AN ANALYSIS OF STUDENT TEACHERS’ REPRESENTATIONS OF REAL LIFE TEACHING PROBLEMS: A NEO-PIAGETIAN PERSPECTIVE

by

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ABSTRACT

This study explored student teachers' level of problem representation over the course of the practicum experience in the face of instructional problems specific to the domains of teaching. The purposes of this study were: (1) to analyze the growth and development of student teachers' levels of problem representation during their practicum in the areas of adaptation of instruction to individual differences among learners and classroom/behaviour management through an application of Case's (1991) neo-Piagetian theory of intellectual development, (2) to use these levels to compare student teachers' representations of hypothetical teaching dilemmas and their representations of their own teaching problems, and (3) to explore how student teachers represent and re-represent their teaching challenges during the practicum through the use of concept maps and reflective interviews.

Eighteen elementary level student teachers and their six faculty advisors completed written and oral output measures during the practicum. Student teachers' responses were rated according to the levels of problem representation derived from Case's neo-Piagetian theory of intellectual development. Faculty advisors' ratings and observations provided a means of assessing whether student teachers translated their representations into action. Student teachers' concept
map drawings and reflections about their teaching challenges provided insight into how they represented their challenges.

The results verified previous research conclusions (Newman, 1992, 1993, 1994) that student teachers' level of problem representation and description of the problem increases in complexity over the course of the practicum experience. Student teachers' level of problem representation is more complex for their own teaching problems than for hypothetical case scenarios. Also, the findings supported that Case’s neo-Piagetian conceptual framework does provide a useful theoretical tool for describing the development of student teachers’ ability to represent classroom/behaviour management and individual differences teaching problems. Concept maps and structured interviews provided very interesting insights into student teachers' representation of teaching challenges associated with classroom management, instructional planning, teaching, and assessment, and student needs. Implications for teacher education and future studies of teacher thinking are discussed.
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DEDICATION

Dedicated to my children,

Henry Walmis Newman Cummings & Ian James Newman Cummings
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CHAPTER I: INTRODUCTION

Classroom problems can be defined as multi-faceted, ill-defined problems and the student teacher's task of teaching as one fraught with uncertainties. Real life instructional problems in the domains of teaching are defined as those ill-structured problems that are complex, uncertain, and laden with dilemmas because they involve on-the-spot decisions about "what students know, what effects teaching has had and will have, what content they should be trying to teach, what instructional authority they have, and how they can improve their teaching" (Floden & Clark, 1988, p. 506). The ability of the professional to make these decisions, to integrate experience with theory and research in the formulation of on-the-spot solutions to unique, complex problems of the day to day task of teaching is what Schon (1983, 1987, 1991) termed "reflective practice." The development of a complex representation of and a reflective perspective on real life teaching problems is the challenge all student teachers are faced with as they begin their journey toward expertise.

Background to the Problem

The enduring problem facing teacher education today is how to prepare prospective teachers for the uncertainties of real life teaching problems. The main emphasis in teacher preparation programs remains on the technical and communicative dimensions of teaching with little attention given to the development of flexibility and the problem solving skills necessary to deal with
the actual complexities of everyday teaching problems (Edmundson, 1990; Goodlad, 1990a, 1994, 1998; Sarason, 1993). Adaptation of instruction to individual differences among learners is central to what teachers 'do', yet actually 'doing it' presents daunting challenges for all teachers, especially student teachers who are focused primarily on survival and delivering 'the curriculum' (Goodman, 1988; Pigge & Marson, 1997; Smith & Sanche, 1992).

Classroom management poses an equally important problem for all teachers, especially student teachers who are "concerned not only with establishing order and gaining student cooperation but also with their own competence" (Hoy & Woolfolk, 1990, p. 280). Classroom control and discipline are the most frequently reported anxieties of student teachers (Hart, 1987). Merrett and Wheldall (1993) conclude that "classroom behavior management is not a major concern of teacher training establishments" (p. 93). Research in the areas of teachers' thought processes and reflective practice offers potential yet partial solutions to these problems of teacher preparation.

The technical analysis typical of research on teachers' thought processes such as counting up of the decision points in a teacher's day has contributed little to our understanding of how the student teacher both thinks about the complexities of real life instructional teaching problems and how the student teacher processes that information while interacting with pupils (Clark, 1988; Clark & Peterson, 1986; Floden & Klinzing, 1990; Mitchell & Marland, 1989).
The specific findings of this body of research provide few directions for teacher education and for the supervisors concerned with the development of flexibility and reflection in student teachers (Goodlad, 1990b, 1994, 1998; Howey & Zimpher, 1989).

Although the concerns of the reflective practice movement are focused on the concerns of the teacher as learner, the complexity of the teacher's own way of knowing, and on the teacher as a 'constructor' of knowledge, little empirical support exists to give direction to teacher education. There is much discussion as to what exactly it is student teachers should be reflecting about (Gore & Zeichner, 1991; Zeichner & Liston, 1990; Zeichner & Tabachnick, 1991) yet little direction as to how to go about the process. The descriptive stages of teacher reflection characteristic of the research to date offer no indications of how student teachers move from one stage of reflection to the next or how educators can promote the kind of reflection necessary for students to make these moves (Beach & Pearson, 1998; Beach & Tedrick, 1993; Bernstein-Colton & Sparks-Langer, 1993; Chen, 1993; Griffith & Tann, 1992; Pultorak, 1997; Pugach, 1990; Ross, 1989; Reiman, 1999; Richert, 1990, 1992; Sparks-Langer, Simmons, Pasch, Colton, & Starko, 1990; Van Manen, 1977; Zeichner & Liston, 1987).

A conceptual framework that specifies the underlying structures and mechanisms of student teachers' development toward expertise is needed if the goal is to substantively educate student teachers rather than just technically train
them (Goodman, 1988; Shulman, 1986, 1992, 2000). Indeed, if teacher
development is to be the agent of change in the simultaneous renewal of schools
and teacher education, as recent research on change suggests, then we need to
embrace a multi-level view of human growth and development that is complex
enough to describe that change (Bullough & Baughman, 1997; Darling-
Hammond, 1997; Holmes Group, 1986; NRC, 1999; Patterson, Michelli &
Pacheco, 1999; Senge et al., 2000; Willinsky, 2001). A neo-Piagetian perspective
(Case, 1985, 1987, 1991, 1993; Case & Okamoto, 1996) may provide this
conceptual framework.

Case's model of intellectual development includes the theoretical tools of
structures and processes necessary to analyze the nature of student teachers'
representation of real life problems and to model the development of that ability
over the course of experience. It provides a multi-level view of development
which integrates both domain-general and domain-specific aspects of
development in a constructivist/integrative fashion. Case's (1991) view of
development was one in which "changes take place at all levels, in a recursive and
interactive fashion according to a process that depends on both biological and
cultural/experiential factors" (p. 374). With both general and specific levels,
Case was able to account for both the evenness and unevenness of cognitive
development. Cognitive, affective, and social developmental changes of the
individual were also addressed within his conceptual framework. This framework
can be used to examine how student teachers begin to think about the complexity and conflict inherent in real life teaching problems.

While Case's model is primarily focused on children's representation of problems, the argument can be made that in the face of new domains (e.g., teaching) the adult learner represents and re-represents problems across these levels as he or she gains experience and reflects on those experiences. Several attempts have already been made by Case and his colleagues to extend his model to the adolescent years (Case, 1988a, 1988b, Marini & Case, 1994). However, the current application of Case's model to the domains of teaching is a unique attempt to use Case's conceptual framework in a new way to model student teachers' development of pedagogical expertise because it is an application of the model to the specific domains of teaching rather than an extension of Case's model upwards to capture the development of adult cognition. Because Case's model is a domain-specific model, it allows for a fine-grained analysis which specifies the structures, processes, and mechanisms available to student teachers in their growth and development toward expertise in teaching. Case's model can be used heuristically to generate a series of proposed stages in student teachers' construction of pedagogical knowledge (Newman, 1992, 1993, 1994).

The levels of student teachers' representation of their pedagogical knowledge of the problems of classroom/behavior management and adaptation of instruction to individual differences among learners in the classroom were
developed in the research studies of Newman (1992, 1994). These previous studies provided a rich set of categories to describe student teachers' level and description of problems over the course of the practicum. They also showed that student teachers' level of problem representation and description increased in complexity over the course of the practicum. They indicated a need for case scenarios accompanied by clinical interviews with student teachers to probe for information based on the student teachers' immediate reaction to questions and their interpretation of those questions. These studies also raised questions about the nature of student teachers' representations and how student teachers formulate those representations during the practicum experience.

The aim of the present study was threefold: first, to substantiate an application of Case's model of intellectual development to proposed levels of problem representation in student teachers' growth and development in the specific domains of teaching (Newman, 1992, 1993, 1994); second, to attempt to bridge some of the gap between student teachers' problem representations in hypothetical teaching dilemmas and their problem representations in real life practicum teaching experiences; and third, to explore in detail how student teachers represent and re-represent teaching problems over the course of their real life practicum teaching experience.

The first aim was accomplished by analyzing student teachers' levels of problem representation of their own teaching problems during the course of the
practicum experience using reflective learning questionnaires and comparing emerging patterns with patterns of student teachers' levels of problem representation in the domains of teaching found in the research of Newman (1992, 1993, 1994). Rating scales and observations by faculty advisors of student teachers' actual problem representations in real life practicum teaching situations provided a triangulated means to assess whether student teachers translate their representations into action. The second aim was accomplished by comparing student teachers' levels of problem representation of their own teaching problems to their levels of problem representation of hypothetical classroom dilemmas presented in case scenarios. The third aim was realized through an indepth exploration of student teachers' thought processes as they represented their own teaching challenges over the course of the practicum experience using both oral and written output methods of concept mapping with accompanying clinical interviews.

Statement of the Problem

Analysis of Student Teachers' Levels of Problem Representation

An analysis of student teachers' levels of problem representation was used to determine if an application of the structures and processes of Case's neo-Piagetian view of intellectual development to student teachers' level of problem representation in the face of instructional problems specific to the domains of teaching (Newman, 1992, 1993, 1994) could be substantiated. This analysis also
attempted to address the theory/practice gap noted by some researchers (Barrow, 1990; Willinsky, 2001) to exist between traditional teacher preparation programs and the complex reality of classroom life.

Case (1991) hypothesized a number of "central conceptual structures" to account for domain-specificity in development. Different domains demand different executive control structures to solve different sorts of problems. The specific executive control structures for each domain form the basis for a central conceptual structure. Research supports the existence of central conceptual structures, as hypothesized by Case, in the domains of scientific, mathematical, spatial, and social reasoning (Bruchkowsky, 1991; Case, Griffin, McKeough, & Okamoto, 1991; Marini, 1991; Marini & Case, 1989, 1994; McKeough, 1991a, 1991b). In order to investigate further the possibility of the existence of a central conceptual structure in the domains of teaching, the following questions were asked:

Research Question One:
How do student teachers represent their real life teaching problems?
More specifically,

a) What patterns are associated with student teachers’ levels of problem representation in the areas of classroom/behaviour management and adaptation of instruction to individual differences among learners over the course of the practicum teaching experience?
b) How do emerging patterns compare to the patterns of student teachers’ levels of problem representation in the domains of teaching described in previous research (Newman, 1992, 1993, 1994)?

Research Question Two:

How do student teachers’ representations of hypothetical teaching dilemmas compare with representations of their own teaching challenges? More specifically,

a) How congruent are student teacher's levels of problem representation of hypothetical teaching problems and real life teaching experiences in the practicum classroom?

b) How congruent are student teacher's levels of problem representation of real life teaching experiences in the practicum classroom and their effectiveness in translating their problem representation into action as observed by their faculty advisors?

The answers to these questions may help to assess the usefulness of using Case’s hypothesized structures and mechanisms to describe the development of student teachers’ problem representation and may bridge the gap between student teachers' levels of problem representation in hypothetical teaching dilemmas and their levels of problem representation in real life practicum teaching experiences.
Nature of Student Teachers' Problem Representations

In order to explore student teachers' representations of real life teaching problems in an in-depth fashion, questions that capture how student teachers define and construct these problem representations must accompany investigations of student teachers' problem representations over the course of the practicum experience.

Research Question Three:

What is the nature of student teachers' representations of real life teaching problems and challenges? How do student teachers define them, construct them, and formulate alternative problem representations?

Significance of the Study

In the reality of the classroom, challenges occur in which principles appear to conflict with one another and no simple solution is possible. This occurs at a time when educators face many new real world contextual challenges such as satisfying widening curricular demands, doing more with fewer resources than were previously available, and educating increasing numbers of students with very diverse needs (Gardener, 1999; Sugai, 1998). Senge et al. (2000) describe the current reality of schooling:

Schools face a unique set of pressures these days, unknown to any other kind of organization...schools are increasingly expected to compensate for the shifts in society and family that affect children: changes in family
structure, rapidly shifting trends in television and popular culture, commercialism without end, poverty (and the inadequate nutrition and health care that go with it), violence, child abuse, teenage pregnancy, substance abuse, and incessant social upheaval..... Struggling to keep up with these kinds of demands, school leaders continually place their institutions on the frontier of change.... The safest prediction is change; schools can no longer prepare people to fit in the world of twenty years ago, because that world will no longer exist.... The idea of building a school that learns...a learning classroom, learning school, and learning community...represents an approach that galvanizes hope. (pp. 9-10)

Ratnavadivel (1999) captured how this call for change and renewal has affected teacher education. He stated,“teacher education is at a crossroads, espousing post-modernist and hermeneutic pedagogical innovations while maintaining bureaucratic and hierarchical implementation structures.” (p. 193)

This study may have a part to play in providing potential answers to the question, “How can advances in research on human cognition, development, and learning be incorporated into educational practice?” (NRC, 1999, p. 2). This question was raised by the Strategic Education Research Program (SERP) developed by the National Research Council (NRC) in its proposal to establish a new standard of coordination, integration, and application for educational research.
The present study also has the potential to serve as a means to integrate the research on teacher thinking, reflective practice and constructivist views of teachers' knowledge growth under the larger auspices of a theoretical, multi-view framework. This conceptual framework may provide a means to capture the underlying structures and mechanisms of development inherent in the student teacher's first step on a path toward development of expertise in teaching.

Definition of Terms

- **Representation** refers to how student teachers think about the real life teaching problems which confront them. In particular, what is known and the way in which that knowledge is organized or structured comprises a view of representation that is a departure from the more traditional and familiar usage of representation as the use of symbols (x stands for y in the external world) (Mandler, 1983). Student teachers’ internal schema or frames of reference are used in their interaction with the external world, in this context, the classroom.

- **Real life teaching problems** refer to those complex, uncertain, ill-structured problems encountered in everyday teaching which require the student teacher to make on-the-spot decisions which balance learner knowledge, ability, understanding, and motivation; task demands; instructional effect--past, present, and future; available resources; and wider expectations of parents, sponsor teacher, faculty supervisor, principal and school board.
- **Developmental perspective** refers to a perspective of growth or change that charts the unfolding story of increments in structural organization of knowledge. Specifically, cognitive development refers to the intercoordination of abilities in an increasingly complex way across the lifespan. In Case's (1985, 1992) neo-Piagetian theory of intellectual development, the conceptual framework adopted in the present study, objects, actions, behaviors, and mental events are consolidated, coordinated, and integrated in a process of hierarchical integration. This integration results in operations of a higher level of abstraction in many domains or specific skill areas, that is, spatial, motor, social, emotional, and logical-mathematical.

- **Constructivist perspective** refers to learners' active construction of their own understandings rather than passive copying of the understandings of others. The construction of new understandings is stimulated when a situation is encountered that challenges the individual's current organization of knowledge.

- **Structures of development** refer to the objects, actions, behaviors, or mental events which are coordinated or hierarchically integrated in the sequence of development. In Case's (1985, 1992) neo-Piagetian theory, the structure is a tripartite control structure which consists of three components: (1) a representation of the current problem situation, (2) a representation of the desired objective, and (3) a representation of the strategy—a sequence for
going from the current problem situation to the desired situation as efficiently as possible. These control structures are independently assembled for each specific domain of interest or experience. As the person grows older, the complexity of the problem situation, objective, and strategy increases but the basic control structures remain the same.

- **Processes of development** refer to the operations which occur to move student teachers from one developmental level (stage or substage) to the next. In particular, Case (1985, 1992) specified four information processes: schematic search, evaluation, retagging and consolidation which activate two schemas (objects, actions, behaviors, or mental events) either at the same time or in succession.

- **Mechanisms of development** differ from processes in that mechanisms set the limit on the number of objects, actions or mental events that can be hierarchically integrated. For Case (1985, 1992), attentional capacity or short term storage space that increases with age provides the means for movement within a stage. The person's growing ability to chunk more information together allows for increased operational efficiency. This operational efficiency is in turn dependent upon maturational factors and, at the upper reaches of development, both instruction and amount of practice.

- **Central conceptual structures** refer to organized sets of concepts and conceptual relations. Case (1992) hypothesized a number of 'central
conceptual structures' to account for domain-specificity in development. Different domains demand different executive control structures to solve different sorts of problems. The specific executive control structures for each domain form the basis for a central conceptual structure. These structures are 'central' in that: (1) they are at the centre of an understanding of a broad number of situations in a domain, (2) they form the core elements out of which more elaborate structures can be formed and (3) they are the product of central or system wide processing.

- **Mutual regulation** is "the active adaption of the child and some other human being to each other's feelings, cognitions, or behaviours" (Case, 1985, p. 269).

- **Individual differences among learners** refer to the characteristics or qualities such as ability, learning rate, prior knowledge, specific interests, motivation level, attentional capacity, maturity level, ethnic background, learning styles, activity level, social skills, personality, and self-esteem which make one learner unique or different from another learner. In order to take individual learner needs into account when planning or adapting instruction in the classroom, student teachers must direct their instruction to the unique and specific needs of the learner.

- **Classroom/ behaviour management** refers to the way in which the classroom environment is planned and organized so that all children have optimum opportunity to attain academic, affective, behavioural and social goals.
SUMMARY

The present study was an attempt to substantiate an application of Case's model of intellectual development, that is, proposed levels of problem representation in student teachers' growth and development in the specific domains of teaching (Newman, 1992, 1993, 1994). It was also an attempt to bridge some of the gap between student teachers' problem representations in hypothetical teaching dilemmas and their problem representations in real life practicum teaching experiences. Through an accompanying indepth exploration of how student teachers represent and re-represent teaching problems in real life practicum teaching situations, it was hoped that this application of a neo-Piagetian perspective of intellectual development may provide insight into how student teachers represent real life teaching problems and ultimately develop the flexibility and reflective skills necessary to meet the challenges of these teaching problems.
CHAPTER II: LITERATURE REVIEW

INTRODUCTION

The present study was designed to address the enduring problem of teacher preparation for real life teaching problems. Case's (1992) multi-level view of the human mind and its corresponding view of human development provides a large enough theoretical backdrop to integrate the various and often polar views of teacher knowledge growth, learning, and pedagogical development and the areas of research which inform those views.

The present study draws heavily on the literature associated with teacher knowledge, teacher reasoning, sociocultural views of teacher learning, and pedagogical development. It also draws on the research areas of teachers' knowledge and thought processes, reflective practice, and constructivist views of teachers' knowledge growth to inform and provide possible solutions to the enduring and often complex problem of how to prepare prospective teachers to deal with the complexities of real-life teaching problems. The study represents a unique combination of these research areas by redefining classroom problems as multi-faceted, ill-defined problems and the student teacher's task of teaching as one fraught with uncertainties. To understand how student teachers think about the ill-defined and uncertain nature of real life teaching problems, research studies related to teachers' thought processes, reflective practice, and sociocultural construction and development of pedagogical knowledge are reviewed. Finally,
an application of Case's neo-Piagetian theory of intellectual development is introduced as a means to analyze how student teachers think about the complex nature of real life teaching problems and how their thinking develops.

Classroom Problems As Ill-Defined Problems

Real life teaching problems are defined as those ill-structured problems that are complex, uncertain, and laden with dilemmas because they involve on-the-spot decisions about "what students know, what effects teaching has had and will have, what content they should be trying to teach, what instructional authority they have, and how they can improve their teaching" (Floden & Clark, 1988, p.506). Ill-structured problems refer to situations in which the individual finds himself/herself confronted with a problem for which there is no immediate, recognizable, known solution (Copeland, Birmingham, DeLa Cruz, & Lewin, 1993; Dunn & Taylor, 1993; Getzels & Csiksentimihalyi, 1976; Moore, 1985). Kitchener (1983) characterized the nature of ill-structured problems:

There is not a single, unequivocal solution which can be effectively determined at the present moment by employing a particular decision-making procedure.... Evidence, expert opinion, reason, and argument can be brought to bear on the issues, but no effective procedure is available which can guarantee a correct or absolute solution. A solution must be constructed by integrating or synthesizing diverse data and opinion. (pp. 224-225)
The problem the student teacher faces in adapting instruction to individual differences among learners or in managing the classroom environment to maximize student learning outcomes is ill-structured in that the student teacher must juggle the cognitive, affective, social, and motivational needs of an individual student or a sub-group of students with the needs of the larger class grouping while taking into account the range of individual ability, behavioural needs within both groups and the resources (space, time, materials) available as well as the wider context of the expectations of parents, supervising teacher, faculty advisor, principal, and board of school trustees. Teaching is a highly complex act in which teachers are expected to make an increasing number and variety of decisions under a continuously changing set of highly contextualized circumstances (Carter, 1992; Connelly, Clandinin, & He, 1997; Copa, 1991; Copeland & D'Emidio-Caston, 1998; Eby & Kujawa, 1994; Feldman, 1997; Floden & Clark, 1988; Grimmett, MacKinnon, Erickson, & Riecken, 1990; Kettle & Sellars, 1996; Lampert, 1985).

Clark and Lampert (1986) described the complexity of the teacher's task:

The teacher encounters a host of interrelated and competing decision situations both while planning and during teaching. There are no perfect or optimal solutions to these decisions. A gain for one student or in one subject matter may mean a foregone opportunity for others. A motivationally and intellectually profitable digression may reduce time
devoted to mandated curriculum. Such conflicts among teacher's multiple commitments lead to practical dilemmas which must be managed in interaction with students. (p. 28)

Previous studies (as reviewed in Romano, 1995) suggested that teachers face such dilemmas daily. The ability of professionals to make these decisions, to integrate experience with research theory in the formulation of quick solutions to complex problems encountered in their teaching is what Schon (1983, 1987, 1991) termed "reflective practice." Indeed, many researchers maintain that reflection is inherent in the practice of teaching (La Boskey, 1993; Russell & Munby, 1991), yet they are less certain as to how it can be found in everyday teaching practice. Goodman (1984) argued for the need to "shift the emphasis in reflective approaches to teaching from 'how to questions' to 'what and why questions' that challenge taken for granted official ends towards which teaching is directed" (p. 11). Petrosky (1994) pushed the boundaries further back with a conception of teaching as "an ill-structured task which teachers must define for themselves" (p. 6). The development of a complex representation of and a reflective perspective on real life teaching problems is the challenge all student teachers are faced with as they begin their journey toward expertise.

The Enduring Problem of Teacher Preparation for Real Life Teaching Problems

The dilemma of how to prepare prospective teachers for the unpredictability of the classroom is manifested in the theory/practice gap. This theory/practice dichotomy powers the debate which occurs in educational circles when educators are faced with the task of developing teacher preparation
programs that cannot wait until all the data are in on what constitutes the most enlightened way to educate prospective teachers (see Rowell, Pope, & Sherman, 1992 and Wideen, Mayer-Smith, & Moon, 1998, for comprehensive reviews). The theory/practice dichotomy refers to the attempt to set theory and practice up in opposition to one another as exemplified by remarks such as "all right in theory but it won't work in practice." Such a statement suggests that something must have been wrong with the theory that said it would work. Barrow (1990) suggested that the theory/practice dichotomy is maintained especially in the minds of teachers precisely because so much of educational theory has been poor. This dichotomy is reflected in views of teaching which range from a generic set of technical skills or pre-specified responses to be supplied at decision points (Gliessman, Pugh, Brown, Archer, & Snyder, 1989; Gliessman, Pugh, Dowden, & Hutchins, 1988; Leinhardt & Greeno, 1986) to teaching as artistry in which the "epistemology of practice is implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness, and value conflict" (Schon, 1983, p. 49).

The nature of the theory/practice dichotomy is consistently reinforced by student teachers' experiences in our teacher education programs. When asked to reflect on their teacher training, first year teachers invariably point to the practicum experience as the single most important factor in their preparation to teach (Calderhead, 1988; Doyle, 1990; Hargreaves, 1984; Sirotnik, 1990), yet Feiman-Nemser and Buchmann (1985) pointed to the pitfalls of teacher classroom preparation inherent in programs that place too heavy an emphasis on the value of the practicum experience. Prospective teachers' previous experience as students,
little connection between field experiences and educational theory courses, and
the fact that classrooms are not designed as laboratories for learning to teach are
pitfalls because they "arrest thought or mislead prospective teachers into believing
that central aspects of teaching have been mastered and understood" (Feiman-
Nemser & Buchmann, p. 63). Indeed, evaluations of teacher education programs
in the United States point to the fact that a generic collection of teaching skills
that offer "quick instructional fixes" will not suffice (Goodlad, 1990a, 1990b,
Kennedy, 1991; Sirotnik, 1990). Goodlad (1990b) explained, "The problem is
not that generic principles of teaching are irrelevant. The problem lies in
overlooking the layers of complexity involved in teaching young people" (p. 700).
We overlook the complex, dynamic, reciprocal relationship between educational
theory and practical preparation of teachers in Teacher Education at our peril
(Boostrom, Jackson, & Hansen, 1993; Copa, 1991; Halliday, 1998; Kessels &
Korthagen, 1996; MacKinnon & Erickson, 1992; Nance & Fawns, 1993;
Robinson, 1998; Shuell, 1993; Strauss, 1993a, 1993b, 1996). Korthagen and
Kessels (1999) asserted that:

Polarization is dangerous because it focuses on the question of whether
teacher education should start with theory or practice instead of the more
important question of how to integrate the two in such a way that it leads to
integration within the teacher. (p. 4)

How we address this fundamental question will determine whether institutions of
teacher education will survive in the future (Korthagen 2001; Loughran, 2001;
Russell, 2001). Wideen, Mayer-Smith, and Moon's (1998) comprehensive metanalytic review of 93 empirical studies on learning to teach supported this view, pointing to a need to "ground the process of learning to teach within a theory that is radically different from that which has traditionally underpinned research and programs in teacher education" (p. 167).

The Strategic Education Research Program (SERP) developed by the National Research Council (NRC) in its proposal to establish a new standard of coordination, integration, and application for educational research spoke of a need for "the preparation of teachers so that they can be consumers of research" (NRC, 1999, p. 2) and called for the "translation of the research findings into forms useful for educational practice" (NRC, p. 11). For this initiative to be a fruitful, far-reaching endeavour in overcoming the knowledge action gap in education, teacher preparation for research consumption must focus on teachers' critical engagement with this knowledge through a collaborative means of exchange, not a top-down, linear, immediate digestion of research-driven educational practices (Willinsky, 2001).

A host of teaching strategies and methodologies have grown up in the attempt to fill the theory/practice gap. Micro-teaching (Cruickshank, 1985; Simbo, 1989), teaching laboratories, (Kowalski, Glover, & Krug, 1988) and case methodology (Shulman, 1992) provide theory which is grounded in the practical context of teaching, yet they lack an underlying conceptual framework, and they view the student teacher as a passive rather than active constructor of his or her own teaching experiences. Reflective techniques such as reflective writing, autobiography and ethnography, questioning and dialogue, inquiry activities, and
faculty modelling (Adler, 1991; Ross, 1987; Zeichner, 1986) and the program approaches to reflective practice such as Elementary Education Program (EEP) (Goodman, 1988), Post Graduate Certificate of Education (PGCE) (Nance & Fawns, 1993), Practice Centered Inquiry (PCI) (Sanders & McCutcheon, 1986), Professional Teacher Education (PROTEACH) (Ross, Johnson, & Smith, 1992), Reflective Inquiry Teacher Education (RITE) (Freiberg & Waxman, 1987), and Queen’s Teacher Education Program (Munby & Hutchinson, 1998) allow the student teacher a voice in the process of becoming a teacher, but they have yet to be grounded in a cohesive conceptual framework. Barrow (1990) asserted that “the only antidote to poor theory is good theory. Either we accept the challenge and seek out a stronger theoretical base, or else by definition, we act intuitively or in response to external command” (p. 309).

The professional development schools (PDS) or programs (PDP) of preservice teacher education which involve collaborative university-public school partnerships were developed in an attempt to reform teacher education in the goal areas of high quality professional preparation, simultaneous renewal, equity, diversity, cultural competence, scholarly inquiry and research, faculty development, and policy to prepare teachers to meet the challenges of the 21st century (Carnegie Forum, 1986; Holmes Group, 1986; Holmes Partnership, 1997). Under the umbrella of PDS, teacher education programs which promoted reflection among student teachers and collaborative action (Griffiths & Tann, 1992; MacKinnon & Erickson, 1992) were developed. Research on the effectiveness of the professional development school partnerships and restructured
teacher education PDP programs is mixed, depending upon the evaluation methods employed (Cobb, 2000).

The developmental perspective which guided the Developmental Teacher Education program (Amarel, 1989; Ammon & Hutcheson, 1989; Ammon & Levin, 1993; Black, 1989; Black & Ammon, 1992) at Berkeley viewed the student teacher as an active constructor of his or her developing pedagogical conceptions. The underlying conceptual framework was loosely described as a "structural-developmental coherent perspective" (Black, p. 2) rather than a developmental theory which included the major factors which contributed to development. The framework was only somewhat theoretically grounded as it pushed the Piagetian notion of general stages to the background in favor of the domain-specific knowledge of pedagogy associated with teaching. The loose nature of the DTE conceptual framework resulted in a program that focused primarily on how to construct domain-specific pedagogical conceptions in student teachers. The cost of such a focus was the missed opportunity to understand what that development looks like (structures) and why and how it unfolds (processes or mechanisms of development).

