A STUDY ON WISDOM, WISDOM IN TEACHING, TEACHER EFFICACY, AND TEACHING PERFORMANCE

by

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We accept this thesis as conforming to the required standard

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ABSTRACT

Despite a rising interest in studying the effects and the antecedents of teacher efficacy, a review of literature indicated that an important individual variable has been left out of these studies. This is the cognitive component which Bandura (1977) suggests is central to the process of efficacy formulation. Specifically Bandura (1977) argues that for performance to be instructive for efficacy formulation, a type of cognitive appraisal needs to be present. To date, this cognitive appraisal has not been identified in teacher efficacy studies. The purpose of this thesis is to search for a way to represent this cognitive component and to examine its role in teaching performance and efficacy formulation. Two variables are selected as possible representations of this cognitive component. They are wisdom and wisdom in teaching.

The two research questions developed for this study are: (1) What is the relative contribution of wisdom, wisdom in teaching, personal teaching efficacy, and general teaching efficacy to teaching performance? And (2) What is the relative contribution of wisdom, wisdom in teaching, and teaching performance to the formulation of personal teaching efficacy and general teaching efficacy?

Eighty-nine final year student teachers were asked to respond to three instruments that measured their level of wisdom, wisdom in teaching, and teacher efficacy. These instruments were: (1) Life planning dilemma “Jack” (Smith & Baltes, 1987), (2) Teaching dilemma “Perimeter” (Arlin, 1987), and (3) The teacher efficacy scale (Gibson & Dembo, 1984). The participants were also asked to submit their teaching practicum marks. This mark represents their
teaching performance.

Teaching performance was best explained by the combined effects of wisdom in teaching and personal teaching efficacy than by either of them alone. Jointly these two variables accounted for 54% of variance in teaching performance.

Wisdom in teaching and teaching performance provided a better explanation for the formulation of personal teaching efficacy than each taken in turn. The joint effects of wisdom, wisdom in teaching, and teaching performance accounted for 7% of variance in the formulation of both personal teaching efficacy and general teaching efficacy.

An important finding from this study is that wisdom in teaching has the greatest impact on teaching performance. An implication of this finding is that teacher educators should develop and provide programmes which can help facilitate the growth of wisdom in teaching.
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CHAPTER I

INTRODUCTION

We are in the midst of a period where strong new efforts are being made to understand the mechanisms of effective teaching and effective learning. One such ethos is built around the analysis of teacher characteristics. Teachers' characteristics are those variables which pertain to the teacher as an individual. Examples include "teachers' knowledge" which is sampled in works by Ball (1989), Grossman, Wilson, and Shulman (1989), Grossman (1990), and Aitken and Mildon (1991); "teachers' reflection" as demonstrated in works by Cruickshank (1987), Schon (1988), and Copeland and Birmingham (1993); and "teachers' cognition" as described in works by Cadwell and Jenkins (1986), Leinhardt and Greeno (1986), and Kagan (1990).

"Teachers' sense of self-efficacy", as a teacher characteristic, has also been receiving increased attention of late (Anderson, Greene, & Loewen, 1988; Raudenbush, Rowan, & Cheong, 1992). A working definition of this term is "the extent to which the teacher believes he or she has the capacity to affect student performance" (McLoughlin & Marsh, 1978, p. 84). The theory of self-efficacy upon which the construct of teacher efficacy is based was initially proposed by Bandura in 1977. According to this theory, individuals' behaviours are determined by their beliefs about action-outcome relationships (a belief that certain behaviour can lead to certain outcomes) as well as their sense of self-efficacy (a belief that they have the requisite skills to produce those outcomes). Translated into teacher characteristics, the theory of self-efficacy implies a belief system which at
least includes (1) the "belief of teachers having the ability to produce student learning despite obstacles" - sense of teaching efficacy, and (2) the "belief of self as being able to teach effectively" - sense of personal teaching efficacy (Gibson & Dembo, 1984, Woolfolk & Hoy, 1990). More recently, Guskey and Passaro (1994) proposed to view teacher efficacy in terms of teachers' perception of internal versus external control. Although this view represented a new and interesting approach at redefining the construct, other researchers maintained that teachers' locus of control does not parallel teacher efficacy (Ross, Cousins, & Gadalla, 1995).

Research conducted to date provides substantial evidence that teachers' sense of self-efficacy impacts positively on student achievement, student behaviour, and teacher behaviours. For example, teacher efficacy is found to be related to student reading achievement (Tracz & Gibson, 1986) and student motivation (Midgley, Feldlaufer, & Eccles, 1989). Positive relationships have also been found between teachers' sense of self-efficacy and teachers' willingness to adopt instructional innovations (Guskey, 1988; Smylie, 1988). Teachers with a high sense of efficacy are also more competent in classroom management (Ashton & Webb, 1986), less likely to leave the profession (Glickman & Tamashiro, 1982), and less likely to label and refer problem children for special education (Meijer & Foster, 1988; Soodak & Podell, 1993). Educators are constantly seeking means to facilitate student learning, and as teacher efficacy has been shown to be a powerful variable for instructional effectiveness, the need to pursue a greater understanding of this phenomenon is evident.
THEORETICAL BACKGROUND

The conceptualization of teacher efficacy is drawn largely from Bandura's theory of self-efficacy. An understanding of Bandura's self-efficacy model as well as an interpretation and application of the model by researchers is helpful in understanding the framework for this study.

Bandura's self-efficacy model

Bandura initially conceptualized the self-efficacy model in the context of understanding behaviour therapy. The model appeared particularly promising for treatment of fearful and avoidance behaviour in individuals. The central concept of the theory rests on the assumption that psychological procedures could serve as a means of creating and strengthening a person's self-efficacy and this, in turn, could result in behavioural change. According to Bandura (1977), self-efficacy has two dimensions: efficacy expectations and outcome expectations. The former is interpreted as "the conviction that one can successfully execute the behaviour required to produce the outcomes" whereas the latter is defined as "a person's estimate that a given behaviour will lead to certain outcomes" (p.193).

Self-efficacy is assigned the central role of mediating between person and behaviour within this theory. In fact, Bandura (1977) posited that self-efficacy has the power to influence both initiation and persistence of coping behaviour as well as to "determine how much effort people will expend and how long they will persist in face of obstacles and aversive experiences" (p.194) on that behaviour. Therefore, strength in self-efficacy could be viewed as having a role in the choice of behaviour as well as on the outcome of the
chosen behaviour.

Expectations of personal efficacy are said to derive from four major sources of information: (1) performance accomplishments, (2) vicarious experiences, (3) verbal persuasions, and (4) physiological states. Bandura (1977) pointed out that "performance accomplishments" are the most influential source because they are based on personal mastery experiences. Moreover, it is suggested that efficacy expectations developed through repeated success could be so strong that the negative impact of occasional failures becomes negligible. "Vicarious experiences" entail seeing others successfully perform threatening activities. From such observations, self-persuasions of parallel success or at least some improvement in the performance can be generated. However, "vicarious experiences" have been said to be less dependable sources of information on one's capabilities than other direct evidence (Bandura, 1977). Another source of information stems from "verbal persuasions" made by another person, but Bandura (1977) observed that efficacy expectations induced in this manner are also likely to be weaker than those arising from one's own accomplishment. Taxing situations generally elicit "physiological states" and these might provide information concerning personal competency. This assumption rests on the premise that high arousal usually debilitates performance; therefore, an individual who has a feeling of excessive tension is less likely to succeed. Bandura (1986) further posited that these four sources of information, though relevant for judging personal capabilities, can only be meaningful after cognitive self appraisal. Speaking on this, Bandura (1986) wrote that: "Information that is relevant for judging personal capabilities - whether conveyed enactively, vicariously, persuasively, or physiologically - is not
inherently enlightening. Rather, it becomes instructive only through cognitive appraisal" (p. 401).

Bandura (1986) suggested that the cognitive processing of efficacy involves two separate functions: (1) attending to the information to be used as indicators of self-efficacy, and (2) use of rules or heuristics to integrate information from different sources to form self-efficacy judgements. In my estimation, these two functions of cognitive appraisal represent: (1) the process whereby the person evaluates the information and makes some judgement regarding the certainty/uncertainty of information received, and (2) the process of evaluating self in the context of the information received and the certainty/uncertainty of one's own performance relative to future contexts. In essence, this cognitive appraisal is a judgemental process which requires contextual thinking, relative thinking, and recognition of uncertainty of effects. These three elements have been adopted as evidence of a wise judgement by researchers such as Baltes and Smith (1990) and Arlin (1990). As both acts of cognitive appraisal and making wise judgements have in common the elements of contextual thinking, relative thinking, and recognition of uncertainty of effects, additional theoretical frameworks which this study has drawn on are the notion of wisdom as proposed by Baltes and Smith (1990) and the notion of wisdom in teaching as proposed by Arlin (1990).

From self-efficacy to teacher efficacy

Bandura's self-efficacy model offers a means to understand quality performance and has captured the interest of scholars from various fields of study. In studies of teachers and teaching, the construct of teacher efficacy was introduced into educational research by two
Rand Corporation evaluation studies (Armor, Conry-Osequera, Cox, Kin, McDonnel, Pascal, Pauly, & Zellman, 1976; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977). The findings from these two studies showed that teacher efficacy is strongly related to student achievement. To date, the most extensive study of teacher efficacy is probably that by Ashton, Webb, and Doda which began in 1979. One of the purposes of that study was to develop a conceptual framework for understanding the nature, antecedents, and consequences of efficacy in teachers. Ashton and Webb (1986), drawing on Bandura's model, described teachers' sense of efficacy as consisting of two dimensions: sense of teaching efficacy and sense of personal teaching efficacy. The dimension of teachers' sense of teaching efficacy refers to teachers' expectations that teaching can influence student learning. The dimension of personal teaching efficacy refers to individuals' assessment of their own teaching competence.

The design of Ashton, Webb, and Doda's study (1983) was based on an ecological model derived from Bronfenbrenner's conception of an educational environment. According to this model, the educational environment could be arranged into four systems: (1) the microsystem, (2) the mesosystem, (3) the exosystem, and (4) the macrosystem. When applied to the study of teacher efficacy, it involved identifying the relationships between teacher efficacy and these systems. The microsystem is the teachers' immediate setting, namely, the classroom environment. The mesosystem is the teachers' major setting, namely, the school environment. The exosystem includes all social structures external to the school environment, and the macrosystem is the basic cultural beliefs regarding the role of education in society. Some of the more pertinent findings from Ashton, Webb, and
Doda's study included the following: (1) student achievement is related to teacher efficacy; (2) team teaching arrangements, opportunity to participate in school decisions, and multi-age grouping contribute towards teachers' sense of efficacy; (3) low salaries, the influence of legislative and school board decisions on classroom instruction, and cultural beliefs such as the nature of intelligence, and the influence of family background on student motivation have negative effects on teachers' sense of efficacy.

Gibson and Dembo's (1984) contribution to the understanding of teacher efficacy was the development of a scale to measure teacher efficacy, the "Teacher Efficacy Scale." The initial version contained 30 items scored on a 6-point scale. Subsequent psychometric analysis resulted in the retention of 16 items. Nine items measure "personal teaching efficacy" and 7 items measure "teaching efficacy." Personal teaching efficacy is the belief that teachers hold regarding their own effectiveness as teachers. Gibson and Dembo (1984) described it as "a teacher's rating of his or her own abilities to perform the necessary tasks to bring about positive student change" (p.574). General teaching efficacy is the belief teachers hold regarding a teacher's ability to produce student learning. Gibson and Dembo (1984) described this as the teacher's belief in "the degree to which students can be taught given their family background, socioeconomic status (SES), and school conditions" (p.574). Since the publication of this instrument, it has been used extensively for related research with considerable success.

Current research in teacher efficacy has proceeded along several directions. Some of

1In this study, the term "teaching efficacy" as used by Gibson and Dembo (1984) is replaced by the term "general teaching efficacy".
these include: (1) establishing relationships between teacher efficacy and student behaviour (Midgley, Feldlaufer, & Eccles, 1989), (2) establishing relationships between teacher efficacy and student achievement (Ashton & Webb, 1986), (3) establishing relationships between teacher efficacy and teacher behaviour (Soodak & Podell, 1993), (4) assessing change in teacher efficacy over time (Glickman & Tamashiro, 1982; Housego, 1992), (5) identifying contextual variables that influence teacher efficacy (Ashton, Webb, & Doda, 1983; Raudenbush, Rowen, & Cheung, 1992), and (6) developing instruments to measure teacher efficacy (Riggs & Enochs, 1990). Despite this diversity of research interest, the cognitive component as mentioned by Bandura (1986), that is, cognitive self-appraisal, has not been adequately incorporated. Therefore, the need to include a cognitive component in teacher efficacy studies is evident.

Wisdom and Wisdom in teaching as expressions of the cognitive component in teacher efficacy

The inclusion of a cognitive component in teacher-related studies is not new. Researchers such as Arlin (1993), Newman (1993), and Sprinthall, Reiman, and Thies-Sprinthall (1993) have attempted to apply cognitive developmental theory to the study of teachers' developing competencies. One purpose of these studies stems from the researchers' belief that such information would be helpful in understanding teachers and the phenomenon of good teaching. The construct of teacher efficacy has not been included in these cognitive developmental models of good teaching. Indeed, it appears strange that despite sharing the common interest in studying "teachers and teaching" there seems little interaction between these two areas of research. Therefore, a meaningful movement would
be to incorporate a cognitive developmental model into the study of teacher efficacy. Of the various developmental models, Baltes and Smith's (1990) cognitive developmental work on wisdom appears appropriate for this purpose.

The conception of Baltes and Smith's (1990) theory of wisdom stems from their interest in studying expert-like performances. They conceived wisdom as an "expert knowledge system" which allows for the functional consequences of having "exceptional insight" and "exceptional judgement" (Baltes & Smith, 1990). They also suggest that an index of wisdom can be constructed based on five criteria: (1) rich factual knowledge, (2) rich procedural knowledge, (3) contextualism, (4) relativism, and (5) the ability to understand and manage uncertainty.

Baltes and Smith (1990) in discussing the developmental process of wisdom proposed a set of antecedent conditions which could regulate its development. One antecedent condition is the factor of personal efficacy: "The general prediction is that the development of wisdom in individuals is dependent on general, specific, and modifying factors. General factors include a certain level of cognitive, personal, and social efficacy" (Baltes & Smith, 1990, pp. 104-105). The inclusion of this factor within Baltes and Smith's model is an important rationale for incorporating the theoretical framework of wisdom into the study of teacher efficacy.

Baltes (1987) holds the view that the human mind possesses two fundamental dimensions. The first dimension is the "mechanics of mind" and the second dimension is the "pragmatics of mind." The former involves the basic operations of the human information-processing system whereas the latter refers to a general system of knowledge
available to individuals within particular occupations. This system of knowledge includes an understanding of how to effectively activate different types of knowledge to aid problem solving within particular contexts. Arlin (1993) is among the first to apply this concept of "pragmatics of mind" to the study of teachers and teaching. In her current work, attempts are made to study how wisdom is related to teaching expertise. To the extent that Arlin has begun to apply the wisdom concept to the study of student teachers and teachers, this study will build on Arlin's work by incorporating teacher efficacy and wisdom in a study of student teachers' teaching performance.

**STATEMENT OF THE PROBLEM**

The purpose of this study is to identify the strength of association among the variables of "wisdom", "wisdom in teaching", "personal teaching efficacy", "general teaching efficacy", and "teaching performance". To fulfill this purpose, two problem statements were developed:

1) To what extent do wisdom, wisdom in teaching, personal teaching efficacy, and general teaching efficacy impact on teaching performance?

2) To what extent do wisdom, wisdom in teaching, and teaching performance impact on the formulation of personal and general teaching efficacy?

