is composed of 36 different cells. In Table I, some examples of cells, arrays, and layers are given. Cell X represents an individual teacher’s competence in the behavioral domain. Array L₁ represents an individual teacher’s performance in affective, behavioral, and cognitive domains. Array L₂ represents the behavioral learning experience of students at the individual, group, and school levels. Layer P represents the total students’ educational outcomes in three domains at three levels.

The cell unit, array unit, and layer unit can be used as building units to conceptualize teacher effectiveness research and develop research strategies. Based on a different choice of research units, research strategies developed may be very different and their implications for practice and improvement may be very different too.

From the structure in Figure 1 and the above research units, the strategies advanced for conceptualizing research can be classified as the individual unit description strategies, the within-layer relationship, the between-layer relationship strategies, and the whole structure strategy.

Table I
Examples of research units: cell, array and layer

<table>
<thead>
<tr>
<th>Teacher competence layer</th>
<th>Teacher performance layer</th>
<th>Student learning experience layer</th>
<th>Student learning outcomes layer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A B C</td>
<td>A B C</td>
<td>A B C</td>
<td>A B C</td>
</tr>
<tr>
<td>I X</td>
<td>L₁ L₂</td>
<td>P</td>
<td></td>
</tr>
</tbody>
</table>

Note:
I: individual level; G: group level; S: school level; A: affective domain; B: behavioral domain; C: cognitive domain; X: an example of a cell; L₁ and L₂: two examples of a array; P: an example of a layer.
Individual unit description strategies
The individual unit description strategies refer to research strategies which focus only on a description of the characteristics of an individual unit of the total teacher effectiveness structure. They can be further classified as follows:

The individual cells approach
The research focuses on the characteristics of chosen individual cells of the total teacher effectiveness structure. For example, to study professional commitment (i.e. affective domain) of individual teachers (i.e. individual level) in the teacher competence layer. Or, in another case, to identify the classroom management skills (i.e. behavior domain) used by a group of English language teachers (i.e. group level) in the teacher performance layer.

The individual arrays approach
The research describes mainly the characteristics of individual arrays of the total teacher effectiveness structure. For example, to study the characteristics of individual teachers’ affective, behavioral, and cognitive performance (i.e. three domains at the individual level in the teacher performance layer) is a popular area for teacher study. For another example, to investigate the pattern and standard of students’ mathematics computation skills at the individual, group (or class), and school levels (i.e. behavioral domain at three levels in the student learning outcomes layer) in a sample of primary schools. This is also a common topic in evaluating effectiveness of teachers and schools.

The individual layers approach
The research aims at describing the characteristics of the individual layer in the total teacher effectiveness structure. For example, to explore the overall characteristics of the teacher performance layer including three domains and three levels. The other layers for research are the teacher competence layer, student learning experience layer, and student learning outcome layer.

In general, individual unit description strategies provide a systematic way to describe certain aspects of the teacher effectiveness structure. However, the findings of studies based on these strategies are often superficial, simplistic, and fragmentary because they only describe certain characteristics of individual units and ignore organic relationships between domains, between levels, and between layers in the teacher effectiveness structure. Obviously, this kind of study does not contribute very much to the understanding of the complex nature of teacher effectiveness.

Within-layer relationship strategies
Within-layer relationship strategies refer to the research strategies which focus on relationships between units within any one layer of the total teacher effectiveness structure. These strategies can be further classified into the following kinds:

The cell-cell approach within one layer
The research investigates the relationships between separate cells in one layer. For example, to study the relationship between job satisfaction and job effort of individual teachers (i.e. affective domain vs behavioral domain at the individual teacher level, or, two cells at the individual level of teacher performance layer). For another example, to explore the relationship between individual teacher’s job behavior and whole school teachers’ social behavioral norms (i.e. behavioral performance at individual level vs at school level in the teacher performance layer) is a typical topic in past organizational climate studies (Ashforth, 1985; Cheng, 1986; Halpin, 1966).

The cell-array approach within one layer
The research focuses on the relationship between one cell and one array within any one layer of the total teacher effectiveness structure. For example, to study the relationship between whole school behavioral norms (i.e. one cell at the school level) and individual teacher’s affective, behavioral and cognitive performance (i.e. one array at the individual level) (see Figure 2).