The proliferation of teacher education programs and coursework designed to promote and establish constructivist teaching practice is a testimony to the inadequacy of teacher education programs and strategies of the teacher knowledge and reasoning perspectives to fill the theory/practice gap. Some important work has begun in investigating how to establish constructivist teaching and learning structures in classrooms (Cobb, Wood & Yackel, 1991; Edwards, 1995; Manning & Payne, 1993; Richards, 1991) and how to devise teacher education programs or
even preservice and inservice coursework which contribute to the growth of constructivist teachers.

Unfortunately, the sheer number of constructivist views that abound under the general rubric of ‘constructivism’ have spawned a proliferation of ‘constructivist’ teacher education programs and strategies that vary with respect to how effectively they prepare teachers to construct their own knowledge of teaching and reflect on it. The five-stage constructivist approach to teaching developed by the Center for Constructivist Teaching through the work of Fosnot (1989, 1996) is distinctly Piagetian in focus as is the work of Kamii (1985). Payne and Manning’s (1991) cognitive self-direction model for teacher education embraces five tenets of the Vygotskian (1978) sociohistorical view of the development of mind. Edward’s (1995) framework for teacher training partnerships between schools and Higher Education Institutions (HEI) in England and Wales embraces a neo-Vygotskian view of learning to teach. The Foxfire Fund, Inc. (1992) has developed the Foxfire Approach based on Deweyan principles.

Evaluation of the contribution of constructivist teacher education programs to the challenge of preparing student teachers or inservice teachers for the complexities of real life classroom situations is further complicated by the variety and combination of views found within programs. For example, many influences shaped the constructivist based Talent Development Model of Teacher Preparation (Benner & Judge, 2000) at the University of Tennessee including Csikszentmihalyi (1993), Gardner (1983), and Vygotsky (1962, 1978). The Hofstra Summer Institute for teachers (O’Loughlin, 1992), Teaching Thinking...
Seminar (TTS) (Keiny, 1994), Math Summerfest Program (MacKinnon, 1996), Summer Math for Teachers Development program (Schifter & Simon, 1992), and Conceptual Change program (Smith & Neale, 1989) have their roots in the teacher reasoning view but go beyond reflection to incorporate constructivist strategies such as apprenticeship learning, autobiographical narratives, collaborative group work, intense dialogue, and socio-culturally mediated activity. Projects tied to specific subject areas such as the Atlanta Math project (AMP, 1990-1994) have strived to encourage teachers in Math (Cobb, 1994a; Cobb et. al, 1991; Shifter & Fosnot, 1993), Math and Science (Cobb, 1994b) and Special Education (Hutchinson & Martin, 1999; Lesar, Benner, Habel, & Coleman, 1997; Lowenbraun & Nolen, 1998) to investigate and implement constructivist learning theory and practices in their own specialty areas.

The combination of constructivism, technology, and case study methodology has resulted in the development of interactive multimedia applications such as C-View (Daniel, 1996); Common Thread Case Project (Bliss & Mazur, 1996); and Understanding Teaching (Hatfield, 1996). Many teacher education programs have incorporated ‘constructivist’ strategies such as the use of authentic assessment tasks, case based methods with peer assisted reflection, concept and opinion maps, experiential learning, learning journals, narratives, portfolios, and storyboarding (Anderson & Baker, 1999; Kenney & LaMontagne, 1999; Sileo, Prater, Luckner, Rhine, & Rude, 1998) to create constructivist based teacher education programs or support a constructivist focus within a teacher education program.
It is precisely because of the burgeoning growth of teacher education programs, projects, and strategies which have flowed from various theoretical permutations and combinations of teacher knowledge, reasoning, and constructivist views that a well articulated, multi-level, conceptual framework is needed if we are to educate student teachers substantively rather than just train them technically (Edmundson, 1990; Goodlad, 1990b, 1994, 1998; Goodman, 1989; Kennedy, 1991; Richardson, 1990, 1994; Shulman, 1986, 1992; Sirotnik, 1990; Wildman & Niles, 1987). A means of assessing how student teachers think about real-life classroom problems that is grounded in a developmental conceptual framework which views student teachers as active constructors of their experiences will go a long way in meeting Feiman-Nemser and Buchmann's (1987) criteria for what makes student teaching teacher education:

Student teaching is teacher education when intending teachers are moved toward a practical understanding of the central tasks of teaching; when their dispositions and skills to extend and probe student learning are strengthened; when they learn to question what they see, believe and do; when they see the limits of justifying their decisions and actions in terms of "neat ideas" or classroom control and when they see experience as a beginning rather than a culminating point in their learning. (p. 272)

Not only is a conceptual framework needed to rationalize teacher education programs, but it is also required if student teachers are to begin to develop adequate representations of real life teaching problems. The few existing
studies of student teachers' representation of classroom problems are at best
descriptive or impressionistic. A comprehensive body of adequate studies on
how student teachers represent real life teaching problems does not exist, let alone
how those representations change over the course of the practicum experience.
The present study focused on student teachers' representations of real life teaching
problems. It also provided support for the necessity of an inquiry method based on
a conceptual framework. The indepth look at the existing perspectives on
teaching that follows will help to frame more adequately the research questions of
the present study and may provide possible solutions to the question of how to
prepare prospective teachers for the uncertainties of the classroom.

Potential Solutions to the Enduring Problem of Teacher Preparation for Real Life

Teaching Problems: Three Perspectives on Teaching

An indepth look at three current perspectives on teaching: (1) teacher
knowledge view, (2) teacher reasoning view, and (3) social constructivist view
may provide potential yet partial solutions to preparing teachers to reason about
authentic teaching problems. All perspectives are concerned with how students
learn and how they can best be taught, yet they answer these questions in
sometimes competitive, sometimes complementary ways. Real world examples
of classroom/ behaviour management and adaptation of instruction to individual
differences among students may elucidate the questions, answers, and focus of
each of these perspectives.

Consider the following classroom management example:
It is 9:00 am and the final bell has just rung. The teacher has moved to the front of the classroom after greeting students at the classroom door and waits for them to take their seats and settle down to begin the lesson. Just then a student enters the classroom and slowly makes his way to his seat, stopping to talk to a friend. The teacher glances at the latecomer and proceeds to write on the transparency on the overhead projector. The students open their binders and begin to respond to the three questions on the screen. As they sit at their tables writing, the teacher moves among them, goes over to the latecomer and speaks with him about his entry.

This example raises several questions for those involved in research on teaching, best educational practice, and teacher education: Why did the teacher act in this way? Was this good practice, and if so, how can we help others to teach in this way?

The following example of an ill-structured problem in the area of adapting instruction to individual differences among students would raise similar questions as well as those questions focused more specifically on student learning needs.

The teacher assigns her students five questions to increase students' understanding of the elements of the short story they have just finished reading together. Quiet descends on the room as the students get to work. The teacher moves around the room monitoring the students' progress.
After three minutes, Jimmy pushes his chair back loudly and proclaims he is finished.

What is Jimmy's progress? Is he really finished? How can Jimmy's individual learning needs best be met? What adaptation(s) or modification(s) must be made to the learning task, materials, presentation order, or other teaching and learning variables while juggling the learning needs of other students in the class, critical contextual factors and important valued outcomes? Broader questions might include: How can a student best be taught to maximize learning potential? What are students capable of learning at different points in their development or at different age or grade levels? Attempts to answer such questions have relied on viewing teaching from the perspectives of: (1) teacher knowledge, (2) teacher reasoning, and (3) social constructivism.

The teacher knowledge view focuses research on teachers and sees teachers as experts at teaching who possess unique types of knowledge: content, pedagogical, and practical and a wide variety of teaching strategies that they use when they provide instruction. From the teacher knowledge view, we could view the teaching in the previous examples as a result of the accumulation of the knowledge of teaching and evaluate the teacher's teaching by comparing the teacher's actions with what research has shown to be effective teaching.

The teacher reasoning view sees teachers as reasoning individuals who make decisions about their teaching practice based on the identification of goals,
practical and moral considerations, and spatial and temporal contexts. They reflect, plan and carry out actions to meet those goals but allow for the possibility of multiple solutions and problems and sometimes unsolvable dilemmas. From the teacher reasoning view, the teaching in the examples would require an investigation into how and why the teachers decided to act in the way they did. The teachers' actions would be seen as resulting from reflection on the situation and could be investigated by analyzing their reasoning processes as they relate to the individual cases.

The social constructivist view of teaching envisions teaching as a contextualized activity in which teacher and student construct the curriculum in an interactive, dialectical way in the social arena of the school and cultural community in which they live. From the social constructivist view, the teachers' actions in the examples can be seen as the result of the interactions of the teachers' socially constructed beliefs, goals, and behaviours with the social context of her practice – the students, classroom, and the curriculum. Teaching, what happens in the class, the teachers' ongoing shaping or construction of teaching become the teachers' and students' negotiation between curriculum, what teachers perceive their students' needs to be at any given point in time, and the complexities of the school environment and the cultural communities in which the school is immersed.
Each of the perspectives on teaching focuses on different underlying conceptions of the mind, the way in which teachers represent those conceptions, and how those conceptions direct how they define teaching. Each perspective also focuses on how teachers represent both certain and uncertain problems and challenges encountered in teaching practice and the potential solutions which flow from their representations. Each of these perspectives gives us only an individual mosaic or part of the larger picture - the "masterpiece" or composite whole of what is teaching. It was hoped that an application of Case's multi-level view of the human mind and its corresponding view of human development would provide the theoretical means necessary to integrate these individual mosaics – the perspectives or views of teaching. This integration allowed for a detailed articulation of how student teachers think about the complex nature of real life teaching problems, how their thinking develops, and thus, how to best prepare prospective teachers for the complex realities of the classroom. The literature pertaining to the underlying ideas, research, and implications for teacher education of each of the perspectives on teaching is reviewed in the following sections.

Implications of the Teacher Knowledge Perspective for Teacher Education:

Research on Teachers’ Thought Processes

The conception of mind embraced by those who support the teacher knowledge perspective is that of the mind as machine or computer. Proponents of
this mechanistic or information processing world view interpret the world as being composed of discrete, interactive components – each with a specific location, function, and systematic antecedent-consequent relation to other components (Pepper, 1942). A ‘correspondence theory’ of the nature of truth underlies the mechanistic view of the world in which a belief is “truthful to the extent that it accurately represents what is outside the mind; mental structures must correlate with or correspond to those structures afforded by the environment” (Prawat & Floden, 1994, p. 38). From the teacher knowledge perspective, teachers are seen as thinking individuals who possess an array of knowledge that is unique to the teaching profession. Research on teachers' knowledge and thought processes has proceeded along the lines of description in an attempt to chip away at the task of describing what appears to be a complex, cognitively demanding, human act.

Shulman (1986) established that there are at least three important sources of knowledge required for the competent performance of teaching: content knowledge, pedagogical content knowledge, and pedagogical knowledge. Content knowledge refers to teachers' understanding of the organization, concepts, and relationships among concepts of subject areas such as English or physics. Pedagogical content knowledge is teachers' ability to transform content knowledge into forms that can be learned by all students. It may take the form of analogies, applications to everyday life, concrete examples, and forms of practice
which teachers use to promote student learning. Pedagogical knowledge differs from pedagogical content knowledge in that it consists primarily of a wider knowledge about organization of classrooms, classroom management, evaluation, motivational methods, communicative skills, and personal knowledge of the needs of individual students.

The description of these sources of knowledge goes beyond the view of teaching as a collection of generic skills. The sources of knowledge required in the task of teaching are not only equivalent to the complexity afforded pedagogical expertise in other professions such as medicine and engineering, but are also firmly embedded in the context of teaching (Berliner, 1989; 1991; Carter, Sabers, Cushing, Dinnegar, & Berliner, 1987; Chi, Glaser, & Farr, 1988; Elstein, Shulman, & Sprafka, 1990; Sanders & McCutcheon, 1986). Research on the sources of teachers' knowledge, however, not only requires further description but also needs to focus on the relationships among teacher knowledge, teachers' interactive thinking and what actually happens in the classroom within the social and practical context in which it occurs. Although the present study did not specifically describe student teachers' sources of knowledge, it did attempt to chart the development of those sources of knowledge in student teachers as they thought about the real life problems of classroom/ behaviour management and adapting instruction to individual differences among learners.
Similarly, research on teachers' thought processes has focused primarily on descriptions of the planning behaviours and interactive thoughts and decisions of experienced teachers. Progress has been made in the description of teachers' planning behaviours, the thinking that teachers do while interacting with students in the classroom and the models that have been constructed to diagram these processes. However, this research focuses on relatively discrete, isolated aspects of teachers' thoughts and actions (Calderhead, 1988). The narrow focus of research surrounding the identification, frequency counts, and antecedents of teachers' interactive thoughts, and description of teachers' alternative courses of action has told us little about how teachers actually make interactive decisions (Clark & Peterson, 1986) or about how they begin to construct and reconstruct more and more adequate pedagogical knowledge. Pedagogical knowledge is essential to any representation of real life teaching problems. It was an assumption in this study that changes in pedagogical knowledge would be accomplished by changes in the problem representation of student teachers.

At the other end of the research spectrum, the accounts of teacher development that have been inferred from schema theory and comparative studies of the cognitions underlying novice and expert teachers' performances (Berliner, 1986; Sabers, Cushing, & Berliner, 1991; Swanson, O'Connor & Cooney, 1990) are too global to be useful. The general models (Berliner, 1988; Eraut, 1990; Fuller & Brown, 1975; Kagan, 1992; Nance & Fawns, 1993) produced by these research efforts give snapshots of teachers' cognitions at very loosely defined 'stages' of 'development' with no attention to the specification of actual processes that move the teacher from one stage to the next.
What is needed is research which: (1) uses "longitudinal designs and cognitive developmental frameworks instead of continuing to accumulate descriptions" (Clark & Peterson, 1986, p. 268); and (2) emphasizes teachers' active construction of knowledge rather than the passive description of their thought processes from an information-processing approach (Calderhead, 1988; Cochran-Smith & Lytle, 1990; Elbaz, 1988; Peterson, Clark, & Dickson, 1990). The present study adopted a developmental, constructivist approach to student teachers' representations of real life teaching problems over the course of the practicum experience in the attempt to understand the development of student teachers' organizing structures and to assess the adequacy of Case's (1985, 1991) neo-Piagetian theory of intellectual development as a theoretical tool and conceptual framework.

Implications of the Teacher Reasoning Perspective for Teacher Education:

Research on Reflective Practice

The conception of mind embraced by those who support the teacher reasoning perspective is also that of the mind as machine or computer. However, teachers as reasoning individuals able to think about, reflect, and make defensible decisions about their practice are firmly at the centre of the decision-making process. The notions of reflective practice that are prevalent in the research literature seem to be as numerous as the practitioners who use them. The terms "reflective practice", "reflective teaching", "reflection-in-action", "action oriented research", "inquiry oriented research", "reflective practitioner", "teacher as researcher", and "teacher as problem solver" all encompass a notion of reflection in the process of professional development which involves a way of thinking
about education that places value on making choices and taking responsibility for those choices (Adler, 1991; Calderhead, 1989; Goodman, 1984; Liston & Zeichner, 1990; Ross, 1989a; Zeichner & Liston, 1987). Such notions of reflection populate a wide spectrum of variation, yet most begin with the issues and concerns of the teacher as learner, honour the complexity of the teacher's own way of knowing and view the teacher as a 'constructor' of knowledge involved in a process of development toward expertise. Ross (1989) aptly summarized some of the elements of the reflective process:

Recognizing an educational dilemma. Responding to a dilemma by recognizing both the similarities to other situations and the unique qualities of the particular situation. Framing and reframing the dilemma. Experimenting with the dilemma to discover the consequences and implications of various solutions. Examining the intended and unintended consequences of an implemented solution and evaluating the solution by determining whether the consequences are desirable or not. (p. 22)

Much of the writing on reflective practice evolves from the concepts offered by a few key theorists: John Dewey (1933), Michael Van Manen (1977), Donald Schon (1983, 1987), Kenneth Zeichner, (1981) and the Frankfurt School of Social Research in the work of Habermas (1974). Various interpretations of these concepts are manifested in the reflective practice programs of Cruickshank (1987), Zeichner and Liston (1987), and the reflective strategies of Adler and
Dewey's (1933) concept of "reflection", defined as "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends" (p. 9) emphasized a sense of wonder or unrest at the problem, and a purposeful, reasoned search for the solution. Dewey suggested that the development of reflection involved the growth of certain attitudes (for example, openmindedness) and the acquisition of certain skills (for example, reasoning).

Building on Dewey's (1933) ideas, Van Manen (1977) identified three levels of reflection: "technical", "practical", and "critical" and further developed degrees and forms of reflection within each level. See Appendix A, (pp. 264 - 269) for a description of Van Manen's (1977) levels. His descriptions of reflective thought revealed the complexity of these thought processes and contributed much to the development of the concept of reflection.

In many ways, Schon (1983, 1987, 1991) echoed Dewey's concept of reflection in his concepts of "knowledge-in action", "tacit knowledge", "knowing in action" and "reflection in action" which place the teacher at the centre of knowledge about the artistry of teaching rather than the researcher. Schon defined the reflective practitioner as the professional who integrates experience with
theory and research in the formulation of solutions which are a response to the uncertainty and complexity of the unique problems of practice. He argued against the view of professional as applied scientist who implements the theories of science in practical situations. He rejected the view of teaching as merely a craft that can be mastered solely through propositional knowledge or passive observation and embraced the teacher as a professional who brings practical competence to bear in divergent situations and searches for "an epistemology of practice implicit in the artistic, intuitive processes which some practitioners do bring to situations of uncertainty, instability, uniqueness, and value conflict" (Schon, 1983, p.49). Schon was more interested in the professional involved in the process of decision-making in which interactive, interpretative skills are brought into play in the analysis and solution of complex problems than the decisions themselves as his concept of "reflection-in-action" suggests:

Reflection-in-action is a reflective conversation with the materials of a situation. Each person carries out his own evolving role... 'listens' to the surprises that result from earlier moves, and responds through on-line production of new moves that give new meanings and directions to the development of the artifact. (Schon, 1987, p. 31)

Crucial to Schon's process of "reflection-in-action" are the notions of "problem setting" and problem solving in which the practitioner must notice the problematic and articulate its nature and context.
In real world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials or problematic situations that are puzzling, troubling and uncertain. When we set the problem, we select what we will treat as the "things" of the situation, we set the boundaries of our attention to it, and we impose upon it a coherence which allows us to say what is wrong and in what directions the situation needs to be changed. Problem setting is a process in which, interactively, we name the things to which we will attend, and frame the context in which we will attend to them. (Schon, 1983, p. 40)

For the teacher involved in the process of "reflection-in-action" in which he sets a problem in a situation, Schon (1983) posited "fundamental principles" that are "closely connected both to his frames and to his repertoire of exemplars" (p. 317). By fundamental principles Schon meant theory or conceptual apparatus in use. In a "reflective conversation" with the practice situation, past experiences of the teacher are brought to bear on the situation, frames are imposed and call attention to certain aspects of the problem, problems are set and actions that entail certain solutions are formulated. How the teacher sees the situation depends on his or her knowledge base, past experience, the uniqueness of the situation and the people involved, social and professional norms of behaviour and the expectations of others, not to mention the individual way in which his or her reflection unfolds.
Schon's conception of problem setting is particularly useful in examining how student teachers represent the uncertainties of real life teaching problems.

Kenneth Zeichner's (1981; Zeichner & Liston, 1987) "critical inquiry" offers another perspective on reflective practice. Zeichner went beyond teaching as technique and the emphasis on specific situations of practice to a level of inquiry that involves questioning what is generally taken for granted. He posited three levels of reflection (Zeichner & Liston, 1987) that uncover unarticulated assumptions and root metaphors and involve seeing from different perspectives. He rejected Van Manen's (1977) notions of hierarchical ordering of reflection in favour of 'domains' that interact and overlap.

Similarly, the work of Habermas (1974) of the Frankfurt School of Social Research also supports a critical conception of reflection. As Calderhead (1989) notes, "Reflection is viewed as a process of becoming aware of one's context, of the influence of societal and ideological constraints on previously taken-for-granted practices, and gaining control over the direction of these influences" (p. 44). The various interpretations of reflective practice which have resulted in a proliferation of reflective teaching programs and strategies (See Adler, 1991, for a comprehensive review) vary in terms of how they view the process, content, preconditions, and product of reflection. They emphasize to differing extents the roles of problem setting, problem solving, knowledge bases, analytic and
interpretative skills, and the attitudes which are brought to bear on the reflective process.

Although many concepts of reflective practice and strategies of how to educate the 'reflective practitioner' have been advanced, operationally defining reflective practice is in itself problematic. Zeichner (1993) noted that "reflective teaching" has become a meaningless term because educators from multiple perspectives have espoused it as desirable and claimed to promote it but have not agreed on exactly what the 'it' is. Essentially, reflective practice lacks an underlying conceptual framework from which operational definitions of reflection, levels of reflection, and the underlying structures and processes involved in reflective practice can flow (Kirby & Teddlie, 1989; Liston & Zeichner, 1990; MacKinnon, 1987). Empirical evidence to support the effectiveness of existing reflective strategies utilized in teacher preparation and professional development programs, even in their present state of operational definition, is lacking (Adler, 1991: Calderhead, 1989). The studies which do examine the use of reflective practice by teachers (Korthagen, 1985; MacKinnon, 1986; Oberg & Field, 1986; Russell, 1986) are exploratory in nature. They rely primarily on case study and qualitative methodology and provide the starting points for further inquiry.

However incomplete the empirical support for the effectiveness of reflective practice may be, such inquiry has produced some models of "levels of
reflection" (Zeichner & Liston, 1987), "frameworks for reflective thinking" (Sparks-Langer, Simmons, Pasch, Colton, & Starko, 1990), "stages in the development of reflective judgment" (Ross, 1989b) or “stages of reflection” (Smyth, 1989) that are useful in understanding how student teachers come to represent the problems of real life teaching. Appendix A, (pp. 264-269) provides a description of these models of reflection.

Inherent in the models described in Appendix A, (pp. 264-269) is a perspective on student teachers' development of reflection which has at its centre a view of development and change as emergent, structural, qualitative, and for the most part constructive or active. Unfortunately, these models of reflection describe only surface features of the reflection that structures teachers' thinking or, worse, only static vignettes of teachers' reflection. They stop short of specifying the underlying processes which are in operation as teachers actively construct those structures of reflection as they move from one level of reflective thinking to another. Reflection is thought to be one of the processes student teachers engage in as they attempt to represent real life classroom problems. A neo-Piagetian conceptual framework which is reviewed later in Chapter Two provides a means for describing the structures and processes which characterize student teachers' reflection.
Social Cultural/ Constructivist Perspective: Research on Teachers’ Knowledge Growth and Development

The social cultural/constructivist perspective is based on the conception of learning as a constructive process in which the learner builds an internal representation of knowledge, a personal interpretation of experience. This internal representation constantly changes as new knowledge structures and linkages are added. Learning is an active process in which new meanings are developed or ‘constructed’ by the learner based on his or her new experiences of the world and the shared experiences of the cultural community of which he or she is a part. Conceptual growth comes from sharing multiple perspectives and the simultaneous changing of one’s internal representations in response to those perspectives as well as from one’s cumulative experience. The role of the teacher changes from one of information provider, information sequencer, and assessment and evaluation creator, to learning facilitator or guide, scaffolder, task or problem presenter. The task of teaching involves the creation of information-rich environments where students think, explore, and construct meaning. Teachers create authentic tasks and problems and support students’ construction process through coaching, prompting, challenging, and fading. The social cultural/constructivist perspective has gained momentum as a ‘real’ world, practical alternative due to its dramatic shift away from traditional empiricist and
rationalist views of mind and learning as the transmission of knowledge, toward a view that is much more complex and interactive.

The research of Clandinin and Connelly (1992), Manning and Payne (1993), Keiny (1994), and Tobin and McRobbie (1996) yielded sociocultural, constructivist tenets and models of teacher growth. Clandinin and Connelly (1992) developed a view in which the work of teachers is inseparable from their context and teaching is a process of curriculum negotiation. Manning and Payne’s (1993) research studies with teachers and student teachers yielded a Vygotskian-based theory of teacher cognition which seeks to promote self-directed teachers via the development of higher psychological processes of mental reflection and self-regulation. Keiny’s (1994) conceptions of teachers’ role as instrumental and developmental and the framework for his five phases of reflection have both constructivist and developmental pieces. Tobin and McRobbie (1996) have worked for a decade on research studies to investigate the nature of teachers’ actions and the nature of action itself. They have focused on “four central tenets: beliefs, goals, behaviours and the context of action” (Tobin & McRobbie, 1996, p. 225) as the basis for a sociocultural theoretical framework for understanding teaching. Their focus is on the dialectical relationship between teacher and the “sociocultural milieu in which they enact their professional lives” (Tobin & McRobbie, 1996, p. 225).
The research that has been done by researchers who align themselves with the sociocultural/ constructivist perspective has made important contributions to what we know about how to prepare student teachers for the uncertain and often perplexing task of teaching. Unfortunately, the very nature of social constructivism and the interdependence of the phenomena make it difficult to assimilate what we have learned as knowledge gained (Grimmett & MacKinnon, 1992). The inseparable details of the act of learning to teach and its social context within classroom and school and the many forms of constructivism which researchers and teacher educators have selected as frameworks to conduct their research and foundations to guide their teacher education programs have also made it difficult to utilize this perspective. To separate the act of learning to teach and the social context in which it occurs contradicts the very essence of the sociocultural/constructivist perspective view of learning. A neo-Piagetian conceptual framework provides a multilevel view that honours the contributions of the sociocultural/constructivist perspective and also provides a means for describing the structures and processes that characterize student teachers' constructions of their practicum experience.

A Neo-Piagetian Conceptual Framework for Understanding Student Teachers' Representations of Real Life Teaching Problems

As one of the dominant figures in the field of cognitive development, Jean Piaget's structural view of intelligence provided a universal, monolithic,
constructivist view of the human mind. Piaget proposed that children's cognitive structures go through four stages: (1) the sensorimotor stage, (2) the preoperational stage, (3) the concrete operational stage, and (4) the formal operational stage. Each stage was characterized by a general thinking structure that was built by differentiating and coordinating existing schemata into a coherent system or psychological structure. The structure enabled the child to construct a way of viewing the world. According to Piaget, these structures determined cognitive performance across domains, and thus constituted a "structure d'ensemble" (structure of the whole). Using Piaget's general stage construct to analyze performance in specific domains is fraught with difficulties, however.

Evidence against the stages included: (1) difficulties inherent in the definition and identification of general logical structures (Flavell, 1963), (2) the unevenness or discontinuity in the development of logically equivalent structures (Beilin, 1971), (3) low correlations for the emergence of same age abilities (Pinard & Laurendeau, 1969), (4) successful training of certain abilities before their predicted age of emergence (Gelman, 1969, 1982), and (5) reinterpretation of developmental shifts as domain-specific conceptual changes (Carey, 1985). Findings such as these seem to be incongruent with Piaget's assertion that one general cognitive structure determines performance. Although neo-Piagetian theories (Case, 1985, 1991; Fischer, 1980; Halford, 1982; Pascual-Leone, 1969)
have retained the concept of stage, they have undertaken considerable transformation of Piagetian theory in order to refute the criticisms presented. First of all, general logical structures have been replaced by domain specific, individually assembled structures. For example, children's structures for logico-mathematical thought are assembled independently from the spatial structures implicit in their art. Secondly, these neo-Piagetian theories emphasize an upper limit, or age-related constraint on cognition in different domains, rather than a uniformity across same-age cognitive operations. Thirdly, the variability in the level of cognitive performance is explained by individual differences in experience, processing, and cultural factors. Last of all, neo-Piagetian theories postulate the constraints on stage transition in information processing terms such as short term storage space.

The theory of intellectual development which directed the research program of Robbie Case (1985, 1987, 1991), a neo-Piagetian theorist, grew out of Piaget's structural view of intelligence and the neo-nativist and information processing views of intelligence. Case's neo-Piagetian theory of intellectual development accepted the Piagetian premises that children actively structure their experiences and that the internal processes available for bringing about this restructuring are vastly different from one stage of development to the next. Case departed from classical Piagetian theory in his detailed description of his four stages of development and the processes and mechanisms which allow movement
between stages. He embraced a sociological perspective in positing structures which are open to the influence of cultural factors. His view of the human mind was "one of a multi-level system, whose structures and processes can vary in their degree of applicability, along a continuum from specific through intermediate (module-wide) through general systemic" (Case, 1991, p. 374). Accompanying this view of mind was a view of development in which "changes take place at all levels, in a recursive and interactive fashion, according to a process that depends on both biological and cultural/experiential factors" (Case, 1991, p. 374).

Case modeled children's ability to solve problems by postulating the use of control structures or "internal blueprints" which represent the child's habitual way of solving problems. All control structures are "tripartite entities" (Case, 1991, p. 48) that consist of three components: (1) a representation of the current problem situation (2) a representation of the desired objective(s) and (3) a representation of the strategy or sequence of mental steps for progression from the initial states of the current problem situation to the desired outcome situation.

Case suggested four distinctly different types of thought processes which comprise the sequence of stages of development that are encountered in the movement from birth to adulthood:

1) In the sensorimotor stage (1-18 months) thinking is motoric.

2) In the interrelational stage (1 1/2 - 5 years) children think in terms of global relationships and the mental events are objects, people, and actions.
3) In the dimensional stage (5 - 11 years) children think in terms of second order relations, in which the elements are categories of relations or dimensions.

4) In the vectorial stage (11 - 19 years) children think in terms of third order dimensions or categories, in an abstract fashion.

The type of mental event encountered at each stage of development is represented by the component schemes of the control structure.

Case postulated three levels of coordination within each stage, each one defining a different substage (see Figure 2.1, p. 52) and using increasingly more powerful strategies of problem solving. "Unifocal" co-ordinations characterize the first substage of a new stage, when two schemes assembled gradually during the previous stage become hierarchically integrated (for example, one becomes subordinate to the other). This assembled unit becomes the basic building block of the new stage. At the next substage, two of these unifocal schemes are linked in "bifocal" coordinations, in which two operations of similar complexity become co-ordinated. Finally, during the "elaborated bifocal" substage, bifocal co-ordinations become flexible and reversible, in such a way that changes in one of the component operations lead easily to compensatory changes in the other.