Several issues associated with these two problem statements warrant attention:

1) Bandura (1977) suggested that formulation of self-efficacy from performance accomplishments is mediated by a cognitive component. It appears that this variable has not been adequately taken into account in teacher efficacy studies.
Therefore, one purpose of this study is to identify the role of a cognitive component in relation to efficacy formation. A cognitive developmental interpretation of teacher efficacy may help provide a more complete understanding of this phenomenon. In order to further investigate this psychological construct with this added dimension, an attempt will be made to assess the strength of relationships between student teachers' two wisdom measures and their teaching performance on the formulation of the two measures of teacher efficacy.

2) Self-efficacy researchers generally concur that there are two dimensions to teacher efficacy: a) personal teaching efficacy, and b) general teaching efficacy. However, the impact of these two components on teaching performance is still largely unclear. An aim of this study is to identify the relative contribution of each of these two dimensions of teacher efficacy to teaching performance.

3) Performance, in Bandura's model of self-efficacy, is influenced by level of self-efficacy. In this study, the cognitive dimension of wisdom has been added to the model. A point of interest would be to assess the relative contribution of the two efficacy measures and the two wisdom measures to teaching performance.

4) Arlin's work on wisdom and expertise in teaching is based on the lifespan model of wisdom proposed by Baltes and his colleagues. Arlin has redefined what Baltes and Smith (1990) called "pragmatics of life" as the "pragmatics of teaching." In presenting a framework of antecedent factors of wisdom, Baltes and Smith (1990) included a variable they called "personal efficacy." This component was not incorporated in Arlin's early work with teachers. This study aims to extend Arlin's
work and to examine the relationship between Baltes' notion of wisdom, Arlin's notion of wisdom in teaching, and teaching performance.

In sum, the focus of this study is to address these four issues so that a more complete understanding of the phenomenon is possible.

RESEARCH QUESTIONS

The general research question derived from the two problem statements of the study is framed as follows: What is the strength of association among the variables wisdom, wisdom in teaching, personal teaching efficacy, general teaching efficacy, and teaching performance?

Arising from this general research question, two particular questions are of interest to the investigator:

1) What is the relative contribution of wisdom, wisdom in teaching, personal teaching efficacy, and general teaching efficacy to teaching performance?

2) What is the relative contribution of wisdom, wisdom in teaching, and teaching performance to the formulation of personal teaching efficacy and general teaching efficacy?

The first research question is designed to identify the relative contribution of the two measures of wisdom (wisdom and wisdom in teaching) and the two measures of teacher efficacy (personal teaching efficacy and general teaching efficacy) to teaching performance. Arlin's (1993) and Arlin and Fung's (1995) work on wisdom and expertise in teaching are based on the premise that wise teachers are expert teachers but the reverse is
not necessarily true. Teacher efficacy studies such as those by Trentham, Silvern, and Brogdon (1985) and Hoover-Dempsey, Bassler, and Brissie (1992) suggest positive correlations between level of personal teaching efficacy and teaching performance. Although there is no previous research on which I could base my conjecture of the relative contribution of the two measures of wisdom and the two measures of teacher efficacy to teaching performance, I speculated that the influence of wisdom in teaching would have the greatest influence on teaching performance. The rationale for this speculation is based, in part, on Bandura's (1981) reference to the importance of a cognitive component in his theory of self-efficacy and in part, on Baltes and Smith’s (1990) proposal of self-efficacy as an antecedent factor of being wise. As Arlin’s notion of wisdom and expertise in teaching is based on Baltes and Smith’s (1990) work on wisdom, one might suspect a substantial amount of commonality between these two components. To the extent that wisdom and expertise in teaching is domain specific, I speculated that it would have a greater influence on teaching performance than the more domain general wisdom proposed by Baltes and Smith (1990).

The second research question is designed to identify the relative function of wisdom, wisdom in teaching, and teaching performance on the formulation of personal teaching efficacy and general teaching efficacy. Bandura (1986) argued that for enactive attainment to be informative for efficacy formulation, the influence of a variable that represents cognitive appraisal needs to be taken into account. In this study, cognitive appraisal is defined in terms of wisdom and wisdom in teaching. I speculated that by incorporating wisdom, and wisdom in teaching, the understanding of efficacy formulation
will be more complete.

**PURPOSE OF THE STUDY**

The main purpose of this study is to contribute to a better understanding of the construct of teacher efficacy from both a social cognitive and a cognitive developmental perspective. This can be achieved by means of identifying the relationships between the variables of wisdom, wisdom in teaching, personal teaching efficacy, general teaching efficacy, and teaching performance.

In trying to identify these relationships, several recursive a-priori path models were specified for testing. Path models are diagrammatic representations of hypothesized relationships of variables of interest and more often than not, contains regression problems involving two or more regression equations. In path models, a straight one-way arrow from one variable pointing to another variable denotes that the latter is the effect of the former. A path coefficient is used to represent the magnitude of this effect. Path diagrams can also have curved two-headed arrows. These are unanalysed correlations between variables not dependent upon the others in the model. Thus, the value for this two-headed arrow is the simple correlation coefficient. Path coefficients can be standardized (correlation coefficients, path coefficients) or concrete (total and path regressions). Following Wright's (1971) suggestion, standardized path coefficients were used in this study as they allow for between path comparisons. By comparing the magnitude of path coefficients, the relative contribution of each exogenous variable (independent variable, "x") on the endogenous variable (dependent variable, "y") can be
There are different ways to analyse path diagrams. One way, as described above, is to identify the relative strength of the effect of each path. The other is to test for goodness-of-fit of the entire model. This method treats the grid of relationships in the observed data as a template against which to test competing theoretical models of those relationships in the real world. Theoretically, many models can be generated and many models may fit the data. Therefore, if a model is identified as one which can adequately describe the data (fits the data), that model can be accepted as one possible explanation of the processes in the population. In this study, four models have been specified to be tested. The rationales for specifying these models as well as the models themselves are presented below.

Models A1 to A3 correspond to the first research question. Model B1 corresponds to the second research question. Koopmans (1971) states that "... any statistical inference regarding identifiable parameters ... is conditional upon the validity of the model" (p. 175). Therefore, the first task of this study is to test the goodness-of-fit of these specified models and to identify the more parsimonious models which can answer the research questions posed. After the more parsimonious models have been identified, statistical inferences regarding the relationships among the variables can then be pursued. This process, known as path analysis, entails decomposing the model and testing the relative contribution of each variable to each of the dependent variables within the system. Path analysis distinguishes three types of relationships: direct effect, indirect effect, and total effect. A direct effect is the influence of one variable on another that is not mediated by another variable in the
model. An indirect effect of a variable occurs when its effect on a variable is mediated by at least one intervening variable. Total effect is the sum of the direct and indirect effects. By taking these effects into consideration, the understanding of the phenomenon being examined is more complete. The a priori models for this study are presented as Figures 1 to 4.

Figure 1: Model A1

Rationale for Model A1:

From a cognitive developmental perspective, wisdom represents a high cognitive function responsible for judgement and subsequent behaviour. Therefore, both wisdom and wisdom
in teaching are seen as having an impact on personal teaching efficacy and general teaching efficacy. As wisdom in teaching is domain specific and wisdom is domain general, it is conceived that the factual and procedural knowledge required for the domains of life-planning and teaching may be different although the two variables share some common components (contextual thinking, relative thinking, and recognition of uncertainties of effects). In this model, the notion that teaching performance is affected by wisdom in teaching rather than wisdom in general is proposed. Previous teacher efficacy studies have demonstrated that personal teaching efficacy impacts on teaching performance. Therefore, in this model, a path from personal teaching efficacy to teaching performance is also specified.

Figure 2: Model A2
Rationale for Model A2:

This model (Model A2) is also developed from a cognitive developmental perspective and the rationales given for Model A1 can be applied. However, it is assumed in this model that wisdom is related to wisdom in teaching and therefore has some impact on teaching performance. It is conceived that the sharing of commonalities in the components of contextual thinking, relative thinking, and recognition of uncertainty of effects might be so large that the effect of discrepancies in the two types of factual and procedural knowledge becomes minimal. Therefore, a causal path is added from the component of wisdom to the component of teaching performance.

Figure 3: Model A3
Rationale for Model A3:

From a cognitive developmental perspective and building from Model A2, a causal path is added from the component of general teaching efficacy to teaching performance. General teaching efficacy has not been established as a significant correlate of teaching performance and this component has been largely ignored in some teacher efficacy research. This component is incorporated in this study and its contribution towards teaching performance is re-tested. It is conceived that with the addition of a cognitive dimension, this component might take on a new role within the teaching efficacy model.

Figure 4: Model B1
Rationale for Model B1:

Bandura (1986) argued that enactive attainment is an influential indicator for efficacy formulation. However, enactive attainment can only be informative and relevant when mediated by a cognitive variable. In this study, the cognitive variable selected as the possible mediators are wisdom and wisdom in teaching. If the assumption is correct, the data obtained in this study would fit the model as specified.

DEFINITION OF TERMS

The terms used in this study were defined as follows:

Wisdom (W)

Wisdom is conceptualized by Staudinger, Smith, and Baltes (1992) as a person's "fundamental pragmatics of life, (it) comprises of a body of knowledge about the variations and conditions of human development across the life course: human nature and conduct, life tasks and goals, social relationships, the dynamics of intergenerational relations, and the meaning of life" (p. 272). In this study, this is represented by a score the student teacher obtains based on his or her written response on a life-planning dilemma. The dilemma used in this study is "Jack" (Smith & Baltes, 1987).

Wisdom in teaching (WT)

Usage of this term follows that of Arlin (1993). In this study, this construct is represented by a score the student teacher achieves based on his or her written response on a teaching related dilemma. The teaching dilemma used for this study is "Perimeter" (Arlin, 1987).
Personal teaching efficacy (PTE)

This is the belief that the student teachers hold regarding their ability to teach effectively. This construct is reflected by the total score the student teachers achieve on 9 items of the Teacher Efficacy Scale (Gibson & Dembo, 1984). These items seek to assess the degree to which teachers believe in their own ability to manage the class, evaluate students, and assist students to learn. In this study, there are two such scores: PTE1 represents the personal teaching efficacy score obtained prior to a teaching practice. This score is used for Models A1 to A3. PTE2 represents personal teaching efficacy score obtained after a teaching practice, this score is used for Model B1.

General teaching efficacy (GTE)

This is the belief that the student teachers hold regarding the notion that teachers have the ability to produce student learning despite obstacles which are student related. This construct is reflected by the total score the student teachers achieve on the 7 items of the Teacher Efficacy Scale (Gibson & Dembo, 1984). These items are used to assess the degree to which a teacher believes that teachers can overcome obstacles such as a student’s parental influence and/or economic disadvantages to produce student learning. In this study, there are two such scores: GTE1 represents the general teaching efficacy score obtained prior to a teaching practice. This score is used for Models A1 to A3. GTE2 represents the general teaching efficacy score obtained after a teaching practice. This score is used for Model B1.

Teaching performance (TP)

This term is used to denote a student teacher's quality of teaching performance. In this
study, this is the total score obtained by a student teacher in his or her teaching practicum. In the teaching practicum, each student is observed and evaluated four times. The total score is an aggregation of scores across the four observations and from the three areas of: 1) lesson preparation, 2) lesson delivery, and 3) classroom management.

SIGNIFICANCE OF THE STUDY

A major interest in studying teaching effectiveness rests on the assumption that an effective teacher can optimize student learning. Various means of assessing teaching effectiveness have been used over the years but it is only recently that the study of teacher efficacy has come to the fore. Only parts of the model of teacher efficacy have been explored. Some of these parts include the relationship between a teacher's personal efficacy and his or her performance, contextual antecedents of teacher efficacy formulation, and change in personal and general teacher efficacy over time. By examining teacher-efficacy with the added cognitive concept of wisdom and wisdom in teaching, an important contribution is made towards elaborating existing models. From a practical perspective, this study can help generate a more complete cognitive and social behavioural profile of student teachers. It is hoped that such information could provide some insights into the structuring of teacher preparation curriculum and practicum experiences.
CHAPTER II

REVIEW OF LITERATURE

The aim of this study is to investigate the inter-relationships between wisdom in general, wisdom in teaching, personal teaching efficacy, general teaching efficacy, and teaching performance. The theoretical framework of the study is built on Bandura's notion of self-efficacy and Arlin's notion of wisdom and expertise in teaching. Whereas Bandura works from a "social-cognitive" perspective, Arlin works within a cognitive developmental framework. Therefore, in an attempt to find linkages between these two diverse research traditions, the review of literature is focused on the two major areas of "self-efficacy" and "wisdom and expertise in teaching."

Within each major area, there are sub-sections. In the area of self-efficacy, the sub-sections are: (1) Bandura's theory of self-efficacy, (2) the study of teacher-efficacy, and (3) a summary of the section. In the area of wisdom and expertise in teaching, the sub-sections are: (1) contemporary theories of wisdom, (2) the application of wisdom to teaching, (3) relating wisdom to other cognitive dispositions, and (4) a summary of the section. A summary of ideas pertinent to the study is presented in the final section.

SELF-EFFICACY

Bandura's theory of self-efficacy

Self-efficacy, a construct developed within the framework of a social cognitive and behavioural theory, has been seen as a mechanism for mediating people's motivation,
thought patterns, and behaviour (Feltz, 1992). Bandura (1977) describes self-efficacy as having two dimensions: outcome expectancy and efficacy expectancy. Outcome expectancy is defined as "a person's estimate that a given behaviour will lead to certain outcomes" (Bandura, 1977, p.193) whereas efficacy expectancy is defined as "the conviction that one can successfully execute the behaviour required to produce the outcomes" (Bandura, 1977, p.193). Two basic claims are made in Bandura's theory: (1) that perceived self-efficacy has "directive influence on choice of activities and settings" (p. 194), and (2) that strength in the dimension of efficacy expectations can affect "how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences" (p. 194) while pursuing their choice of activity. This second claim has been of particular interest to researchers who are interested in identifying means to optimize performance. Therefore, a majority of research on the topic of self-efficacy has been centered on testing the relationship between level of efficacy expectations and performance outcomes.

Although Bandura presented a clear theoretical framework on self-efficacy, he did not provide any means to measure this construct. Therefore, methods to assess self-efficacy have been left in the hands of individual investigators. A review of this literature shows that most researchers constructed paper-and-pencil tests to assess a person's feeling of efficacy in a specific area. Examples of such works include the construction and use of the Physical Self-Efficacy Scale by Ryckman, Robbins, Thornton, and Cantrell (1982) to measure the extent to which a person feels efficacious about his or her physical ability, the Teacher Efficacy Scale by Gibson and Dembo (1984) to measure the extent to which a
teacher feels efficacious about his or her ability to teach, and the Gymnastic Efficacy Measure by McAuley (1985) to measure the extent to which an individual feels efficacious that he or she can execute a balance beam skill in gymnastics. Using context specific instruments, researchers are able to establish a relationship between level of self-efficacy and performance. For example, Feltz and Riessinger (1990) and George, Feltz, and Chase (1992) found a strong correlation between level of self-efficacy and performance in muscular endurance. Similarly, Lirgg and Feltz (1990) found a significant correlation between self-efficacy and motor performance. Furthermore, in a recent review paper on self-efficacy and work-related behaviour, Sadri and Robertson (1993) conclude that the positive relationship between self-efficacy and performance is clear and definite.

Teacher-efficacy

The study of teacher-efficacy was inspired by Bandura's theory of self-efficacy. The basic assumption of Bandura's theory rests on the premise that a person's behaviour is acquired and regulated through a sense of self-efficacy. Translated into more practical terms, the theory suggests that self-efficacy could actually determine how much effort a person will expend and how long an individual will persist in face of obstacles and aversive experiences while pursuing an activity. Excited by this claim, teacher educators began to question whether a teacher's activity, namely teaching performance, could be affected by his or her sense of efficacy. Researchers generally concurred that teachers with higher self-efficacy scores are more effective and competent on some of the characteristics which have been regarded as desirable for achieving student outcomes. For example, Woolfolk,
Rosoff, and Hoy (1990) found that teachers with higher sense of efficacy use classroom management approaches that stimulate student autonomy and keep students on task. Teachers with a higher sense of efficacy also attend more closely to the needs of lower ability students (Ashton, Webb, & Doda, 1983) and are more willing to learn and implement new teaching techniques (Raudenbush, Rowen, & Cheong, 1992).