The array-array approach within one layer
The research investigates the relationship between two separate arrays within one layer. For example, to study the relationship between overall individual teacher performance (i.e. one array at individual level) and overall group performance in the affective, behavioral, and cognitive domains (i.e. one array at group level) is one typical category of research which focus often on the influence of group dynamics on teachers’ job effectiveness (see Figure 3).

Including contextual factors in studying relationships within layer
As mentioned previously, there are potential influences from the external and internal teaching environments and pre-existing student characteristics on the teaching and...
learning processes. Therefore, each of the above approaches to investigating the relationships within layers may also take these contextual influences into consideration in order to deepen the understanding of how these relationships are contingent on different contextual factors.

Compared with the individual unit description strategies, the within-layer relationship strategies seem to be more powerful because the studies based on these strategies may provide more knowledge about the relationship among units of one layer of the total teacher effectiveness structure. However, these strategies which focus on only one layer yield research findings which still have limitations for enhancing teacher effectiveness. They cannot provide any knowledge about how teacher competence affects teacher performance, how teacher performance influences students' learning experience, and how student learning experience relates to learning outcomes. Therefore, taking between-layer relationship into consideration should be important when conceptualizing research on total teacher effectiveness.

**Between-layer relationship strategies**

The between-layer relationship strategies refer to research strategies which focus on the relationship between two research units that are on two different layers. If the chosen two layers are adjacent (e.g., teacher competence layer and performance layer; or teacher performance layer and student learning experience layer; or student learning experience layer and learning outcome layer), the relationship between two research units to be studied may be perceived as a direct relationship. If the chosen two layers are not adjacent, the relationship to be studied may be perceived as an indirect relationship. For example, the relationship between a teacher’s teaching style (i.e., in the teacher performance layer) and students’ feeling of interest in learning (i.e., in the student learning experience layer) may be a direct relationship. But that between a teacher’s academic qualification (i.e., in the teacher competence layer) and students’ satisfaction in learning (i.e., in the student learning experience layer) may be an indirect relationship.

According to the choice of research units on layers, there may be different approaches to conceptualizing research, as follows:

The cell-cell approach between two layers

The research investigates the relationship between two cells on two separate layers. For example, to study how individual teacher’s job commitment (i.e., a cell in the teacher performance layer) relates to the learning attitudes of a group (class) of students (i.e., a cell in the student learning experience layer).

The cell-array approach between two layers

The research explores the relationship between one cell and one array on two separate layers. For example, to study how individual teacher’s job commitment (i.e., a cell in the teacher performance layer) relates to individual student’s affective, behavioral, and cognitive performance in learning activities (i.e., an array in the student learning experience layer).

The array-array approach between two layers

The research focuses on the relationship between two arrays on two separate layers. For example, to study how the affective, behavioral, and cognitive performance of a group of mathematics teachers (i.e., an array...
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in the teacher performance layer) relates to the affective, behavioral, and cognitive performance of a class of students in learning activities (i.e. an array in the student learning performance layer).

The cell-layer approach between two layers
The research investigates the relationship between one cell and one separate layer. For example, to study how the individual teacher’s communication skills achieved in a training course (i.e. a cell in the teacher competence layer) relates to the overall performance of the student learning experience layer. Obviously, this is also an example to illustrate the indirect relationship between a cell and a layer.

The array-layer approach between two layers
The research investigates the relationship between one array and one separate layer. For example, to study how the affective, behavioral, and cognitive performance of a group of language teachers (i.e. an array in the teacher performance layer) relates to the overall achievement of students at three levels in the three domains (i.e. the student learning outcome layer).

The layer-layer approach
The research investigates the overall relationship between two separate layers. For example, to study how the characteristics of the whole teacher performance layer relate to the overall achievement of students at three levels in the three domains (i.e. the student learning outcome layer).

Some examples of the above approaches are also illustrated in Figures 4 and 5. Comparatively, the findings of a direct relationship study should be more useful than those of an indirect relationship study because the results of an indirect relationship study may be complicated by middle layer(s) existing between the investigated layers.