Continued practice and streamlining results in consolidation of these structures into the units which will be hierarchically integrated at the transition to the next stage.
Figure 2.1

Hypothesized Structure of Children’s Knowledge at Different Stages and Substages from Birth to Adulthood (Case, 1991, p. 346).
Case's model addresses the problem of continuity by positing a between stage transition in which the units coordinated and consolidated at the previous substage become the building blocks of the first substage of the next level. As the child moves from the last substage of one level to the first substage of the next level, there is a qualitative shift in thought. Then as the child progresses through the remaining three substages of a level, the strategies used become more quantitatively complex. The child is capable of more of the same kind of thinking.

An increase in working memory capacity makes progression through stages possible and allows the child to focus on an additional chunk of information and integrate it into the problem solving procedure. To summarize, the child constructs quantitatively different problem solving structures as he/she progresses through the substages of each major stage, while qualitatively different structures mark his/her movement from one major stage to the next. It is also Case's (1985) concept of 'executive processing space' or working memory capacity or 'm-space', that allows for the application of Case’s neo-Piagetian framework to adult student teachers’ problem representations. Case (1985) asserted that hierarchical integration and maturational growth in working memory storage space are the processes at work that impact the number of structures a child can assemble at any given stage of development. He also suggested that further intellectual development can still occur but only as “a result of domain-
specific reorganizations in the subjects’ existing repertoire of structures, not as a result of a domain-independent increase in the amount of short-term storage space which they have available for coordinating these structures” (p. 307).

In the face of new domains such as representation of ill-structured teaching problems, adult student teachers’ repertoire of structures available will require a domain-specific reorganization or coordination and consolidation of the components of the problem they are able to represent in order for growth and development to occur.

The processes that account for within-stage structural coordinations are four information processes described by Case (1987) as: (1) schematic search, in which a second schema is sought for activation while a first schema remains active; (2) schematic evaluation, in which the usefulness of the combination of the two schemas is evaluated; (3) retagging, in which two schemes are relabelled into a single paired, or higher order scheme, so that the two schemes can be retrieved as a single operation; and (4) schematic consolidation, which involves forming a new, smoothly running unit comprising the two formerly separate schemes. The mechanisms of development that set limits on the highest level of intellectual operation which can be achieved are: (1) operational efficiency or the amount of working memory available (STSS - short term storage space) and (2) maturation or practice and instruction available in specific problem areas, especially as these problem areas become more culture bound and more abstract. Case’s model
incorporates socially based forms of learning which are central to the social constructivist view through the concept of mutual regulation. Case (1985) defined mutual regulation as “the active adaption of the child and some other human being to each other’s feelings, cognitions, or behaviours” (p. 269). Case’s model offers insight into the design of educational activities, appropriate to each developmental level, that will facilitate optimal and advanced learning. Figure 2.2, (p. 56), summarizes the processes and mechanisms operative in the ‘hierarchical learning loop’ or ‘iterative feedback loop’ present in all regulatory learning activities.

Case’s (1996) summary of the properties of the hierarchical learning loop provide the processes and mechanisms to be investigated in order to describe a new central conceptual structure. These include:

(1) New central conceptual structures are almost invariably formed by the differentiation, integration, and consolidation of existing structures.

(2) The process by which this occurs is one in which both associative and conceptual learning are involved.

(3) The process is one in which both specific and general learning are involved.

(4) Whenever these pairs of processes are involved, they feed on each other in a reciprocal and highly dynamic manner (pp. 20-21).
Iterative learning loop:

conceptual learning
prepares way for further associative learning

Figure 2.2
The hierarchical learning loop. (Case, 1996, p. 21)
Because Case's model is domain-specific and allows for a fine-grained analysis which specifies the structures, processes, and mechanisms available to student teachers in their growth and development toward expertise in teaching, it may prove to be a useful conceptual framework. Case's model can be used heuristically to generate a series of proposed stages in student teachers' construction of pedagogical knowledge. Specifically, it can be used to provide one means of describing student teachers' representation of their pedagogical knowledge of classroom problems. Appendices B and C (pp. 270-281) describe ways of portraying these shifts in student teachers' representations of the problem areas of classroom/behaviour management and the adaptation of their instruction to individual differences among learners (Newman, 1992, 1994). These previous studies provided a rich set of categories to describe student teachers' level and description of problems over the course of the practicum as shown in Appendices B and C (pp. 270-281). They also showed that student teachers' level of problem representation and description increased in complexity over the course of the practicum. They indicated a need for case scenarios accompanied by clinical interviews with student teachers to probe for information based on the student teachers' immediate reaction to questions and their interpretation of those questions. These studies also raised questions about the nature of student teachers' representations and how student teachers formulate those representations during the practicum experience.
Classroom management or "the establishment and maintenance of productive learning environments that foster high levels of student engagement and prevent student disruptions" (Brophy & Evertson, 1976 as cited in Gettinger, 1988, p. 227) is an important aspect of school life. It poses an important problem for all teachers, especially student teachers who are "concerned not only with establishing order and gaining student cooperation but also with their own competence" (Hoy & Woolfolk, 1990, p. 280). Classroom control and discipline are the most frequently reported anxieties of student teachers (Hart, 1987). Unfortunately, Merrett and Wheldall (1993) concluded that "classroom behavior management is not a major concern of teacher training establishments" (p. 93).

Although it is difficult to specify the content or aspects of student teachers' representations as they think about problem situations, goals, and strategies associated with adapting their instruction to individual differences among learners or problems of classroom management, Case's conceptual framework gets beyond the what and specifically addresses the how. Debate in the literature over what beginning teachers reflect upon, that is, lesson content, pacing, routines, ethical, social, and moral issues (Gore & Zeichner, 1991; Grossman, 1992), becomes less significant in the face of the question concerning just how it is that student teachers construct their representations of individual difference and classroom/behaviour management problems. This adaptation of Case's theory of intellectual development provides the machinery for an inquiry into the
development of the structures and processes utilized by student teachers in their representation of real teaching problems.

Case's model was used heuristically to generate a series of proposed stages in student teachers' construction of pedagogical knowledge (Newman, 1992, 1993, 1994). Specifically, it was used to provide one means of describing student teachers' representations of their pedagogical knowledge of the problems of classroom/behavior management and adaptation of instruction to individual differences among learners in the classroom. This study used Case’s terminology to describe the series of proposed stages in student teachers' construction of pedagogical knowledge (Newman, 1992, 1993, 1994) specifically “sensorimotor, interrelational, dimensional, and vectorial”. Although use of the term “sensorimotor” to describe adult student teachers’ beginning representations of their pedagogical knowledge may have seemed inappropriate, it was important to maintain Case’s terminology in this exploratory study and evaluate the appropriateness of this term in the discussion phase of this study.

SUMMARY

The nature of the present study was exploratory. The major purposes of this study were to substantiate an application of Case’s model of intellectual development to levels of problem representation in student teachers’ growth and development in the specific domains of teaching and to explore the ways in which student teachers represent and rerepresent teaching problems in both hypothetical
and real life practicum teaching situations. The emphasis was on the substantiation of a conceptual approach, the exploration of phenomena and the development of hypotheses from a data base as opposed to the formal setting, testing, and confirmation of hypotheses associated with an intervention or comparison. Such an inquiry was supported by the review of the literature which incorporated the perspectives of the theory-practice dilemma in teacher education, and the teacher knowledge perspective found in research on teachers' thought processes. Also incorporated were the teacher reasoning perspective found in the contributions of the growing movement of reflective practice and social cultural/constructivist perspective found in the research on the constructivist approach to knowledge growth and development.

In order to determine if the structures and processes of Case's (1985, 1987, 1991) neo-Piagetian perspective were useful theoretical tools to address the development of student teachers' ability to represent real life teaching problems of classroom management/behaviour and adaptation of their instruction to individual differences among learners, a means for operationally defining the terms associated with each of the three objectives of the study and the three research questions posed and their more specific component questions is provided. Chapter Three describes these procedures and methods.
CHAPTER III: METHOD
INTRODUCTION AND DESIGN

The rationale behind choosing one methodology over another is connected to the nature of the subject being studied and the underlying goals of the research. Because this study strove to substantiate an application of Case's (1992) neo-Piagetian theory of intellectual development to the growth and development of student teachers' levels of problem representation and to explore the complex interconnection between students' beliefs and actions in their representation of these problems, over the course of the practicum experience, a blend of methodologies was utilized.

Methodology that lent itself to the incorporation of the language, actions, thoughts, feelings, perceptions, and experiences of the participants themselves over the course of the practicum experience was necessary. As a result, the methods selected to collect and analyze data were those associated with qualitative field studies (e.g., Bogdan & Biklen, 1998; Glaser & Strauss, 1967; Hansen, 1979; Pelto & Pelto, 1978; Spradley, 1979). This approach was selected because it captured the complexity of the broader sociocultural context of the practicum situation and experience, it allowed for the generation of analysis grounded in recorded data concerning the perspectives of student teachers, and it allowed for the combination of a variety of data gathering methods. In order to secure trustworthiness of the research data, credibility, triangulation, and
transferability were obtained through the use of a combination of written and oral output measures. Credibility was enhanced through the use of both written and oral output measures across the practicum experience to capture student teachers' problem representations. Triangulation was achieved through the use of multiple data collection methods: questionnaires, faculty advisor rating scales and observations, case study scenarios and accompanying interviews, and concept maps and accompanying interviews across the practicum experience. Although every effort has been made to secure transferability, these efforts were limited by setting and context. The emphasis was on the description of phenomena and on the development of hypotheses from a data base as opposed to the formal setting, testing, and confirmation of hypotheses.

Analysis of Student Teachers' Levels of Problem Representation

The present study focused on an analysis of student teachers' level of problem representation in the face of instructional problems specific to the domains of teaching. Representation refers to how student teachers think about the real life teaching problems which confront them, specifically, what is known and the way in which that knowledge is organized or structured. Student teachers' 'representations' (or 'concepts' or 'internal schema' or 'frames of reference') are constructed and utilized as they interact with the external world, in this context, the classroom. Central conceptual structures are organized sets of represented concepts (Case & Griffin, 1990). The present study investigated how
student teachers form or construct a new central conceptual structure in the domains of teaching. Case (1996) indicated that new structures are formed by “differentiation, integration, and consolidation of existing structures,” (pp. 20-21).

In order to understand what is ‘represented’ when student teachers think about real life teaching problems, student teachers’ problem representation was investigated. An investigation of problem representation requires a focus on the structures or concepts that student teachers represent, the processes and mechanisms by which student teachers construct representations of teaching problems they encounter that contribute to the development of a new central conceptual structure in the domains of teaching, and the existing schemes or concepts or representations that are differentiated, integrated, and consolidated to create that new central conceptual structure. Research question one addressed this area of investigation.

Research Question One:
How do student teachers represent their real life teaching problems?

More specifically,

a) What patterns are associated with student teachers’ levels of problem representation in the areas of classroom/behaviour management and adaptation of instruction to individual differences among learners over the course of the practicum teaching experience?
b) How do emerging patterns compare to the patterns of student teachers' levels of problem representation in the domains of teaching described in previous research (Newman, 1992, 1993, 1994)?

In order to bridge the gap between educational theory and real life teaching practice, student teachers' levels of problem representation in hypothetical teaching dilemmas and their actual levels of problem representation in real life teaching experiences in the practicum classroom were analyzed. Research question two addresses this area of investigation.

Research Question Two:
How do student teachers' representations of hypothetical teaching dilemmas compare with representations of their own teaching challenges? More specifically,

a) How congruent are student teacher's levels of problem representation of hypothetical teaching problems and real life teaching experiences in the practicum classroom?

b) How congruent are student teacher's levels of problem representation of real life teaching experiences in the practicum classroom and their effectiveness in translating their problem representation into action as observed by their faculty advisors? The following hypotheses were generated:

- Emerging patterns of this group of student teachers' levels of problem representation and description of the problem in the problem areas of
classroom/ behaviour management and adaptation of instruction to individual differences among learners will mirror the patterns described in previous research as discussed in Newman (1992, 1994).

- Student teachers’ representations of the problem areas in their own practicum will become more integrated over the course of the practicum experience as would be predicted by Case’s (1978) neo-Piagetian theory of intellectual development.

- Student teachers’ levels of problem representation of hypothetical teaching dilemmas will closely match their levels of problem representation of their own real life teaching problems during the practicum as would be predicted by Case’s neo-Piagetian theory of intellectual development.

- Student teachers who show higher levels of problem representation of their own reported teaching problems encountered in the practicum classroom than their peers will be rated more effective in managing their classroom and adapting their instruction to individual differences among learners by their faculty advisors.

Nature of Student Teachers' Problem Representations

In order to explore student teachers’ representations of real life teaching problems, an investigation of the following questions must accompany investigations of student teachers' problem representations in both hypothetical teaching dilemmas and real life practicum teaching experiences. The answers to
these questions may yield a deeper understanding of how student teachers represent and re-represent their teaching challenges over the course of the practicum experience and the nature of their constructions of their understanding of real life teaching problems they encounter during the practicum experience. Research question three addresses this area of investigation:

Research Question Three:

To explore the nature of student teachers' representations of real life teaching problems, the questions of how student teachers construct their representations of real life teaching challenges and how these representations change over the practicum were investigated. More specifically,

- What information, thoughts, feelings, and/or actions do student teachers select to formulate their problem representations?

- What concepts or representations are differentiated, integrated, and consolidated to create new concepts or representations?

- How do student teachers select information from their pedagogical knowledge base, repertoire of experiences and actions to formulate representations of the problem?

- How do student teachers' problem representations change over the course of the practicum and to what source do they attribute those changes?
DESCRIPTIONS OF THE PARTICIPANTS

The participants consisted of a group of eighteen student teachers in the Elementary Teacher Preparation Program at the University of British Columbia (UBC). The two year UBC Elementary Teacher Preparation Program consists of four terms of instruction in a blend of general and subject-specific studies, pedagogical studies, and school experience. In year one, term one, student teachers complete half day visits to a school to observe and work with students on a one-to-one or small group basis. In term two, student teachers complete a two week practicum designed as an orientation to the school, classrooms, and teachers, and a gradual immersion into the responsibilities of teaching. In year two, term one, student teachers’ culminating school experience is a thirteen week extended practicum during which student teachers experience a range of teaching assignments including a sustained block of teaching with a teaching load of eighty percent.

At the time of this study, student teachers were participating in their thirteen week extended practicum. At time one of this study, (weeks one and two of the practicum), student teachers’ teaching load was 20 to 30% of the sponsor teachers’ teaching assignment. At time two, (weeks six and seven of the practicum), student teachers’ teaching load was 70-80% of the sponsor teachers’ teaching assignment. At time three, (weeks twelve and thirteen of the practicum), student teachers’ teaching load was 40-50% of the sponsor teachers’ teaching
load. This final teaching load consisted of teaching on call experiences in other teachers’ classes in the school to give student teachers an opportunity to work with other teachers and classes of students.

Eighteen student teachers and the six faculty advisors (one male and five females) responsible for the student teachers participated in all aspects of the study. Student teacher participants were three male and fifteen female student teachers between the ages of 22 and 41. Of the eighteen student teachers who participated in the study, 15 were between the ages of 22 and 26. Of the other three student teachers, one was in the age range of 27 to 30, two in the age range of 31 to 35, and one over 40. Student teachers participated in their extended thirteen week practicum experience at the elementary schools of eight school districts located across the greater Vancouver Lower Mainland region. Nearly all of the student teachers enrolled in the Elementary Teacher Preparation Program came from British Columbia; however, they reflected a variety of social, economic, and cultural backgrounds. Sixteen of the student teachers held previous bachelor degrees, (one in this group of sixteen held a Masters degree too), and only two student teachers had come into the elementary teacher education program with only three years in a previous undergraduate program. Of the seventeen student teachers who held previous degrees, sixteen held arts degrees and one held a science degree. Appendix D, (pp. 282-283), gives a
further description of the student teachers’ teacher education program focus and grade level taught during the thirteen week practicum experience.

A complete data set was available for each of the student teachers who participated in the study. Elementary student teachers were selected for study over secondary student teachers because they had more opportunity to interact with a fixed number of students across the school day. Also, by remaining with a smaller number of pupils, student teachers had more opportunity to monitor the individual differences among learners and adapt their instruction accordingly and develop classroom and behaviour management routines.

The six faculty advisor participants ranged in age from 43 to 59 years with four of them falling into the age range of 55-59. All of the faculty advisors held masters degrees in teacher education or in an area related to teacher education (curriculum and instruction, math science curriculum, counselling, and administration). The number of years faculty advisors had spent supervising student teachers ranged from three to five years. The number of each faculty advisors’ student teachers who had consented to participate ranged from one to five. One of the faculty advisors had five student teachers whom she was supervising participate in the research study and two other faculty advisors had four student teachers each whom they supervised. Over the course of the thirteen week practicum, faculty advisors observed student teachers on average approximately 10-12 separate occasions for at least a 45 minute period on each
occasion. This resulted in faculty advisor contact with student teachers on almost a weekly basis.

An invitation letter to participate in the study was sent to student teachers at their practicum site school and faculty advisors at their UBC office. The letter explained participation details such as purpose, tasks, time commitment, advantages, confidentiality assurances, and contact numbers for more information.

PROCEDURES

In order to investigate the three research questions posed in this research study, a variety of oral and written output measures were used over the course of the practicum experience with student teachers and faculty advisors. Table 3.1, (p. 71), outlines the research questions and the corresponding research measures that were used to address those questions. Table 3.1, (p. 71), also indicates when the measures were presented to student teachers and faculty advisors at different time periods during the practicum experience.

At time one, at the beginning of the practicum, all of the measures were presented to each student teacher in an individual interview format. This was done in a quiet room on site at the student teachers' practicum setting by the researcher or her research assistant. Both researchers were females between the ages of 38 and 45. They both held bachelor of arts degrees in the areas of psychology and English and post graduate teaching certificates. Both researchers had a minimum of five years teaching experience at the elementary and secondary
Table 3.1

Summary of Research Measures

<table>
<thead>
<tr>
<th>Questions</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Beginning of Practicum</td>
<td>1st Half (1-7wks)</td>
<td>2nd Half (8-13 wks)</td>
</tr>
<tr>
<td>Question #1</td>
<td>Reflective Learning Questionnaire</td>
<td>Reflective Learning Questionnaire</td>
<td>Reflective Learning Questionnaire</td>
</tr>
<tr>
<td>Question #2</td>
<td>Case Study Scenarios Classroom Management, Individual Diffs, Reflective Interview</td>
<td>Self-Assessment on Effective Teaching Rating Scale</td>
<td>Self-Assessment on Effective Teaching Rating Scale</td>
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<tr>
<td></td>
<td></td>
<td>Faculty Advisor Rating Scale Observation Form</td>
<td>Faculty Advisor Rating Scale Observation Form</td>
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<td></td>
<td></td>
<td>Effective Teaching Rating Scale by Faculty Advisor</td>
<td>Effective Teaching Rating Scale by Faculty Advisor</td>
</tr>
<tr>
<td>Question #3</td>
<td>Concept Map Reflective Interview</td>
<td>Concept Map Reflective Interview Concept Card Sort</td>
<td>Concept Map Reflective Interview Concept Card Sort</td>
</tr>
</tbody>
</table>

Classroom Management = Classroom/ Behaviour Management

Individual Diffs. = Individual Differences Among Learners
levels. The researchers met individually with each student teacher to conduct the first, time one interview during the beginning two weeks of the practicum experience. The duration of the individual interviews varied from 1.5 to 2 hours in length.

At time two, at the eighth week of the practicum, the student teachers either brought with them to the individual interview session an already completed Reflective Learning Questionnaire for the first half of the practicum and their self assessment on the Effective Teaching Rating Scale or had already mailed these completed questionnaires in the self-addressed stamped envelope provided. The remaining measures were completed at an individual interview conducted by one of the two researchers in a quiet room either on site at the student teachers’ practicum setting or in a quiet room at UBC. Individual interviews lasted from one to two hours depending upon the speed at which the individual student teacher worked through the tasks. The measures were completed during the eighth week of the practicum (immediately following the first half or seventh week of the practicum). Data collection for time three, at the end of the practicum, proceeded in the same manner with two researchers conducting individual interviews with student teachers immediately following the thirteenth week of the practicum. In the following section, each of the measures are described in detail. The description of the measures is divided into three
components: (1) measure rationale, (2) measure description, and (3) measure administration and data return.

**Reflective Learning Questionnaire**

The Reflective Learning Questionnaire in the present study was a shortened version of the Reflective Learning Questionnaire developed by Arlin and Arlin (1991). The original Reflective Learning Questionnaire (Pre Practicum, Practicum First Half, and Practicum Second Half) used in previous research (Arlin & Arlin, 1991; Newman, 1992, 1993, 1994) used the same question stems for five different problem areas. The questions from these earlier studies dealing with the problem areas of adaptation of instruction to individual differences among learners and classroom/behaviour management and control were used in their original form in the present study. The three student teacher Reflective Learning Questionnaires, as shown in Appendices E, F, G, (pp. 284-292), were used to explore student teachers' level of problem representation and their description of their own real life teaching problems in the areas of adaptation of instruction to individual differences and classroom/behaviour management and control over the course of the practicum experience in the present study. Only the time of administration for The Pre Practicum Reflective Learning Questionnaire was modified.

In the present study, the Pre Practicum questionnaire was given to student teachers at the beginning of the practicum. Faculty advisors who participated in
the present study completed a shortened version of the UBC Faculty Advisor Practicum First Half and Second Half Rating Scales with questions parallel to the questions on the Reflective Learning Questionnaire. These measures were shortened in a similar fashion as the Reflective Learning Questionnaire for the present study to include faculty advisors' ratings only on the problem areas under study: classroom/behaviour management and individual differences. They retained the same wording as the original questions from Arlin and Arlin (1991) and Newman (1992, 1993, 1994) on the rating scales of these problem areas. The rationale, description, and administration of the Reflective Learning Questionnaire are outlined in the next sections.

**Questionnaire Rationale**

The rationale for the use of the Reflective Learning Questionnaire was threefold. First of all, the questionnaire allowed for the opportunity to track student teachers' development in the areas of individual differences and classroom/behaviour management in their movement toward expertise. Second, it provided the foundation upon which the levels of student teachers' problem representation (Newman 1992, 1993, 1994) in the areas of adaptation of instruction to individual differences among learners and classroom/behaviour management were developed. Third, its format included both open-ended responses from student teachers and rating forms and observations from their faculty advisors. The triangulation employed with the use of a Reflective
Learning Questionnaire for student teachers and a parallel form for faculty advisors allows for a blend of process tracing and ethnographic methods of inquiry. Such a method of inquiry is supported by research which advocates that research of this nature should be based on natural rather than experimental methods (Elbaz, 1988; Goodman, 1988; Mitchell & Marland, 1989). Use of this method of inquiry permitted a close examination of the subtleties of the development of student teachers' problem representation over the course of the practicum experience. In the present study, the questions of adapting instruction to individual differences among learners and classroom/behaviour management were used to elicit written output responses from student teachers in order to provide a way of: (1) analyzing the growth and development of student teachers' levels of problem representation over the course of the practicum experience, and (2) exploring the structures and processes they might have available for representing the individual differences and classroom/behaviour management problems in hypothetical case scenarios in these problem areas and in real classroom life.

Questionnaire Description

The Reflective Learning Questionnaires for times 1, 2, and 3 are shown in Appendices E, F, and G (pp. 284-292). The questions asked on these questionnaires probed into student teachers' representation level and problem
description. Student teachers' level of problem representation in both problem areas was assessed using the following questions.

In the area of classroom/ behaviour management, the question: "What aspects of classroom management do you think are likely to be problematic for teaching?" asked of student teachers at the beginning of the practicum experience provided a baseline of their level of problem representation. The parallel question: "What have been the most important aspects of classroom management to take into account when teaching this group of students?" asked of student teachers during the sixth and twelfth weeks gave a measure of their levels of problem representation during the practicum experience.

In the area of adaptation of instruction to individual differences among learners, "What aspects of individual differences do you think are likely to be problematic for teaching?" asked of student teachers at the beginning of the practicum experience provided a baseline of their level of problem representation. The parallel question: "What have been the most important aspects of individual differences to take into account when teaching this group of students?" asked of student teachers during the seventh and thirteenth weeks gave a measure of their levels of problem representation during the practicum experience. Responses were rated according to the complexity of the student teachers' thinking about the problem of classroom management and assigned a stage and substage which matched the complexity of their problem representation based on an adaptation of
Case's (1985, 1991) neo-Piagetian conceptual framework. The descriptions of the levels and codes of problem representation are contained in Appendices B and C, (pp. 270-281).

In order to explore the nature of student teachers' description of problem representation, student teachers were asked, "Describe one of the most serious problems with classroom management you have had. What steps did you take to resolve this problem?" at the sixth and twelfth weeks of the practicum experience and "Describe one of the most serious problems with adapting your instruction to the individual differences among learners you have had. What steps did you take to resolve this problem?" at the seventh and thirteenth weeks of the practicum experience. Student teachers' responses to these questions were rated for the presence and number of aspects of each of the three components which constitute Case's (1985, 1991) control structure: representation of the problem situation, representation of objectives, and representation of strategy or strategies employed.

Questionnaire Administration

The three sets of two questions about each of the problem areas: (1) adaptation of instruction to individual differences among learners, and (2) classroom/behaviour management were completed by student teachers at the beginning of the practicum experience (time 1), during the first half of the practicum experience (time 2), and during the second half of the practicum experience (time 3). During the first two weeks of their practicum experience,
consenting students were asked to complete the Pre-Practicum Reflective Learning Questionnaire in one sitting. Completion of the Practicum: First Half Reflective Learning Questionnaire by student teachers was begun in week six of the practicum after an opportunity for introduction to and immersion in classroom learning during weeks one to five. The classroom management problem area was scheduled for completion during week six and the individual differences problem area was scheduled for completion during week seven. After completion of the first half of the practicum topics, student teachers returned their questionnaires in sealed envelopes to the researcher via mail service. A similar procedure was followed for the Practicum Second Half Reflective Learning Questionnaire. Student teachers returned this questionnaire directly to the researcher at the final interview sealed in the envelope provided.

Faculty advisors completed their first half and second half of practicum rating scales and observations for each of the student teachers they supervised during the same weeks as the student teachers. They returned them in sealed envelopes via mail to the researcher.

Faculty Advisors' Observations and Rating Forms

Faculty advisors' rating forms and observations provided another perspective on how well student teachers were able to translate their representation of the problems of accommodation of instruction to individual differences among learners and classroom management into action. Responses
were scored along a 7 point Likert scale which represented a continuum from low (where 1 was equivalent to poor or minimal accommodation/ineffective classroom management) to mid (where 4 was equivalent to moderate accommodation/minimally effective classroom management) to high (where 7 was equivalent to excellent or considerable accommodation/effective classroom management) levels. The Faculty Advisors’ Rating Forms are shown in Appendices H, Practicum First Half, and I, Practicum Second Half, (pp. 293-298).

Student teachers were asked at the beginning of their practicum experience what their definitions of classroom management and individual differences were. They were also asked what aspects of classroom management and individual differences they thought would likely be problematic for teaching and why. During the first and second halves of their practicum, the student teachers were asked to describe one of the most serious problems with classroom management and individual differences. Similarly, faculty advisors were asked how their student teachers resolved classroom management and individual differences problems during the first and second halves of the practicum. The faculty advisors were also asked to rank the student teachers on a seven point Likert scale designed to indicate how well the student teachers were able to effectively deal with classroom management and adapting their instruction to individual differences among learners during the two periods outlined.
Case Study Scenarios

Case study scenarios provided an opportunity to substantiate an application of Case's (1992) Neo-Piagetian theory of intellectual development to the growth and development of student teachers' levels of problem representation by exploring the structures and processes they might have available for representing individual differences and classroom/behaviour management problems.

Case Study Scenarios Rationale

Case studies create opportunities for student teachers to study hypothetical classroom scenarios and the teachers of those scenarios' representations of problem areas without the intrusion of observers into a real life classroom. Case studies also allow the student teacher to identify, analyze, and reflect on situations and teaching practices applicable to the event described. Users can read any portion of a case study several times for multiple analyses from different perspectives. Clark's (1995) survey of preservice teachers using case study application indicates its effectiveness in helping these teachers to recognize, identify, and explain teaching standards.

Case Study Scenarios Description

The case study scenarios were selected from Santrock (2000), originally published by Silverman, Welty, and Lyon (1991). See Appendix J, (pp. 299-317), to view the case study scenarios. They focused on complex pedagogical issues.
They are highly engaging narratives which have been developed to meet the following case criteria as a result of multiple field tests with student and beginning teachers (Silverman et al., 1992). Each case study contains the four elements deemed essential to a good case study:

- A good narrative structure (Connelly & Clandinin, 1990)
- A true, factually correct, compelling account. The authenticity of the case is essential and is underscored by Phillips (1994) who explained that one is more likely to accept what is true and more likely to be successful when what one acts upon is correct.
- Tangible episodes of good teaching. These episodes must include particulars that become tangible to the reader. Connelly and Clandinin (1990) and Eisner (1990) have stated the importance of rich contextual details.
- Consequential aspects of standards-based practice.
  (Bliss & Mazur, 1996, p.186)

The Reflective Interview questions which followed the case scenario were extracted from the question stems found across case study methodology literature (Copeland & D’Emidio-Caston, 1998; Copeland et al., 1994; Pultorak, 1993; Silverman, et al., 1992). The Reflective Interview Questions consisted of two components: (1) an open-ended understanding question, and (2) a more focused series of direct probing questions (see Appendix K, p. 318). The open-ended
understanding question was designed to elicit the student teacher’s understanding of what he/she read: “Tell me about the case study scenario you read. Explain your understanding of what you read.” The more focused series of direct probing questions were designed to elicit the student teacher’s understanding of the scenario: (a) “What were positives associated with the case scenario?” (b) “What were the challenges of the case scenario?” (c) “What steps did the teacher take to address the challenges of the case scenario?” These questions parallel the questions asked of student teachers in the Reflective Learning Questionnaire about their own classroom practice in the individual differences and classroom/behaviour management problem areas.