Despite such encouraging findings, only a few attempts have been made to identify variables which might contribute to a high perception of efficacy. A review of this line of work showed that most studies are focused on associating organizational variables (size of class, class structure, and principal's support); student variables (ability and behaviour); or teacher characteristics (sex and experience); with teachers' sense of efficacy. Some of these efforts include works by Safran (1985), Guskey (1987), Raudenbush, Rowan, and Cheong (1992), and Raudenbush, Bhumirat, and Kamali (1992). It appeared from these studies that student characteristics and teaching environment (class size, class structure and principal's support) can affect a teacher's sense of efficacy. It would appear that the more the teachers feel that they can control these variables, the greater is their sense of efficacy. In identifying teacher characteristics which might influence teacher efficacy, it was found that females more often reported a higher sense of personal teaching efficacy than males (Anderson, Greene, & Loewen, 1988; Raudenbush, Rowan, & Cheong, 1992) whereas experience seems to have a negative effect on general teaching efficacy (Hoy & Woolfolk, 1990; Saklofske, Michayluk, & Randhawa, 1988). Personal teaching efficacy, on the other hand, seems to increase with experience (Benz, Bradley, Alderman, & Flowers, 1992; Housego, 1990; and Hoy & Woolfolk, 1990).
Early investigators tended to use questionnaires adapted from other areas as measures of teacher efficacy. The study by Barfield and Burlingame (1974) is one such example. They used the Political Efficacy Scale constructed by the Political Behaviour Research team at the Survey Research Center of the University of Michigan to assess teacher efficacy. The adapted questionnaire contained 5 items and respondents were asked to indicate whether they "agree" or "disagree" with each of the items. However, the authors failed to give a detailed report on the psychometric properties of their adapted version, thus its potential for use in future research is not clear.

A review of current research on teacher-efficacy revealed that the instruments most commonly used to assess teacher efficacy included: (1) the two items developed by the Rand Corporation in 1976, (2) the 15 efficacy vignettes developed by Ashton, Webb, and Doda in 1983, and (3) the 16 item scale by Gibson and Dembo in 1984.

The two Rand items purport to classify respondents into the 4 categories of (1) high in general efficacy and high in personal efficacy, (2) high in general efficacy and low in personal efficacy, (3) low in general efficacy and high in personal efficacy, and (4) low in general efficacy and low in personal efficacy. However, the reliability and validity of a two item scale in measuring teacher efficacy adequately is questionable.

Ashton, Webb, and Doda (1983) developed a 15-item Efficacy Vignette to measure teacher efficacy. This Efficacy Vignette is scored on a 7-point scale. The claim is made that it provides information on personal teaching efficacy. Each item of the instrument depicts a situation and respondents are asked to judge their ability to handle each situation effectively. Teaching behaviours corresponding to the 15 items include those of discipline,
work with parents, planning, socialization, motivation, and evaluation. Since situations depicted in the instrument seem to describe the expected duties required from a teacher, the instrument appears to be more useful for assessing in-service teachers than student teachers. Apart from this, the instrument does not seem to provide an assessment of general teaching efficacy - the belief that teaching could influence student learning - the "outcome expectations" component of Bandura's model. Therefore, if a researcher is interested in assessing both components of Bandura's model - personal teaching efficacy and general teaching efficacy, the Teacher Efficacy Scale constructed by Gibson and Dembo (1984) is the most appropriate choice. This scale contains 16 items scored on a 6-point scale. Nine items of the instrument measure personal teaching efficacy whereas the remaining 7 items measure general teaching efficacy. Internal reliability coefficients for the personal dimension, general dimension and the total scale (16 items) are .78, .75, and .79 respectively. Gibson and Dembo (1984) established the psychometric properties of this scale through a multi-trait multi-method triangulation procedure. It therefore warrants confidence for use.

In a recent review on teacher efficacy, Ross (1994) made several observations about the study of this construct. Regarding the choice of instruments, Ross (1994) made two particular points: (1) the inappropriateness of measuring teacher efficacy as a singular trait, and (2) the need for researchers to employ the most frequently used instruments for their work so that comparisons between studies can be made. Based on these observations, this investigator believes that Gibson and Dembo's (1984) Teacher Efficacy Scale would be a suitable instrument for use in this present study for the following reasons: (1) the Gibson
and Dembo’s (1984) Teacher Efficacy Scale yields separate scores for the two dimensions of teacher efficacy, namely, personal teaching efficacy and general teaching efficacy rather than as a score representing a singular trait. Following Ross’ (1994) suggestion and Bandura’s original theory of self-efficacy, this instrument meets the criterion well; (2) twenty-three studies completed since 1990 have utilized Gibson and Dembo’s (1984) Teacher Efficacy Scale. Twenty-one have used a mixture of self-constructed or other instruments. For the purpose of generating data for a field of study so that comparisons with previous works could be adequately performed, this instrument is an appropriate choice; and (3) the psychometric properties of this scale are well established (Anderson, Greene, & Loewen, 1988; Podell & Soodak, 1993; Soodak & Podell, 1993).

A summary of the review on self-efficacy

Nine conclusions can be drawn from the above review of the self-efficacy and teacher efficacy literature:

1) Bandura’s theory of self-efficacy provides a framework for understanding the relationship between a person’s level of self-efficacy and level of performance.

2) Application of Bandura’s theory to the study of teacher effectiveness showed a positive correlation between effectiveness and level of self-efficacy.

3) Recent teacher efficacy research have identified the construct as having two dimensions: 1) general teaching efficacy - the belief that teachers and teaching can affect student learning, and 2) personal teaching efficacy - the belief of self as having the ability to teach.
4) Variables influencing the self-percept of teacher efficacy included those of student ability, organization of environment, and individual characteristics such as sex and experience.

5) Personal and general teaching efficacy can change over time. Experience in teaching contributes positively to personal efficacy but negatively to general teaching efficacy.

6) The most commonly used method of assessing teacher efficacy is through paper-and-pencil tests. Several tests have been constructed by various researchers and the choice of instrument depends on the nature of the investigation but it should measure teacher efficacy as a multi-dimensional trait.

7) The Teacher Efficacy Scale (Gibson & Dembo, 1984) is an acceptable instrument for assessing teacher efficacy.

8) Researchers working on teacher efficacy have largely neglected to include a cognitive component (a measure of cognitive appraisal) in their work.

**WISDOM AND EXPERTISE IN TEACHING**

**Contemporary theories of wisdom**

Chandler and Holliday (1990) suggested that some reasons for the renewed interest to study wisdom included those of: (1) awareness of an aging population, (2) the need to look for "some up side to the otherwise downward spiral of getting old," and (3) the notion of "successful aging." However, Smith and Baltes (1990) argued that chronological aging "may be a necessary (but not sufficient) condition for the acquisition of wisdom." This
proposition suggested that reasons to study wisdom should extend beyond those of Chandler and Holliday (1990). Sternberg (1990) proposed that the study of wisdom could serve as a basis for the formulation of explicit and implicit psychological theories. This contention immediately opens up a vista of possibilities for those who wish to pursue wisdom studies. It would appear that the word "wisdom" carries various connotations, and that it can be viewed as a cognitive factor which influences a person's behaviour in a particular setting. Furthermore, "wisdom" need not be restricted to gerontology studies nor does it necessarily hold a linear relationship to chronological age (Smith & Baltes, 1990).

Contemporary theorists working with the concept of wisdom have come up with seemingly different working definitions for the term. Orwell and Perlmutter (1990), for example, referred to wisdom as an integration of cognition with affect, affiliation, and social concerns whereas Meacham (1990) defined it as an awareness of the fallibility of knowing. Kitchener and Brenner (1990) described wisdom as an intellectual ability whereby a wise person is seen as one who is aware of the limitations of knowing and how this limitation affects judgement. Sternberg (1990) described wisdom in terms of a metacognitive style so that a wise person is one who knows that he or she does not know everything. When one scrutinizes these working definitions, certain basic tenets are evident. The more prominent ones are the acceptance of uncertainties and the recognition of one's own limits in knowing.

The most comprehensive current work on wisdom is probably that of Baltes and his associates. Baltes and Smith (1990) proposed that their concept of wisdom is "similar to and extends the original conceptual framework of Cattell-Horn theory of fluid-crystallized
intelligence" (p.94). They defined wisdom as "expert knowledge involving good judgement and advice in the domain, fundamental pragmatics of life" (p.94). The basic element of their theory rests on the notion that wisdom involves "good judgement and advice about important but uncertain matters of life" (Staudinger, Smith, & Baltes, 1992, p.272). According to their conception, wisdom was viewed as a cognitive construct with five components so that a wise person could be described as one who: (1) has rich factual knowledge, (2) has rich procedural knowledge, (3) is able to conceive matters and events in a life-span context, (4) accepts the notion that when judgement is passed, it is only relative to a perspective, and (5) is able to accept the notion that events and solutions to problems can be tentative.

Smith and Baltes (1987) proposed a 7-point assessment scheme for each of the five components described above. Assessment procedures entail asking the testee to respond to a life-planning dilemma which is then rated on a 7-point scale. For each component, a higher score means that the response matches well to the ideal protocol - an indication of a higher level of wisdom.

In describing a theoretical model for wisdom, Baltes and Smith (1990) included three major antecedent components. These are: (1) general factors such as cognitive mechanics, cultural learning, and personal efficacy; (2) specific expertise factors such as practice with problems of life, organized tutelage, and motivational dispositions; and (3) modifying and/or facilitative factors such as age, education, professional status, and leadership experience.

To date, the theory developed by Baltes and his colleagues has been applied mainly
to investigate differences in wisdom-related knowledge with respect to age and professional specialization. One such study which is pertinent to the present work is that of Arlin (1993). Specifically, Arlin (1993) extended Baltes' theory of wisdom to the study of teachers and teaching. In the following section, wisdom-related studies pertaining to teaching will be reviewed.

The application of wisdom to teaching

Arlin (1993) extended Baltes' definition of wisdom and applied it to teachers and teaching. Baltes' "pragmatics of life" were redefined as the "pragmatics of teaching" by Arlin (1993). Under this assumption, teachers' wisdom in teaching can be evaluated in terms of their richness in factual and procedural knowledge related to teaching, their ability to view the act of teaching as being in context, and as being relative to other influences such as students, values, and priorities. Teachers' degree of acceptance about the uncertainty of the effects of decisions encountered during teaching can also give an indication of their level of wisdom. These are the Baltes and Smith (1990) wisdom criteria redefined in terms of teaching.

In the area of assessment, Arlin (1993) developed different classroom dilemmas to assess teachers' wisdom. This notion parallels Smith and Baltes' (1987) use of life-planning dilemmas to assess wisdom in the pragmatics of life. Arlin's suggestion was an extension of Levitt's (1988) work which employed teachers' responses to classroom dilemmas to identify teachers' cognitive developmental status.

Lee (1993), from a slightly different perspective, characterised the teaching act of
"wise teachers" as being democratic, dialogic, and ecologically valid. Furthermore, she described wise teachers as "expert teachers" who possess a high level of cognitive development. According to Lee, wise teachers were postformal reasoners. Following Csikszentmihalyi and Rathunde (1990), Lee (1993) depicted postformal reasoners as persons who acknowledge the interrelatedness of all experience and adopt a metasystematic or reflective and integrative approach to thinking. This line of thinking echoes that of Arlin (1975) and Kramer (1983). Arlin (1975) described postformal reasoners as persons with creative thoughts, who have the ability to envision new questions, and are problem-finders while Kramer (1983) suggested that there are three major characteristics associated with adult postformal thought. These were (1) knowledge has a relativistic, non-absolute nature; (2) contradiction is accepted as part of reality; and (3) the integrative approach to thinking. When these characteristics are viewed against the wisdom components described by Baltes and Smith (1990), postformal thinkers and wise persons seems to have similar cognitive dispositions.

Arlin and Fung (1995) tested the relationship between postformal thinking and wisdom and found a positive correlation between level of postformal thinking and level of wisdom. Specifically, postformal measures including dialectical reasoning, reflective judgement, and social problem finding, were strong indicators of life-planning wisdom. They also suggested that when novice and expert teachers were compared on the wisdom criteria, the frequency of achieving a high score was greater among expert teachers. This finding is congruent with previous works on novice and expert teachers including those by Carter, Cushing, Sabers, Stein, and Berliner (1988) and Swanson, O'Connor, and Cooney
(1990) who suggested that expert teachers are superior to novices in terms of domain specific cognitive functioning.

If "wise" teachers could indeed be portrayed as expert teachers with a high level of cognitive functioning, it can be argued that teaching performance is also affected by a teacher's developmental status with respect to wisdom in teaching. While conceptually wisdom and expertise in teaching can be linked, no empirical test of this relationship exists.

Relating wisdom to other cognitive dispositions

Characteristics of wisdom, particularly those of reflective thinking/reflective judgement and problem finding, had been associated with high level judgement and performances in teacher studies. The idea of studying teachers as reflective thinkers stems from Schon's (1983) notion of "reflection-in-action." Schon (1983) pointed out that when a person has to cope with "troublesome divergent situations of practice" (p.62) the opportunity to reflect-in-action is created. Faced with this situation, the person may surface and criticize his initial understanding of the phenomenon, construct a new description of it, and test the new description by an on-the-spot experiment ...

when he finds himself stuck in a problematic situation which he cannot readily convert to a manageable problem, he may construct a new way of setting the problem ... (p.63)

Furthermore, Schon (1983) also pointed out that "when a practitioner becomes a researcher into his own practice, he engages in a continuing process of self-education" (p. 299). This notion of "a continuing process of self-education" suggests a developmental process which
is also a basic assumption in Baltes' lifespan theory of wisdom and Arlin's construct of wisdom in teaching.

A consistent theme in Arlin's concept of wisdom and expertise in teaching is one of teachers' reactions to "ill-defined problems." According to Arlin (1993), the context of teaching presents a milieu in which teachers and students encounter "ill-defined problems." Wise teachers can be characterized as persons who are able to take the students' points of view and thereby solve the problem based on their perspective and understanding of the phenomenon in question. This ability of wise teachers to integrate experience with theory in the formulation of on-the-spot solutions to unique and complex teaching problems is similar to Schon's notion of reflection-in-action. It is also similar to Selman's (1980) notion of perspective taking - the ability to differentiate the other's view from one's own.

The relationship between perspective-taking capacity and teaching performance is sparse. Early studies such as those by Hunt (1976) and Applegate (1980, 1982) indicate that there is a positive relationship between interpersonal adaptability and level of cognitive development. Hunt's work is grounded in a cognitive developmental framework. He identified two general components of adaptation processes and suggested that a teacher must first "read" cues presented by the students, then the teacher must "flex" the communication approach in relation to the learner's perspective. Applegate (1980, 1982) took this notion further and examined the development differences in interpersonal adaptability. He proposed that the ability to construct adaptive communication is linked to the development of more abstract and dispositionally oriented constructs of perceiving others. In his 1980 study, he found a significant difference in prospective teachers'
abilities to perceive and adapt to individual students' perspectives and concluded that there is a positive correlation between this and the quality of teaching. O'Keefe and Johnston (1989) in a more recent paper on perspective taking and teacher effectiveness suggested that teachers' perspective-taking abilities and understanding are developmentally acquired capacities. To the extent that perspective taking involves taking another point of view and is developmentally based, I argue that there is some commonality between Arlin's notion of wisdom and expertise in teaching, Hunt's notion of adaptive communication, and Selman's notion of perspective taking.

A summary of the review on wisdom

The following conclusions can be drawn from the review of wisdom related literature:

1) Age is a necessary but not sufficient condition for achieving wisdom.

2) A wise person is one who can recognize one's own limits in knowing.

3) Wisdom that is domain specific is reflected in a person's richness in factual and procedural knowledge of that domain as well as the degree to which that person accepts the contextualism, relativism, and uncertainties of issues pertaining to that domain.