Including the contextual factors in studying relationships between layers
As shown in the structure of total teacher effectiveness (Figure 1), the external and internal teaching contexts and the pre-existing student characteristics may have influences on the direct or indirect relationships between layers. Therefore, it is important to include these contextual factors in research and investigate how they moderate or interfere with the relationships between layers. In other words, the inclusion of contextual factors in the above approaches can deepen the understanding of the contingent nature of teacher effectiveness.

Obviously, the between-layer relationship strategies are more powerful than the other strategies because studies based on these strategies can provide more information and knowledge about the longitudinal relationships between components of the total teacher effectiveness structure, as shown in Figure 1, and the findings can be more useful to enhancement of teacher effectiveness. Therefore, in teacher effectiveness research, these strategies should be strongly recommended.

The whole structure strategy
In addition to the above strategies, we may adopt the whole structure of total teacher effectiveness to conceptualize research. This is the whole structure strategy which takes all the layers, arrays, and cells into consideration and can provide a more comprehensive understanding of total teacher effectiveness instead of only considering fragmentary relationships between separate units. Of course, since it involves so many factors and components, it would be quite difficult in research design particularly in using the quantitative approach. Therefore, case study or qualitative methods would be preferable in using the whole structure strategy to conduct teacher effectiveness research.

Research on the concept of congruence
According to the concept of congruence in systems (Cheng, 1996a; Nadler and Tushman, 1983), whether teacher competence is congruent across the affective, behavioral, and cognitive domains and across the individual, group, and school levels (i.e. congruence within the teacher competence layer) can affect the contribution of the teacher competence layer to the teacher performance layer. The congruence across domains represents the extent to which affective competence, behavioral competence, and cognitive competence of teachers are mutually supported and reinforced in contributing to teachers' action and performance. The congruence across levels represents the extent to which the competence of individual teachers, groups of teachers, and whole school teachers is mutually supported and reinforced in contributing to teachers' action and performance. Based on the concept of congruence, there are some important propositions that can be tested in the research on teacher effectiveness particularly by the between-layer relationship strate-
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Gies and the whole structure strategies. They are listed, as follows:

- The more the congruence of teacher competence across domains and across levels, the more the contribution of the teacher competence layer to the teacher performance layer.
- The more the congruence of teacher performance across domains and across levels (i.e. congruence within the teacher performance layer), the more the contribution of the teacher performance layer to the student learning experience layer.
- The more the congruence of the student learning experience across domains and across levels (i.e. congruence within the student learning experience layer), the more the contribution of the student learning experience layer to the student learning outcomes layer.

In addition to testing these propositions, studying how to ensure congruence within the teacher competence layer, within the teacher performance layer, and within the student learning experience layer to bring about teacher effectiveness is also an important area for research. This congruence approach is very different from the traditional research that focuses only on fragmentary and overt aspects of teacher performance without taking totality and congruence into consideration.

**Conclusion**

To a great extent, the above strategies represent different degrees of complexity of research conception. Comparatively, the conception complexity of research units varies with the cell as the least, the array as the second, and the layer as the most complex. The conception complexity of strategies also follows a hierarchy with the individual unit description strategies as the least, the within-layer relationship strategies as the second, the between-layer strategies as the third and the whole structure strategy as the most complex. Obviously, inclusion of the internal and external contexts and pre-existing student characteristics into research will increase the conception complexity of each strategy. Furthermore, inclusion of the concept of congruence between domains and between levels into research will enrich research conception and support theory development to explain how to enhance teacher effectiveness. In order to bring about meaningful findings for improving educational practice and enhancing teacher effectiveness, inevitably more sophisticated research conceptions and strategies are needed. The strategies developed from the total teacher effectiveness framework can provide a wide range of alternatives for researchers to conceptualize their study of teacher effectiveness as well as school effectiveness.

Hopefully, the coming educational reforms can benefit from research on teacher effectiveness using more sophisticated and comprehensive conception strategies in both local and international contexts.
Between-layer relationship strategy, examples of direct relationships

A = Affective Domain, B = Behavioral Domain, C = Cognitive Domain
I = Individual Level, G = Group Level, S = School Level

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