Case Study Scenarios Administration

Student teachers read two case study scenarios in each of the problem areas of individual differences and classroom/behaviour management at the interviews during the first two weeks of the practicum and after the practicum. To facilitate easy examination of the case study scenarios, student teachers were presented with a hard copy of the case scenario to read. They were permitted to write, highlight or make notes on their copy of the case scenario. They were given the direction: “Study the scenario until you are satisfied that you understand it as well as you can.” Student teachers were given as much time as they needed to read and examine the case scenario. After each student teacher had stated that he/she had completed his/her examination of the scenario, a two part reflective
interview was conducted. Both parts of the interviews with all the student
teachers were audio-recorded and then later transcribed for analysis.

Effective Teaching Rating Scale

Effective Teaching Rating Scale Rationale

Developed by George Sugai (1993) to obtain a quick snapshot or teaching
profile of teaching practice, the Effective Teaching Rating Scale provided a
quick, informal measure for student teacher self-assessment and assessment by the
faculty advisor of effective teaching practice. See Sugai (1993) for a detailed
description of the measure. Sugai (1993) used this measure in his research on
effective schools in his work with teachers to evaluate the extent to which
teachers displayed the twenty four teaching practices or behaviours in their
teaching practice. These teaching practices such as “high expectations for
achievement”, “brisk pacing”, and “reinforcement for task completion”, were
derived from the school improvement research (Sugai, 1993). Research on the
psychometric properties of the Effective Teaching Rating Scale to establish its
reliability and validity has not been conducted. The Effective Teaching Rating
Scale was selected to provide a quick sampling of student teachers’ and faculty
advisors’ view of student teachers’ demonstration of specific skills and
behaviours that constitute effective teaching practices. The Effective Teaching
Rating Scale provided the researcher with another picture in addition to the
Faculty Advisor Rating Scales and Observations of the effectiveness of the
student teachers' instruction from student teachers' and the faculty advisor's perspectives.

**Effective Teaching Rating Scale Description**

This rating scale consists of twenty four items which reflect all aspects of teaching instruction within a classroom setting (see Appendix L, pp. 319-320). Items 1, 2, 4, 7, 8, 9, 10, 12, 14, 17, and 19 are directly related to the problem area of adapting instruction to individual differences among learners. Items 3, 5, 6, 11, 13, 15, 16, 18, and 20 are directly related to the problem area of classroom/behaviour management. The instructions which accompany the measure were adapted slightly in order to ask the respondent to circle a number from one to seven on a 7 point Likert scale: (YES-1-2-3-4-5-6-7-NO) to indicate the extent to which the student teacher displayed the effective teaching practice rather than just placing an X on the line between YES and NO, as in the original measure. Each value could then be connected to display a teaching profile.

**Effective Teaching Rating Scale Administration**

This rating scale was completed by student teachers as a self-assessment tool at time two, at their first half of the practicum (week 7) concept map and card sort interview and again at time three, at the end of the practicum experience (week 13) interview. The effective teaching rating scale was also completed by faculty advisors on each of the student teachers as part of the first half and the second half practicum experience rating scales and observations.
Concept Maps of Teaching Challenges

In order to explore student teachers' representations of real life teaching problems, concept maps of student teachers' teaching challenges were used to provide an indepth exploration of the structures and processes student teachers might have available for representing the individual differences and classroom/behaviour management problems over the course of the thirteen week practicum. Accompanying structured interview questions provided a means to capture further the depth of student teachers' thinking associated with their concept map of teaching challenges.

Concept Map Rationale

Concept mapping is a procedure developed for examining how an individual organizes his or her knowledge and for tracing conceptual change over time (Byerbach, 1988; Hiebert & Johnson, 1994; Jones & Vesilind, 1995, 1996; Morine-Dershimer, 1989, 1993; Novak & Gowin, 1984). Prior research has demonstrated the efficiency of concept maps in representing what is known or believed about a topic (Byerbach, 1988; Byerbach & Smith, 1990; Morine-Dershimer, 1989, 1993). Concept maps have been especially effective for documenting conceptual change (Jones & Vesilind, 1995, 1996; Morine-Dershimer, 1993; Novak & Musonda, 1991; Winitzky & Kauchak, 1995). Concept mapping has been described as a very useful tool to provide constructivist teachers and researchers with insight into how students construct
their own view of concepts (Trowbridge & Wandersee, 1994). Concept maps were used here to provide a two-dimensional representation of the challenges encountered by student teachers in their teaching over the course of the practicum experience.

**Concept Map Description**

A concept map is a diagram that shows one's understanding of a term, including key components and related or supporting concepts. Concept mapping is a technique of graphically representing concepts and their hierarchical interrelationships (Beyerbach, 1988). The concept map diagram shows one's understanding of a term, including key pieces and related or supporting concepts. The generic mapping techniques employed in reducing reality to a two-dimensional space enables students to discover structures which would remain unknown if not mapped (Robinson, 1982). The concept mapping measure used with student teachers asked them to construct a concept map of teaching challenges they had encountered in the practicum experience.

**Concept Map Administration**

At the interview which occurred during the first two weeks of the practicum experience, student teachers were given standardized instructions on how to draw a concept map and an opportunity to draw a practice concept map on a sample topic of cooking. They were then given thirty minutes to draw a map based on their own understanding of the challenges they had encountered in their
teaching practicum to date. No other prompt or pool of concepts was given. The student teachers drew concept maps on three separate occasions: during the first two weeks of the practicum (time 1), halfway through the practicum at week 7 or 8 (time 2) and at the end of the practicum at weeks 12 or 13 (time 3). At times two and three, the previous concept map each student teacher had drawn was returned and student teachers were asked to draw a new map, modify and/or redraw the old map. After student teachers had drawn their maps, they were interviewed using a structured interview script. An interviewer examined with each student teacher his or her concept map and asked the questions listed in Appendix M, (pp. 321-322). Concept maps served as prompts to elicit student teachers' representations of teaching challenges. Interviews were audiorecorded and later transcribed.

SUMMARY

Eighteen student teachers and six faculty advisors participated in completing a combination of questionnaires, rating scales, structured interviews, concept mapping and structured interview research tasks at three different time frames during the thirteen week practicum experience. Table 3.1, (p. 71) provides a summary of the research tasks and when they were given over the course of the thirteen week practicum. The data that the research tasks yielded provided a means for addressing the research questions and their related hypotheses. Chapter Four will provide a detailed description of the scoring of the research measures.
CHAPTER IV: SCORING

INTRODUCTION

The scoring criteria for each of the tasks used to investigate the three research questions of this study are described in this chapter. All scoring was conducted by the researcher. A second rater, blind to the features of the study except the scoring procedure, also rated the responses to research measures to provide an evaluation of interrater reliability for each of the tasks in the study. The independent rater had a Masters of Education degree and twelve years experience as an elementary teacher. This rater was given the codes for level of student teacher’s problem representation in the individual difference and classroom/behaviour management areas and sample student teacher responses and asked to study these and then apply them to practice items. When it was clear that the evaluation process was understood, the rater was given all of the protocols to score. No characteristics of the student teacher or grade level taught during practicum were indicated on the protocol, nor were they presented in any particular order. Interrater reliability was computed for each measure.

Research Question One

How do student teachers represent their real life teaching problems? More specifically, what patterns are associated with student teachers’ levels of problem representation in the areas of classroom/behaviour management and adaptation of instruction to individual differences among learners over the course of the
practicum teaching experience? How do emerging patterns compare to the patterns of student teachers' levels of problem representation in the domains of teaching described in previous research (Newman, 1992, 1993, 1994)? The first research question was investigated using the Reflective Learning Questionnaire.

Reflective Learning Questionnaire

Student teachers' responses were coded according to the codes for levels of student teachers' representation of individual differences and classroom/behaviour management problem areas constructed by Newman (1992, 1993, 1994). Appendices B and C, (pp. 270-281), present those codes in full with examples of student teachers' responses examples for each level of problem representation. They were also coded according to the codes for the description of student teachers' problem representation of situation, goal, and objective of these problem areas developed by Newman (1992, 1993, 1994). Appendix N, (p. 323), presents the codes for the number of aspects or components of problem description.

Research Question Two

How do student teachers' representations of hypothetical teaching dilemmas compare with representations of their own teaching challenges? More specifically, what is the congruence between student teachers' levels of representation of hypothetical teaching problems and their levels of representation of real life teaching problems specific to the domains of teaching? How congruent
are student teachers' levels of problem representation of real life teaching experiences in the practicum classroom and their effectiveness in translating their problem representation into action as observed by their faculty advisors? This question was addressed with an analysis of the results from the following measures: (1) Case Study Scenarios, (2) Faculty Advisors' Rating Forms and Observations, and (3) Effective Teaching Profile Ratings.

Case Study Scenarios

Student teachers' responses to the case study scenarios on the individual differences and classroom/behaviour management problem areas were also coded for level of problem representation using the Codes for Student Teachers' Levels of Problem Representation in the problem area of classroom/behaviour management presented in Appendix B, (pp. 270-275), and adaptation of instruction to individual differences among learners presented in Appendix C, (pp. 276-281).

Faculty Advisors' Rating Forms and Observations

The Faculty Advisors' Rating Forms are shown in Appendices H and I (pp. 293-298). Faculty Advisors' responses were coded according to the rating criteria developed in Newman (1992, 1993, 1994). Responses were scored along a 7 point Likert scale which represented a continuum from low (where 1 was equivalent to poor or minimal accommodation/ineffective classroom management) to mid (where 4 was equivalent to moderate accommodation/
minimally effective classroom management) high (where 7 was equivalent to excellent or considerable accommodation/ effective classroom management) levels. Appendix O, (pp. 324-325 ), provides rating criteria for the descriptions and examples of faculty advisors' observations of student teachers' effectiveness in dealing with classroom management at each of the seven Likert scale points. Appendix P (pp. 326-327) provides a description and examples of faculty advisors' written responses of their observations of student teachers' accommodation of individual differences at each of the seven points.

Effective Teaching Profile Rating Scale

Student teachers' responses and faculty advisors' ratings of student teachers at time two, the first half of the practicum and at time three, the end of the practicum, were recorded and compared.

Research Question Three

To explore the nature of student teachers' representations of real life teaching problems, the questions of how student teachers construct their representations of real life teaching challenges and how these representations change over the practicum were investigated. More specifically,

- What information, thoughts, feelings, and/or actions do student teachers select to formulate their problem representations?
- What concepts or representations are differentiated, integrated, and consolidated to create new concepts or representations?
• How do student teachers select information from their pedagogical knowledge base, repertoire of experiences and actions to formulate representations of the problem?

• How do student teachers’ problem representations change over the course of the practicum and to what source do they attribute those changes?

**Concept Map of Teaching Challenges**

Student teachers’ concept maps of teaching challenges were read and reread and interpreted by the researcher and an independent reader, a process described by Erickson (1986) and Miles and Huberman (1984). Concept maps were coded according to the guidelines proposed by Hiebert and Johnson (1994), Jones and Vesilind (1994, 1996), Morine-Dershimer (1989, 1993), Novak and Gowin (1984), and Winitzky and Kauchak (1995). Figure 4.1, (p. 93) gives a graphic representation of a sample concept map with terms defined. A concept or bubble is a circle with a word or words, statement, question or exclamation written inside it. A concept or bubble is a thought or aspect of a thought, scheme or representation of an idea or an aspect of an idea. Superordinate concepts or concepts layer 1 were defined as those concepts which were directly connected to the concept map topic: “My Teaching Challenges”. Concepts Layer 2 were defined as bubble(s) or concept(s) connected to concept layer 1 or the superordinate concepts. Concept Layer 2 bubbles were also called subordinate concepts. Concepts Layer 3 were defined as bubble(s) or concept(s) connected to
Graphic Representation of Sample Concept Map with Terms Defined

Note:

- Concept Layer 1 = bubble or concept directly connected to the concept map topic: "My Teaching Challenges". Also called superordinate concepts.
- Concept Layer 2 = bubble or concept connected to concept layer 1 or the superordinate concepts. Also called subordinate concepts.
- Concept Layer 3 = bubble or concept connected to concept layer 2 or the subordinate concepts.
- Concept Layer 4 = bubble or concept connected to concept layer 3 or the subordinate concepts.
- Chunk = a superordinate concept and its contiguous subordinate concepts or concept layers 1, 2, 3, 4 etc.
- Link = line joining 2 or more concepts across different concept layers.
- Cross Link = line joining 2 or more concepts across the same concept layer. For example, a line between a concept layer 2 and a concept layer 2.
concept layer 2. Concepts Layer 3 could also be known as subordinate concepts. This method of labelling the concept layers of a concept map continued in ascending order (Concept Layer 1, 2, 3, 4, etc...) depending on how many layers of concepts student teachers connected to the superordinate or concept layer 1. The concept maps at times one, two, and three were coded on both micro and macro levels.

At the micro level, maps were scored for number and description of superordinate concepts or concepts in layer 1 and number and description of subordinate concepts or concepts in layers 2, 3, 4, etc... Chunks were scored for the depth or total number of layers, total number of bubbles, words, linkages between and across concepts, and the nature of concepts (two word concept or less, statement, or question). These area scores were totaled across the whole concept map yielding a total number of bubbles, words, and linkages on the map. To understand the changing nature of the concept maps across time, the superordinate concepts and the next subordinate concepts were assessed for concepts which were added or deleted across each time period. See Figure 4.1, (p. 93) for a graphic representation of a sample concept map with illustrations of concept maps terms such as superordinate, subordinate concept, concept layer, link, crosslink, and chunk defined.

At the macro level, the concept maps and the concept map structured interview responses were read and reread multiple times as a whole by two
independent researchers. These independent researchers were two females with Bachelor degrees in Education and over five years of elementary teaching experience. For each interview period, large matrices were constructed in a data base that grouped responses by student for three time periods. The responses were then grouped according to emerging categories of themes. The researchers read, reread, discussed, and reread the interviews until agreement on emerging categories was reached according to processes outlined by Jones and Vesilind (1995), Markham, Mintzes, and Jones (1994), Morine-Dershimer (1993), Novak and Gowan (1984), and Winitzky and Kauchak (1995). There were six main emerging theme categories:

1. classroom management
2. instructional planning
3. teaching and instructional strategies
4. time management, organization, and pacing
5. assessment and evaluation
6. student needs.

Appendix Q, (p. 328) provides a listing of the emerging theme categories and the types of entries that would be represented in each of them. In order to summarize the emerging patterns of student teachers' representation of their teaching challenges over the course of the practicum, category frequency and centrality analyses were conducted. The frequency of categories on a concept
map was determined by the following process. After each item on the concept map had been coded, a subtotal count per student teacher was recorded for each of the categories in order to determine prominence or frequency of the categories on student teachers’ maps at time 1, 2, and 3. The centrality of a category was determined by inspecting the concept layers and links of a map and recording the highest level of entry across all instances of that category. Category items that were located directly off the prompt “Teaching Challenges” were assigned a concept layer of 1 (highest). Those items that branched off from concept layer 1 item were assigned a concept layer of 2, and item branches from concept layer 2 were identified as level 3, etc. Concept layer 1 items were seen as most central, closest to and at the highest layer of entry, for teaching challenges. Interrater rater reliability measures for using this category system were conducted and are described in Chapter Five.

Emerging categories of themes sections of the concept maps were triangulated with those of the concept map interviews. Sections of the concept maps and corresponding sections in the concept map interviews which included concepts or comments related to the problem areas of individual differences and classroom/behaviour management or related to the levels of problem representation were highlighted and coded across the different time periods. Care was taken during the analysis to look for negative examples and alternative explanations. Recognition of the fact that interpretations of student teachers’
representations of their teaching challenges was not completely objective but bounded by the perspectives of the researchers, is acknowledged. The research questions, and the ability of the researchers and the faculty advisors to interpret the subject’s words and actions, are also noted.

Concept Map Structured Interview

Concept Map Interview questions: “Tell me everything you can about your concept map,” “Were there concepts you weren’t sure where to put? “Which aspect of your map are you the most certain of? Can you tell me more?” “Which aspect of your map are you least certain of? Can you tell me more?” provided a rich context and insight into student teachers’ construction of their teaching challenges and contributed to the emerging theme categories. Question five of the interview, “What area of your map represents the greatest teaching challenge for you?” provided further insight into the nature of student teachers’ construction of their teaching challenges and verified which problem area provided the student teacher with the most cognitive dissonance. The additional concept map interview questions at times two and three provided an opportunity to look more closely at how student teachers represented and re-represented their teaching challenges. Question number six: “Did you change your map from the one you drew last time? Tell me about these changes. Can you tell me more?” provided an opportunity to investigate those changes. Questions seven, eight, and nine: “Can you identify where this (these) change(s) came from?” “Was there anything that
you read, heard, saw, or did that influenced the changes you made in your map?"

"What made you want to change your map?" provided source(s) of change.

Using the guidelines provided by Jones and Vesilind (1996), two researchers independently coded all of the student teachers' responses for categories of sources of change. The sources of change categories and subcategory codes that emerged are described in Appendix R, (pp. 329-330). The sources of change categories that emerged included practicum experiences, university classes, external influences, reflection, resources, and process. After all scoring was completed and an interrater reliability agreement calculated, frequency analyses were performed. Results of all interrater reliability measures for category systems and these analyses are described in Chapter Five.
CHAPTER V: RESULTS

INTRODUCTION

This chapter provides a picture of the patterns arising from the research data and an exploratory discussion of student teachers' responses to research tasks associated with each of the three research questions. Analysis consisted of an examination of the raw data obtained from participants for each question and a construction of frequency tables pertaining to overall group responses. Summary tables and frequencies may be found in a separate addendum volume. Only pertinent figures may be found in the text of Chapter Five. Comparisons between student teachers rated high and student teachers rated low on the variables of level and description of problem representation provided further insight into how student teachers represent the real life teaching problems of classroom/behaviour management and adapting instruction to individual differences among learners. Also, a discussion of a subsample of student teachers' individual pathways of problem representation across research tasks over the course of the practicum provided additional information of interest to the present study. Questions raised as a result of the analysis will be presented and elaborated upon in Chapter Six.
Research Question One

The Reflective Learning Questionnaire includes sets of two questions each about the problem areas of classroom/behaviour management and adaptation of learning to individual differences among learners. These were posed to student teachers at the beginning of, during, and after the practicum experience and they provided the data to address the first research question: How do student teachers represent their real life teaching problems? More specifically, (a) What patterns are associated with student teachers' levels of problem representation in the areas of classroom/behaviour management and adaptation of instruction to individual differences among learners over the course of the practicum teaching experience? and (b) How do emerging patterns compare to the patterns of student teachers' levels of problem representation in the domains of teaching described in previous research (Newman, 1992, 1993, 1994)?

The two questions on the Reflective Learning Questionnaire asked of student teachers at the beginning of the practicum experience (as shown in Appendix E, pp. 284-286) were designed to access student teachers' definition of the problem areas of classroom/behaviour management and individual differences among learners and prediction of their impact on their teaching. The two parallel questions asked in the sixth/seventh (as shown in Appendix F, pp.287-289), and in the twelfth/thirteenth weeks (as shown in Appendix G, pp. 290-292) were designed to elicit student teachers' level of problem representation,
and their description of the situation, objectives, and strategies employed in classroom/behaviour management and individual differences problem areas.

Interrater Reliability

All of the eighteen sets of responses were coded by the researcher. A second rater, blind to all features of the study except the scoring procedure, also rated all of the protocols to provide a measure of interrater reliability for the level of problem representation and description of the problem on the Reflective Learning Questionnaire and the Case Study Scenarios, using the categorical descriptions of the levels of problem representation (outlined in Appendices B and C, pp. 270-281) and description (outlined in Appendix N, p. 323) used in Newman (1992, 1993, 1994) and originally adapted from Case (1991). The independent rater had a Master of Education degree and twenty years of teaching experience at the elementary level. This rater was given the level of problem representation and description of the problem codes. She was asked to study these, and was given practice items. When it was clear that the evaluation process was understood, the rater was given a clean, photocopied, complete set of protocols to score. No markings for age, grade level, gender, or level scores were written on them, nor were they presented in any particular order. The two raters were considered to be in agreement when they both rated the student teacher's response at the same level of problem representation. For example, they both independently assigned to a student's response a code of 04 to indicate that they thought the student teacher's
level of problem representation was best described at the dimensional stage, substage 1 level. The initial percentage of agreement between the two raters was 89% for levels of problem representation in the problem area of classroom/behaviour management, 87% for levels of problem representation in the problem area of individual differences, 84% for the description of the problem in the area of classroom/behaviour management, and 85% for the description of the problem in the area of individual differences. In all instances, disagreement differed by only one level or coding category or one aspect in the initial independent coding. For example, one rater assigned a student teacher's response a 2 or interrelational stage, substage 2 and the other rater assigned the same student teacher's response a 3 or interrelational stage, substage 3. After discussion, consensus was reached on cases of disagreement and 100% agreement between the two raters was obtained.

The results which have implications for research question one will be presented and discussed in the following two sections:

1. Student Teachers' Levels of Problem Representation
   
   (a) Classroom/ Behaviour Management Problem Area
   
   (b) Individual Differences Problem Area

2. Student Teachers' Description of the Problem Representation
   
   (a) Classroom/ Behaviour Management Problem Area
   
   (b) Individual Differences Problem Area
Comparisons between emerging patterns of student teachers’ levels of problem representation in the present study and the patterns of student teachers’ levels of problem representation described in previous research (Newman, 1992, 1993, 1994) will be made as research results are presented and discussed.

Student Teachers’ Levels of Problem Representation

Classroom/Behaviour Management Problem Area

The question: "What aspects of classroom/behaviour management do you think are likely to be problematic for teaching?" asked of student teachers at the beginning of the practicum experience provided a baseline of their level of problem representation. The parallel question: "What have been the most important aspects of classroom/behaviour management to take into account when teaching this particular group of students?" asked of student teachers during the sixth and twelfth weeks gave a measure of their levels of problem representation during the practicum experience. Student teachers’ responses to these questions were examined in terms of levels of representation of the problem of classroom/behaviour management as adapted from Case’s (1985, 1991) neo-Piagetian theory of intellectual development (Newman, 1994).

Responses were rated according to the complexity of the student teachers’ thinking about the problem of classroom/behaviour management and assigned a stage and substage which matched the complexity of their problem representation (See Appendix B, pp. 270-275) for a description of the Levels of Student
Teachers' Problem Representation). Tables S.1, S.2, and S.3, found in Appendix S, (pp. 332-334) provide a distribution of the ratings for level of problem representation over the course of the practicum experience.

At the beginning of the practicum experience, student teachers' levels of problem representation were distributed throughout the levels of problem representation with clusterings at the sensorimotor stage, substage 3, the interrelational stage, substage 2, and the dimensional stage, substage 2. Although the largest group of student teachers had a low level of problem representation (interrelational stage, substage 2), there was also a group of student teachers at the lowest level of problem representation (sensorimotor stage, substage 3) and a group of student teachers at a higher level of problem representation (dimensional stage, substage 2). These patterns are very similar to patterns of student teachers' levels of problem representation in the classroom management problem area at the beginning of the practicum found in Newman's (1994) previous study.

Of the total number of student teachers (n=18), 2 or 11.1% of student teachers gave sensorimotor stage, substage 3 level of problem representation responses. The following is an example typical of a sensorimotor stage, substage 3 responses:

Dealing with problems that come up. I haven’t had a lot of experience and I am a bit of a softy. (Student Teacher #06)
The student teacher is focused on orienting herself to classroom/behaviour management. She is focused on her own issues and while she does notice the class’s reaction to her instruction, she is not focused on the cues of impending problems.

Six or 33.3% of student teachers’ representation of the problem of classroom/behaviour management was characteristic of the interrelational stage, substage 2. The following is an example typical of this level of response:

Keeping students on task is a problem because if students are constantly talking and socializing there is no way they will be on task to do work. Those students that have short attention spans will be disruptive towards the rest of the class. It is important to keep them engaged. (Student Teacher #05)

Responses rated at the interrelational stage, substage 2 of the levels of problem representation suggest that the student teacher is able to focus on the class’ reaction to her instruction while noticing one specific instance of an effect of a behaviour problem in an individual learner’s response to her instruction. None of the student teachers’ responses were coded at the interrelational stage in the substage 3 level of problem representation, suggesting that at the beginning of the practicum they had not yet developed the ability to focus on the class’ reactions to their instruction while noticing and identifying one behaviour problem in an individual or small group of individuals. A similar appreciative lack of student
teachers’ responses were coded at the interrelational stage in the substage 3 level of problem representation in the previous data set (Newman, 1994) where only one or 2.4% of 41 student teachers’ responses were coded as interrelational stage, substage 3 level of problem representation.

By contrast, 5 or 27.7% of student teachers’ responses reflected a higher level of problem representation, that is, at the dimensional stage, substage 2. The following is an example typical of responses of this nature:

Balancing my need to have control with the students’ need for freedom versus empowering the students to be responsible for themselves appears to make classroom discipline rather problematic because I can’t allow misbehaving students to detract from other students’ learning. All this in a proactive rather than reactive fashion and in a way that creates a physically and emotionally safe place for learning to take place and teaches students about classroom expectations and addresses students who aren’t aware or capable of respectful behaviour. (Student Teacher #09)

At this stage, the student teacher is able to identify an index of classroom management, describe the degree, effect, and cause, note the complexity of the problem, and indicate a notion of balance or tradeoff needed between individual or class needs and the student teacher’s need to manage the class.

Only two (or 11.1%) of student teachers’ responses showed a vectorial stage, substage 1 level of problem representation. Such a response indicates an
awareness of not only the elements noted at the dimensional stage, substage 2 but also the idea that meeting individual needs involves an interaction between instructor and learner in which monitoring and feedback help shape adjustments in student teachers' actions, beliefs, and expectations. The following is an example typical of a vectorial stage, substage 1 response:

Balancing being in control of the class versus the students being in control of the class, knowing what discipline techniques to use, knowing when to use them, which ones are the most effective depending on the student and the situation, being proactive versus reactive, preventing a situation from occuring in the first place rather than it happening and then having to deal with it. These are real challenges especially when I as the teacher gets too emotional when responding to students, kids can see that and use it against you thus learning to stay calm and not let them have a reaction from you is key. Also when there are so many different skill levels in your class it's a real challenge to teach to all of them without some students getting bored because it's too easy or lost because it's too difficult. If they do, they are less likely to pay attention and begin to find something else to do such as acting up (such a great way to tell you they are not getting it!). All very hard to balance when you don't know when/ how to manage let alone discipline yet.(Student Teacher #09)
By the sixth week of the practicum, all of the student teachers had moved beyond a sensorimotor stage, substage 3 level of problem representation. The reality of managing the classroom and students’ behaviour in the real classroom focused student teachers' responses primarily in the interrelational and dimensional stages of problem representation. This pattern of results parallels the findings of Newman (1994).

The largest number of the group of student teachers (14 or 77.7% of the 18) were clustered at the interrelational stage of problem representation. Of the total number of student teachers, 7 or 38.8% of student teachers' responses were at a lower level, interrelational stage, substage 1 of problem representation. The following is a typical example of this lower level of problem:

During a math lesson, I had to repeatedly warn the class that they were being way too loud while doing their seatwork. I gave the students 3 warnings to lower the volume and after the 3rd warning I assigned extra homework. (Student Teacher #14)

In this response, the student teacher focuses exclusively on the class's reaction to his instruction. He may label a behaviour problem but is unable to describe a management issue in any detail and his solution, if offered, is reactionary rather than preventative and is directed at the whole class or the “trouble-maker” child but does not get at the cause of the problem. Another 7 or 38.8% of student teachers clustered at the interrelational level substage 2. These student teachers
were able to notice the class of learners' reaction to their instruction while noticing one specific instance of an effect of a discipline problem in an individual learner's response to their instruction. Solutions, if offered, were reactionary rather than preventative and directed at the whole class of learners or at one learner.

Two student teachers were clustered around the transition point between the interrelational and dimensional stages. Two or 11.1% of the student teachers' responses were at the interrelational stage, substage 3. The following is an example typical of an interrelational stage, substage 3 response:

All students speaking out at once which leads to a noisy classroom.

Students tend to talk to one another when another student or I am speaking. I have found it distracting as well as disrespectful to others.

First I went over the two class rules. Treat others the way you want to be treated and don't speak when others are speaking. I reminded them that they should keep these in mind at all times. If they continue then I will call the name of the student to get their attention and they stop. If they persist, I tell them this is the second time. Third time, I will deduct points from their group. This gets them to stop because the group puts pressure on the individual. (Student Teacher #05)

The student teacher is able to identify the index of the classroom/behaviour management problem, yet she does not describe the range of the behavioral
problem or its complexity. The student teacher’s solution of setting rules and expectations for off-task behavior attempts to address the individual’s behaviour, but it is directed at all the learners in the class rather than one learner in particular. By contrast, of the total number of student teachers, 2 or 11.1% were at the dimensional stage, substage 2, a stage in which student teachers are able to represent the classroom/behaviour management problem as a category or dimension. The following is an example typical of the qualitatively different nature of a dimensional level response:

Some are more willing than others to participate in new things while others are afraid of taking the risk. I continue to struggle with the effective implementation of an inclusive learning environment. It is challenging and it affects all parts of my teaching. I often feel stressed and overworked by this. It is important to reassure the students and offer encouragement and reinforcement. I place myself nearest to those students who I feel need the extra support. We use a daily checklist to help us (teacher and student) to determine whether we are meeting or exceeding personal goals of participation. (Student Teacher #01)

At this higher level of problem representation, the student teacher is able to coordinate an identification of a variable of classroom/behaviour management: inclusion. Some are more willing to participate in new things while others are
afraid of taking the risk. The solution is a general one directed at the low risk-taking group rather than tailored to the needs of each individual learner.

Faced with the realities of the classroom, the two student teachers who were identified at the vectorial stage, substage 1 level of problem representation retreated down a stage to the dimensional stage, substage 2 and an interrelational stage, substage 2 respectively. None of the student teachers' responses reflected a vectorial stage, substage 1, high level of problem representation during the first half of the practicum experience.