4) Responses given to a life-span dilemma can reflect a person's developmental level of wisdom. Likewise, teachers' responses to classroom dilemmas may reflect their developmental status of wisdom in teaching.

5) Domain specific ideas of wisdom make possible the application of this concept to
6) Characteristics of wise teachers include the possession of domain specific expertise, the ability to take the perspective of students and to engage in reflective thinking.

7) The relationship between life-planning wisdom, wisdom in teaching, and teaching performance needs to be established empirically.

SUMMARY OF IDEAS PERTINENT TO THE STUDY

Research on teacher efficacy and wisdom provides the framework for the study. The ideas framing arguments for the study are as follows:

1) An interest in studying teacher efficacy stems from the association of teaching performance with teacher efficacy. Since teaching performance is seen as one factor which impacts on student learning, the phenomenon of teacher efficacy warrants greater attention.

2) The importance of a cognitive component in efficacy formulation has not been adequately explored despite Bandura’s stress on its importance. An inclusion of this variable in teacher efficacy studies is necessary in order to make the understanding of the phenomenon more complete.

3) The Teacher Efficacy Scale (Gibson & Dembo, 1984) is one means of assessing teaching efficacy. This instrument has met the psychometric requirements necessary for obtaining a valid and reliable measure of teacher efficacy along two dimensions: personal teaching efficacy and general teaching efficacy.

4) The motivation to study wisdom stems from the association of wisdom with expert
and expert-like performances. Wisdom-related works on teachers and teaching have not included the social cognitive construct of teacher efficacy. Given that most teaching is situated in a social context, the inclusion of teacher efficacy in teacher-related wisdom studies aids the understanding of expert and expert-like teaching performances.

5) The assessment of wisdom in general is based on responses made to life-problems presented as a "dilemma scenario" in a paper-and-pencil format. This form of assessment can be extended to a domain specific situation through the use of a classroom dilemma presented as a teaching problem. Responses made to the dilemma can reflect the respondent's status of teaching-related wisdom in a manner similar to the general wisdom dilemma.

6) The relationship between life-planning wisdom and wisdom in teaching, despite sharing similar components, has not been examined empirically. Therefore, empirical establishment of their relationship is important.

7) The study of teachers and their teaching performances are the main foci of interest in teacher efficacy and wisdom in teaching research. Despite this obvious commonality, there is little effort to integrate these two lines of work. Therefore, studies which take on this approach are clearly needed if "teachers" and "teaching" are to be better understood.
CHAPTER III

METHODOLOGY

The methodology employed in this investigation is described under the sub-sections of: (1) description of participants, (2) description of instruments, (3) scoring of the responses, (4) inter-rater reliabilities, (5) teaching performance score, (6) procedure of data collections, and (7) treatment of data.

Description of participants

The sample pool for this study was second year students attending a two-year full-time teacher education programme in Hong Kong. As part of their course requirement, they had to complete a six week teaching practice during their second year of attendance. This teaching practice was the first time they experienced full-time teaching in a school setting. The subjects they were assigned to teach were those they had selected in their programme of studies. They were observed at least four times by two different college supervisors over this course of teaching practice. After each observation, an assessment of their teaching performance was made.

Eighty-nine student teachers volunteered to participate in this study (28 males (31.5%) and 61 females (68.5%)). Their mean age was 21.3 (SD = .97, range = 20 to 25). Following Cohen and Cohen's (1983) recommendation for the calculation of power for research which employs regression analysis, the size of the participant sample resulted in a power of beyond .80 (alpha = .05).
Description of instruments

All instruments used in the study were translated into Chinese because Chinese is the first language used by the participants. The technique of "Back Translation" as recommended by Brislin, Lonner, and Thorndike (1973) was applied to ensure that the original meaning of the instruments used remained intact. This procedure involved several steps: 1) the original questionnaire was translated into Chinese, 2) the translated version was translated back into English by another person, 3) the two English versions were then checked by a third individual for face agreement.

Four instruments were used in this study. The first was a demographic form (Appendix A), the second was Gibson and Dembo’s (1984) Teacher Efficacy Scale (Appendix B), the third was the teaching dilemma “Perimeter” (Appendix C), and the fourth was the life-planning dilemma “Jack” (Appendix D).

The demographic form

The purpose of the demographic form was to obtain personal information from the participants. Information was gathered on student identity number, sex, age, and major and minor study areas. This personal profile aided in the understanding of the participants and interpretation of the findings. As this study involved data collection over time, this information was also necessary for the purpose of record tracing.

The Teacher Efficacy Scale

The Teacher Efficacy Scale (Gibson & Dembo, 1984) was used to obtain a measurement of both the participants’ personal teaching efficacy and general teaching efficacy. There are 30 items in the original scale. Psychometric evaluation by Gibson and Dembo (1984) led
to the retention of 16 items. The order of item presentation used in this study is the same as in the original form. There are 16 items on the questionnaire. Nine of these items are related to personal teaching efficacy and seven items are related to general teaching efficacy. Items related to personal teaching efficacy are: 1, 5, 6, 7, 9, 10, 12, 13, and 15. Items related to general teaching efficacy are: 2, 3, 4, 8, 11, 14, and 16.

The teaching dilemma

The teaching dilemma "Perimeter" (Arlin, 1987) provides a measure of the participants' teaching wisdom. The protocol contains a description of a classroom dilemma and 4 sets of questions for participants' response. The perimeter scenario was chosen because the dilemma described closely resembles a teaching situation which is familiar to the participants.

The four sets of questions that the participants were asked to respond to are:

1) Do you think the students have a problem? If so, what might it/they be and why do you think they are having such problem(s)?

2) Would you ask your students any questions? If so, what might it/they be?

3) Do you think you can help the students? If so, what activity(ies) would you plan for the next lesson and explain why you choose this/these activity(ies).

4) Do you need extra information before you can plan for the next lesson? If so, what might it be?

The life-planning dilemma

The life-planning dilemma "Jack" (Smith & Baltes, 1987) is designed to obtain a measure of wisdom. In this study, a slight adaptation was made to the protocol. The adaptation
involved changing Jack's retirement age from 65 to 60 to be commensurate with the situation familiar to the participants. This protocol contains a description of a life-planning dilemma and a question to cue the participants to respond. The question to help cue the participant to respond is "What should Jack do?".

Teaching performance

Teaching performance was represented by the composite marks a student teacher obtained for his or her teaching practicum. Each student teacher was observed four times and graded on the three areas of preparation of lesson, delivery of lesson, and classroom management.

Scoring of the instruments

Teacher Efficacy Scale

The Teacher Efficacy Scale is scored on a 6 point scale (Gibson & Dembo, 1984). All items of the personal teaching efficacy dimension (items 1, 5, 6, 7, 9, 10, 12, 13, 15) are phrased in a way so that agreement with the item would yield a high score. The scores of all items in this dimension are summed so as to yield a total personal teaching efficacy score. Of the 7 items of the general teaching efficacy dimension (items 2, 3, 4, 8, 11, 14, 16), 6 are phrased so that agreement with each would yield a low score. The item which is phrased so that agreement with it yields a high score is item 14 which reads as follows: "The influence of a student's home experience can be overcome by good teaching." In calculating the total for this dimension, 6 items (items 2, 3, 4, 8, 11, 16) are scored in reverse so as to ensure that high scores mean high efficacy on both dimensions. The scores of all items in this dimension are summed so as to yield a total general teaching efficacy
The teaching dilemma

The scoring system for this questionnaire is adapted from Smith and Baltes (1990) in their study of the pragmatics of life, specifically for life-planning problems. In this study, each participant's response to the questionnaire was rated on different components: (1) factual and procedural knowledge, (2) contextualism, (3) relativism, and (4) uncertainty. In each component, the rater is asked to assess the extent to which the response matches the given criteria and then to assign its equivalent score. For the component of factual and procedural knowledge, the question posed to the rater is:

*To what extent does the person who produced this protocol give the impression that he or she has a rich factual and procedural knowledge about planning for future instructions about "perimeter"?*

From this guiding question, four related questions were used to help develop a scoring system. The first question is:

*Does the person discuss the problem in a way that shows a depth of factual and procedural knowledge about lesson planning? Depth is indicated by a discussion of using: 1) a specific theme cued by the problem, 2) a constructivist approach, 3) logical and appropriate teaching strategies, and 4) a clear process in making lesson plans.*

Based on this question, the scoring system developed is:

Score 1 = next lesson not related to same topic
Score 2 = next lesson is on the same topic but is not related to the students' problem

---

2 Following Smith and Baltes (1990b), the components of "factual knowledge" and "procedural knowledge" have been collapsed for scoring in this dilemma. This component is termed "factual and procedural knowledge". This procedure is particularly suitable for scoring the perimeter dilemma. Treatment of factual and procedural knowledge as separate components would have made the scoring procedure for this dilemma less effective.
Score 3 = next lesson is planned so as to resolve students' problem

The second question which guides the development of a scoring system for the component
of factual and procedural knowledge is:

**Does the protocol show a constructivist approach to teaching?**

Based on this question, the scoring system developed is:

Score 1 = does not demonstrate constructivist approach
Score 2 = demonstrates a one-stage constructivist approach
Score 3 = demonstrates a two or multi-stage constructivist approach

The third question which guides the development of a scoring system for the component of
factual and procedural knowledge is:

**Does the person mention teaching strategies to be used?**

Based on this question, the scoring system developed is:

Score 1 = no mention of any teaching strategy
Score 2 = mention of one teaching strategy
Score 3 = mention of two or more teaching strategies

The fourth question which guides the development of a scoring system for the component
of factual and procedural knowledge is:

**Does the person who produced this protocol show a knowledge about the
process of making lesson plans? For example, are there clear lesson
objectives and methods for their evaluation?**

Based on this question, the scoring system developed is:

Score 1 = no mention of lesson objectives
Score 2 = a vague mention of lesson objective(s)
Score 3 = mention of clear objective(s) and how it/they are evaluated

For the component of contextualism, the question which guided the development of the
scoring the scoring system is:
To what extent does the person who produced this protocol give the impression that he or she knows a great deal about the past, current, and future learning problems of the students?

The scoring system developed for this question is as follows:

Score 1 = thinks there is a problem and relates it to a non-student-related source
Score 2 = thinks there is a problem and indicates generally that it might be related to students and other source
Score 3 = speculates one or more specific student-related reasons. Examples would be age-related, socio-historical, or idiosyncratic

For the component of relativism, the guiding question is:

To what extent does the person who produced this protocol give the impression that instead of being rigid (egocentric) in judgement, can consider values, motives, and goals that are different from his or her own?

Based on this question, the scoring system is:

Score 1 = give reason(s) and solution(s) to the problem from the perspective of self as teacher
Score 2 = give one reason for the problem and one solution to the problem from the perspective of the student
Score 3 = give two or more reasons for students' problem and solution(s) to the problem from the perspective of the student

For the component of uncertainty, the guiding question is:

To what extent does the person who produced this protocol give the impression that he or she has a good understanding of the inherent uncertainty of the problem as well as effectiveness of proposed strategies for managing the problem?

Based on this question, the scoring system is:

Score 1 = positive of reason(s) given to the students' problem(s) and positive of the effectiveness of its management strategy
Score 2 = positive of some of the reasons given to the students' problem(s) and uncertain of the effectiveness of some of the management strategy(ies) OR uncertain of the reason(s) and positive about the strategy(ies)
Score 3 = uncertain about the students' problem(s) and uncertain about the effectiveness of the management strategies. Although the person recognizes that the instructional problems are ill-defined and that there are multiple strategies/solutions which may be used, he or she also recognizes that what he or she selects may not be the most adequate for the problem.

The life-planning dilemma

A 7-point scale has been created following Smith and Baltes' (1987) scale to score the responses on this dilemma protocol. There are five areas to be scored. The scoring system for each area is guided by a descriptive statement adapted from Smith and Baltes (1987).

The descriptive statement is presented first and is followed by the scoring plan:

**Good, insightful judgement and advice about difficult life decisions**

Score 1 = gives an illogical piece of advice
Score 2 = gives an illogical piece of advice with supportive reasons
Score 3 = selects option 1 or 2 but gives no further comments
Score 4 = selects option 1 or 2 and makes comments about what Jack can do after selecting that option
Score 5 = selects option 1 or 2 and makes comments about what Jack can do after selecting that option and on the negative aspect(s) of the non-selected option
Score 6 = selects option 1 or 2 and makes comments on the negative and positive aspect(s) of both options
Score 7 = gives a well supported alternate option which is logical and maybe in Jack's best interest

**Rich knowledge about life problems and about life planning**

Score 1 = sees Jack's present problem and future as non-problematic and does not make any future plan for Jack
Score 2 = sees Jack's problem as non-problematic and the future as problematic but does not develop any future plan for Jack
Score 3 = sees Jack's present problem and future as non-problematic, and makes one simple future plan for Jack that does not take into consideration any possible unforeseeable problems
Score 4 = sees Jack's problem and future as somewhat problematic but can still make one simple future plan for Jack that does not take into consideration any possible unforeseeable problems
Score 5 = sees Jack’s problem and future as somewhat problematic and
speculates on one possible problem that Jack might need to deal
with in the future, and makes one simple future plan for Jack
that takes account of that one possible problem
Score 6 = sees Jack’s problem and future as somewhat problematic and
speculates on two or more possible problems that Jack might need
to deal with in the future, and makes one simple plan for Jack
that takes into account those problems
Score 7 = sees Jack’s problem and future as somewhat problematic and
speculates on two or more possible problems that Jack might need
to deal with in the future, and makes two or more simple plans
for Jack that takes into account of those problems

Contextualistic thinking: Good knowledge about the background context
of life problem

Score 1 = does not discuss Jack’s problem and future in relation to his
present status variables (age, interest, health, finance)
Score 2 = discusses Jack’s problem and future in relation to one of his
present status variables
Score 3 = discusses Jack’s problem and future in relation to two or more
of his present status variables
Score 4 = discusses Jack’s problem and future in relation to his significant
others (immediate family) - the impact of Jack’s choice on them
Score 5 = discusses Jack’s problem and future in relation to his immediate
family and friends - the impact of Jack’s choice on them
Score 6 = discusses Jack’s problem and future in relation to his immediate
family and friends - their interactive impact on each other
Score 7 = discusses Jack’s problem and future in relation to his immediate
family and friends and their interactive impact, and how these
interactions might change with time so that there is a need for
short-term and long-term plans

Relativistic thinking

Score 1 = from the standpoint of own experiences describes one solution
that is based on one of Jack’s present or future status, ie.
solution is relative to that one status but is based on respondent’s
own experiences rather than Jack’s
Score 2 = from the standpoint of own experiences describes two or more
solutions that are based on two or more of Jack’s present and
future status variables, ie. solutions are relative to different status but
solution is based on own experience
Score 3 = from the standpoint of own experience describes one solution
that is based on two or more of Jack's present and future status variables but gives indication(s) that it might not work for Jack relative to Jack's own conditions

Score 4 = from the standpoint of own experience describes two or more solutions that are based on two or more of Jack's present and future status variables but gives indication(s) that they might not work for Jack

Score 5 = from a hypothetical standpoint created for Jack, describes one solution that is based on two or more of Jack's present and future status variables but gives indication(s) that the hypothetical standpoint created for Jack is limited to his or her own experiences and may not be relevant for Jack

Score 6 = from a hypothetical standpoint created for Jack, describes two or more solutions that are based on two or more of Jack's present and future status variables but gives indication(s) that the hypothetical standpoint created for Jack is limited to his or her own experiences and may not be relevant for Jack

Score 7 = creates several hypothetical standpoints for Jack and describes two or more solutions that are based on two or more of Jack's present and future status variables but gives the indication(s) that the hypothetical standpoints created for Jack are limited to his or her own experiences and may not be relevant for Jack

**Awareness of uncertainty**

Score 1 = prescribes a solution for Jack without indicating a need for more information about Jack. He or she is certain that the solution is workable

Score 2 = indicates a need for specific information about Jack but could still prescribe a solution that he or she thinks if definitely workable

Score 3 = suggests a solution for Jack without indicating a need for more information about Jack but acknowledges that the solution may not be workable

Score 4 = indicates a need for specific information about Jack. Suggests a solution for Jack but acknowledges that the solution may not be workable

Score 5 = indicates a need for specific information about Jack. Suggests several solutions for Jack but acknowledges that not every one is workable
Score 6 = indicates a need for specific information about Jack, but acknowledges that there might still be other information needed although he or she is uncertain about what they might be at the moment. Suggests several solutions for Jack but acknowledges that not every one is workable.

Score 7 = indicates a need for various information (Jack related as well as Jack non-related) and suggests various solutions but admits that he or she is uncertain about whether they are workable, that is, gives the impression that "one can never know everything about a problem, about the past or future" and indicates "the ultimate uncertainty of any plan or decisions" - awareness that certainty can never be achieved due to changing contexts.

Teaching performance

Each student teacher was observed on four teaching practice occasions by supervisors who were faculty members of the teacher preparation programme. After each observation the student teachers were given a set of assessment scores on their teaching performance and were evaluated in the areas of: 1) preparation of lesson, 2) delivery of lesson, and 3) management of teaching environment. Scores given for each area range from 0 to 5. A score of 0 denotes that the performance is unacceptable whereas a score of 5 denotes outstanding performance. For analysis purposes, the scores of all areas over the four occasions were summed to yield one score to represent teaching performance.

Inter-rater reliabilities

For the Teacher Efficacy Scale, the investigator was responsible for the scoring. As the instrument has a likert-type scale, only one scorer was needed to achieve objectivity.

Mathematical re-calculations involved were re-checked by a second person for accuracy.

Wisdom in teaching and wisdom were assessed by two instruments (Perimeter and Jack) which have an open response format. In scoring these two dilemma responses, two
independent raters were used. To assess inter-rater reliability, the modified kappa procedure (Brennan & Predinger, 1981) was applied. This was used instead of Cohen's Kappa because the modified kappa assumes that the marginal propositions are free to vary (ie., the number to be classified into each category is not predetermined). The coefficients for the 7 scores of the dilemma "Perimeter" are .77, .75, .81, .79, .76, .72, and .74. The coefficients for the 5 scores of the dilemma "Jack" are .73, .76, .80, .80, and .79. These coefficients indicated that there is an acceptable degree of agreement between the raters (Wilkinson, 1990). For analysis, the mean score for each rating was used.

The scores for teaching performance were marks the student teachers obtained from their supervisors. These supervisors are faculty members assigned to evaluate the teaching practicum. In grading the students, validity and reliability of these grades were ensured through conferencing processes between the supervisors. Based on the premise that the student teachers and faculty members are from the same institution, and that the supervisors are familiar with the evaluation process and the grading procedures, an acceptable degree of inter-rater reliability was expected.

**Procedures for data collection**

Upon completion of formal University procedures, faculty members from the teacher preparation programme were recruited to assist in data collection. A meeting was arranged so that the purpose of the study and procedures for data collection could be explained. The faculty members were responsible for recruitment of participants and data collection.

The demographic form, the two dilemma protocols, and the Teacher Efficacy Scale
(Gibson & Dembo, 1984) were given to those student teachers who indicated their intention to participate. They were requested to complete and return all instruments prior to the commencement of the teaching practice. During the last week of their teaching practice, the Teacher Efficacy Scale was again passed on to the student teachers. They were asked to return the completed instrument together with copies of their teaching evaluation sheets. One hundred and twenty copies were passed out and eighty-nine were returned. This constituted a very good return rate of 74 percent (Babbie, 1990).

**Treatment of data**

All data were entered into an IBM compatible personal computer for analysis upon completion of data collection. Statistical analyses were performed with two statistical software packages: SPSS/PC+ for preliminary analyses and LISREL 8 for the testing of the path models. In this study, the significance level adopted for most statistical testing was .05. More stringent levels are indicated as used.

In testing the goodness-of-fit of the four a-priori models specified earlier (pp. 16-19), the method of Maximum Likelihood (ML) was used for estimation. The main rationale for using this method of estimation is that it provides a test of the overall model fit for overidentified models. Following suggestions from Joreskog and Sorbom (1993) and Cudeck (1989), the covariance matrix rather than the correlation matrix was used for analysis. The rationale for this choice is that the use of a correlation matrix may be problematic because it may produce incorrect goodness-of-fit indices and incorrect standard errors (Cudeck, 1989).
Assessment of model fit was based on multiple criteria that reflected statistical, theoretical, and substantive meaningfulness of the model (MacCullum, 1986). The main goodness-of-fit indices used to determine whether the model was acceptable are the Normed Fit Index (NFI), the Comparative Fit Index (CFI), and the Standardized Root Means Square Residual (SRMR). The NFI has a value that may range from 0 to 1.00. A value of 1.00 indicates that the improvement of fit has reached a maximum limit and a value of 0.9 can be used as a threshold for acceptance (Bentler & Bonett, 1980). A disadvantage of the NFI as pointed out by Bearden, Sharm, and Teel (1982) is that it can be affected by sample size and may not reach 1.0 even when the model is correct if the sample size is small. Bentler (1990) attempted to adjust for this by introducing the CFI. The CFI is a revised version of the Bentler-Bonett (1980) normed fit index that adjusts for degrees of freedom and is derived from the comparison of a restricted model (one in which structure is imposed on the data) with a null model (one in which each variable represents a factor). The value of the index can range from 0 to 1.00. A value > .90 indicates a psychometrically acceptable fit to the data. Bentler (1990) suggested that the CFI is a more precise measure of fit than the earlier normed fit index he and Bonett proposed. As calculation of this index is adjusted for degrees of freedom, this was the main index used for model comparison purposes. The SRMR is the standardized version of the square root of the average of the square residuals. A value of 0.00 would mean a perfect fit.

Other indices which were used as references are the Chi-square Goodness-of-Fit, the Goodness-of-fit Index (GFI), and the Adjusted Goodness-of-fit Index (AGFI). In interpreting the Chi-square Goodness-of-Fit, a value with a probability level of greater than
.05 was accepted as significant. For the indices of GFI and AGFI, possible ranges are 0 to 1.00. Theoretically speaking, a value of 1.00 is an indication of a perfect fit.

Results of the analyses are presented in the next chapter.
CHAPTER IV

DATA ANALYSES AND RESULTS

This chapter includes the data analyses and the results of the study. The analyses and results are presented in five sections: (1) preliminary statistical analyses, (2) results path analysis, (3) qualitative analysis of wisdom, (4) qualitative analysis of wisdom in teaching, and (5) summary of pertinent findings.

PRELIMINARY STATISTICAL ANALYSES

Data screening

The data were screened for accuracy, distribution normality, and outliers before further analyses. Frequency plots and values of skewness were obtained for each variable. The conventional but conservative alpha level (.001) was used to evaluate the significance of skewness (Tabachnick & Fidell, 1989). As none of the obtained z values (z range = .03 to 3.21) were beyond the p = .001 criterion of 3.67 (2-tailed), the distributions of scores were considered normal.

The next procedure was employed to detect outliers. As the data set and the main method of analysis for this study was multivariate in nature, the multivariate method for screening outliers as suggested by Tabachnick and Fidell (1989) was employed. Mahalanobis’ distance and Cook’s distance were used to identify influential outliers. No outliers were identified in the data set. The patterns of the histogram of standardized residuals and the normal probability plot were also examined. It has been suggested
(Norusis, 1988) that the assumption of normality is met when the histogram of studentized residuals resembles a normal curve and when the normal probability plot shows values closely distributed along the line of fit. These patterns were obtained in the present analysis. The assumptions of linearity and homoscedasticity were met through inspection of bivariate scatter plots and plots of residuals.

To assess whether there were gender differences in any of the measures, the Mann-Whitney U test was applied. Results (Table 1) showed that there was a significant difference between male and female participants with respect to level of general teaching efficacy measured prior to the teaching practicum. As this was the only variable that appeared to be affected by gender, the decision to use pooled data for analysis was made.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Rank</th>
<th>U</th>
<th>two-tailed p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (n=28)</td>
<td>Female (n=61)</td>
<td></td>
</tr>
<tr>
<td>Wisdom</td>
<td>39.66</td>
<td>47.45</td>
<td>704.50</td>
</tr>
<tr>
<td>Wisdom in teaching</td>
<td>36.43</td>
<td>48.93</td>
<td>614.00</td>
</tr>
<tr>
<td>Personal teaching efficacy 1</td>
<td>44.03</td>
<td>45.44</td>
<td>827.00</td>
</tr>
<tr>
<td>General teaching efficacy 1</td>
<td>57.46</td>
<td>39.28</td>
<td>505.00</td>
</tr>
<tr>
<td>Personal teaching efficacy 2</td>
<td>43.46</td>
<td>45.70</td>
<td>811.00</td>
</tr>
<tr>
<td>General teaching efficacy 2</td>
<td>40.79</td>
<td>46.93</td>
<td>736.00</td>
</tr>
<tr>
<td>Teaching performance</td>
<td>36.64</td>
<td>48.84</td>
<td>620.00</td>
</tr>
</tbody>
</table>
Descriptive statistics

Each participant was assessed on seven variables with two being repeated measures. The variables that were measured twice were "personal teaching efficacy" (PTE) and "general teaching efficacy" (GTE). These components are represented by PTE1 and GTE1 to denote the first time measurement and PTE2 and GTE2 to denote the second time measurement. Other variable which were measured once were "wisdom" (W), "wisdom in teaching" (WT), and "teaching performance" (TP).

Wisdom (W)

This component was scored on a 7-point scale. According to Smith and Baltes (1987), scoring of this component is made in terms of five criteria. Therefore, the possible score range for this component was 5 to 35 with 5 representing the lowest score for life-planning wisdom. The mean score achieved by the participants in this component was 13.34, and the standard deviation was 3.33. The higher the score the more closely the response approaches wisdom.

Wisdom in teaching (WT)

A 3-point scale was used to score this variable. Seven criteria were used to score wisdom in teaching. The possible score range for this component was 7 to 21 with 7 representing the lower end of wisdom in teaching. The mean and standard deviation of this score for the participants were 13.84 and 1.61 respectively.

Personal teaching efficacy 1 and 2 (PTE 1 and PTE 2)

Nine items of the Teacher Efficacy Scale (Gibson & Dembo, 1984) were used to assess the participants' level of personal teaching efficacy. Each item was scored on a 6-point scale.
The possible score range for this component was 9 to 54 with 9 representing a lower belief in personal teaching efficacy. The mean score achieved by the participants for PTE1 was 37.16 and for PTE2 was 36.33. The respective standard deviations were 4.24 and 4.34. Repeated t-test showed that there was no significant difference between PTE1 and PTE2.

**General teaching efficacy 1 and 2 (GTE1 and GTE2)**

Seven items of the Teacher Efficacy Scale (Gibson & Dembo, 1984) were used to assess the participants' level of general teaching efficacy. The scoring of each item was also on a 6-point scale. Therefore, the possible score range for this component was 7 to 42 with 7 representing a lower belief in general teaching efficacy. The mean score achieved by the participants for GTE1 was 25.70, for GTE2 was 22.51. The respective standard deviations were 5.09 and 3.80. Repeated t-test showed that there was a significant difference between GTE1 and GTE2 score ($t=4.56$, $p<.05$). The graphic representation of change in these scores is presented in Figure 5.

**Figure 5: Graphic representation of PTE1, PTE2, GTE1, and GTE2 mean scores**
Teaching performance (TP)

This variable was scored on a 6-point scale and along three dimensions. A score of 0 represents "unacceptable performance" and a score of 5 represented "outstanding performance". When the three dimensions were taken collectively, the score ranged from 0 to 15. As each participant received four sets of these scores, the possible score range for this variable was 0 to 60 with 0 representing the lowest teaching performance. The mean and standard deviation of the TP score were 40.44 and 3.95.

The means, standard deviations, and score ranges for all these measures are presented in Table 2.

Table 2: Mean, standard deviation, and score range for each variable

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean (n=89)</th>
<th>Standard deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisdom</td>
<td>13.34</td>
<td>3.33</td>
<td>6.00 - 25.00</td>
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<tr>
<td>Wisdom in teaching</td>
<td>13.84</td>
<td>1.61</td>
<td>11.00 - 19.00</td>
</tr>
<tr>
<td>Personal teaching efficacy 1</td>
<td>37.16</td>
<td>4.24</td>
<td>28.00 - 47.00</td>
</tr>
<tr>
<td>General teaching efficacy 1</td>
<td>25.70</td>
<td>5.09</td>
<td>14.00 - 37.00</td>
</tr>
<tr>
<td>Personal teaching efficacy 2</td>
<td>36.33</td>
<td>4.34</td>
<td>23.00 - 47.00</td>
</tr>
<tr>
<td>General teaching efficacy 2</td>
<td>22.51</td>
<td>3.80</td>
<td>14.00 - 30.00</td>
</tr>
<tr>
<td>Teaching performance</td>
<td>40.44</td>
<td>3.95</td>
<td>30.50 - 49.30</td>
</tr>
</tbody>
</table>
Reliability analysis of instruments

Two types of reliability coefficients were obtained for the data: (1) Cronbach’s alphas to indicate the internal consistency for the two dimensions of the Teacher Efficacy Scale (personal teaching efficacy and general teaching efficacy), and (2) Cohen’s Kappa to indicate degree of inter-rater reliability in the scoring of the dilemma for wisdom and the dilemma for wisdom in teaching. The Cronbach’s alpha obtained for the dimensions of personal teaching efficacy were .75 (PTE1) and .76 (PTE2). For general teaching efficacy, the values were .70 (GTE1) and .69 (GTE2). The Kappa coefficients for wisdom and wisdom in teaching ranged from .72 to .81 (These were reported on pages 51-52).

Reliability of the teaching performance score

The teaching performance score represents a mark given to the student teacher by the faculty members. Conferencing between faculty members ensures rating validity and consistency. The correlation coefficients among the three areas of: 1) lesson preparation, 2) lesson delivery, and 3) classroom management were: lesson preparation and lesson delivery = .73; lesson preparation and classroom management = .54; lesson delivery and classroom management = .68. All three correlation coefficients were significant after Bonferroni adjustment (p < .02, [adjusted p level = .05/3 = .02]). Extent of the instrument’s reliability, namely instrument’s precision, was acceptable (Cronbach’s alpha = .83). The correlation coefficients between each area and the total teaching score were: lesson preparation = .85; lesson delivery = .90; classroom management = .86.
Pearson Product Moment Correlation (PPMC)

Table 3 is the PPMC intercorrelation matrix. The correlation coefficients among the 7 variables ranged from .01 to .59. Tabachnick and Fidell (1989) pointed out that when variables are too highly correlated (.90 and above), the issue of multicollinearity may be present. As none of the coefficients in the correlation matrix exceeds .70, there was no reason to suspect multicollinearity.

After Bonferroni adjustment, significant correlations were found between personal teaching efficacy 1 and personal teaching efficacy 2 (r = .41) and between wisdom in teaching and teaching performance (r = .59). As the variables of wisdom in teaching and teaching performance were composite scores, further examination of the correlation coefficients between the components of these variables was warranted. The PPMC intercorrelation matrix of the components of these two variables is presented in Table 4. It appears that the component of factual and procedural knowledge from the variable of wisdom in teaching is significantly correlated with all the components from the variable of teaching performance. This suggested that teaching performance, as a variable, is a reflection of factual and procedural knowledge in teaching.

There were a number of negative values. Most of these involved general teaching efficacy 1 and wisdom. There were four negative correlation coefficients between general teaching efficacy 1 and the other variables (range = -.08 to -.24). This suggested that there was an inverse relationship between general teaching efficacy 1 and the other variables.

Wisdom was also negatively correlated with four other variables. These are personal teaching efficacy 1 and 2, and general teaching efficacy 1 and 2. The range was -
The highest correlation coefficient between this and another variable was .28. That variable was wisdom in teaching.