Table S.3, (p. 334), provides a distribution of the student teachers' levels of problem representation during the second half of the practicum experience. By the twelfth week of the practicum experience, none of the student teachers' level of problem representation was at the lowest sensorimotor stage, substage 3, and only two student teachers were rated at the interrelational stage, substage 1 level of problem representation. This emerging pattern of results reflects the same pattern found in the earlier study of student teachers' levels of problem representation in the area of classroom management (Newman, 1994). Of the total number of student teachers, 6 or 33.3% of the student teachers' responses were at the interrelational stage, substage 2 and 4 or 22.2% were at the interrelational stage, substage 3, while 3 or 16.6% each were at the dimensional stage, substages 1 and 2. This finding suggests that ten of the student teachers were wrestling with the movement from a representation of the problem as one
concerned with people and actions to one concerned with categories of relations or dimensions by the twelfth week of the practicum. They were able to identify an index of classroom/behaviour management in one learner while focusing on the class of learners, yet only some were able to coordinate this with a description of the range or dimension of that discipline problem.

Three or 16.6% of the student teachers' responses were at the dimensional stage, substage 2 level of problem representation. The following is an example typical of this level of response:

Our class were selecting groups to work on a project and one boy jumped up and yelled, "I don't have to work with anyone because everyone hates me." This caused a major uproar. Some students were laughing, some just looked shocked, others agitated, but no one was calm. I got the attention of all students and then had a thoughtful, caring discussion at the carpet about why someone would say something like that and how that person must feel. The boy participated a bit. I had a more lengthy talk with him after class about why and his need and fears around working with a partner. He is spending some time with the counsellor. Later that week, during our class meeting, the boy got at least four warm fuzzies from his classmates. (Student Teacher #08)

At this higher level of problem representation, the student teacher focuses on the range and complexity of the index of classroom/behaviour management while
still addressing the needs of the class as a whole. The solution offered here is
directed at the whole class of learners, and at an individual student. The solution
does address the individual learner’s needs and is to some extent embedded into
the instruction through the class meeting structure.

None of the student teachers’ responses in the present study were at the
vectorial stage, substage 1 level of problem representation. This pattern is
contrary to the results found in Newman (1994) in which 10.3% of the student
teachers’ responses were at the vectorial stage, substage 1 level of problem
representation at the second half of the practicum.

Figure 5.1, (p. 114) provides a graphic summary of the frequency
distributions associated with the shifts in levels of problem representation in the
area of classroom/behaviour management over the course of the practicum
experience.

Individual Differences Problem Area

The question: "What aspects of individual differences do you think are
likely to be problematic for teaching?" asked of student teachers at the beginning
of the practicum experience provided a baseline of their level of problem
representation. The parallel question: "What have been the most important
individual differences to take into account when teaching this particular group of
students?" asked of student teachers during the seventh and thirteenth weeks gave
Figure 5.1

Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Levels of Problem Representation at the Beginning of (Time 1), and During the First (Time 2), and Second Halves (Time 3) of the Practicum
a measure of their levels of problem representation during the practicum experience. Student teachers' responses to these questions were examined in terms of levels of representation of the problem of adapting instruction to individual differences among learners as adapted from Case's (1985, 1991) neo-Piagetian theory of intellectual development.

Responses were rated according to the complexity of the student teachers' thinking about the problem of individual differences and assigned a stage and substage which matched the complexity of their problem representation (See Appendix C, (pp. 276-281), for a description of the Levels of Student Teachers' Problem Representation). Tables S.4, S.5, and S.6, found in Appendix S, (pp. 335-337), provide a distribution of the ratings for level of problem representation over the course of the practicum experience.

At the beginning of the practicum experience, student teachers' levels of problem representation were distributed throughout the levels of problem representation with clusterings at the interrelational stage, substage 2, and the dimensional stage, substage 2. Although the largest group of student teachers had a lower level of problem representation (interrelational stage, substage 2), there was also a group of student teachers at a higher level of problem representation (dimensional stage, substage 2). There were no student teacher responses coded at the sensorimotor stage, substage 3 level of problem representation in the
present study, unlike the patterns characteristic of the results of the previous study of Newman (1992, 1993).

Six or 33.3% of student teachers' representation of the problem of individual differences was characteristic of the interrelational stage, substage 1. The following response is an example typical of this level:

Home environment of a student because it is very frustrating to not be able to help when support from home is lacking for a student. (Student Teacher #15)

Responses rated at the interrelational stage, substage 1 of the levels of problem representation suggest that the student teacher is able to focus on the class's reaction to her instruction or an individual learner's reactions to her instruction. Two or 11.1% of the student teachers' responses were situated at the interrelational stage, substage 2 level of problem representation, suggesting an ability to identify one individual difference of a learner's response to class instruction while noticing the whole class's reaction to instruction.

Six or 33.3% of student teachers representation of the problem of individual differences was characteristic of the interrelational stage, substage 3. The following response is an example typical of this level:

Being able to meet the needs of all of my students to the best of my ability without taking away from any of the other students. If one particular student becomes a focal point for yourself you could lose focus on the rest
of your group. No single student should take more time than another.

Every student should get equal time and treatment from the instructor.

(Student Teacher #03)

Responses rated at the interrelational stage, substage 3 of the levels of problem representation suggest that the student teacher is able to focus on the class' reaction to his instruction while noticing one individual difference in an individual learner's response to his instruction. The simplistic solution of giving each student equal time and treatment attempts to address the individual difference but is really directed at the class of learners as a whole.

By contrast, 4 or 22.2% of student teachers' responses reflected a higher level of problem representation, that is, at the dimensional stage, substage 1. The following example is typical of this level:

Gardner's theory of multiple intelligences will have the most impact on the way I teach during the practicum. Students learn in different ways and at different rates. My class has a range of high achievers to lower achievers and quite an ESL population. Finding ways to “get through” to all of the kids in my class will be the biggest challenge. I think my students with ESL differences will be most problematic for my teaching because the current educational system relies heavily on print material. A student in an intermediate grade, who is ESL has a very difficult time learning new concepts. They will memorize, but not fully understand
what is being taught. I will have to modify their program. (Student Teacher #13)

At this stage, the student teacher is able to identify an index of individual difference, describe the range of ability levels, and note an effect of individual difference in one learner and the cause.

Patterns of distribution of student teachers' representation of the individual difference problem in the present study matched that of patterns established in previous studies (Newman, 1992, 1993) for student response at the interrelational stage, substages 1-3 and dimensional stage, substage 1. However, in the present study, no student teachers showed a dimensional stage, substage 2 or 3 level or a vectorial stage substage 1 level of problem representation at the beginning of the practicum. In the previous studies, a combined total of 9 (n=39) or 23% of student teachers demonstrated a dimensional stage, substage 2 or substage 3 level of problem representation and one student teacher's response showed a vectorial stage, substage 1 level of problem representation. Table S.5, (p. 336), provides a distribution of the ratings for level of problem representation during the first half of the practicum experience (Week 7).

By the seventh week of the practicum, all of the student teachers had moved beyond a sensorimotor stage, substage 3 level of problem representation even when the reality of adapting real instruction to real individual differences among real learners in the real classroom is taken into consideration. This reality,
however, clustered student teachers' responses in the interrelational and
dimensional stages of problem representation, repeating much the same pattern as
established in previous research results (Newman, 1992, 1993).

Two or 11.1% of student teachers' responses were at a lower level,
interrelational stage, substage 1 of problem representation. The following
response is an example typical of this lower level of problem representation:

A big part of the difficulty with these students is that they are easily
distracted and have a hard time staying on task. By spending extra time
on the carpet where I can watch them closely, they can do better. (Student
Teacher #08)

In this response, the student teacher focuses exclusively on the class's reaction to
her instruction. She is unable to identify or describe individual differences among
learners and her solution is a global one directed at class members rather than the
individual differences among learners in that class.

The largest number of student teachers was clustered around the transition
point between interrelational stage and dimensional stages. Eight or 44.4% of the
student teachers' responses were at the interrelational stage, substage 3. The
following response is an example typical of this level:

I am teaching a split class so there are many differing levels of
achievement and understanding right away. I had 5 really low students
who did not even know how to write so they needed so much help from
me. I brainstormed words with the class and as I wrote the words on the board, I drew a corresponding picture next to each one. That way the students could use the picture on the board as a cue if they couldn’t read the word. (Student Teacher #11)

The student teacher is able to identify the index of individual difference: different reading abilities, yet he does not describe the range of the differing ability levels in any great detail. The student teacher’s solution of brainstorming words with the class and drawing corresponding picture cues attempts to address the individual difference of the small group of “low” learners, but it is directed at all the learners in the class.

By contrast, of the total number of student teachers, 5 or 27.7% were at the dimensional stage, substage 1, a stage in which student teachers are able to represent individual differences among learners as a category or dimension. The following response is an example typical of the qualitatively different dimensional level:

I have a split grade of 4s and 5s so already it’s difficult when you have 2 different sets of learning outcomes from the IRPs that you need to cover and it’s too difficult to try and split the grades up and teach them two different lessons everytime. Even with 2 grade levels though, there are such a variety of ability levels that I would say the range which exists is more like between grade 3 and 6. Our class is a mixture of students from 3
different classrooms from last year so that contributes greatly to their range of ability levels. Finally, my class is made up of over 25% ESL students so their range of ability due to language deficiencies makes it difficult to teach everyone. Having said all of that though, I am not finding it as difficult as I thought it would be to incorporate the variety of ability levels within the class. We have students (ESL, grade 4,5 combos, special needs) grouped into tribes and they work in these groups for a month or so and because we do a lot of partner and group work, the stronger ones help the others who need a lot of help. (Student Teacher #07)

At this higher level of problem representation, the student teacher is able to coordinate an identification of an individual difference, ability levels, and fully describe that dimension. The solution is a general one utilizing the whole class through ability grouping through the formation of “tribes” and is directed at the lower ability level students rather than tailored to the individual learning needs of each individual learner.

Faced with the teaching realities characteristic of an 80% teaching load, none of the student teachers was identified at the dimensional stage, substage 2 - 3 level of problem representation. This pattern is similar to the results found in previous studies (Newman, 1992, 1993). In that research, only a small percentage (8 of 39 or 20.5%) of student teachers’ responses were coded at the dimensional
stage, substages 2 and 3 combined and none of the student teachers' responses reflected higher levels of problem representation at the vectorial stage during the first half of the practicum experience.

Table S.6, (p.337), provides a distribution of the student teachers' levels of problem representation during the second half of the practicum experience. By the thirteenth week of the practicum experience, as before, none of the student teachers' level of problem representation dropped back to the lowest sensorimotor stage, substage 3 or the lowest interrelational stage, substage 1 level of problem representation. Only one student teacher was rated at the lower interrelational stage, substage 2 level of problem representation. Of the total number of student teachers (n=18), 5 or 27.7% of the student teachers' responses were at the interrelational stage, substage 3, while 4 or 22.2% were at the dimensional stage, substage 1. This finding suggests that at least half of the student teachers who participated in the study were wrestling with the movement from a representation of the problem as one concerned with people and actions to one concerned with categories of relations or dimensions by the thirteenth week of the practicum. They were able to identify an index of individual difference in one learner while focusing on the class of learners, yet only some were able to coordinate this with a description of the range or dimension of that individual difference.
Five or 27.7% of the student teachers' responses were at the dimensional stage, substage 2 level of problem representation. The following response is an example typical of this level:

In Math, there is quite a large gap between lots of the students with a huge range of ability between learners. I found it difficult to design lessons to meet all of the students' needs while supporting individual student needs at the same time. The slower learners need more detail and more time and at the same time I don't want the faster learners to get bored and lose focus and motivation. I focused the lesson around the slower learners using lots of manipulatives and games not only to teach but to keep everyone – fast and slow – interested and involved. (Student Teacher #14)

At this higher level of problem representation, the student teacher focuses on the range and complexity of the index of individual difference while still addressing the needs of the class as a whole. The solution offered here is directed at a subgroup of learners, in this case underachievers rather than individual underachievers, yet the solution does involve both slow and fast learners.

One or 5.5% of the student teachers' responses was at the vectorial stage, substage 1 level of problem representation. The following response is an example typical of this level:

The different levels within the groups of student within creative writing.

It is not the same problem with students in their writing. It is either
punctuation, spelling, capitals, or omissions. That makes it hard for me as a student teacher to handle all these difficult concerns and problems with a class of 30 different individuals. I find that when the students are doing creative writing I talk to each individual or group of individuals who are having problems with the same element of writing. By giving each individual a thing to look at and to be aware of in their own writing.

(Student Teacher #01)

At this highest level of problem representation found in the sample, the student teacher is able to adapt his instruction to the needs of the individual learner. His solution is arrived at through adjustments in his actions, and expectations due to monitoring of and feedback from the individual learner.

Figure 5.2, (p.125), provides a graphic summary of the frequency distributions associated with the shifts in levels of problem representation over the course of the practicum experience.
Figure 5.2

Frequency Distributions Associated with the Student Teachers' Levels of Problem Representation at the Beginning of (Time 1), During the First (Time 2), and Second Halves (Time 3) of the Practicum
Student Teachers’ Description of the Problem Representation

Classroom/Behaviour Management Problem Area

In order to explore the nature of student teachers' problem representation, student teachers were asked to: "Describe the most difficult problem you had with classroom/behaviour management. What steps did you take to resolve this problem?" at the sixth and twelfth weeks of the practicum experience. Student teachers' responses to this question were examined in terms of presence of the three components which constitute Case's (1985, 1991) control structure: representation of the problem situation, representation of objectives, and representation of strategy or strategies employed. The number of aspects of each of these three components were noted. Responses were rated according to the presence of components and the number of aspects of these components of problem representation (See Chapter 3 for a description of the representation of the problem and Appendix N, (p. 323), for a description of the codes assigned to the components). Table S.7, (p. 338), in Appendix S provides a distribution of the ratings for the description of problem representation during the first half of the practicum experience. Figure 5.3, (p. 127), provides a graphic summary of the frequency distributions associated with the student teachers' description of the problem representation of the classroom/behaviour management problem area on the Reflective Learning Questionnaire during the first half of the practicum.
Figure 5.3

Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Description of the Problem Representation of the Classroom/Behaviour Management Problem Area on the Reflective Learning Questionnaire During the First Half of the Practicum (Time 2)
During the first half of the practicum experience, the two components of representation of the problem situation and representation of the problem strategy were present in all student teachers' descriptions of their representation of the classroom/behaviour management problem. Of the total number of student teachers, 17 or 94.4% did not explicitly state a representation of the problem objective in their description. Only one or 5.5% of the student teachers was able to give a description of one objective in her representation of the problem.

As indicated in Table S.7, (p. 338), the majority or over half of student teachers' representations of the problem situation component and the problem strategies component of the classroom management problem featured predominantly three aspects. The following is an example typical of a description of the components of a problem representation with a limited number of aspects represented:

People talking in class. I stopped them and went over expectations and we tried again. (Student Teacher #15)

In the student teacher's representation of his most difficult problem during the first half of the practicum, his representation of the problem situation contains only one aspect; no problem objective is represented, and his representation of the problem strategy contains three very simple aspects.
By contrast, the following typical example of a more elaborate description of the aspects or components of problem representation suggests a more detailed representation of problem situation, objective(s), and strategy:

One part of classroom management that I continue to struggle with is effective implementation of an inclusive environment. It is particularly challenging because it affects so many other parts of my teaching. I try to effectively implement an inclusive learning environment by seating students where I feel they will be the most productive. Along with my sponsor teacher, I discuss and situate our “stronger” students where they may help to scaffold the weaker students. I place myself nearest to those students who I feel need extra support during activities. I look for attention cues and check for clarity, understanding of expectations especially for my exceptional students. (Student teacher # 01)

This student teacher's representation of his most difficult problem contains a detailed description of at least four aspects of the problem situation. He describes an objective for his instruction: “to effectively implement an inclusive learning environment”. His strategies for implementing this objective include many aspects: seating arrangements, peer scaffolding, instructor proximity, extra support and supervision, checking for understanding and use of attention cues.

Table S.8, (p. 339), provides a distribution of student teachers’ description of the problem representation during the second half of the practicum experience.
Figure 5.4, (p. 131), provides a graphic summary of the frequency distributions associated with the student teachers' description of the problem representation of the classroom/behaviour management problem area on the reflective learning questionnaire during the second half of the practicum.

By the second half or thirteenth week of the practicum, over half of student teachers' representations of the problem situation component increased to three to four aspects. Their representations of the strategy employed to move from the problem situation to the desired situation ranged from two to four aspects with five students referring to six or more aspects in their problem situation descriptions. Only a small change was reflected in the student teachers' representations of their objectives when faced with a problem situation. Of the total number of student teachers, 14 or 77.7% still were unable to represent one aspect of their description of the representation of the problem objective. Only 4 or 22.2% of student teachers could represent one or two aspects in their description of the representation of the problem objective. This result suggests that student teachers may still have difficulty representing the problem objective component of a difficult problem even by the second half of the practicum experience.

Individual Differences Problem Area

In order to explore the nature of student teachers' problem representation, student teachers were asked to: "Describe the most difficult problem you have
Figure 5.4

Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Description of the Problem Representation of the Classroom/Behaviour Management Problem Area on the Reflective Learning Questionnaire During the Second Half of the Practicum (Time 3)
had in adapting your teaching to individual differences among your learners.

What steps did you take to resolve this problem?" at the seventh and thirteenth weeks of the practicum experience. Student Teachers' responses to this question were examined in the same manner as student teachers' responses to the parallel question in the classroom/behaviour management problem area, namely for the presence of the three components which constitute Case's (1985, 1991) control structure: representation of the problem situation, representation of objectives, and representation of strategy or strategies employed. Responses were rated according to the presence of components and the number of aspects of these components of problem representation (See Chapter 3 and Appendix N, p. 323 for a description of the problem description codes). Table S.9, p. 340, provides a distribution of the ratings for the description of problem representation during the first half of the practicum experience.

During the first half of the practicum experience, all three components: representation of the problem situation, representation of the problem objective, and representation of the problem strategy were present in all student teachers' descriptions of their representation of the individual differences problem. Of the total number of student teachers, 4 or 22.2% did not explicitly state a representation of the problem objective in their description. Eight or 44.4% of the student teachers were only able to give a description of one objective in their representation of the problem.
As indicated in Table S.9, (p. 340), over half of student teachers' representations of the problem situation component of the individual difference problem featured three to five aspects whereas their representations of the problem strategies component consisted of two or three aspects. Figure 5.5, (p. 134), provides a graphic summary of the frequency distributions associated with the student teachers' description of the problem representation of the individual differences problem area on the Reflective Learning Questionnaire during the first half of the practicum. The following is an example typical of a lower level description of the components of problem representation:

I haven't had to adapt on the whole, I just make sure that the students I feel to be slower get ample time to answer the questions. (Student Teacher #04)

In the student teacher's representation of her most difficult problem during the first half of the practicum, her representation of the problem situation contains only one aspect; no problem objective is represented; her representation of the problem strategy contains only one aspect.

By contrast, the following example typical of a higher level of description of components of problem representation suggests a more detailed representation of problem situation, objective(s), and strategy:

We have a number of ESL (Iranian) students in the class. Some don't understand a word of English (or very few words) and can't write.
Figure 5.5

Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Description of the Problem Representation of the Individual Differences Problem Area on the Reflective Learning Questionnaire During the First Half of the Practicum (Time 2)
Others are "dying" to learn and pretend to understand the directions when they really can't. Therefore, I had to make sure that all my lessons were directed at everyone, but especially more so to them. (Student Teacher #07)

This student teacher's representation of his most difficult problem contains a detailed description of at least four aspects of the problem situation. He describes an objective for his instruction: to make sure all lessons were directed at everyone. His strategy for implementing this objective involves two aspects: planning instruction to accommodate all levels of prior knowledge, especially the varying levels of ESL students in his class.

Table S.10, (p. 341), provides a distribution of student teacher's description of the problem representation during the second half of the practicum experience. Figure 5.6, (p. 136), provides a graphic summary of the frequency distributions associated with the student teachers' description of the problem representation of the individual differences problem area on the Reflective Learning Questionnaire during the second half of the practicum. By the second half or thirteenth week of the practicum, over half or fifty percent of student teachers' representations of the problem situation component increased to three aspects. Their representations of the strategy employed to move from the problem situation to the desired situation
Figure 5.6

Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Description of the Problem Representation of the Individual Differences Problem Area on the Reflective Learning Questionnaire During the Second Half of the Practicum (Time 3)
ranged from two to six aspects. Only a small degree of change was reflected in the student teachers' representations of their objectives when faced with a problem situation. Of the total number of student teachers, 8 or 44.4% did not represent an aspect in their description of the representation of the problem objective and only 6 or 33.3% still represented only one aspect in their description of the representation of the problem objective. This result suggests that student teachers may still have difficulty representing the problem objective component of a difficult problem even by the second half of the practicum experience. Student teachers' description of their representations of problem situation, objective, and strategy seem to experience more growth over the course of the practicum in the problem area of individual differences than in the area of classroom/behaviour management.

Research Question Two

Student teachers' responses to the case study scenario questions during the case study reflective interviews at the beginning and end of their practicum and the triangulation data collected as a result of student teachers' and faculty advisors' responses on the Effective Teaching Rating Scale and the Faculty Advisor Rating Scales, respectively, were used to investigate the second research question: (a) What is the congruence between student teachers' levels of representation of hypothetical teaching problems and their levels of representation of real life teaching problems specific to the domains of teaching? (b) How
congruent are student teacher's levels of problem representation of real life teaching experiences in the practicum classroom and their effectiveness in translating their problem representation into action as observed by their faculty advisors?

**Case Study Scenarios**

The case study scenarios provided an opportunity to substantiate an application of Case’s (1992) neo-Piagetian theory of intellectual development to the growth and development of student teachers’ levels of problem representation by exploring the structures and processes they might have available for representing the individual differences and classroom/behaviour management problems. Case studies created opportunities for student teachers to study how teachers of hypothetical classroom scenarios represented classroom problems in the areas of classroom/behaviour management and adaptation of instruction to individual differences among learners. They allowed the student teacher to identify, analyze, and reflect on situations and teaching practices applicable to the event described. The Case Study scenarios comprised of two sets of one case study for each problem area can be found in Appendix M, (pp. 321-322).

Student teachers’ responses to the Reflective Interview open-ended question: “Tell me about the case study scenario you read. Explain your understanding of what you read.” which followed the case scenario was designed to elicit student teachers’ understanding of what they read. The more focused
direct probing questions designed to elicit the student teacher's understanding of
the scenario: "What were the challenges of the case scenario?", "What steps did
the teacher take to address the challenges of the case scenario?" asked at the
beginning and end of the practicum provided an indication of their level of
problem representation on hypothetical teaching problems. These questions
paralleled the questions asked of student teachers in the Reflective Learning
Questionnaire about their own classroom practice in the classroom/behaviour
management and individual differences problem areas and they were coded in the
same manner using the levels of problem representation codes for classroom/
behaviour management presented in Appendix B, (pp. 270-275), and individual
differences in Appendix C, (pp. 276-281). See Appendix N, (p. 323) for a
description of codes for description of the problem representation.

Interrater Reliability

All of the eighteen sets of responses were coded using the same
procedures as before by the same independent second rater who performed the
interrater reliability check for the Reflective Learning Questionnaire. The
categorical descriptions outlined in Appendices B and C, (pp. 270-281), were
used to code student teachers' level of problem representation. The resultant
percentages of agreement between the two raters obtained were 83% for
judgments regarding student teachers' level of problem representation in the
problem area of classroom/behaviour management and 81% for judgments
regarding student teachers' level of problem representation in the problem area of individual differences. The percentages of agreement between the two raters for judgments regarding the number of aspects student teachers used in their description of the problem area were 79% for judgments regarding the number of aspects student teachers used in their description of the problem in the area of classroom/behaviour management and 81% for judgments regarding the number of aspects student teachers used in their description of the problem in the area of individual differences. In all instances, disagreement differed by only one level or one aspect in the initial independent coding. After discussion, consensus was reached on cases of disagreement and 100% agreement between the two raters was obtained.

The results which have implications for research question two will be presented and discussed in the following two sections:

Student Teachers' Levels of Problem Representation

(a) Classroom/Behaviour Management Problem Area

(b) Individual Differences Problem Area

Student Teachers' Description of the Problem Representation

(c) Classroom/Behaviour Management Problem Area

(d) Individual Differences Problem Area
Student Teachers' Levels of Problem Representation

Classroom/Behaviour Management Problem Area

Student teachers' responses to the Reflective Interview Probing Questions after each classroom/behaviour management problem focused scenario were rated according to the complexity of the students' teachers' thinking about the problem and assigned a stage and substage which matched the complexity of their problem representation (See Appendix J, pp. 299-317, for a copy of the case scenarios and see Appendix B, pp. 270-275, for a description of the Levels of Student Teachers' Problem Representation.) Table S.11, (p. 342), provides a distribution of the ratings for level of problem representation on the case scenarios at the beginning and end of the practicum.

At the beginning of the practicum experience, student teachers' levels of problem representation were distributed between the interrelational and dimensional stages with a clustering of 11 or 61% of student teachers at the interrelational stage, substages 2 and 3 and 5 or 27.7% of student teachers representing the problem at the dimensional stage, substage 1. All student teachers' levels of problem representation were beyond the sensorimotor stage, substage 3 which suggests that they were able to go beyond a level of thinking about the problem which focused only on the teacher in the case scenario's basic orientation to the class and the learning activities.
By the end of the practicum, student teachers' levels of problem representation reflected a general, gradual trend upward in stages and substages with eleven or 61.1% of student teachers' levels of problem representation focused at the interrelational stage, substage 2 and 3. Five or 27.7% of student teachers displayed problem representation at the dimensional stage, substage 1 level and two or 11.1% of student teachers at the dimensional stage, substage 2 level. At the beginning of the practicum, only five or 27.7% of student teachers displayed levels of problem representation at the dimensional stage, substages 1 and 2. By the end of the practicum, seven or 38.8% of student teachers showed levels of problem representation at the dimensional stage, substages 1 and 2. Figure 5.7, (p. 143), provides a graphic summary of the frequency distributions associated with the shifts in levels of problem representation of the case scenarios from the beginning to the end of the practicum. These patterns of student teachers' levels of problem representation on the case scenarios were markedly different from student teachers' levels of problem representation of their own classroom/behaviour management problems on the Reflective Learning Questionnaire. Student teachers represented their own classroom/behaviour management problems across a broader range at the beginning of the practicum from the sensorimotor stage, substage 1 up to dimensional stage, substage 2 and vectorial stage, substage 1 whereas the range of problem representation was not as great on the case scenarios. By the end of the practicum, a closer match existed between
Figure 5.7
Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Levels of Classroom/Behaviour Management Problem Representation on the Case Scenarios at the Beginning (Time 1) and the End of the Practicum (Time 3)
student teachers’ levels of problem representation on the case studies and their own teaching problems with no student teachers at the sensorimotor stage, substage 3 level on either measure and a clustering of student teachers’ levels of problem representation at the interrelational stage, substages 2 and 3 and the dimensional stage, substages 4 and 5.

Individual Difference Problem Area

Student teachers’ responses to the Reflective Interview Probing Questions after each individual differences problem focused scenario were rated in the same fashion as their responses to classroom/behaviour management focused case scenarios (See Appendix J, pp. 299-317, for a copy of the individual differences problem focused case scenarios.) Table S.12, (p. 343), provides a distribution of the ratings for level of problem representation at the beginning and end of the practicum.

At the beginning of the practicum experience, student teachers’ levels of problem representation on the individual differences problem-focused case scenario were similar to those found on the classroom/behaviour management case scenario. For the most part, they were evenly distributed between the interrelational and dimensional stages with a clustering of four or 22.2% of student teachers at each of the interrelational stage, substages 2 and 3 and 5 or 27.7% representing the problem at the dimensional stage, substage 1.
By the end of the practicum, student teachers' levels of problem representation reflected the same general, gradual migration upward in stages and substages with the twelve or 66.6% of student teachers' levels of problem representation focused at the interrelational stage, substage 2 and 3 up four or 22.2% of student teachers than at the beginning of the practicum. Five or 27.7% of student teachers displayed problem representation at the dimensional stage, substage 1 level and one or 5.5% of student teachers represented the individual differences focused scenario at the dimensional stage, substage 2. At the beginning of the practicum, no students were representing the individual differences focused scenario at the dimensional stage, substage 2. Figure 5.8, (p. 146), provides a graphic summary of the frequency distributions associated with the shifts in levels of problem representation of the case scenarios from the beginning to the end of the practicum. The patterns of student teachers' levels of problem representation on the individual differences focused case scenarios and those of their own representations of individual differences problems on the Reflective Learning Questionnaire are more similar for the individual differences problem area than the classroom/behaviour management area. On both measures, at the beginning of the practicum, student teachers' levels of problem representation are spread evenly from the sensorimotor stage, substage 1 up to the dimensional stage, substage 2.
Figure 5.8

Graphic Summary of the Frequency Distributions Associated with the Student Teachers' Levels of Individual Differences Problem Representation on the Case Scenarios at the Beginning (Time 1) and the End of the Practicum (Time 3)
By the end of the practicum, a general, gradual pattern of movement up the levels occurred between student teachers' levels of problem representation on the case studies and their own teaching problems with no student teachers at the sensorimotor stage, substage 3 level on either measure and a clustering of student teachers' levels of problem representation at the interrelational stage, substages 2 and 3 and the dimensional stage, substages 2 and 3. Student teachers seemed to show more growth in levels of problem representation of their own representation of their teaching challenges encountered when adapting their instruction to individual differences among their learners than on the hypothetical problems of the individual differences focused case scenario once their level of problem representation progressed past the interrelational stage, substage 3. One or 5.5% of student teachers had a level of problem representation on their own teaching challenges at the interrelational stage, substage 2 compared to 8 or 44.4% on the case scenario. Five or 27.7% of student teachers had a level of problem representation at the dimensional stage, substage 2, on their own teaching challenges, compared to only 1 or 5.5% of student teacher who had a level of problem representation at this level in the case scenarios. This difference in level of problem representation is also reflected at the dimensional stage, substage 3 and vectorial stage, substage 1 levels in which two students (one at each substage level) were able to represent their own individual differences teaching challenges.
at a much higher level than on the case scenarios. No student teachers showed such levels of problem representation on the case scenarios.