### Table 3: PPMC coefficient matrix of seven variables

<table>
<thead>
<tr>
<th></th>
<th>W</th>
<th>WT</th>
<th>PTE1</th>
<th>GTE1</th>
<th>PTE2</th>
<th>GTE2</th>
<th>TP</th>
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<tr>
<td>W</td>
<td>1.00</td>
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<td></td>
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<td></td>
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<td>1.00</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>PTE1</td>
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<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>GTE1</td>
<td>-0.24</td>
<td>-0.27</td>
<td>0.16</td>
<td>1.00</td>
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<tr>
<td>PTE2</td>
<td>-0.12</td>
<td>0.17</td>
<td>0.41*</td>
<td>0.09</td>
<td>1.00</td>
<td></td>
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<tr>
<td>GTE2</td>
<td>-0.25</td>
<td>0.02</td>
<td>0.03</td>
<td>-0.08</td>
<td>0.11</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>TP</td>
<td>0.05</td>
<td>0.59*</td>
<td>0.24</td>
<td>-0.10</td>
<td>0.24</td>
<td>0.04</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* Significant after Bonferroni adjustment (p<.002, [adjusted p level = .05/21 = .002])

**KEY:**
- W = wisdom
- WT = wisdom in teaching
- PTE1 = personal teaching efficacy 1
- GTE1 = general teaching efficacy 1
- PTE2 = personal teaching efficacy 2
- GTE2 = general teaching efficacy 2
- TP = teaching performance
Table 4: PPMC coefficient matrix of WT and TP components

<table>
<thead>
<tr>
<th></th>
<th>LP</th>
<th>LD</th>
<th>MAN</th>
<th>P/F</th>
<th>CON</th>
<th>REL</th>
<th>UN</th>
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<tr>
<td>LP</td>
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<td>0.41*</td>
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</tr>
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<td>0.14</td>
<td>0.18</td>
<td>0.24</td>
<td>0.27</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* Significant after Bonferroni adjustment (p < .002, [adjusted p level = .05/21 = .002])

KEY:

LP = lesson planning
LD = lesson delivery
MAN = classroom management
P/F = procedural and factual knowledge
CON = contextual thinking
REL = relativistic thinking
UN = recognitions of uncertainties of life effects

RESULTS OF THE PATH ANALYSIS

In performing path analysis, each a-priori model was tested for goodness-of-fit then the direct and indirect effects of the independent variables on the dependent variables were
identified. For all model testing, the LISREL8 (Joreskog & Sorbom, 1993) statistical package was used. In determining goodness-of-fit, the main fit indices used were the NFI, the CFI, the SRMR, the GFI, the AGFI, and the Chi-square goodness of fit index (acceptance of $x^2$ is set at .05 level of significance). In presenting the results of the path analysis, the model (path diagram) is presented with both the unstandardized and standardized coefficients because these two types of coefficients serve different functions when used for interpretation. Biddle and Marlin (1981) pointed out that whereas unstandardized coefficients can express "... the relations between the explanatory and explained variables in terms of the original scales ... (the standardized) enables simple comparisons to be made among the relative effects of explanatory variables" (p. 7). In testing of paths, the t-test was used and the level of significance was set at .05.

There were four models to be tested. Models A1 to A3 were related to the first research question:

**What is the relative contribution of wisdom, wisdom in teaching, personal efficacy, and general teaching efficacy to teaching performance?**

The purpose of testing these models was to identify the best model to explain teaching performance. When the most parsimonious model was selected, the direct and indirect effects of independent variables on the dependent variable of teaching performance were identified.

Model B1 is used to answer the following research question:
What is the relative contribution of wisdom, wisdom in teaching, and teaching performance to the formulation of personal teaching efficacy and general teaching efficacy?

The main purpose of testing this model was to determine whether the data obtained fit the model which was built upon the findings of previous studies. A secondary purpose was to identify the role of each exogenous variable (W, WT, and TP) in formulation of a new level of personal and general teaching efficacy (PTE2 and GTE2). If this model failed to achieve a good fit, the model would then be respecified for further testing until a more parsimonious fit was obtained. Upon obtaining a model with a good fit, the direct and indirect effects of the independent variables on the dependent variables of personal teaching efficacy 2 and general teaching efficacy 2 were identified.
Results of testing Model A1

Model A1 and its path coefficients (unstandardized and standardized) are presented as Figure 6. The standardized coefficients are in brackets.

Figure 6: Model A1 and coefficients

Wisdom

Wisdom in teaching

Personal teaching efficacy 1

Teaching performance

General teaching efficacy 1

-- non-significant paths (t value with p > .05)

-- significant paths (t value with p < .05)

When the model was subjected to LISREL analysis for goodness-of-fit, values of the fit indices indicated that the model was tenable. The fit indices were: NFI = .95, CFI = .98, SRMR = .05, GFI = .98, AGFI = .90, $x^2 = 4.48$ (df = 3, p = .21).
Results of testing Model A2

Model A2 and its path coefficients (unstandardized and standardized) are presented in Figure 7. The standardized coefficients are in brackets.

Figure 7: Model A2 and coefficients

In this model, a directional path was added from W to TP. The fit indices of this model were: NFI = .97, CFI = .99, SRMR = .04, GFI = .99, AGFI = .90, and $x^2 = 2.92$ (df = 2, p = .23). Based on the information from these indices, the model was accepted as tenable.
Results of testing Model A3

Model A3 and its path coefficients (unstandardized and standardized) are presented in Figure 8. The standardized coefficients are in brackets.

Figure 8: Model A3 and coefficients

This model differs from the previous one (Model A2) in that a path was specified from GTE1 to TP. The fit indices indicated that the model was acceptable. Fit indices for this model were: NFI=.98, CFI=.98, SRMR=.04, GFI=.99, AGFI=.84, \( \chi^2 = 2.46 \) (df=1, p=.12).
Model comparison

All three models were tenable based on the results of the model testing. To search for the most parsimonious model, all fit indices and considerations of the model's theoretical implications were used as the basis for making this decision. These indices were presented in Table 4. It was determined that Model A1 was the most parsimonious model. From a statistical perspective, one major support for this decision is related to the value of the CFI. The CFI has been suggested as an index useful for model comparison purposes as it is adjusted for degrees of freedom (Bentler, 1990). The CFI for all three models were very similar but Model A2 had a CFI that was the closest to the possible maximum value of 1.00. From another statistical perspective, Bollen (1989) suggested using the difference in the chi-square to determine whether one model differs significantly from another. The difference in chi-square values between Model A1 and Model A2 was 1.56 whereas the difference in chi-square value between Model A1 and Model A3 was 1.01. Both of these were not significant at .05 level. The implication is that neither Model A2 nor Model A3 differs significantly from Model A1. An observation made by Bollen (1989) was taken into consideration in the selection of Model A1. Bollen (1989) suggested that when the data are judged to fit several models and approximate reality to the same degree, one should select the simplest model. Therefore, in this study, Model A1 was selected as the most parsimonious model.
Table 4: Fit indices for Models A1 to A3

<table>
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<tr>
<th></th>
<th>$x^2$</th>
<th>df</th>
<th>p</th>
<th>NFI</th>
<th>CFI</th>
<th>SRMR</th>
<th>GFI</th>
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</thead>
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<td>Model A2</td>
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<td>.04</td>
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<td>.84</td>
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**Identifying the direct and indirect effects of Model A1**

A two-stage path analysis was carried out on Model A1. Personal teaching efficacy and general teaching efficacy were predicted from wisdom and wisdom in teaching in stage one. Teaching performance was predicted from wisdom in teaching and personal teaching efficacy in stage two. Results of stage one analysis indicated that neither wisdom ($t=-1.83, p>.05$) or wisdom in teaching ($t=1.51, p>.05$) were effective predictors of personal teaching efficacy. However, both were effective in predicting general teaching efficacy ($W: t=-1.96, p<.05$; $WT: t=-1.96, p<.05$). It also appeared that when the effect of wisdom and wisdom in teaching on general teaching efficacy were compared, their effects were similar. These two variables, in combination, explained 11% of the variability in general teaching efficacy.

In stage two of the analysis, the task was to identify the relative contribution of wisdom in teaching and personal teaching efficacy to teaching performance. In
combination, wisdom in teaching and personal teaching efficacy accounted for 54% of the variability in teaching performance. When the direct effects of wisdom in teaching and personal teaching efficacy on teaching performance were compared, wisdom in teaching appeared to have a stronger effect (standardized coefficients: WT = .70, PTE1 = .16). A summary of effects for Model A1 is presented in Table 5.

Table 5: Summary of (standardized) and unstandardized effects for Model A1

<table>
<thead>
<tr>
<th>Effect</th>
<th>r</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
<th>R²</th>
</tr>
</thead>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of W</td>
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<td>---</td>
<td>-.26</td>
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<td>(.17)</td>
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<tr>
<td>On GTE1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of W</td>
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<td>---</td>
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<td></td>
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<tr>
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<td>(.03)</td>
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</table>
Results of testing Model B1

The model and its path coefficients (unstandardized and standardized) are presented in Figure 9. The standardized coefficients are in brackets.

Figure 9: Model B1 and coefficients
The purpose of this model was to test the theoretical assumption that efficacy formulation (PTE2 and GTE2) is influenced by enactive attainment (TP) and mediated by cognitive functions (W and WT). If the assumptions expressed in the model hold, then the data generated in this study should support the model specified.

Fit indices obtained from testing this model were: NFI = .99, CFI = 1.00, SRMR = .01, GFI = 1.00, AGFI = .97, $x^2 = .48$ (df = 1, p = .49). Based on these fit indices, the model was accepted as tenable.

**Identifying the direct and indirect effects of Model B1**

Path analysis of Model B1 was a two-stage process. The first stage involved assessing the strength of the effects of wisdom and wisdom in teaching on teaching performance. The second stage involved assessing the strength of effects of wisdom, wisdom in teaching, and teaching performance on personal and general efficacy. The research question that needed to be answered was:

"What is the relative contribution of wisdom, wisdom in teaching, and teaching performance to the formulation of personal teaching efficacy and general teaching efficacy?"

Therefore, the main interest of conducting a path analysis on Model B1 was to identify those variables which contribute effectively to the formulation of personal teaching efficacy and general teaching efficacy.

The standardized path coefficients were inspected. The t-values indicated that none of the paths to personal teaching efficacy were significant whereas the path between
wisdom and general teaching efficacy 2 was significant \( t = -2.47, p < .05 \). Based on the effects values, it appeared that personal teaching efficacy 2 was best explained by teaching performance rather than wisdom or wisdom in teaching (standardized coefficients: \( TP = .24, W = -.11, WT = .06 \)). However, the combined effects of wisdom and teaching performance can explain more effectively the formulation of personal teaching efficacy (standardized coefficients: \( TP = .24, WT + TP = .25 \)). A summary of effects for Model B1 is presented in Table 6.
Table 6: A summary of (standardized) and unstandardized effects for Model B1

<table>
<thead>
<tr>
<th>Effects</th>
<th>r</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
<th>R²</th>
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<td>(.24)</td>
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<td>(-.05)</td>
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QUALITATIVE ANALYSIS OF WISDOM

Qualitative analysis of the response to both the wisdom and the wisdom in teaching tasks provided further insight in the participants’ thinking. Wisdom was scored in terms of the five criteria for life problems and planning (Smith & Baltes, 1987): (1) good judgement and advice about difficult life decisions, (2) knowledge about life problems and planning,
(3) contextualistic thinking about life problems and planning, (4) relativistic thinking about life problems and planning, and (5) awareness and management of uncertainty about life problems and planning. Some typical responses given by the participants are analyzed in the following sections.

**Good judgement and advice about difficult life decisions**

All respondents were able to describe a plan for Jack (the character in the dilemma, appendix D). A majority of participants were able to give supporting reasons for the option they selected as well as rationales for not selecting the alternative. However, there were some participants who concentrated only on giving rationale(s) for the option they chose for Jack without making any comments on the alternative they did not select. Some typical supporting reasons in recommending Jack to take early retirement included:

- "Should take early retirement so as to take time to pursue some leisure activity"
- "Might not fit in well with the new environment so might as well take early retirement"
- "Early retirement means instant amount of cash which can be used for investment"
- "It is important to take cash now because there is no knowing what can happen to the company in another two years"

Some typical supporting reasons in recommending Jack to opt for transfer included:

- "He is still young and in good working condition so he..."
should continue to work"

"It is important to keep working because idleness is depressing"

"He has a lot of experience so he should be useful for the company even if the job is different"

"He can make more money by working longer"

"He can begin to work and if he finds it is not to his liking, he can then quit"

From these responses it appeared that the participants generally had a good understanding of the dilemma posed for them to analyse. The reason(s) they gave to support their chosen option showed that they were aware of some of the consequences of the decision they made. This was demonstrated by their use of "If...then" statements. The fact that no unrelated or illogical advice was given indicated that they generally were able to give judgement and advice about the life problem posed to them.

**Knowledge about life problems and planning**

Participants' richness of knowledge about life problems and planning was demonstrated by their recognition that there might be other possible future problems that could confront Jack other than the present dilemma. Therefore, in making a decision for action, there was a need to take those possible problems into account. Some of the problems that were identified as possible future problems were:

"Jack's present health status"

"Jack's present social circle"
"Jack's attitude about work and leisure"

"Jack's present financial status"

"Jack ability to fit into a new environment"

A majority of plans drawn up for Jack took into account possible future problems. For example, those participants who foresaw Jack's health and/or ability to fit into a new environment as possible future problems had plans which suggested that Jack could take up the new position and then resign when and if the problems (health or ability to adapt to environment) arose and became unmanageable. Some participants made plans that took into consideration the problems of health and/or ability to fit into an environment as problems that had to be dealt even though they were not present at the moment. In those plans, the position of the participants was for Jack to take early retirement and therefore gave "health" and "ability to fit into a new environment" as supporting reasons for Jack to retire. The method of incorporating these problems into a plan differs from those who opted for Jack to continue working, but both plans demonstrated the same richness of knowledge about life problems.

**Contextualistic thinking about life problems and planning**

Contextualistic thinking about life problems and planning was demonstrated by considering possible factors that needed to be taken into account when making decisions, the reciprocal impact of decision(s) on these factors, and the process of carefully weighing out positive outcomes with negative consequences of options. Some of the responses from the participants included concerns about:
"Jack’s financial position and existing financial commitments"

"Jack’s personal health status"

"Jack’s ability to occupy himself with meaningful activities other than work"

"Health of Jack’s family - wife, parents, children"

"Expectation from Jack’s wife - early retirement means more time spent with family"

"Jack’s attitude about political situations"

"Jack’s actual skill level and ability to adapt to new environment"

"Situation of Jack’s existing colleagues - are they considering a transfer as well"

The factors most often cited were those pertaining to Jack’s financial, health, and skill level. Mention about Jack’s wife with respect to time spent with her was the most often mentioned concern after those related to Jack’s financial, health, and skill level. Most participants were able to give a plan for Jack that took into account two of Jack’s personal factors. A small number of participants were able to take Jack’s family related factors (wife and/or children) into account in addition to those pertaining to Jack’s personal factors (health, interest, finance, skill level). This suggested that the level of “contextualistic thinking” about life problems and planning" was only moderately high as most participants tended to view Jack’s problem in somewhat limited contexts.
Relativistic thinking about life problems and planning

Relativistic thinking is the ability to view problems from perspectives other than that of self and the awareness that decisions and judgements made are dependent on the position/perspective that guided the interpretation of information. Responses that achieved higher scores were those that took into account factors that might affect Jack from his perspective and therefore gave advice to Jack based on Jack's own situation. These responses typically contained statements which begin with "Jack could ....," or "For Jack, the problem is ...." These were in contrast to responses in which the dilemma was turned into a situation in which the respondent became the character. In these responses, the interpretation of information was viewed from the participants' own perspective and decisions were based on the respondents' own experiences. The protocols of these responses typically began with the statement of "I will ...."

Awareness and management of uncertainty about life problems and planning

A low scoring response protocol was one in which there was no indication of the need for further information. The person giving the response was confident that the plan drawn up for Jack was definitely workable and the information provided in the dilemma was sufficient for making a plan for Jack. Response protocols which received a higher score were those that sought more information. This seeking for more information was interpreted as an expression of uncertainty about the working of the plan because the participants' awareness that the plan they made was contingent on information available and therefore might not be workable let alone the best possible plan. Most response protocols
were written with certainty although there were some protocols that indicated a need for more information. Example of protocols that indicated a need for more information include:

"If Jack’s health is good, then ... but if Jack’s health is failing ..."

"Depending on whether Jack’s children are still in school ..."

"If Jack’s financial position ..."

Such phrases suggested that the participants recognized that the response protocols they gave were contingent on pertinent information which was not given to them. Their management of this uncertainty was demonstrated by the way they set up the hypothetical situations - a contingency plan that catered to more than one condition.

QUALITATIVE ANALYSIS OF WISDOM IN TEACHING

In this section, a qualitative comparison of response protocols between high and low scorers in the component of wisdom in teaching will be made. The presentation of this section will be in three sub-sections: (1) a transcription of typical responses by high scores, (2) a transcription of typical responses by low scorers, and (3) comparison of responses. In presenting a transcription of typical responses, the responses are first categorized into four areas: (1) identification of the problem situation, (2) causes for the problem, (3) questions they would (as the teacher) ask the students, and (4) activities/strategies they would plan for the next lesson (Appendix C). Typical responses from high and low scorers are presented separately. High scorers are those who achieved a score of 16 and above and the low scorers are those who achieved a score of less than 12. Using this system for
differentiation, there were 21.3% high scorers and 23.59% low scorers. Finally some comments will be made comparing the wisdom responses with those of wisdom in teaching.

**A transcription of typical responses by higher scorers**

**Area 1: Identification of the problem situation**

"The problem is one of a majority of students’ producing inaccurate answers to the work assignment"

"The problem is the large variation of answers"

"The problem is the students are having difficulties with understanding the concept"

**Area 2: Causes for the problem**

"Maybe students do not having an accurate understanding of the meaning of the word perimeter"

"Because the students do not have an accurate concept of the word perimeter"

"This may be caused by teacher not having demonstrated the actual measuring technique"

"The teacher did not demonstrate how to do it"

"Maybe teacher did not supplement the information from the text book with explanation"

"The explanation given by the teacher about perimeters may be unclear"
"Because the teacher did not explain so the students do not know what to do"

"The teacher is teaching too fast"

"This is caused by insufficient information in the text book"

"This is caused by students not having previous knowledge needed to complete the assignment"

"Maybe the students are using a bad ruler"

"The students did not pay attention in class"

Area 3: Questions they would (as the teacher) ask the students

"Ask students how did they get the answer"

"Ask the student what it is that they do not understand"

"Ask the students to give a definition of perimeter"

"Ask those students who got it right to tell how they did it"

Area 4: Activities/strategies they would plan for the next lesson

"I, as teacher, will demonstrate how to measure the desk"

"Ask a student who had a correct answer to demonstrate how it was done"

"Explain the definition of perimeter again"

"Measuring a big object is difficult, ask student to repeat exercise by measuring a book"

"Ask students to use strings to measure the perimeter and then to measure the string. Tell them the length of string
represents the total perimeter"

"Purposely group students (those who have right answers
with those who do have right answers) to measure other objects"

"Present the formula for measuring perimeter as A+B+C+D
with a diagram notated with A,B,C,D"

"Bring more complicated shapes (made from paper cards)
for students to practice on so that they know how to measure
all types of perimeters"

"Take them to the school playground to measure the size of
the basketball court"

"After demonstrating how to measure the desk (last assignment),
ask those who had it wrong to show how they will now measure
a book"

A transcription of typical responses by low scorers

Area 1: Identification of the problem situation

"The problem is a majority of students cannot give the right answer"

"The problem is the students misunderstand the concept of perimeter"

Area 2: Causes for the problem

"Maybe the students do not understand the meaning of perimeter properly"

"It is the first time they are presented with the word and concept of perimeter"

"The students do not know what I am talking about"
"There are no other examples in the text book to follow"

"The concept is too abstract"

Area 3: Questions they would (as the teacher) ask the students

"I will not ask questions"

"Ask them do they know what is the meaning of perimeter"

"Asking more questions will confuse the students more"

"Do you understand my explanation"

"What is the perimeter of the desk"

"How should one calculate perimeter"

Area 4: Activities/strategies they would plan for the next lesson

"I will demonstrate how to do it, then ask students to repeat the exercise"

"Ask a student to demonstrate"

"I will explain again the meaning of perimeter"

"I will ask the students measure a smaller object and tell me the answer. Then I will show those who are wrong how to do it right"

"Ask a student who has it right to explain how he/she did it"

Comparison of responses

Inspection of the typical responses from both groups showed that some of the responses are common to both groups. However, in cases where a part of the response is identical, the high scorer, more often than not, also gives an elaboration or an alternative response in addition to that which is identical to the low scorer.
Comparison of responses between the high and low scorers in those four areas suggested that higher scorers are more likely than their counterparts to: (1) see the problem as being "students having difficulties with" in addition to "students not understanding" or "students giving wrong answers", (2) use of "maybe" when describing the cause(s) of problem(s), (3) give a greater variety of causes (student related as well as teacher and teaching related) for the problem(s), (4) seek to understand the basis of the problem from the students' point of view, and (5) plan activities and teaching strategies that are progressional. The high scorers recognized the complexities of the problem and offered multiple ways to try to solve it.

The qualitative analysis of the two tasks, wisdom and wisdom in teaching, provided some insight into the participants' thought characteristics and their performance on domain general and domain specific types of tasks.

**SUMMARY OF PERTINENT FINDINGS**

The following findings are important for this study:

1) Models A1 and B1 are accepted as models to explain teaching performance and the formulation of teacher efficacy. Decisions to accept these models are based on theoretical arguments as well as statistical considerations.

2) Personal teaching efficacy and wisdom in teaching both influence teaching performance but the influence from wisdom in teaching is stronger.

3) Personal teaching efficacy is best explained by experience from teaching performance.
4) Wisdom has a negative impact on general teaching efficacy. Wiser persons have lower feelings of general teaching efficacy.

5) Participants who scored higher in the component of wisdom are able to view life problems as relative and in context and are able to make better judgements about life problems by taking into consideration more than one factor that might influence how the problem is to be viewed. When making plans, they are able to consider the possible consequences of these plans and how these consequences might, in turn, affect the smooth running of the plans once made.

6) Participants who scored higher in the component of wisdom in teaching are more likely to give multiple reasons for the problem they identified from the teaching dilemma and are also more likely to take a constructivist approach in planning activities and strategies for the next lesson.
CHAPTER V

DISCUSSION OF FINDINGS

The major purpose of this study was to contribute towards a better understanding of the construct of teacher efficacy from both a social cognitive and a cognitive developmental perspective. This was achieved by means of completing an empirical study which aims to identify two sets of relationships: (1) the relative contribution of the social cognitive variable of teacher efficacy (personal and general teaching efficacy) and the cognitive developmental variables of wisdom and wisdom in teaching to teaching performance, and (2) the relative contribution of wisdom, wisdom in teaching, and teaching performance to formulation of teacher efficacy (personal and general teaching efficacy). Bandura’s social cognitive theory of self-efficacy suggests that a person’s level of efficacy influences his or her choice of acting out a behaviour as well as his or her persistence to continue acting in spite of obstacles. When applied to the study of teachers, this suggests that teachers with a high level of teacher efficacy will choose to teach as well as persist to teach even when faced with obstacles. Bandura’s theory also suggests that formulation of efficacy is contingent on several factors. Enactive accomplishment is the most influential of these. However, the instructiveness of enactive accomplishment to efficacy formulation is only effective when mediated by a cognitive variable. In the present study, wisdom was selected as a possible representation of that cognitive variable. When applied to the study of teachers and teaching, wisdom, as well as wisdom cast in a teaching setting (wisdom in teaching) were selected as possible variables that might work with enactive performance to
influence formulation of teacher efficacy.

Previous writings have distinguished teacher efficacy as a construct with two dimensions: personal teaching efficacy and general teaching efficacy. Teacher efficacy studies indicate that level of personal teaching efficacy has a positive impact on desirable teacher behaviour. From a cognitive developmental perspective, wisdom in teaching, a domain specific version of wisdom, may also have an impact on the way teachers teach. Therefore, a point of interest would be to identify the relative contribution of personal teaching efficacy and wisdom in teaching to teaching behaviours that have been rated as effective.

General teaching efficacy, on the other hand, has not really received much attention in teacher efficacy research. One possible reason for this stems from its supposed lack of relationship to actual behaviour. It is conceived that general teaching efficacy is an outcome expectancy belief (the belief that teaching can lead to student learning) and that "individuals can believe that a particular course of action will produce certain outcomes, but if they entertain serious doubts about whether they can perform the necessary activities, such information does not influence their behaviour" (Bandura, 1977, p.193). Some studies (Housego, 1992; Hoy & Woolfolk, 1990) have shown that general teaching efficacy decreases with teaching experience and some have shown it to be weakly or not related at all to personal teaching efficacy (Fritz, Miller-Heyl, Kreutzer, & MacPhee, 1995; Saklofske, Michayluk, & Randhawa, 1988). The question of this relationship between personal teaching efficacy and general teaching efficacy was reintroduced. The possibility exists that one or another cognitive variable might mediate this relationship.
In an effort to identify the complex relationship among these variables of interest (wisdom, wisdom in teaching, teaching performance, personal teaching efficacy, and general teaching efficacy), two research questions were identified:

1) What is the relative contribution of wisdom, wisdom in teaching, personal teaching efficacy, and general teaching efficacy to teaching performance?

2) What is the relative contribution of wisdom, wisdom in teaching, and teaching performance to the formulation of personal and general teaching efficacy?

To answer these research questions, four a priori models were specified and subjected to the statistical methodology of path analysis. This statistical method was selected because it treats the grid of relationships in the observed data as a template against which to test competing theoretical models of those relationships in the real world. Theoretically, many models can be generated and the same set of data may fit several models. Therefore, if a model is identified as one which can adequately describe the data (data fitting the model), that model can be accepted as one possible explanation of the processes in the population. In this chapter, the accepted models, their significant paths, and their implications with respect to teaching performance and formulation of teacher efficacy will be presented and discussed. Following this there will be a section on the limitations of this study and recommendations for further research.

A model which explains teaching performance (TP)

The model identified as a possible explanation of teaching performance is presented again for reference (Figure 10).
From this model, several conclusions can be drawn. By accepting this as the most parsimonious model among the three specified for testing, wisdom and general teaching efficacy are treated as having a non-influential effect on teaching performance. A possible explanation for not being able to establish an important relationship between wisdom and teaching performance might be traced to the domain specific versus domain general issue. To assess wisdom, Smith and Baltes' (1987) life-planning dilemma of “Jack” was adapted for use. Wisdom represents general wisdom on a life-planning task. This variable failed to
exert an important impact on teaching performance. Wisdom has five components: rich factual knowledge, rich procedural knowledge, relative thinking, contextualistic thinking, and recognition of the uncertainties of effects (Baltes & Smith, 1990). It would appear that the "knowledge" tapped by the dilemma of "Jack" is a type of knowledge which pertains only to life-problems. Richness in this type of knowledge might aid in solving life-problems but might not be beneficial to reviewing classroom type problems and planning of teaching strategies. In contrast, in assessing wisdom in teaching, domain specific knowledge is tapped. The dilemma to be solved pertains to problems associated with student learning and respondents were asked to identify the possible problems and give plans to resolve them. The task of reviewing teaching-learning problems and planning teaching strategies to resolve problems requires pedagogical knowledge - the type that is necessary for real-life teaching. Therefore, it is reasonable for those who showed a higher level of wisdom in teaching to be better in their actual teaching as well.

One way to explain the strong influence of wisdom in teaching on teaching performance is to draw on literature in the area of expert-novice studies. Findings of expert-novice studies have identified several characteristics which distinguish experts from novices. Some of these include: (1) expert performers have a body of knowledge that is more extensive than nonexperts (Feltovich, Johnson, Moller, & Swanson, 1984), (2) experts appear to access relevant knowledge more efficiently (Jeffries, Turner, Polson, & Anderson, 1981), (3) experts are more able to notice inconsistencies rapidly and therefore able to make adjustments in diagnosis more rapidly (Feltovich, Johnson, Moller, & Swanson, 1984), and (4) similar characteristics of expert performances are found across
different domains of expertise (Ericsson & Smith, 1991). Although participants in this study were not experts by the generally accepted definition used in some expert-novice teacher studies such as those by Carter, Cushing, Sabers, Stein, and Berliner (1988), and Swanson, O'Connor, and Cooney (1990), there were many differences in the quality of their performances. Following Salthouse's (1991) suggestion, measures of real competence are used in this instance to assess expertise. By using "experts" to describe those who have scored higher, we can also accept that, in comparison to their counterparts, the higher scorers have a more extensive knowledge base, are able to access this knowledge more efficiently, and are able to make adjustments to their diagnosis more rapidly. These characteristics are similar to those described as "rich factual and procedural knowledge" by Baltes and Smith (1990). As "rich factual and procedural knowledge" is an important component of wisdom, the obtained strength of relationship between wisdom in teaching and teaching performance seems reasonable.

In previous literature, teachers with a strong sense of personal teaching efficacy are said to be able to adopt more effective teaching strategies and they receive higher rankings by supervisors (Trentham, Silvern, & Brogdon, 1985). A similar pattern has been reported for principals' ratings of teachers (Riggs & Enochs, 1990) and ratings of pre-service teachers by university faculty (Saklofske, Michayluk, & Randhawa, 1988). However, when personal teaching efficacy and wisdom in teaching are compared on their relative contributions to teaching performance, it appears that wisdom in teaching plays a more influential role. One possible explanation for this is that in previous studies, the effect of personal teaching efficacy on teaching performance was not examined in conjunction with
wisdom in teaching. By introducing this new variable, a clearer picture of what brings about effective teaching performance is available.

General teaching efficacy is the belief that teachers have the ability to produce student learning (Gibson & Dembo, 1984); as such it can be conceived of as an expectancy construct. This dimension has been found to correlate weakly or not at all with personal teaching efficacy (Ross, 1992; Woolfolk & Hoy, 1990). Therefore, to suspect that it has a different effect on teaching performance as compared to personal teaching efficacy seems reasonable. In this study, by accepting Model A1 as the most parsimonious model, the impact of general teaching efficacy on teaching performance was considered unimportant. In fact, inspection of the path between these two variables in Model A3 shows that the decision was appropriate. However, even though general teaching efficacy was not considered an important contributor to effective teaching performance, its role in motivating a person to engage in teaching should not be overlooked.

In sum, results of this study suggests that when one has to prioritize the contribution of wisdom, wisdom in teaching, personal teaching efficacy, and general teaching efficacy to teaching performance, the highest priority is wisdom in teaching. This would be followed by personal teaching efficacy, wisdom, and general teaching efficacy.

A model which explains the formulation of teacher efficacy (PTE and GTE)

A possible model which can explain the formulation of personal teaching efficacy and general teaching efficacy is presented again below as Figure 11.
Figure 11: A model explaining the formulation of personal teaching efficacy and general teaching efficacy

There are two significant paths in this model: (1) the path between wisdom in teaching and teaching performance, and (2) the path between wisdom and general teaching efficacy. As the effect of the first significant path has been explained in the previous
section and the main purpose of Model B1 was to identify the relative contribution of wisdom, wisdom in teaching, and teaching performance to the formulation of personal and general teaching efficacy, discussion will focus on this aspect. Bandura (1977), in his theory of self-efficacy, suggested that among the four types of information (performance accomplishment, vicarious experiences, verbal persuasions, and physiological states) responsible for efficacy formulation, that of enactive performance is the most influential. He qualified this further and posited that for this information to be instructive, some sort of cognitive appraisal needs to be involved. In this study, wisdom and wisdom in teaching have been proposed to represent the type of cognitive appraisal as proposed by Bandura.