**Description of the Problem**

In order to explore the nature of student teachers' problem representation on both the classroom/behaviour management and individual differences focused case scenarios, student teachers were asked: "What were the challenges of the case scenario?" and "What steps does the teacher need to take to address the challenges of the case scenario?" at the seventh and thirteenth weeks of the practicum experience. Student Teachers' responses to these questions were examined in the same manner as student teachers' responses to the parallel questions on the Reflective Learning Questionnaire in the classroom/behaviour management problem areas for the presence of the three components which constitute Case's (1985, 1991) control structure: representation of the problem situation, representation of objectives, and representation of strategy or strategies employed. Responses were rated as before according to the presence of components and the number of aspects of these components of problem representation (See Chapter 3 and Appendix N, (p. 323), for problem description codes).

**Classroom/Behaviour Management Problem Area**

Tables S.13, (p. 344), and S.14, (p. 345), provide the distributions of the ratings for the description of problem representation at the beginning and at the
second half of the practicum experience in the problem area of classroom/behaviour management.

**Individual Differences Problem Area**

Tables S.15, (p. 346), and S.16, (p. 347), provide the distributions of the ratings for the description of problem representation at the beginning and at the second half of the practicum experience in the problem area of individual differences.

Student teachers' responses showed more competency with the description of aspects or components of the problem situation and problem solution of the case scenarios in both classroom management and individual differences problem areas at the beginning of the practicum than they did on their representations of their own teaching problems on the Reflective Learning Questionnaire. More student teachers were able to represent a problem goal for the teacher in the case scenario than in the representation of the problem goal in their own teaching problems on the Reflective Learning Questionnaire. Their descriptions of the case scenario problem showed an increase in their ability to describe more aspects of the problem situation, objective, and solutions from the beginning to the end of the practicum. This growth pattern was similar to the pattern found in their description of their own teaching problems on the Reflective Learning Questionnaire.
By the end of the practicum, however, in both problem areas, and especially in the classroom management problem area, student teachers' descriptions of the problem situation, goal, and solution seemed to hit a ceiling in that the majority of student teachers did not describe the problem situation or solution beyond three or four aspects. Also of interest is the quality or detail of the aspects of a student teacher's description of the problem situation and problem solution. Many student teachers' descriptions relied on very generic, non-specific, simplistic descriptions that did not address the challenges of the problem area and were not really tailored to the challenges of the case scenario. For example, in response to the individual differences focused problem area case study of Marsha Warren at the end of the practicum, the following descriptions of the challenges and steps to address the challenges were recorded.

Challenges...All the different backgrounds of the kids. She's got a few that are very disruptive, and they're just not getting along well with each other. Her classroom management might be a big one.

Steps...I don't know what she can do. Definitely reflecting, asking other teachers for help. Talking with her principal about it. Maybe attend some workshops. (Student Teacher #06)

When another student teacher began to relate the teaching challenges of the teacher in the case scenario to his own practicum experience, the number of
aspects included in his description of the problem situation and strategy or solutions increased.

Challenges...She tried some different things with the group, like separating them from each other and some real general things. I think her biggest problem was with consequences. She said she would take away their recess but kids don’t care. From my own experience, the way I got kids to listen to me and focus their attention was to take away the fun things that they really cared about. That’s when they really start listening and thinking about their actions.

Steps...put in some real consequences that actually will get them thinking about their actions. Take away their fun things. I had one student in my class who threw an eraser at me and I said that was completely inappropriate because it was unsafe and disrespectful. I knew that if I kept him in at recess, he wouldn’t care. So I said he couldn’t play floor hockey or go to computers when his actions were unsafe or disrespectful. And that really made a difference. Sometimes you have to be the heavy, and I don’t think she was doing enough of that. (Student Teacher #03)

Overall, the patterns of increase in student teachers’ level of problem representation and description of problems posed in the classroom management and individual differences focused case scenarios during the course of the practicum did mirror the corresponding patterns of increase in student teachers’
level of problem representation and description on their own teaching problems as
described in the Reflective Learning Questionnaire. These results indicate a
congruence between student teachers’ levels of representation of hypothetical
teaching problems and their levels of representation of real life teaching problems
specific to the domains of teaching. The faculty advisors’ ratings and
observations, as well as their ratings and the student teachers’ ratings on the
Effective Teaching Rating Scale, provided further information on and insight into
the second aspect of the second research question posed in this study, namely,
how do student teachers translate their problem representations of into action as
perceived by themselves and their faculty advisors?

Faculty Advisors’ Rating Forms and Observations

The faculty advisors’ ratings and observations were designed to provide a
means of triangulation to check on how well student teachers were able to
translate their representations of the problem areas into action during the
practicum experiences. The Faculty Advisor Rating Scales protocols for the first
and second halves of the practicum are shown in Appendices H and I, (pp. 293-
298). Faculty advisors’ ratings were scored along a 7-point Likert scale which
represented a continuum from low (1) to high (7) levels of effective classroom/
behaviour management (see Appendix O, pp. 324-325), for a detailed description
of ratings and observations) or minimal (1) to considerable (7) levels of
accommodation of individual differences (see Appendix P, pp. 326-327), for a detailed description of ratings and observations).

Classroom/Behaviour Management Problem Area

The faculty advisors' ratings and observations were designed to provide a means of triangulation to check on how well student teachers were able to translate their representations of the problem of individual differences into action during the practicum experience. Faculty advisors' ratings were scored along a 7 point Likert scale which represented a continuum from low (ineffective) assigned a value of 1 to high (effective) assigned a value of 7, levels of effective classroom/behaviour management. Table S.17, (p. 348), provides a distribution of the faculty advisors' ratings of student teachers' effectiveness in classroom/behaviour management during the first half or seventh week of the practicum experience.

The majority or over half of student teachers, 6 or 33.3%, were rated as a five and 8 or 44.4% were rated as a six on the Likert Scale scoring just above the mid level 4 of effective management. Typically, such a range of classroom/behaviour management included recognition of at least one index of classroom management and at least one strategy which involved some setting of expectations and consequences to ensure a mid level of effective management.

Table S.18, (p. 349), provides a distribution of the advisors' ratings of student teachers' effectiveness in classroom/behaviour management during the
second half or thirteenth week of the practicum experience. By the second half of the practicum, all of the student teachers except for two were observed to progress beyond the mid level of effective classroom/behaviour management. Over half of the student teachers, 10 or 55.5%, were rated as a seven, the highest level of effective management. At this level, faculty advisors reported that student teachers set clear expectations and utilized a number of strategies to enforce expectations and monitor classroom activities and encourage positive, safe and appropriate student behaviour. Three or 16.6% of student teachers were rated as a five and another three, or 16.6%, of student teachers were rated as a six, indicating that most of the student teachers had progressed into the upper levels of effective management.

**Individual Differences Problem Area**

The faculty advisors' ratings and observations provided a means of triangulation to check on how well student teachers were able to translate their representations of the problem of individual differences into action during the practicum experience. Faculty advisors' ratings were scored along a 7 point Likert scale which represented a continuum from low (1) to high (7) levels of accommodation of individual differences. Table S.19, (p. 350), provides a distribution of the advisors' ratings of how well student teachers accommodated individual differences during the first half or seventh week of the practicum experience.
Six or 33.3% of student teachers were rated as a five and 8 or 44.4%, were rated as a six representing levels of accommodation beyond the mid level of 4. Typically, such accommodation of individual differences included recognition of at least one index of individual difference among learners and at least one strategy which involved some individualization of instruction to accommodate individual learner's or subgroups of learners' needs.

Table S.20, (p. 351), provides a distribution of the advisors' ratings of student teachers' accommodation of individual differences during the second half or thirteenth week of the practicum experience. By the second half of the practicum, all student teachers were observed to progress beyond the lowest levels of minimal accommodation of individual differences.

Eight or 44.4%, of the total number of student teachers, were rated as a five and 6 or 33.3%, were rated as a six, both higher levels of accommodation. At this level, faculty advisors reported that individual needs shaped the learning activities and student teachers used monitoring and feedback as a means to identify and meet individual differences among learners.

When faculty advisors' ratings on the problem areas of classroom management and individual differences are compared, it is interesting to note that faculty advisors rated 10 or 55.5% of the total number of student teachers at a level 7 on the classroom/behaviour management rating scale at the second half of the practicum whereas they did not rate any student teachers at a level 7 on the
accommodation of individual differences rating scale at the second half of the practicum.

Figure 5.9, (p. 157), provides a graphic summary of the frequency distributions associated with the shifts in faculty advisors' ratings over the course of the practicum experience for the classroom/behaviour management and individual differences problem areas.

Effective Teaching Rating Scale

The student teachers' and faculty advisors' effective teaching rating scales were designed to provide a means of triangulation to check on how well student teachers were able to translate their representations of the problem areas into action during the practicum experiences. Student teachers and faculty advisors' ratings were scored along a 7 point Likert scale which represented a continuum from high levels of effective teaching (7) to low levels or ineffective teaching (1) (See Appendix L, pp. 319-320), for a copy of the Effective Teaching Rating Scales). Table S.21, (p. 352), provides a total of each of the ratings on the seven point Likert scale by student teachers in self-assessment ratings and Table S.22, (p. 353), provides a total of each of the ratings by the faculty advisors' ratings of student teachers at the seventh and thirteenth weeks of the practicum across student teachers. These tables give an indication of how effective student teachers' teaching was on the 24 items on the Effective Teaching Rating scale.
Figure 5.9

Graphic Summary of the Frequency Distributions of Faculty Advisors’ Ratings
Over the Course of the Practicum in the Problem Areas at Time 2 and Time 3

Note:
Time 2 CM = Faculty Advisor Rating at First Half of the Practicum in the classroom/behaviour management problem area.
Time 3 CM = Faculty Advisor Rating at Second Half of the Practicum in the classroom/behaviour management problem area.
Time 2 ID = Faculty Advisor Rating at First Half of the Practicum in the individual differences problem area.
Time 3 ID = Faculty Advisor Rating at Second Half of the Practicum in the individual differences problem area.
By the end of the practicum, faculty advisors’ ratings of student teachers on the Effective Teaching Rating scale reflected an overall increase in most effective 1, 2, ratings and a corresponding decrease in mid and least effective ratings 3, 4, 5, 6, 7. The difference between student teachers’ ratings of themselves and faculty advisors’ ratings of them decreased by the end of the practicum. Student teachers rated themselves slightly higher than faculty advisors rated them at the seventh week of the practicum.

By the thirteenth week, the margin between student teachers and faculty advisors ratings narrowed considerably, only varying by one to five points. These results suggested that by the end of the practicum, student teachers were able to translate their representations of the problem into action as perceived by themselves and their faculty advisors. The concept maps and accompanying concept map interviews completed by all student teachers presented in the section provided further insight into what those problem representations looked like, and how student teachers constructed those representations as they attempted to put them into action over the course of the practicum.
Research Question Three

An exploration of student teachers’ Concept Maps of Teaching Challenges drawn at the beginning, during, and at the end of their practicum and their accompanying Concept Map Reflective Interview provided the information necessary to investigate the questions of how student teachers construct their representations of real life teaching challenges and how these representations change over the practicum. More specifically,

- What information, thoughts, feelings, and/or actions do student teachers select to formulate their problem representations?
- What concepts or representations are differentiated, integrated, and consolidated to create new concepts or representations?
- How do student teachers select information from their pedagogical knowledge base, repertoire of experiences and actions to formulate representations of the problem?

Concept Maps of Teaching Challenges

In order to explore student teachers’ representations of real life teaching problems, student teachers completed concept maps of their teaching challenges at the beginning, seventh and thirteenth weeks of the practicum to provide a means from which to explore the structures and processes student teachers might have available for representing their teaching challenges and the classroom/behaviour management and individual differences problems in
particular over the course of the thirteen week practicum. Tables S.23, (p. 354), S.24, (p. 355), and S.25, (p. 356), show the summary data for the concept maps over the course of the practicum. A detailed exploration of three student teachers’ concept maps of teaching challenges and their accompanying interviews and levels of problem representation on the Reflective Learning Questionnaire and Case Study Scenarios will follow in a later section. This will provide an understanding of the content of the bubbles or concepts on the concept maps and insight into the growth and development these student teachers experienced as they represented and re-represented their teaching challenges across the practicum.

Table S.23, (p. 354), provides a summary of the minimum, maximum, and total numbers of concept bubbles, links, cross links, and words that student teachers placed on their concept maps over the course of the practicum. Figure 5.10, (p. 161), shows a graphic summary of this concept map data. Patterns shown in Table S.23, (p. 354), are:

- The number of concepts or bubbles, links, and words decreased over the course of the practicum, which may indicate an increased level of coordination and consolidation of concepts represented on the maps over time.
- The increase in the number of cross links between or within superordinate
Figure 5.10

Graphic Summary of the Total Number of Concept Bubbles, Links, Cross Links, and Words on the Concept Maps at Time 1, 2, and 3
concepts and the concepts in subsequent layers (chunk of the concept map) at time 2 may indicate growth in student teachers’ ability to make connections among and between concepts and represent concepts in a more sophisticated, consolidated fashion.

In order to understand the patterns associated with how student teachers represent their teaching challenges, the number of one word concepts, two or more word statements, questions, and exclamations were tallied. Table S.24, (p. 355), provides a summary of the minimum, maximum, and total numbers of the types of concept bubbles that student teachers placed on their concept maps over the course of the practicum. Figure 5.11, (p. 163), provides a graphic summary of the concept map types of bubbles. Patterns reflected in Table S.24, (p. 355), are:

- Number of concepts, statements, and questions decreases over the course of the practicum with the exception of the number of concepts at time 3.
- The pattern of decrease in the number of concepts at time 2 and then a subsequent increase again at time 3 may reflect the same pattern of student teachers’ problem representation on the Reflective Learning Questionnaire when the U-shaped pattern or implementation dip emerged as student teachers reached their maximum teaching load. Alternatively, it might reflect a consolidation or coordination of concepts as student teachers move from one level of representation to another.
Figure 5.11

Graphic Summary of the Concept Map Types of Concept Bubbles

Note:
Exclaim. = Exclamation marks
In order to get a sense of the diversity among student teachers in their use of concepts and layers or levels of thought about a concept and the volume or depths of concepts on their maps, the number of concept bubbles in each layer of student teachers' maps was tallied. Table S.25, (p. 356), provides a summary of the total numbers of the bubbles in each layer of student teachers' concept maps over the course of the practicum. Patterns across concept maps at times 1, 2, 3 reflected in Table S.25, (p. 356), were:

- A general decline in the number of concepts in most of the layers across time 1, 2, 3. This may suggest a pattern of coordination and consolidation of student teachers' representation of their teaching challenges on the concept maps over time.

- Less use of layers 4 and 5 to represent concepts over the course of the practicum.

- In Layer 1, the number of concepts represented across the student teachers' concept map increased from time 1 to time 2, perhaps representative of student teachers' reaching their full teaching load by time 2 and the opportunity for them to encounter more incidents of teaching challenges.

Figure 5.12, (p. 165), provides a graphic summary of the bubbles in each concept map layer. To understand the changing nature of the concept maps across time, the total number of superordinate concepts or concept layer #1 concepts and
Figure 5.12

Graphic Summary of the Concepts in Each Concept Map Layer
the next layer of subordinate concepts of the layers were compared across each
time period. Number of concepts or bubbles, links, and words were tallied to
give an indication of the volume of ideas associated with that superordinate
concept or teaching challenge. Patterns reflected in this summation were:

- For the superordinate concept or categories of management, instructional
  planning and teaching, and student needs, student teachers’ concept maps
  showed more complexity over time as evidenced by a greater number of
  layers of concepts, total number of words and concepts or bubbles
  associated with these areas.

- Also when the actual concepts are examined for content, there are more
  instances of dimensional thought in which there is a balancing of two
  items or an indication of a range or complexity of a concept in these areas
  of teaching challenges.

Such patterns give an indicator of the teaching challenge areas which are laden
with ill structured teaching problems and require more complex problem
representation in order to overcome, think about or come to grips with the
problem. The themes noted in this summation became the starting point for
analysis at the macro level.

At the macro level, large matrices were constructed in a data base that
grouped responses by student for the three time periods. The responses were then
grouped according to emerging categories of themes across time 1, 2, and 3. In
order to summarize the emerging patterns of student teachers’ representation of their teaching challenges over the course of the practicum, category frequency and centrality analyses were conducted.

The frequency of categories on a concept map was determined by the following process. After each item on the concept map had been coded, a subtotal count per student teacher was recorded for each of the categories in order to determine prominence or frequency of the categories on student teachers’ maps at time 1, 2, and 3. Table S.26, (p. 357), provides a summary of the superordinate concept theme categories that student teachers expressed on their concept maps over the course of the practicum. Patterns reflected in Table S.26, (p. 357), were:

- Student teachers represent the problem area classroom management the most often in their superordinate concept or concept layer #1 directly connected to teaching challenges at the centre of their concept maps over the course of the practicum.

- With the exception of instructional planning and student needs, the total number of all the other superordinate concepts increase at time 2 when student teachers’ teaching load is greatest. With the exception of the problem areas of student needs and assessment/evaluation, which actually increase further at time 3, all other problem areas decrease again at time 3.

- These patterns may reflect increasing coordination and consolidation of concepts that contribute to student teachers’ representation of these
problem areas. Perhaps in the area of student needs and assessment/evaluation, they have not yet reached such coordination and consolidation and need more time than is afforded by the student teacher practicum to represent these problem areas in a more complex or integrated fashion.

The centrality of a concept was determined by inspecting the concept layers and links of a map and recording the highest level of entry across all instances of that superordinate concept. Superordinate concepts that were located directly off the prompt “Teaching Challenges” were assigned a concept layer of 1 (highest). Those items referred to subordinate concepts that branched off from concept layer 1 were assigned a concept layer of 2, and item branches from concept layer 2 were identified as level 3, etc. Concept layer 1 items or superordinate concepts were seen as most central to teaching challenges. Tables 5.1, (p. 169), 5.2, (p. 170), and 5.3, (p. 171), show examples of the superordinate concepts that were assigned a concept layer of 1 (highest) and examples of subordinate concepts that were assigned a concept layer of 2 or 3 at each time period during the practicum.

In order to summarize the emerging themes from the teaching challenges concept map data across the practicum, a 2 x 2 matrix that depicted the frequency (how often the superordinate concept was mentioned) and centrality (how central the concept was on the map) of superordinate concepts at time 1, 2, and 3. Table
Table 5.1

Teaching Challenges Superordinate Concepts and Examples of Subordinate Concepts at Time 1

<table>
<thead>
<tr>
<th>Superordinate Concepts</th>
<th>Examples of Subordinate Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Management</td>
<td>Understanding communication, classroom management: making it work, instructions about behaviour, management of certain misbehaving students, line between teacher and friend, freedom and control</td>
</tr>
<tr>
<td>Instructional Planning</td>
<td>Planning, new ideas, lesson plans, curriculum, planning where we are going, lesson objectives met, resources</td>
</tr>
<tr>
<td>Teaching/Instructional Strategies</td>
<td>Variety of teaching strategies, actually teaching pacing of lessons while teaching, creating innovative, creative, interactional, activities for students, multiple intelligences</td>
</tr>
<tr>
<td>Time Management/Organization</td>
<td>Time management, organization, multitask time balance</td>
</tr>
<tr>
<td>Assessment/Evaluation</td>
<td>Assignment and evaluation, marking assessment strategies</td>
</tr>
<tr>
<td>Student Needs</td>
<td>Designing lessons to meet needs of all kids, different levels of learning, student concerns, English as a second language, learning assistance centre, inclusion, understanding school, community, and neighbourhood</td>
</tr>
</tbody>
</table>
Table 5.2

Teaching Challenges Superordinate Concepts and Examples of Subordinate Concepts at Time 2

<table>
<thead>
<tr>
<th>Superordinate Concepts</th>
<th>Examples of Subordinate Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Management</td>
<td>Communication, classroom/ behaviour management, proactive behaviour techniques, expectations,</td>
</tr>
<tr>
<td></td>
<td>4 levels of classroom management, keeping students engaged/on task, proper language, conflict</td>
</tr>
<tr>
<td></td>
<td>resolution, learning environment, having freedom</td>
</tr>
<tr>
<td>Instructional Planning</td>
<td>Planning, lesson planning, lesson plans</td>
</tr>
<tr>
<td>Teaching/Instructional Strategies</td>
<td>Instructional management, instruction, Teaching French language, getting it in instruction,</td>
</tr>
<tr>
<td></td>
<td>knowing what it is to learn</td>
</tr>
<tr>
<td>Time Management/Organization</td>
<td>Time management, organization, pacing, multitask time to do it and time to relax</td>
</tr>
<tr>
<td>Assessment/Evaluation</td>
<td>Marking – soft vs. hard assessment, questions about assessment, self-evaluation, assessment</td>
</tr>
<tr>
<td>Student Needs</td>
<td>My students, meeting all students’ needs, questions about inclusion, questions about individual</td>
</tr>
<tr>
<td></td>
<td>differences, social issues</td>
</tr>
</tbody>
</table>
Table 5.3
Teaching Challenges Superordinate Concepts and Examples of Subordinate Concepts at Time 3

<table>
<thead>
<tr>
<th>Superordinate Concepts</th>
<th>Examples of Subordinate Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Management</td>
<td>Setting up roles for TOCing (Teacher On Call), teacher presence, voice and proximities, reinforcement of consequences, positive reinforcements, language</td>
</tr>
<tr>
<td>Instructional Planning</td>
<td>Planning of lessons, closing off of lesson units started, pacing of lessons and units, materials</td>
</tr>
<tr>
<td>Teaching/ Instructional Strategies</td>
<td>Instructional strategies, implementation of instructional strategies, instruction, curriculum</td>
</tr>
<tr>
<td>Time Management/ Organization</td>
<td>Time, time management, organization, Marking, grading, assessment, evaluation, and reporting, assignment evaluation, report cards, self-evaluation, effective assessment criteria</td>
</tr>
<tr>
<td>Assessment/Evaluation</td>
<td>Social issues, raising all students’ achievement, my students, meeting students’ needs, motivating students, meeting needs of all learning types, social development of students</td>
</tr>
</tbody>
</table>
5.4, (p. 172), provides a summary matrix of the centrality and frequency of superordinate concepts or theme categories at time 1. Classroom management and instructional planning were judged to be the most centrally and most frequently expressed on student teachers’ concept maps at the beginning of the practicum.

Student needs and time management/organization concepts were judged to be central to student teachers’ concept maps, however they were not expressed as frequently in concept layer 1 as classroom management or instructional planning concepts. Teaching/instructional strategies was judged to be low centrality/high frequency because this concept was not expressed in superordinate, concept layer 1 but was frequently expressed in subordinate concept layers 2 to 7. Assessment/evaluation was judged to be represented on student teachers’ concept maps as a low centrality/low frequency concept because this concept did not appear among the superordinate concepts in concept layer 1 and only appeared a total of four times in concept layers 2 – 7 combined.

Table 5.5, (p. 174), provides a summary matrix of the centrality and frequency of superordinate concepts at time 2. Classroom management was still judged to be the most centrally and most frequently expressed on student teachers’ concept maps during the first half of the practicum. Student needs, assessment/evaluation, and teaching/instructional strategies time management/organization concepts were judged to be central to student teachers’ concept m
Table 5.4
Summary Matrix of Centrality and Frequency of Superordinate Concepts at Time 1

<table>
<thead>
<tr>
<th>CENTRALITY</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Assessment/Evaluation</td>
<td>Student Needs</td>
</tr>
<tr>
<td></td>
<td>Time Management/Organization</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Teaching/Instructional Strategies</td>
<td>Classroom Management</td>
</tr>
<tr>
<td></td>
<td>Instructional Planning</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.5

Summary Matrix of Centrality and Frequency of Superordinate Concepts at Time 2

<table>
<thead>
<tr>
<th>CENTRALITY</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FREQUENCY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student Needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Management/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
maps; however they were not expressed as frequently in concept layer 1 as classroom management. Time management/organization and instructional planning were judged to be low centrality/high frequency because these concepts were not expressed by student teachers in the superordinate, concept layer 1 of their maps but were frequently expressed in subordinate concept layers 2 to 7. No concepts were judged to be represented on student teachers' concept maps as a low centrality/low frequency categories at time 2. During the first half of the practicum, all theme concepts were represented on student teachers' maps as either centrally or frequently in their representations of their teaching challenges.

Table 5.6, (p. 176), provides a summary matrix of the centrality and frequency of superordinate concepts at time 3. Classroom management was still the most centrally and most frequently expressed on student teachers' concept maps at the second half of the practicum. Instructional planning also returned to a central position and frequent mention on student teachers' concept maps of teaching challenges at time 3. Student needs, assessment/evaluation, and teaching/instructional strategies concepts were central to student teachers' concept maps; however they were not expressed as frequently in concept layer 1 as classroom management and instructional planning. Student needs, assessment/evaluation, and teaching/instructional strategies concepts proved to be very stable in their position in the high centrality/low frequency quadrant of the
Table 5.6

Summary Matrix of Centrality and Frequency of Superordinate Concepts at Time 3

<table>
<thead>
<tr>
<th>CENTRALITY</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Student Needs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assessment/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evaluation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teaching/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Instructional Strategy</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>Time Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Classroom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Instructional Planning</td>
<td></td>
</tr>
</tbody>
</table>
matrix during the first and second halves of the practicum. Time management/organization was low centrality/high frequency. This category was not expressed by student teachers in the superordinate, concept layer 1 of their maps but was frequently expressed in subordinate concept layers 2 to 7. No categories were represented on student teachers' concept maps as low centrality/low frequency concepts at time 3 as well. During the second half of the practicum, all concepts were represented on student teachers' maps either centrally or frequently in student teachers' representations of their teaching challenges.

An inspection of the superordinate concepts that student teachers represented on their concept maps over the course of the practicum provided an interesting picture of how student teachers' representations of their teaching challenges changed over time. For example, the problem area of classroom management was mentioned most often and remained central to student teachers' concept maps throughout the practicum. The sampling of subordinate concepts of teaching challenges that student teachers represented on their map under the superordinate concept classroom management changed from general concerns such as “line between teacher and friend” to specific components or skills related to classroom management such as: “expectations”, “conflict resolution”, “keeping students engaged, on task”, and “proactive behaviour techniques.” Similar changes occurred in student teachers' representations of the subordinate concepts of assessment and evaluation later in the practicum when they confronted this
challenge at time 2 and at time 3. These findings, taken together with the patterns of student teachers’ descriptions of aspects of the problem areas over the course of the practicum, provide an indication of the integration, consolidation, coordination, and focus that went into building student teachers’ representations of teaching problems.

Emerging superordinate concepts were triangulated with those of the concept map interviews. Sections of the concept maps and corresponding sections in the concept map interviews which included concepts or comments related to the problem areas of classroom/behaviour management and individual differences or related to the levels of problem representation were highlighted and coded across the different time periods. In order to gain a deeper understanding of the themes that emerged from student teachers’ concept maps of teaching challenges, a look at accompanying concept map reflective interviews and their connection to student teachers’ representations of the problem areas of classroom/behaviour management and individual differences is necessary. Three student teachers’ representations of their teaching challenges over the course of the practicum are explored in the next section. These three student teachers, whose names are fictitious, were selected as representative of growth patterns with different starting points in their levels of problem representation during the practicum due to their prototypical response patterns on the Reflective Learning Questionnaire that were coded at the beginning of the practicum at the
sensorimotor, and interrelational stage, or dimensional stages respectively. See Table S.27, (p. 358), for a summary of selected student teachers' levels of problem representation on the Reflective Learning Questionnaire, Case Study Scenarios, as well as Faculty Advisor ratings over the course of the practicum.

The first of the three student teachers' level of problem representation was focused at the interrelational stage and stayed within that realm for the most part across the practicum experience. Student teacher, Jill, (#6), began the practicum with levels of problem representation on the Reflective Learning Questionnaire (RLQ) and the Case Study Scenarios (CS) representative of the sensorimotor, beginning interrelational stages in the problem area of classroom/behaviour management. Only one other student teacher in the sample also had a level of problem representation at the sensorimotor stage, substage 3 at the beginning of the practicum. Jill’s first concept map as shown in Figure 5.13, (p. 180), shows four superordinate concepts linked directly to the main concept of teaching challenges. There are a very limited number of subordinate concepts (minimum of 3 to a maximum of 4) branching off from these concepts. Concepts or bubbles are one or two words consisting of labels. Subordinate concepts under the superordinate areas of classroom management: “focussing in on positive behaviour not negative” and staff/parents: “meeting challenging parents/staff members” suggest the orienting response consistent with Jill’s sensorimotor stage,
Figure 5.13

Graphic Representation of Student Teacher Jill’s Concept Map of Teaching Challenges at the Beginning of the Practicum, Time 1
substage 3 and beginning interrelational stage levels of problem representation indicated in Table S.27, (p. 358).

At time two, seven weeks into the practicum, Jill wrote classroom management into the prompt “Teaching Challenges” bubble on her second map as shown in Figure 5.14, (p. 182). In Jill’s representation of teaching challenges, “organization” and “lesson plans” concept bubbles that stood alone as superordinate concepts were consolidated under the “classroom management” overarching concept. Jill was also able to add a secondary layer of concepts under the concept “lesson plans”. A crosslink, a link between two concepts at the same level, occurs between “time management” and “lesson plans,” suggesting some integration of ideas. Adapting instruction to individual differences among her learners is represented somewhat in the concept bubbles: “good lessons for all students (challenging pathways for all learners)” and “easy entry, challenging pathways, closure” at two different chunks of her map.

By time three, at the end of the practicum, Jill’s third map as shown in Figure 5.15, (p. 183), has three main superordinate bubbles: instructional strategies, assessment/evaluation, and organization. The label classroom management has disappeared from her map. Jill’s concepts are for the most part still only two layers deep; however there are now more statements than one or two word labels that represent more of the ill-structured nature of the teaching challenge than simple one or two word labels. For example: “making a
Figure 5.14

Graphic Representation of Student Teacher Jill's Concept Map of Teaching Challenges at the Seventh Week of the Practicum, Time 2
Figure 5.15

Graphic Representation of Student Teacher Jill's Concept Map of Teaching Challenges at the Thirteenth Week of the Practicum, Time 3
and just rubric for assessing” under “assessment/evaluation” communicates some of the complexity of issues inherent in designing assessment rubrics. They must be fair and just. Jill’s adaptation to individual differences among her learners is represented by the bubble: “having one-on-one time with students”. This representation suggests that mental events in this problem area are focused on action and people characteristic of the interrelational stage of problem representation.