None of the direct paths specified to personal teaching efficacy are significant. As a result, the variables in the model can only explain 7% of its variance. However, inspection of the standardized path coefficients suggest that teaching performance can explain the variance in personal teaching efficacy better than wisdom or wisdom in teaching alone, but the combined effect of wisdom in teaching and teaching performance can account best for formulation of personal teaching efficacy. Bandura (1977) has pointed out that enactive performance can be instructive for efficacy formulation only when mediated by cognitive appraisal. This study supports this contention. First, teaching performance is moderately correlated with personal teaching efficacy ($r = .24$). This shows that success in teaching performance does not necessarily lead to a high sense of personal teaching efficacy. Furthermore, in the path model, it has been shown that the joint effect of teaching performance and wisdom in teaching can explain the feeling of personal teaching efficacy better than either of them working alone. However, even taken in unison, the explanatory
power is still very small. This suggests that there might be other factors in operation that
affected the formulation of personal and general teaching efficacy. Bandura (1977)
mentioned that one possible variable that might influence a person's formulation of efficacy
when faced with successful performance is the type of attribution the person holds - the
degree of effort the person perceived they have spent in accomplishing the task. It has
been suggested that "success with minimal effort fosters ability ascriptions that reinforce a
strong sense of efficacy...By contrast...high expenditure of effort connote a lesser ability
and are thus likely to have a weaker effect on perceived self-efficacy" (p.201). This
dimension was not included in the present study and its potential as an influential
contributor to efficacy formulation should be included in future studies.

In the Teacher Efficacy Scale, nine items measure the dimension of personal
teaching efficacy. The item means of the participants' pre-practicum and post-practicum
score were 4.12 and 4.03 respectively. This score range is slightly lower than those
obtained in other studies that used the same instrument with a similar population (student
teachers). Housego (1992) reported a score range of 4.37 to 4.50 in her study with
Canadian student teachers whereas Gorrell and Hwang (1995) reported a score range of
4.40 to 4.58 in their study with Korean student teachers. Factors contributing to this score
difference are not clear; however I suspect cultural differences as well as programme
differences may play a significant role. A direction that future teacher efficacy studies can
take is to examine the relationship between different types of teacher preparation
programmes and their effect on teacher efficacy.

Examination of the wisdom in teaching scores showed that there was very little
variance among the student teachers (M = 13.84, SD = 1.61). From a measurement perspective, the two more likely reasons for a small standard deviation in a given score are: (1) that the sample is homogenous on the measure of interest and, (2) that the discriminatory power of the scale is less than desirable. In this study, I would argue that the first reason is the most likely. For a start, the participants were all student teachers from the same institution and were prepared in a similar manner for their first teaching practicum. Wisdom in teaching is assessed with a paper-and-pencil task which required them to analyse a problematic teaching situation and to provide responses on how they might handle and resolve the situation. The situation described in the task is a common teaching and learning scenario. Therefore, as these student teachers have been prepared well with a "bag of teaching tricks," the responses they gave might be expected to have a great similarity.

Wisdom did not surface as an important indicator of personal teaching efficacy. Whereas it is tempting to support this finding with the domain specific versus domain general argument, I would suggest that the major reason is related to the participants' level of wisdom. Examination of the wisdom score at the component level might clarify this contention. The wisdom score is made up of five components: 1) factual knowledge, 2) procedural knowledge, 3) contextual thinking, 4) relative thinking, and 5) uncertainty of effects. The scores obtained by the student teachers in the last three components - the essence of "wisdom", showed that this group of participants are not very "wise" and at most can only be described as having a good grasp of factual and procedural knowledge that enables them to develop short-term plans to handle life situations. The mean scores for
these five components are as follows: factual knowledge = 4.65, procedural knowledge = 3.96, contextual thinking = 2.20, relative thinking = 1.15, and uncertainty of effects = 1.38. On a 7-point scale, scores of the latter three components are truly at the lower end of the continuum. Baltes and Smith (1990) identified a person with rich factual knowledge as a person "having, in long-term memory, an extensive data base about life matters" (p. 100) and a person with rich procedural knowledge as a person "having a repertoire of mental procedures ... for purposes of decision making and action planning" (p. 101). These two types of knowledge are seen as essential for "problem-solving" and are identified as characteristics of "experts" in expert-novice research (Leithwood & Steinbach, 1995). Within Baltes and Smith's (1990) conceptual framework for wisdom, self-efficacy is seen as an antecedent factor for wisdom. This suggests that self-efficacy is a necessary but not sufficient condition for wisdom. Therefore, if the level of wisdom among the participants is low, its failure to be selected as an influential indicator seems reasonable.

Further support for the contention that the participants are "experts" rather than "wise persons" can be traced to their personal teaching efficacy scores. The mean personal efficacy score of the participants is comparatively lower than those reported in other studies with student teachers. Therefore, if self-efficacy is indeed a necessary but not sufficient condition for wisdom, then maybe the efficacy levels of these participants are not sufficiently high enough to warrant the qualification of "wise."

Another notable finding from this model is the establishment of a significant but inverse relationship between wisdom and general teaching efficacy. This means that the "wiser" the teachers, the less they believe that "teachers have the ability to produce student
learning despite obstacles" (Gibson & Dembo, 1984). Baltes and Smith (1990) characterized wise thinkers as persons being able to “think” about problems and phenomena in context, relative to other problems and phenomena, and able to accommodate the idea that solutions or points of view about such problems and phenomena are not definite. It seems reasonable to argue from this perspective that the wiser the person the more he or she would question the power of teaching to produce student learning outcomes in face of obstacles. Wise persons are probably more aware that teachers, working alone, have relatively less power to affect student learning, and that concerted efforts from home, school, and society are necessary to optimize student learning. This type of “realistic thinking” represents mature thinking that might characterize wiser teachers. There is also an inverse, although not significant, correlation between wisdom and personal teaching efficacy. It appears that “wiser” teachers are also less confident about their own ability to teach. At first this does not seem to make sense. However, cast in the light of Meacham’s (1983) about knowing that one doesn’t know, it makes sense that the wiser teachers are able to question the extent to which they knows. This type of thought maturity might, in turn, drive them to be less confident than those teachers who are “less wise”.

Contributions and limitations of the study and possibilities for future research

This study has made several contributions towards a better understanding of teacher efficacy. The more important include: (1) Personal teaching efficacy has been found to have less impact on teaching performance than wisdom in teaching. Jointly, the two variables offer a better explanation of teaching performance. (2) General teaching efficacy
does not necessarily impact on teaching performance. (3) Formulation of personal teaching efficacy does not rely on prior teaching performance alone. The addition of a cognitive factor, a type of cognitive appraisal which is identified as wisdom in teaching, can contribute towards its formulation. (4) Student teachers who have demonstrated a higher level of wisdom have a more realistic view of general teaching efficacy.

Despite having made these findings, there are several limitations to this study. The use of teaching practice scores to represent levels of teaching performance has both advantages and disadvantages. As the participants are students from the same institution, one might expect the scores they received for their teaching performance to have higher reliabilities than if they were from different institutions. What student teachers do during teaching practice may or may not reflect their true teaching activity once they become regular teachers. Therefore, the scores they received now can only represent situation-specific behaviours. The magnitude of this phenomenon is further exacerbated by the fact that the student teachers were asked to teach only the subjects they elected in their program of studies and that they were posted in "selected" schools that have demonstrated co-operative behaviour in terms of staff support and student classroom behaviour. All these efforts have created a "hot-house" effect for student teachers. While this may be seen as a means of easing student teachers into the profession, it does not necessarily reflect the true scenarios they might need to face as certified teachers. It would be of interest to follow the teaching careers of these student teachers in order to determine whether their teaching performances differ substantially from those exhibited during teaching practice as well as to evaluate the relative impact of teacher efficacy and wisdom in teaching on their subsequent
teaching performances.

The fact that evaluations of teaching performance for each participant were made by two supervisors and across four occasions suggests that the effort to minimize rating bias has been made. From a logistical perspective, efforts to minimize rating bias might be more problematic if certified teachers instead of student teachers were used as participants in this study. This issue needs to be addressed if future studies are planned to include certified teachers or if longitudinal designs are employed.

One purpose of this study was to establish the relationships of wisdom, wisdom in teaching, personal teaching efficacy, and general teaching efficacy to teaching performance as well as the relationships of wisdom, wisdom in teaching, and teaching performance to personal teaching efficacy and general teaching. Therefore, only the relationships of the endogenous and exogenous variables rather than the structure of each variable have been of prime concern. Future studies might include an evaluation of the structure of each variable so that fuller and more complex models can be specified to explain the phenomena of interest.

One short coming of this study relates to the use of paper-and-pencil tests as the sole method for obtaining responses on wisdom, wisdom in teaching, and teacher efficacy. While this procedure represents an economical method to obtain a large number of responses, future studies should consider the use of interview data to supplement and cross-validate participants' written responses. Resources permitting, future studies should also be designed to access written and interview responses from supervisors on their conceptions of the students they supervised. Another shortcoming of this study pertains to the limited
choice of variables of interest. The estimation of teacher efficacy formulation has been restricted to wisdom, wisdom in teaching, and teaching performance only. Future studies might consider the incorporation of contextual and behavioural variables (e.g. staff support and student characteristics.) The inclusion of teachers’ perceptions of control and coping strategies might add to a greater understanding of teacher efficacy.

Conclusions and implications of findings

This study has contributed to knowledge about the formulation of teacher efficacy and the impact of teacher efficacy to teaching performance. It has also established the role of wisdom and wisdom in teaching in the formulation of teacher efficacy. How might this study contribute to educational practice? The following are some suggestions that teacher education programs might consider:

1) The importance of teacher efficacy to teaching performance renders the need to look into ways in which levels of teacher efficacy can be enhanced. The position that self-efficacy can be developed and enhanced through training has been established in a few studies (Fritz, Miller-Heyl, Kreutzer, & MacPhee, 1995; Saks, 1995). Whereas these studies have examined the effect of training on in-service professionals, it seems reasonable to argue that similar training in teacher education programs may have similar results. Gorrell and Capron (1990) investigated the impact of using cognitive modelling on pre-service teachers’ self-efficacy and concluded that it is a robust method. Although programmes to enhance teacher efficacy and studies which examine their effects are sparse, they represent a
beginning effort to recognize the potential and need to develop and incorporate teacher efficacy training programs in the teacher education curriculum.

2) Although wisdom in teaching is studied and viewed as a developmental phenomenon, I would suggest that it can be facilitated by guidance. One criterion associated with wisdom in teaching, that of rich factual and procedural knowledge, has been a major concern in teacher education programmes. It may be timely to think of ways to further enhance student teachers' ability in contextual thinking, relative thinking, and awareness of uncertainty of effects. If cognitive modelling has been shown to be a possible method to enhance teacher efficacy, maybe a similar strategy could help student teachers to improve their wisdom in teaching. Fidler and Underwood (1995) suggested that to be a wise teacher, the person needs to give up certain practices. Some of these include: (1) following a prescribed content and curriculum, (2) reliance on standardized tests, textbooks, and workbooks, and (3) complete control of the classroom. Such practices seem contradictory to what some of us have experienced. But, if we cherish wisdom in teaching, then perhaps it is time that we shift our attention and try practising these new strategies.

As a concluding remark, I would stress that this study represents one new way of viewing an old problem. The findings and its implications for educational practices should encourage the search for other new ways.
REFERENCES


APPENDIX A

Demographic Form

Student ID: _______________

Sex: _______________

Age: _______________

Subject Major: _______________

Subject Minor: _______________
Previous informal teaching experience (this includes private tuition/coaching prior to entry into college, give approximate total hours and type):

____________________________

____________________________

____________________________

Your completion of questionnaires will indicate your consent to participate in the study.
APPENDIX B

Gibson & Dembo Scale

STUDENT ID: _______

INSTRUCTIONS: (1) Please rate the degree to which you agree or disagree with each of the statements by circling the appropriate number next to each statement.

(2) The number represents the following:

1 = SD = strongly disagree
2 = MD = moderately disagree
3 = DS = disagree slightly more than agree
4 = AS = agree slightly more than disagree
5 = MA = moderately agree
6 = SA = strongly agree

___________________________ STATEMENTS BEGIN FROM HERE ON ___________________
<table>
<thead>
<tr>
<th>Statements</th>
<th>SD</th>
<th>MD</th>
<th>DS</th>
<th>AS</th>
<th>MA</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. When a student does better than usual, many times it is because I exerted a little extra effort.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2. The hours in my class have little influence on students compared to the influence of their home environment.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>3. The amount that a student can learn is primarily related to family background.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. If students aren't disciplined at home, they aren't likely to accept any discipline.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>5. When a student is having difficulty with an assignment, I am usually able to adjust it to his or her level.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
6. When a student gets a better grade than he/she usually gets, it is usually because I found better ways of teaching that student.

7. When I really try, I can get through to most difficult students.

8. A teacher is very limited in what he/she can achieve because a student’s home environment has a large influence on his or her achievement.

9. When the grades of my students improve, it is usually because I found more effective teaching approaches.
Statements

10. If a student masters a new concept quickly, this might be because I knew the necessary steps in teaching this concept.

11. If parents would do more with their children, I could do more.

12. If a student did not remember information I gave in a previous lesson, I would know how to increase his or her retention in the next lesson.

13. If a student in my class becomes disruptive and noisy, I feel assured that I know some techniques to redirect him quickly.
14. The influence of a student's home experiences can be overcome by good teaching.

15. If one of my students couldn't do a class assignment, I would be able to accurately assess whether the assignment was at the correct level of difficulty.

16. Even a teacher with good teaching abilities may not reach many students.

END OF STATEMENTS

Please check whether you have responded to all statements and have written in your student ID.

THANK YOU
APPENDIX C

Teaching Dilemma

What would you do as a teacher?

STUDENT ID: ___________________

Instructions:

1. The following (next page) is a description of what happened to you as a teacher. After reading the scenario, answer the four questions as fully as possible.

2. You may use extra paper if necessary.

The Scenario

You are teaching a math class in a school. You can choose to teach in the English or Chinese language and the students have no problem with understanding the language you have chosen to use. The topic of the day is "Perimeters." This is their first introduction to perimeter. The following is what you did:

First, you gave your students the definition of "perimeter" as it appeared in their textbook. The definition is: "Perimeter is the distance around the outside of a figure or a surface."

Then, you asked the students to do the first exercise in their textbook. The exercise is: "Measure the perimeter of your desk."

The measurement of the students' desk are as illustrated on the next page.
When the students give you their answers, most of them gave you the wrong answer. Some said 60 cm. Some said 63 cm. and some said 100 cm. You expected the answer to be 200 cm. but only a few students gave you this answer. After hearing their answers,

(1) Do you think the students have a problem? If so, what might it/they be and why do you think they are having such problem(s)? (This is question 1)

(2) Would you ask your students any questions? If so, what might it/they be? (This is question 2)

(3) Do you think you can help the students? If so, what activity(ies) would you plan for the next lesson and explain why you choose this/these activity(ies). (This is question 3)

(4) Do you need extra information before you can plan for the next lesson? If so, what might they be? (This is question 4)

Write your answers on back of this page
Feel free to use extra paper
APPENDIX D

Life-planning dilemma

STUDENT ID: ______________________

Instructions:

Everybody has been in situations in which they have to make plans about the future. These situations may be big challenges or they may be small ones, but they are all situations in which people don't necessarily know exactly the right thing to do. In the following story a person has just encountered this kind of situation. Please read the story and formulate for this person a realistic life plan. The plan should at least cover what the person should do and consider in the next three to five years.

The story:

Up to now, Jack, aged 58 and married, compulsory retirement is 60. Recently, his company was taken over. The new management had decided to close the branch where Jack is employed. Jack is considering the following options: (1) he can plan to take early retirement with full pay as compensation for two years, or (2) he can plan to move to work in the company head office for a further two years to three years.

What should Jack do?

***Write the plan from here on***