The other two student teachers’ levels of problem representation began at the transition point between interrelational and dimensional substages and were primarily focused at the dimensional stage. These student teachers’ concept maps are representative of the implementation dip or U-shaped pattern over the three time periods. Student teacher, Carole, (#9), started the practicum with levels of problem representation on the Reflective Learning Questionnaire (RLQ) and the Case Study Scenarios (CS) representative of the beginning interrelational stages in the problem area of classroom/behaviour management. The complexity and detail of Carole’s three concept maps were too difficult to illustrate through line drawings or photocopy reduction in a figure. An attempt to do so would have compromised the integrity of her original concept maps.

Carole’s first concept map shows six superordinate concepts linked directly to the main concept of teaching challenges. There are many subordinate concepts (minimum of 3 to a maximum of 7) branching out of from these
concepts. Concepts or bubbles range from representations of one or two words consisting of labels to very detailed statements expressing a range of components to take into account. For example, under the superordinate concept of “assessment”: “giving more meaningful feedback and not relying too much on praise” Carole indicates the need for a balance or tradeoff. Under the superordinate concept of “classroom management”: “being more aware of my students and less in my head while I’m teaching my lesson”, Carole acknowledges the need to go beyond her own teaching agenda to reach her students. The nature of the statements and the occurrence of cross links between ideas in a chunk suggest the ability to represent challenges across a range or along a dimension of the concept in question and to coordinate several aspects at a time that are consistent with Carole’s dimensional stage, substage 1 and 2 levels of problem representation indicated in Table S.27, (p. 358).

At time two, seven weeks into the practicum, the number of superordinate concepts increases to eight from six on map 1 as the superordinate concepts of “self-evaluation” and “faculty advisor” make an appearance. Four of the superordinate concepts: “classroom management”, “instructional strategies”, “student needs”, “professionalism” remain the same but subordinate concepts beneath them become more consolidated into one or two word concepts. Previous superordinate concepts of “planning” and “assessment” merge into ‘learning environment” and “feedback/criteria/assessment” superordinate concepts. A
crosslink occurs between “learning environment” and “student needs” located on the opposite side of her map suggesting integration of ideas. Adapting instruction to individual differences among her learners is limited to one representation in the subordinate concept bubble: “knowing what student can and can’t do”. Her subordinate concept bubble under “student needs” on map one was: “adapt the lesson for more and less advanced students”. This change in the representation of the individual differences problem area suggests the possibility of the “implementation dip” or impact of reality in the first half of the practicum which is also characteristic of her levels of problem representation on the Reflective Learning Questionnaire.

By time three, at the end of the practicum, Carole’s third map has seven main superordinate bubbles. “Instructional strategies” and previous concepts under “planning” are integrated under “lessons”. Faculty advisor superordinate concept is gone from her third map. Carole’s third map is not as busy with crosslinks and number of layers of concepts as her second map. This pattern might be indicative of the general ‘winding down’ of activity at the end of the practicum. Carole’s adaptation to individual differences among her learners represented under the superordinate concept of “student needs” is more complex. The subordinate concept bubbles of: “knowing how to have a constructive discussion with a student who has hurt another’s feelings and acted disrespectfully” and “setting students up for success, for teaching each other”
indicates that she is wrestling with the challenge of taking on a facilitative rather than a directive role.

Student teacher, Kim’s, (#13), levels of problem representation on the Reflective Learning Questionnaire (RLQ) and the Case Study Scenarios (CS) were representative of the dimensional stages in the problem areas of classroom/behaviour management and individual differences. Kim’s first concept map as shown in Figure 5.16, (p. 188), shows five superordinate concepts linked directly to the main concept of teaching challenges. There are many subordinate concepts (minimum of 4 to a maximum of 9) branching off from these concepts. The superordinate concept bubble “classroom management” has the most subordinate concepts represented. Concepts or bubbles range from representations of one or two words consisting of labels to three or four word statements expressing a range of components to take into account. For example, under the superordinate concept of “multiple intelligence”: “encorporating 2-3 at a time”, Kim indicates the need for a range of learning needs. The question raised with regards to textbooks paired with her commentary in her concept map interview suggests the
Figure 5.16

Graphic Representation of Student Teacher Kim’s Concept Map of Teaching Challenges at the Beginning of the Practicum, Time 1
complexity of problem consistent with Carole’s dimensional stage, substage 1 and 2 levels of problem representation indicated in Table S.27, (p. 358).

At time two, seven weeks into the practicum, Kim’s second map, as shown in figure 5.17, (p. 190), shows a decrease in the number of superordinate concepts from five to four. The superordinate concept “classroom management” chunk shrinks from nine subordinate concepts to three. The superordinate concept “multi-task” gains a second subordinate layer which also reflects Kim’s comment in the concept map interview on the intensity of the practicum during the 80% teaching load and “the difficulty of keeping everything on the mental platform at once”. The superordinate concept of “inclusion” from the first map disappears and the subordinate concept bubble: “ESL” (English as a Second Language) is all that remains of the subordinate concepts that represent the problem area of individual differences. “ESL” surfaces on map 2 under the superordinate concept bubble of “instruction”. This new location may also be an attempt at consolidation of ideas as well. A crosslink between superordinate concepts of “friends” and “spouse” labelled “finding the right balance” occurs suggesting coordination of ideas and the notion of balance.

By time three, at the end of the practicum, Kim’s third map as shown in figure 5.18, (p. 181), still has four main superordinate bubbles. Subordinate concepts related to the individual differences problem area “adaptations/
Figure 5.17
Graphic Representation of Student Teacher Kim’s Concept Map of Teaching Challenges at the Seventh Week of the Practicum, Time 2
Figure 5.18

Graphic Representation of Student Teacher Kim’s Concept Map of Teaching Challenges at the Thirteenth Week of the Practicum, Time 3
modifications "learning levels" "enrichment", "ESL", "integration" are now located under the superordinate concept of "instruction". Kim seems to have consolidated and coordinated the ideas of "inclusion" and "multiple intelligences" from map one into an array of concepts that merge her theoretical representation of those concepts on map one: "inclusion" "multiple intelligences" with a practical representation of these concepts on map three: "integration", "adaptations/ modifications", "learning levels". Kim's third map does not have the crosslinks and number of layers characteristic of her representation of concepts on her second map. This pattern might be indicative of the decrease in teaching load and handing over of teaching activity to the sponsor teacher at the end of the practicum and thus fewer opportunities for ill-structured problems to impinge on the senses and require representation.

All of the student teachers' concept maps provided very interesting windows on their growth and development in their ability to represent their own teaching challenges. The next section explores the patterns which emerged on structured concept map interviews over the course of the practicum.

Concept Map Structured Interview

Student teachers' responses to the structured interview questions which accompanied the concept map of teaching challenges provided a means to clarify their representation of their teaching challenges and to capture further the depth of student teachers' thinking associated with their concept map of teaching
challenges. At time two and three, the concept map each student teacher had
drawn previously was returned and student teachers were asked to draw a new
map, modify and/or redraw the old concept map. After student teachers had
drawn their maps, they were interviewed using a structured interview script of the
questions listed in Appendix M, (p. 321-322). Concept maps served as prompts to
elicit student teachers' representations of teaching challenges. Patterns in student
teachers' responses were determined in the same manner as the superordinate
concepts were derived on the concept maps of teaching challenges. The student
teachers' concept interview responses were read and reread multiple times as a
whole by the two independent researchers described in Chapter 4. For each
interview period, large matrices were constructed in a data base that grouped
responses by student for three time periods. The responses were then grouped
according to common ideas or themes across responses. The researchers read,
reread, discussed, and reread the interviews until agreement on common ideas or
themes was reached according to processes outlined by Jones and Vesilind
(1995), Markham, Mintzes, and Jones (1994), Morine-Dershimer (1993), Novak

Student teachers' responses to question one: “Tell me everything you can
about your concept map” and question two: “Were there concepts you weren't
sure where to put?” showed the following observations:
• Responses helped to give life to the words written on the concept map drawing and further clarification as to the nature or aspect of the teaching challenge represented on the concept map.

• Oral output about how they had represented their teaching challenges on the concept map really complemented what they had drawn on their maps.

• When student teachers talked about the concepts they had placed on their maps, their level of problem representation as assessed by the Reflective Learning Questionnaire in the problem areas over the course of the practicum was reflected in how they described those teaching challenges on the concept map. Overlaps between these two data sources were observed.

Question three: “Which aspect of your map are you the most certain of?” yielded the following observations across the practicum of:

• Time 1: Student teachers were most certain of categories of or labels associated with topics such as classroom management and organization.

• Time 2: Student teachers cited classroom management, curriculum, and planning most often. “My students” was mentioned more often by time 2.

• Time 3: The above, plus teaching strategies, pacing, and assessment were indicated. The pattern of listing aspects of the map as categories or labels as if they represented domains of items still exists in student teachers’ responses.
Question four: “Which aspect of your map are you the least certain of?” yielded the observations of:

- **Time 1:** Student teachers’ prototypical responses to this question such as, “Meeting all the students’ needs,” (Student Teacher #14) “not crossing the line of friendship” (Student Teacher #16), “understanding the community and neighbourhood.” (Student Teacher #17), “staying within my own classroom routines that I’ve established” (Student Teacher #10).

- **Time 2:** Focus on the actual teaching, behaviour management, student needs. Statements were longer at time 2. For example: “finding the right balance between teaching and personal life organization” (Student Teacher #13) “figuring out how to help resource kids keep up” (Student Teacher #15)

- **Time 3:** Similar observations as at time 2. Focus was wider and dealt with such topics as extracurricular, staff interactions, parents, professional role. For example: “Being involved in extracurricular activities with so little time available.” (Student Teacher #05) “Working with colleagues and the whole staff aspect and the staff environment in the school” (Student Teacher #10) “Finding time and ways to communicate with the sponsor teacher, my FA” (Student Teacher #18) “Developing my view of myself as a teaching professional” (Student Teacher #01)
This question across the time period yielded some reflections by student teachers which showed the issues they were wrestling with and the complexity of their representations of these issues. Perhaps because the reflections were about areas which they were least certain of and thus still trying to make sense of and construct for themselves into a coordinated whole.

Question five of the interview, “What area of your map represents the greatest teaching challenge for you?” provided further insight into the nature of student teachers' construction of their teaching challenges and verified which problem area provided the student teacher with the most cognitive dissonance. These observations were made about student teachers’ responses to question five over the course of the practicum:

Time 1

- Classroom/behaviour management issues were most often mentioned as reflected in the Concept Map count. For example: “Classroom management. About being in my own head space and just remembering to listen to my students and being aware of my students. I’m too much on task and too much in my head and too much focused on myself and what I’m am doing and not on them.” (Student Teacher #09)
• Instructional planning, curriculum were also widely mentioned key challenges. Example: “Planning and making sure its educationally useful and they are building on the skills that they may have and they are building new skills. Mostly because I’m not sure of that exactly.” (Student Teacher #12) Example: “Curriculum. Get through the curriculum so kids are prepared for the next grade.” (Student Teacher #15)

Time 2

• Student teachers focused on specific aspects or details of classroom management such as proactive behaviour techniques, the learning environment, specific teaching strategies, student needs or concerns.

• Assessment began to emerge as a teaching challenge as student teachers took on a greater teaching load.

Time 3

• More fine tuning or coordinating and consolidating occurred in student teachers’ comments about their teaching challenges.

• Student teachers focused on the link between student needs and need for a variety of teaching strategies to support inclusion of students. Example: “How to accommodate for all students in your class forces me to think about and find other ways to teach to have a stronger impact on everybody” (Student Teacher #15)
• Assessment and report cards were indicated as a teaching challenge more often than in the previous time periods, which is characteristic of this stage of the practicum.
• Student teachers were looking ahead and speculating how they would meet their teaching challenges in a classroom of their own.
• Future plans and life as a professional teacher started to emerge as themes in their thinking when they reflected on their teaching challenges.
• The politics of job action and school sponsor teacher and school teaching staff response to job action impacted student teachers.

The additional concept map interview questions at times two and three provided an opportunity to look more closely at how student teachers represented and re-represented their teaching challenges. Question number six: “Did you change your map from the one you drew last time? Tell me about these changes. Can you tell me more?” provided an opportunity to investigate those changes. These patterns were reflected in student teachers’ responses to question number six:

• Over half of the student teachers indicated a change in their maps and cited new challenges that had emerged as directing that change and how those new challenges had changed their focus.
• Students often alluded to a coordination and consolidation of ideas on their maps. Superordinate concepts remained but more consolidation of concepts at layers 1, 2, 3 occurred. Such a finding would be characteristic of a student teacher’s movement to a higher level of problem representation. Coordination and consolidation of ideas is required in order to move up the trajectory of development. Example: “My map seems to be decreasing in size. A lot of the things are still the same but I would group more things under a single grouping.” (Student Teacher #01)

Questions seven, eight, and nine: “Can you identify where this (these) change(s) came from?” “Was there anything that you read, heard, saw, or did that influenced the changes you made in your map?” “What made you want to change your map?” provided source(s) of change data. Table S.28, (p. 359), shows a summary of the frequency counts for each of the sources of change over the course of the practicum. Student teachers’ responses to the following questions reflected some very interesting patterns.

Question seven: “Can you identify where this (these) change(s) came from?” showed these patterns:

• “Student teaching experiences” was selected the most overall, and was selected most often in Time 2
• The second most often cited source of change was "experiences with students", which grew in influence from Time 2 to Time 3.

• Experiences with sponsor teacher, faculty advisors, other teachers Time 2, declines in Time 3.

• Personal growth and development and future plans selected more often in Time 3.

• University course work cited by only one student teacher as contributing to change.

Question eight: "Was there anything that you read, heard, saw, or did that influenced the changes you made in your map?" reflected these patterns:

• "They had heard from sponsor teacher," "student teacher reflection", and "metacognition" were the most often cited influences of changes made to student maps.

• Observations at the practicum site and experiences with other teachers was the second most often cited influence of change. Growth of influence occurred from time 2 to time 3 due to teaching experiences, experiences with students, and experiences with other teachers. Reflection, metacognition, and personal growth and development declined as influences of change on the third map at time 3.
• Students began to cite resources such as IEPs, books, professional
development opportunities and processes such as trial and error, success,
and greater teaching load as an influence of change in their final maps by
time 3.

Question nine: “What made you want to change your map?” asked at
Time 2 and Time 3 yielded the patterns of:

At Time 2

• Student teachers’ recognition that things that were challenges at the
beginning of the practicum don’t necessarily apply now. These were
things at the beginning that they were unsure about and now they felt
better about them.

• There is some connection between learners’ needs in their practicum class
and student teachers’ changes to their concept map evident among student
teachers’ responses to this question. Responding to student learning needs
is beginning to enter into their teaching challenges. Example: “More of an
assessment of my own teaching strategies and how effective they’ve been.
It’s also made me think that maybe I have to do some more non-
cumulative assessment where I can make checks to see that the kids are
actually understanding what we’re doing. There’s always a time issue
with that. I feel like I’m being kind of pushed to go at a faster speed than I
want to or this is appropriate for a lot of the kids in the class. I think 10 kids out of 30 is enough to warrant some kind of change.”

(Student Teacher #15)

At Time 3

- Student teachers cited a change in focus, personal growth and development. They indicated a recognition that they had different challenges now and different goals by the end of the practicum. Example: “Where I’m seeing my weaknesses now, I’m able to step back and get a clearer picture of what’s going on and pin point out more specifically things than I hadn’t before. Instead of having this broad, huge concept as a challenge, I’m able to pick out the things I do well in, what seems to work and just narrow it down to a few things that I find challenging. I’ve become more self-reflective.” (Student Teacher #18) Example: “I think it is more of a retrospect map now. I can look back and say that these were the main things, this was it, whereas when I first started this map, I had so many questions, I still have tons of questions but they are more directive, more focused.” (Student Teacher #13)

SUMMARY

These data were used to explore and to generate questions about student teachers' representations of real life teaching problems and the ways in which
those representations change during the practicum experience based on the results discussed in this chapter. Further discussion of the results as they apply to the formulation of questions, the evaluation of Case's neo-Piagetian conceptual framework as a theoretical tool, and the implications of these questions and theoretical perspective for research on teacher education, student teacher thinking, reflective practice, and a social constructivist perspective on student teachers’ knowledge growth and thinking will be presented in Chapter Six. In addition, the limitations of the study and directions for further research will be discussed.
CHAPTER VI: DISCUSSION

This study was designed to explore how student teachers represent the teaching problems of classroom/behaviour management and adapting instruction to individual differences among learners and how this ability develops over the course of the practicum experience. The extent to which Case's (1985, 1991) neo-Piagetian theory of intellectual development may provide a theoretical framework for conceptualizing student teachers' representations of these problem areas was also investigated. These questions were formulated from research on teacher education, teachers' thought processes, reflective practice and social constructivism.

The major purposes of the study were to substantiate an application of Case's model of intellectual development to proposed levels of problem representation in student teachers' growth and development in the specific domains of teaching (Newman, 1992, 1993, 1994) and to attempt to bridge some of the gap between student teachers' problem representations in hypothetical teaching dilemmas and their problem representations in the real life practicum teaching experiences. Another purpose was to explore in detail how student teachers represent and re-represent their teaching challenges over the course of the practicum through the use of written and oral output methods. The results and limitations of the study contribute to the implications for and generation of future
research questions on teacher education, student teacher thinking, and reflective practice.

DISCUSSION

Research Question One

The investigation of student teachers' level of problem representation focused on the structures or concepts that student teachers represent, the processes and mechanisms by which student teachers construct representations of teaching problems they encounter that contribute to the development of a central conceptual structure in the domains of teaching, and the existing representations that are differentiated, integrated, and consolidated to create that central conceptual structure.

Student Teachers' Level of Problem Representation

Student teachers' responses to the question: "What aspects of classroom/behaviour management or individual differences are likely to be problematic for your teaching?" at the beginning of the practicum provided a means to explore their representations of the classroom management and individual differences problem areas and answer the research question, how do student teachers represent their real life teaching problems? The hypothesis that student teachers' representations of the problem areas in their own practicum would become more integrated over the course of the practicum experience as would be predicted by Case's (1978) neo-Piagetian theory of intellectual development, was generated.
Results indicate patterns of development consistent with this hypothesis in some ways and inconsistent in other ways.

Results show that at the beginning of the practicum, student teachers think in a variety of ways, not all at the same level or where researchers and teacher educators think or anticipate that they will begin. The variability of student teachers' starting points in the representation of the problem areas is inconsistent with the hierarchical nature of Case's view of intellectual development; however, it is consistent with the interactive fashion in which Case (1991) postulated that change occurs, that is, as mediated by "both biological and cultural/experiential factors" (p. 374). A revision of Case's stage label "sensorimotor" to "self-oriented" would better reflect adult student teachers' initial representations of problem areas.

Half way through the practicum, those student teachers who had begun the practicum at a higher level of development experienced some regression in their problem representations. This pattern of retreating to a previous substage of problem representation when faced with the uncertainties of real teaching situations affected 8 or 44.4% of student teachers in the classroom management problem area and 3 or 16.6% of student teachers in the individual differences problem area. This pattern is consistent with Case's (1991) model of intellectual development because it reflects the "recursive and interactive fashion" (p. 374) in which changes take place at all levels of problem representation. The processes
and mechanisms operative in Case's (1996) "hierarchical learning loop" (p. 21) are reflected in student teachers' coordination and consolidation of their representations of teaching problems as they think about the teaching problems they encounter.

By the end of the practicum, over half of the student teachers showed an increase in their level of problem representation in both problem areas. This finding is consistent with the hypothesis that student teachers' representations of the problem areas in their own practicum would become more integrated over the course of the practicum experience as predicted by Case's (1978) theory. None of the student teachers in the sample was able to represent classroom/behaviour management problems at the vectorial stage of problem representation. Student teachers' problem representation reached a ceiling of representation at the dimensional stage, substage 2. On the surface, these findings seem inconsistent with Case's (1991) model of intellectual development as applied to adult aged student teachers. However, the mechanisms of development postulated by Case (1985) that set limits on the highest level of intellectual operation, (1) operational efficiency and (2) maturation or practice and instruction available in specific problem areas, especially as these problem areas become more culture bound and more abstract, may have impacted student teachers' ability to represent their teaching problems at this level. Perhaps with further support in representation of classroom/behaviour management challenges and inservice in effective behaviour
support systems beyond control and containment, students would be able to represent classroom/behaviour management problems at more complex levels of problem representation.

By the thirteenth week of the practicum, in the classroom/behaviour management problem area, 6 of 8 student teachers whose levels of problem representation retreated a substage recovered, reflecting a U-shaped pattern similar to the pattern Turiel (1969) found in the results he used to support his idea of stage 4.5 "transitions". Turiel asserted that transitional thinking patterns that were not sufficiently solidified would require a retreat to previous schemes to allow for consolidation and coordination before movement to the next stage could occur. In the individual differences problem area, 2 of 3 student teachers whose levels of problem representation retreated a substage recovered. The "implementation dip" phenomenon which occurs when new strategies or innovations are put into practice may also account for the pattern which was reflected in the student teachers' levels of problem representation during the course of the practicum (Fullan & Hargreaves, 1998).

The patterns of findings that emerged in the present study, mirror the patterns of student teachers' levels of problem representation in the domains of teaching described in previous research (Newman, 1992, 1994). These results, taken together with the student teachers' description of the components of problem representation which will be discussed next, provide a rich and detailed picture of
how student teachers’ ability to think about the real teaching problems of
classroom/behaviour management and adapting instruction to individual
differences among learners develops during the practicum.

Student Teachers' Description of Problem Representation

When asked to describe the most difficult problem they had with
classroom/behaviour management and adapting their teaching to individual
differences among learners at the mid point and at the end of the thirteen week
practicum, all of the student teachers' responses reflected the presence of two of
the three components of problem representation. The complexity of student
teachers' descriptions of problem situation and problem strategy components
increased during the practicum from 1 or 3 aspects to 4 or 6. Student teachers'
descriptions of the problem objective component remained unchanged over the
practicum. In fact, in the classroom management problem area, 77.7% of the
student teachers' responses did not include an explicit statement of problem
objective. In the area of individual differences, 44.4% of student teachers’
responses did not include an explicit statement of the problem objective. Over
half of the student teachers were able to describe one aspect or more of the
problem objective in the description of the problem of individual differences.
Forty-four percent of student teachers were able to describe one aspect or more of
the problem objective in the classroom management problem area. These findings
suggest that student teachers may still have difficulty representing the problem

objectives component of a difficult problem even by the second half of the practicum experience.

Student teachers' ability to describe more aspects of the situation and strategy components of problem representation, and their progression beyond a sensorimotor stage, substage 3 level of problem representation to levels of problem representation primarily at the interrelational substage 3 and dimensional substages suggest a growth in their ability to represent the problem areas of classroom/behaviour management and individual differences. These findings are expected, given Case's view of development in which experience plays an important role in the hierarchical integration of cognitive structures. Some evidence of the increasing complexity of student teachers' level and description of problem representation during the practicum indicates the importance of the role of experience and reflection on experience in student teacher development. In addition, this evidence suggests that Case's model with its emphasis on the role of experience, is an appropriate conceptual framework to describe the development of student teachers' ability to represent real life teaching problems.

Case's Neo-Piagetian Perspective as a Conceptual Framework for Thinking About Student Teachers' Representation of Real Life Teaching Problems

One of the purposes of the present study was to investigate whether or not the structures and processes of Case's (1985, 1987, 1991, 1996) neo-Piagetian theory of intellectual development could provide an adequate theoretical means to
describe the development of student teachers' ability to represent real life teaching problems. Case's model provided a rich set of categories to describe the shifts occurring across the levels of student teachers' problem representation during the practicum. The findings are consistent with basic principles of Case's theory and his emphasis on the contribution of environmental factors and experience. The finding that student teachers' initial levels of problem representation ranged from lowest sensorimotor stage, substage 3 to higher vectorial stage, substage 1 levels further supports the use of a perspective that embraces a constructivist approach. Case's theory provides a means of assessing where student teachers are in their representation of real life teaching problems rather than where researchers and teacher educators think or anticipate students "will begin".

The findings of the present study are consistent with findings reported by Newman (1992, 1993, 1994). They are also consistent with the findings reported by Ammon and Hutcheson (1989) in their use of five levels to represent structural stages in the domain of developmental pedagogy. They found that the majority of student teachers attained median levels of pedagogical conception while only a few student teachers achieved higher levels. Although Ammon and Hutcheson (1989) did not specify the structures and processes that account for student teachers' movement from level to level, their findings are compatible with the results of the present study. Such a parallel suggests that Case's neo-Piagetian
perspective may be an appropriate theoretical tool to conceptualize student teachers' representations of real life teaching problems.

As an exploratory step, the present study provided a useful set of categories from which student teachers' levels and complexity of representation of classroom management and individual differences problems could be described. The refinement of these categories, together with the development of an action research intervention to assist student teachers in the representation of real life teaching problems in their teaching practice, represent the next steps in research which uses Case's neo-Piagetian conceptual framework. The present study provides support for a conceptual framework that has the potential to provide a theoretical basis for research in teacher education, teacher thinking, and reflective practice which investigates the process of becoming a teacher.

Research Question Two

Case study scenarios at the beginning and the end of the practicum experience and the triangulation data collected as a result of student teachers' and faculty advisors' responses to the Effective Teaching Rating Scales and the Faculty Advisor Rating Scales, respectively, were used to assess the congruence between student teachers' levels of problem representation of hypothetical teaching problems and their own teaching problems encountered during their practicum experience and student teachers' ability to translate their problem representations into action.
Student teachers’ representations of the teaching problems presented in the case studies reflected more complex levels of problem representation over the course of the practicum. These results mirrored those found in student teachers’ representations of their own teaching problems. However, the growth in student teachers’ levels of representation on the case scenarios was not as great as the growth they showed in their levels of representation of their own teaching problems. Student teachers started at higher levels of problem representation on case scenarios at the beginning of the practicum, possibly because the details of the problem were presented for them and representation required recognition of those aspects rather than actual generation of them. At the end of the practicum, when student teachers were presented with a parallel set of hypothetical case scenarios in the two problem areas, their levels of problem representation did not match their representation of their own teaching problems in degree of complexity. This result may be due to the fact that student teachers lived their own teaching problems and no matter how much reading and reviewing of the case scenario they did, they were unable to construct the case scenario teaching problems to the same degree as they were able to represent their own teaching problems. This finding has implications for the use of case scenarios as a teaching tool in teacher education programs. Case scenarios may be best utilized at the beginning of student teacher programs in principles of teaching courses to introduce student teachers to reflective practice and representation of teaching...
application indicated its effectiveness in helping them to recognize, identify, and
explain teaching standards. As student teachers engage in practicum experiences,
their own teaching problems need to become the focus of reflective practice and
the subject of directed inquiry if student teachers are to be taught how to represent
their teaching challenges in a more complex fashion and construct their
pedagogical knowledge in a meaningful way.

Faculty advisor ratings and observations on how well student teachers
effectively managed classroom and student behaviour and accommodated
individual differences among learners paralleled student teachers' growing
abilities to represent the problems of classroom/management and individual
differences in more complex ways. All student teachers were observed to
progress beyond the lowest levels of ineffective management or minimal
accommodation of individual differences by the second half of the practicum.
Over half of the student teachers demonstrated higher levels of effective
management or considerable accommodation of individual differences by the end
of the practicum.

Effective Teaching Rating Scales completed by faculty advisors and
student teachers also reflected student teachers' growing ability to represent the
problem areas of classroom/behaviour management and individual differences in
increasingly more complex ways. Student teachers' ratings of their own
effectiveness as teachers also reflected this pattern. Faculty advisors' higher level ratings of student teachers on both the Effective Teaching Rating Scales and on the Faculty Advisor Rating Scales underscored the usefulness of the Effective Teaching Rating Scale measure.

Research Question Three

To explore the nature of student teachers' representations of real life teaching problems, the questions of how student teachers construct their representations of real life teaching challenges and how these representations change over the practicum were investigated. Concept Maps of teaching challenges drawn by student teachers at the beginning, seventh, and thirteenth weeks of the practicum and accompanying Concept Map Interview questions which investigated student teachers’ thinking and contructions of their teaching challenges provided a very rich data source to understand the changing nature of student teachers’ representations of teaching challenges over the course of the practicum. Student teachers’ concept maps of teaching challenges and their reflections about their maps in the concept map reflective interview provided testimony to the individual nature of student teachers’ constructions of ill-structured problems over time.

Micro level analysis of the number of superordinate concepts, links, cross links, words, chunks of concepts, and types of concepts indicated the increasing coordination and consolidation of student teachers’ thinking about their teaching
challenges. Change in number and theme of student teachers' teaching challenges over the course of the practicum provided insight into the constant cognitive restructuring and conflicts with existing teaching knowledge with which student teachers wrestled as they encountered ill-structured teaching problems in their teaching practice. The sources of change to which student teachers attributed the change in their maps reflected the present theory–practice gap which plagues our teacher education programs. Change in the majority of student teachers' maps was influenced by actual experiences teaching students during the practicum rather than university course work, professional development opportunities, or resources such as books or internet information. Interventions to support student teachers need to be directly tied to their own teaching challenges in the practicum experience.

Macro level analysis of the themes, patterns, and questions which emerged from summary matrices of the frequency and centrality of the superordinate concepts that student teachers represented on their concept maps across the practicum provided interesting insight into student teachers' representations of their teaching challenges. For example, the problem area of classroom management was mentioned most often and remained central to student teachers' concept maps throughout the practicum. The sampling of subordinate concepts of teaching challenges that student teachers represented on their map under the superordinate concept theme of classroom management changed from general
concerns such as "line between teacher and friend" to specific components or skills related to classroom management such as: "expectations", "conflict resolution", "keeping students engaged, on task", and "proactive behaviour techniques". When and how often student teachers mentioned the superordinate concepts provided interesting information about the challenges they were confronting during the practicum. For example, instructional planning was central to and frequent in student teachers' representations at time 1 but receded in time 2 and time 3. Assessment and evaluation became a central and frequent theme category represented on student teachers' concept maps at time 2 and time 3. These findings, taken together with the patterns of student teachers' descriptions of aspects of the problem areas over the course of the practicum, provide an indication of how student teachers' representations of teaching problems change over the practicum.

A subset of three student teachers' concept maps and accompanying interviews provided an interesting road map of student teachers' very individualized construction of their own journeys as they represented and rerepresented their teaching challenges over the course of the practicum. Snapshots of the structures and processes displayed in their problem representation on the Reflective Learning Questionnaire and Case Studies were captured in the representation of their own teaching challenges on the concept maps.
LIMITATIONS OF THE STUDY

Several methodological issues, including the generalizability of the results, the verbal protocols as a measure of student teacher thinking, and the conclusions that can be drawn from the results require careful consideration. The present study was exploratory only. Its intention was to generate questions based on the development of a framework for student teacher thinking which combines several research traditions. Case's model of intellectual development was but one way to look at the data generated from this exploratory study. The participants in the present study consisted of a total of eighteen student teachers completing the final thirteen week practicum of the two year teacher education program and six faculty advisors. Participants were not randomly selected; therefore, generalizations to other student teachers and to other teacher education programs must be considered with caution. Because participants volunteered to participate only those student teachers who felt they had the time to contribute to the study and felt sufficiently comfortable and competent with scrutiny by an outside observer may have elected to participate. Therefore, it is possible that participants had a higher level of skill, competency, confidence, time management and organizational abilities than other student teachers even at the outset of the study. Although the number of participants in the study was adequate for the exploratory nature of the study, the number of student teachers within each substage of the levels of problem representation varied. For both problem representation areas of classroom/
behaviour management and individual differences, only two student teachers were rated at the sensorimotor level of problem representation. Similarly, only three student teachers were rated at the vectorial level of problem representation. Therefore, the effect of student teachers' experience over the course of the practicum on level of problem representation should be interpreted with caution.

The contextual features of international and provincial events during the time frame, September 2001 to November 2001 may have impacted the results as well. The bombing of the World Trade Centre in New York and the Pentagon in Washington, D.C., on September 11, 2001 may have demanded of student teachers a response to student questions and emotions that took them beyond their own instruction to consider individual needs in their students. Job action by sponsor teachers in the province of British Columbia which commenced during the last week of October 2001 and continued for the remainder of the practicum (approximately five weeks) may have impacted the results due to the politics at school sites and a focus on instructional tasks only. As a result, student teachers' participation in extra curricular activities, recess supervision, parent meetings, and report card preparation came to an end. Faculty advisors had student teachers do practice report cards for a sample of their students but they did not complete or contribute to a report card for each of the students they taught during the practicum, thus minimizing, for example, the opportunity to represent the final
stages of the challenge of assessment, evaluation, and reporting on student learning.

The use of questionnaires to stimulate student teachers' thinking about the nature of real life teaching problems in the areas of classroom/behaviour management and adaption of their teaching to individual differences among learners gives rise to several methodological concerns. The Reflective Learning Questionnaire — the three sets of two questions asked at the beginning, and at the first and last halves of the practicum experience — represented a way of stimulating thought processes associated with the representation of the problem areas and provided opportunities for student teachers to reveal their own thinking about this real life teaching problem. Anomalies in the student teachers' responses may be due to the time pressures experienced over the course of the practicum experience. At the beginning of the practicum, student teachers gave well articulated, lengthy responses to the questions asked of them. At the sixth and seventh weeks of the practicum, responses ranged from a few words to a few sentences to paragraphs. By the twelfth and thirteenth weeks, responses increased in length to a couple of sentences to detailed paragraphs. The amount of time spent on the questionnaires may account in part for the U-shaped pattern of response described above. Although the use of questionnaires does not achieve the quality of responses and explanations that are elicited in a clinical interview,
factors such as cost, time, economy of administration and the exploratory nature of the study influenced the method employed.

The opportunity for the interviewer to elicit continuous responses in real time from each student teacher would help to determine how the student teacher is interpreting the question posed as well as how he/she is thinking about the task. In this situation, the interviewer is able to ask as many questions as deemed necessary in order to elicit the student teacher's representation of the problem.

Although the methodology of the present study used triangulation in a blend of process tracing and ethnographic methods of inquiry, anomalies in the faculty advisors' ratings and the observations they gave on how well student teachers accommodated individual differences among learners in their instruction were apparent. For example, some faculty advisors rated student teachers as a 6 or 7 (maximum effectiveness or considerable accommodation) on the 7 point Likert scale, while citing examples of effectiveness or accommodation which reflected only moderate effectiveness and/or accommodation and median level of problem representation. This finding indicates a need to examine consistency of evaluation across faculty advisors and develop a systematized means to avoid problems such as grade inflation in assessment and evaluation of the student teachers' practicum experiences. A more comprehensive method to assess the faculty advisor's definition of classroom/behaviour management and individual differences and the aspects of these which they deem to be problematic for
teaching in the form of an interview, concept map or further questions may have shed some light on these anomalies. The extent to which student teachers reflect on their own construction of the teaching problems of classroom/behaviour management and adapting instruction to individual differences, formulates their own strategies for dealing with the problem based on their representations, and then uses these representations in the classroom setting could be established more effectively through classroom observation which employs observers versed in Case's neo-Piagetian conceptual framework.

In the present study, the suggestion is that student teachers who have a higher level of problem representation and a more detailed description of the problem may have available the thought processes and pedagogical knowledge for organizing and reflecting-in-action on their own problem representations of teaching challenges within the practice setting. The extent to which student teachers reflect on their "knowledge-in-action" may depend on the representations they have available to them. Evidence for this may best be established through weekly interviews with student teachers during the course of the practicum, augmented by careful classroom observation. In addition, the design and implementation of action research intervention during the practicum to support student teachers' representation of their own teaching challenges may support student teachers' in their problem representation growth and development.
Despite these limitations, several implications and questions for future research of student teachers' thought processes emerged from the findings.

IMPLICATIONS FOR RESEARCH ON TEACHING

Studies of teachers' thought processes have focused on identification, frequency counts, and antecedents of teachers' interactive thoughts (see Clark & Peterson, 1986 for a review). Such a narrow focus of research has yielded little about how teachers actually make interactive decisions or how they begin to construct and reconstruct more adequate conceptions of pedagogical knowledge. What these researchers neglect to consider are the implications of a developmental perspective for studies of teacher thinking. Within a constructivist framework of growth in knowledge, researchers have the opportunity to examine how student teachers think about teaching and learning. Student teachers' own experiences and actions, and the cognitive developmental processes which may be associated with their ability to think about teaching from a developmental perspective, may provide researchers with insight into student teachers' own "reflection-in-action". The use of a neo-Piagetian conceptual framework may provide a rich theoretical tool for further research on teacher thinking and for the development of teacher education programs for student teachers.

If researchers begin to study the student teacher's representations of real life teaching problems from a theoretical perspective which can yield a fine-grained analysis of the underlying structures and processes available to student
teachers as they construct their own representations of the problems they confront in the classroom, then they may begin to understand "how" and "why" student teachers develop the ability to teach. If researchers ask questions about the student teacher's own level of problem representation, then their capacity to match teacher education curriculum to the needs of the student teachers may be enhanced. If they begin to observe student teachers in the act of teaching, then they may be in a better position to describe the growth of problem representation, pedagogical knowledge, and reflection-in-action which occurs as student teachers engage in the teaching process. They may also be in a better position to address the theory/practice dichotomy that Barrow (1990) and Willinsky (2001) have used to characterize some aspects of the curricula of our present teacher education programs. In this view, teacher education will have the capacity to begin where the student teacher is rather than where researchers and teacher educators anticipate the student teacher "to be". What the present study offers the researcher and teacher educator is a developmental perspective and a conceptual framework for identifying the underlying structures and processes that characterize student teachers' level and complexity of problem representation when they are faced with real life classroom problems which may be defined as ill-defined problems. Further research can reveal whether it is possible to influence the development of student teachers' levels of problem representation and ultimately promote growth. A goal that arises from this study is to assist
student teachers in moving beyond superficial coping strategies toward a more comprehensive representation of teaching challenges.

**DIRECTIONS FOR FURTHER RESEARCH**

The intent of the present study was to generate questions based on an exploration of the ways in which student teachers represent the problem areas of classroom/behaviour management and adapting instruction to individual differences among learners and the ways in which their representations change over the course of the practicum. As a result of the findings, several questions were generated to stimulate further research on student teachers' representations of real life teaching problems from a neo-Piagetian perspective.

1. To what extent do the level and complexity of student teachers' problem representations predict success in dealing with the uncertainties of the classroom?

2. To what extent would an action research intervention designed to stimulate and support the development of student teachers' level of problem representation of their own teaching challenges help student teachers to develop a more sophisticated level of problem representation and problem description? In the context of such a study with a small number of participants, the questions could be posed:
   - What sorts of problems and tasks in the domains of teaching can be
modeled using Case's neo-Piagetian conceptual framework?

- Can both conceptual and procedural aspects of the complex task of teaching be modeled by Case's neo-Piagetian conceptual framework?

- To what extent is a central conceptual structure a necessary prerequisite for success in the process of learning how to teach?

- To what extent can student teachers be helped to bridge the gap between their present level of problem representation and the next level at the beginning, during, and after the practicum when they begin their first year of teaching experience?

- Is the vectorial stage of problem representation obtained by the majority of student teachers only if special provision is made for experience which allows for that level of hierarchical integration?

3. What does the growth trajectory for student teachers’ level of problem representation and description of teaching problems look like during their first years of teaching as teachers-on-call, or as teachers with their own class?
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APPENDIX A: Models of Reflection

Griffiths and Tann (1992)—Five Levels of Reflection
(a) Reflection in action: likely to be personal and private.

1. Act-react (Rapid Action)
   • Reaction is immediate, that is, child is behaving well, a teacher may automatically give praise, while another teacher may equally automatically not.
   • The teaching action is immediate and routine, but not all teachers have same immediate and automatic reaction.

2. React-monitor-react/rework-plan-act (Repair)
   • Although there is a pause for thought, it is "on the spot" and very quick.
   • Untrained observer will miss it.
   • For example, teacher may see children have unexpected reaction to work and adjust lesson or abandon it, or see that a child has unexpected interest in work and make decision to allow child to pursue it rather than carry on with normal work.

(b) Reflection-on-action: Likely to be interpersonal and collegial.

3. Act-observe-analyze-and evaluate-plan-act (Review)
   • Thought and reflection are going on after the actions are completed.
   • May happen at any time during the normal working day, after school, end of the day or end of the week.
   • Teacher will muse over or talk about the progress of particular group or child. May be a result of memory or making work.
   • As a result existing plans for teaching and learning may be modified.
   • Teacher may reassess how a child is to be managed or think again about group relations in the class.

   • Observation becomes systematic and sharply focused.
• Process of collecting information, analysing it, and evaluating it may be a matter of weeks or months.
• Tick sheets, video or diary may be used to collect information on a particular issue.
• Teacher will then reflect carefully on the reasons for the way the issue has arisen in the way it has, and also on the information collecting itself (its validity and reliability).

5. Act-observe systematically-analyze rigorously-evaluate-retheorize-plan-act. (Re theorizing and reformulating)
• Level of abstract, rigorous reflection which is formulated and reformulated over a matter of months or years.
• In the process the teachers' own theories will become changed and it is possible that accepted theories will be challenged.
• This level cannot occur unless the teacher is reading theory critically.

Ross (1989b)--Stages in the Development of Reflective Judgment

The Individual:
Stages 1 and 2
• Views world as simple.
• Believes knowledge to be absolute.
• Views authorities as the source of all knowledge.

Stage 3
• Acknowledges existence of differences of viewpoints.
• Believes knowledge to be relative.
• Sees varying positions about issues as equally right or equally wrong.
• Uses unsupported personal belief as frequently as "hard" evidence in making decisions.
• Views truth as "knowable" but not yet known.

Stage 4
• Perceives legitimate differences of viewpoint.
• Develops a beginning ability to interpret evidence.
• Uses unsupported personal belief and evidence in making decisions but is beginning to be able to differentiate between them.
• Believes that knowledge is uncertain in some areas.

Stages 5 and 6
• Views knowledge as contextually based.
• Develops views that an integrated perspective can be evaluated as more or less likely to be true.
• Develops initial ability to integrate evidence into a coherent point of view.

Stage 7
• Exhibits all characteristics listed in stages 5 and 6.
• Possesses ability to make objective judgments based on reasoning and evidence.
• Is able to modify judgements based on new evidence if necessary.

Smyth (1989) Four Stages of Reflection

Four forms of action teachers can undertake to reflect on their work and change the conditions of teaching to promote less oppressive, more just, humane, and dignified society

• Describing: Teachers ask: What do I do? Thy try to answer by writing a narrative of the events of teaching.
• Informing: Teachers ask: What does this mean? What are the pedagogical principles behind what I do? Here teachers may codify their explanations alone or with other teachers.
• Confronting: Teachers ask: How did I come to be like this? They subject the principles or theories developed in the informing stage to an investigation of their sources, situating the theories in the larger social, cultural, and political contexts. They ask: What are my assumptions, values, and beliefs about teaching? Where did these ideas come from? What causes me to maintain this theory? Whose interests seem to be served by my practice?
- Reconstructing: Teachers ask and answer: How might I do things differently? The question follows from the assumption that the confronting stage will result in the teachers' modifying or reconceptualizing their theoretical stances or in aligning the social, cultural, and political contexts in which they function.

Sparks-Langer et. al. (1989)--Framework of Reflective Thinking

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>No descriptive language. (no description provided).</td>
</tr>
<tr>
<td>2.</td>
<td>Simple layperson description of the instructional event. For example, she used groups.</td>
</tr>
<tr>
<td>3.</td>
<td>Events labelled with appropriate terms. For example, she used cooperative groups.</td>
</tr>
<tr>
<td>4.</td>
<td>Explanation with tradition or personal preference given as the rationale. For example, we always use reading groups.</td>
</tr>
<tr>
<td>5.</td>
<td>Explanation with principle or theory given as rationale. For example, interdependence in group work helps build desire to help others learn: this sink or swim feeling keeps students committed to their own learning and that of their peers.</td>
</tr>
<tr>
<td>6.</td>
<td>Explanation with principle/theory and consideration of context factors, student characteristics, subject matter, or community factors. For example, in this class, students' social groups are generally formed along economic lines. Cooperative learning is especially useful in such situations because it provides repeated positive experiences with children from different backgrounds.</td>
</tr>
</tbody>
</table>
7. Explanation with consideration of ethical, moral, political issues. For example, cooperative learning is being used here because there is a split along economic lines in this community and we want students to accept and value each other in spite of these differences. Such values may contribute in the long run to saving this planet.

Van Manen (1977) Levels of Reflection

Technical
- Focuses on practical concerns, based on a technical application of educational knowledge, primarily the means to achieve goals over consideration of the end result.

Practical
- Focuses on analysis and clarification of multiple aspects of experiences, making decisions based on curricular components.

Critical
- Focuses on the political and ethical meanings to actions, requiring a critique of the power structure and social institutions.

Zeichner and Liston (1987) Three Levels of Reflection

1. Technical
- Emphasis on the efficient application of professional knowledge to given ends.
- Goals and objectives are not a subject for scrutiny, nor are long range consequences.
- Teachers and prospective teachers need to learn to reflect upon the effectiveness of their teaching strategies. Have the learners achieved the given set of objectives?

2. Teaching is placed within its situational and institutional contexts.
- Teachers are expected to be able to reflect upon why certain choices of practice are made.
- How are these choices constrained and influenced by institutional, social, and historical factors?
What hidden curricula may be embedded in their practices, in the norms of the institution?

This level of reflection goes beyond questions of proficiency at achieving particular ends towards a thoughtful examination of how contexts influence teaching and learning, and a consideration of the worth of competing educational goals.

3. Moral Ethical Issues
- Thinking about teaching and learning is guided by concerns for justice and equity.
- Teachers must become "transformative intellectuals' who are capable of examining the ways in which schooling generally, and one's own teaching specifically, contribute to or fail to contribute to a just and humane society.
- In reflection, teachers would be able to transcend everyday experience, to imagine things as they ought to be, not simply accept things as they are.
- Such images should shape the teacher's practice and their thinking about their practice.
APPENDIX B: Description of Levels and Codes of Problem Representation: Classroom/Behaviour Management Problem Area

Focus: How student teachers represent the problem of managing the classroom environment and student behaviour to maximize learning outcomes, how they represent this problem, and how they pose this problem rather than the solution they offer to their most difficult problem encountered though the relation of a problem to a solution is also of importance.

Note: Substages are characterized by the number of mental elements of a particular sort which can be represented simultaneously.

$0 = \text{Sensorimotor Substage 3}$

Precursory Unit:

Sensory orienting response:
- Student teacher has ability to notice class' reaction to her instruction while she instructs the class.
- Student teacher does not pick up on cues of impending discipline problems.

\textbf{Interrelational Stage 2nd Order Relations}

Mental elements are objects, people, actions

$1 = \text{Substage 1 A – B Whole class – Individual of learners learner}$

Student teacher focuses on:
- Discipline aspect of classroom management
- Class or learners' reactions to her instruction or individual learner's reactions to her instruction.
  Example: Gaining the students' attention.
- Discipline problems may be identified with labels but are not described in any detail.
- If solution is offered, it is reactionary rather than preventative and is directed at the whole class or the "trouble-maker" child and does not get at the cause of the problem.
• Example: "A student swore at me, so I gave her a detention, for which she refused to stay."

2 = Substage 2 A1-B1 Whole class - Individual learner
   A2-B2 Effect of discipline problem on other learners
Student teacher focuses on:
• Discipline aspect of classroom management.
• Class of learners' reaction to her instruction while noticing one specific instance of an effect of a discipline problem in an individual learner's response to her instruction.
• If solution is offered, it is reactionary rather than preventative and it is directed at either the whole class of learners or at one learner.
• Example: "Students speaking out or talking while one or another student is speaking. This disturbs other students. I called their attention to this."

3 = Substage 3 A1-B1 Whole class - Individual learner
   A2-B2 Variable of one discipline problem
Student teacher focuses on:
• Discipline aspect of classroom management though some attempt is made to communicate expectations.
• Class' reactions to her instruction while noticing and identifying one discipline problem in an individual or small group of individuals.
• Reactionary, simplistic solution is offered which attempts to address the discipline problem by following through on communicated expectations but is directed at the class of learners as a whole.
• Example: "Behavioral problems while teaching lessons, constantly it has been the same group of boys who are off task both at their desks and at the carpet. Setting rules and expectations for off task behavior has reduced the number of interruptions during lessons."

**Dimensional Stage 3rd Order Relations**
Mental elements are categories of relations or dimensions

Student teacher is able to represent the problem/aspect of classroom management along a dimension of a given variable. There is a recognition of the complexity of the problem and a notion of balance or tradeoff between student needs and student teacher's instruction.
4 = Substage 1 A - B Index - Degrees of Classroom Management Problems

Student Teacher focuses on:
- One index of classroom management.
- Degrees of the classroom management problem are identified.
- Effect of management problem and its cause are noted.
- A preventative rather than reactionary solution is offered but it may be too simplistic or too general to get at the root of the problem and sufficiently meet the needs of the class or a subgroup of learners who precipitated the problem.
- Example: I don't feel I have had any serious problems but I have spent a great deal of time establishing guidelines and routines for students so instruction and transitions move smoothly. I have created posters in the classroom with four guidelines, a list of enrichment activities to do when they have finished seatwork.

5 = Substage 2 A1-B1 Index - Degrees of Classroom Management Problems
A2-B2 Whole Class - Individual Learner

Student Teacher focuses on:
- One index of classroom management.
- Degree, effect, and cause of the classroom management problem are identified.
- Complexity of the problem is acknowledged.
- Notion of balance between individual or class needs and student teacher's instruction; need to manage the class is indicated but not elaborated on.
- Solution stated is preventative, may be embedded in the context of instruction and is designed to meet whole classroom needs or subgroup of learners or individual learner needs but not these needs in combination.
- Goal may be stated but not integrated into instruction or solution.
- Example: "Dealing with split grades. How to juggle both grades which are doing two completely different curricular items and how to ensure that one grade will stay on-task while I am teaching the other grade. I tried silent reading with one group while I instructed the other group. Before moving to the other grade, I take a few minutes to ensure the
other grade is on-task. A few minutes saves me later so I don't have to interrupt my other grade to tell the first grade to stay on task."

6 = Substage 3 A1-B1 Index - Degrees of Classroom Management. Problems
A2-B2 Whole Class - Individual Learner
Student teacher focuses on:
• Detailed description of the index of classroom management problem.
• Degrees of classroom management problem, its effect and cause are indicated.
• Complexity of the problem is acknowledged.
• Notion of balance between learner needs and student teacher's instruction is described.
• Solution described is preventative, embedded in the context of instruction, and designed to meet both individual learner needs and whole class or subgroup of learners' needs.
• Goal to be achieved is integrated into the solution
• Example: "I have not had any real problems but I find consistency and appearing fair to all students is a challenge. Flexibility, variety, and communication in instructional activities as well as in ways of handling each student according to their individual needs are the keys in dealing with the number of problems I am faced with in any given lesson. I am developing my ability to be in all places at once too."

Vectorial or Abstract Dimensional Stage 4th Order Relations
Mental elements are second order categories

7 = Substage 1 A - B Student Teachers' - Classroom Management
Instruction Problem
Student teacher focuses on:
• One index of classroom management problem.
• Degrees, effect, and cause of classroom management problem are identified.
• Complexity of the problem is acknowledged.
• Notion of balance between learner needs and student teacher's instruction and needs of whole class are described.
• Solution involves adjustments in student teacher's actions, beliefs and expectations to meet individual learner's actions, beliefs, and expectations in an interactive way (one affects the other).
Example: "It will be hard when students' classroom behavior stems from their "home" environment. I think this may be difficult because when outside factors come into play in children's minds it is very hard to determine what the appropriate solution will be. I will have to take into account each child's personal experience and adjust my expectations and actions accordingly."

8 = Substage 2 A1-B1 Student Teachers' Instruction –
2 or more Classroom Management Problems
A2-B2 Student Teacher's Monitoring - Individual Feedback

Student teacher focuses on:
- Two or more indices of classroom management problems.
- Degree, effect, and cause of classroom management problems are identified.
- Complexity of problem is acknowledged.
- Notion of balance between learners' individual differences and whole group's needs or student teacher's instruction is described.
- Solution involves adjustments on student teacher's part to meet individual learner needs. Solution features monitoring learner's actions, assessing their reactions and taking learner's feedback into account during solution phase to the problem.
- Example: None present in the data set.

9 = Substage 3 A1-B1 Student Teachers' Instruction - 2 or CM Problems
A2-B2 Student Teachers' Monitoring - Individual Feedback

Student teacher focuses on:
- Two or more indices of classroom management.
- Degrees, effect, and cause of classroom management problem are identified.
- Complexity of problem is acknowledged.
- Notion of balance between individual difference of learner and whole class needs or student teacher's instruction is described.
- Solution involves adjustments in both student teacher's actions, beliefs and expectations and individual learner's actions, beliefs and expectations in an interactive way.
- Solution proceeds in an integrated fashion involving adjustments on both student teacher and learner's parts to meet individual differences of the learner.
- Student teacher is able to view the classroom management problem from the learner's point of view.
- Acknowledgement that there is no systematic, effective, single, identifiable solution but rather multiple solutions ordered across time.
- Example: None present in the data set.
APPENDIX C: Description of Levels and Codes of Problem Representation of Individual Differences Problem Area

Levels of Student Teachers' Representation of the Problem of Adapting Instruction to Individual Differences Among Learners

Focus: How student teachers represent the problem of adapting their instruction to individual differences among learners, how they represent this problem, and how they pose this problem rather than the solution they offer to their most difficult problem encountered though the relation of a problem to a solution is also of importance.

Substages are a function of the number of mental elements of a particular sort which can be represented simultaneously.

Sensorimotor Substage 3 Precursory Unit:
Sensory orienting response:
- Student teacher has ability to notice class' reaction to her instruction while she instructs the class.
- Student teacher does not notice individual differences among learners.

Interrelational Stage 2nd Order Relations
Mental elements are objects, people, actions

1 = Substage 1 A – B Whole Class - Individual of Learners Learner

Student teacher focuses on:
- Class or learners' reactions to her instruction or individual learner's reactions to her instruction.
- If student teacher's attention is focused on the individual learner, only the effect of the individual difference in that learner is noted.
- Individual differences among learners are not identified or described.
• If solution is offered, it is directed at the whole class and does not address individual differences among learners.
• Example: “The slower students need extra help and it is imperative that they get it. I would offer help at lunch or after school.”

2 = Substage 2 A1-B1 Whole class - Individual Learner
   A2-B2 Effect of Individual Difference of Learner

Student teacher focuses on:
• Class of learners' reaction to her instruction while noticing one specific instance of an effect of an individual difference in an individual learner's response to her instruction.
• If solution is offered, it is a simplistic or global solution directed at either the whole class of learners or at the specific instance of an individual difference in one learner.
• Example: “I’m noticing only one problem and that is with a boy who seems to be challenging me. He continues to shout at inappropriate answers and I continually move him to the back.”

3 = Substage 3 A1-B1 Whole class - Individual Learner
   A2-B2 Variable of 1 Individual Difference

Student teacher focuses on:
• Class' reactions to her instruction while noticing and identifying one individual difference in an individual learner's response to her instruction.
• Simplistic solution is offered which attempts to address the individual difference of an identified learner while considering the class of learners as a whole.
• Example: “behavioural problems...While teaching lessons, constantly it has been the same group of individuals who are off task. Setting rules and expectations for off task behaviour has reduced the number of interruptions during lessons.”

**Dimensional Stage 3rd Order Relations**
Mental elements are categories of relations or dimensions

Student teacher is able to represent the problem/aspect of individual differences along a dimension of a given variable.
There is a recognition of the complexity of the problem and a notion of balance or tradeoff between student needs and student teacher's instruction.

4 = Substage 1 A - B Index - Range of Individual Difference

Student Teacher focuses on:
- One index of individual learner difference.
- Range of the individual difference is identified.
- Effect of individual difference in one learner and cause of individual difference is noted.
- Solution is offered but it may be a simplistic or general solution that meets the needs of the class or a subgroup of learners but is not tailored to the actual individual difference identified among learners.
- Example: “Some are more willing to try new ideas and challenges while others are afraid of being wrong. It is important to reassure the students and offer encouragement and reinforcement. They need to be encouraged as much as possible since most of them suffer from low self-esteem to begin with.”

5 = Substage 2 A1-B1 Index - Range of Individual Difference

A2-B2 Whole Class - Individual Learner

Student Teacher focuses on:
- One index of individual learner difference.
- Range of the individual difference is identified.
- Complexity of the problem is acknowledged.
- Notion of balance between individual or class needs and student teacher's instruction is indicated but not elaborated on.
- Solution stated is a general solution or standard to be achieved. It is designed to meet whole classroom needs or subgroup of learners not individual difference identified in a learner.
- Goal may be stated but not integrated into instruction or solution.
- Example: “They are all at various writing stages. Some may write complete sentences while some are not even sure what a sentence is. Those requiring extra help I let the ‘better’ sentence writers partner up and help. I also circulated to help.”
6 = Substage 3A1-B1 Index - Range of Individual Difference
   A2-B2 Whole Class - Individual Learner

Student teacher focuses on:
• Detailed description of the index of individual difference.
• Range of individual difference is indicated.
• Complexity of the problem is acknowledged.
• Notion of balance between individual learner needs and student teacher's instruction is described.
• Solution described is designed to meet individual difference in learner rather than just the whole class or subgroup of learners needs.
• Goal to be achieved is integrated into the solution.
• Example: “The various skill levels of the students at grasping and understanding new concepts, such as how to use “scale of distance”, was something that I constantly had to deal with. The only way I dealt with the high to low skill levels was to reteach the whole group at times, provide very simplistic steps as to how to apply the concept, and monitor and individualize instruction for those having difficulty.”

Vectorial or Abstract Dimensional Stage 4th Order Relations
Mental elements are fourth order categories

7 = Substage 1A – B
Student Teachers’ Instruction - Individual Learner Difference

Student teacher focuses on:
• One index of individual difference among learners.
• Range of individual difference is identified.
• Complexity of the problem is acknowledged.
• Notion of balance between learner needs and student teacher's instruction and needs of whole class are described.
• Solution involves adjustments in student teacher's actions, beliefs and expectations to meet individual learner's actions, beliefs, and expectations in an interactive way (one affects the other).
Example: “The different levels within the groups of students within creative writing. It is not the same problem with students in their writing. It is either punctuation, spelling, captials or omissions. That makes it hard for me as a student teacher to handle all these different concerns and problems with a class of 30 different individuals. I find that when the students are doing creative writing, I talk to each individual or group of individuals who are having problems with the same element of writing. By giving each individual a thing to look at and to be aware of in their own writing.”

8 = Substage 2 A1-B1 Student Teachers' Instruction –
   2 or more Individual Learner Differences
   A2-B2 Student Teachers' Monitoring –
   Individual Feedback

Student teacher focuses on:

- Two or more indices of individual differences.
- Range of individual differences are identified.
- Complexity of problem is acknowledged.
- Notion of balance between learners' individual differences and whole group's needs or student teacher's instruction is described.
- Solution involves adjustments on student teacher's part to meet individual learner needs.
- Solution features monitoring learner's actions, assessing their reactions and taking learner's feedback into account during solution phase to the problem.
- Example:

9 = Substage 3 A1-B1 Student Teachers' Instruction –
   2 or more Individual Learner Differences
   A2-B2 Student Teacher's Monitoring –
   Individual Feedback

Student teacher focuses on:

- Two or more indices of individual differences.
- Range of individual difference is identified.
- Complexity of problem is acknowledged.
Notion of balance between individual differences of learner and whole class needs or student teacher's instruction is described.

Solution involves adjustments in both student teacher's actions, beliefs, and expectations and individual learner's actions, beliefs and expectations in an interactive way.

Solution proceeds in an integrated fashion involving adjustments on both student teacher and learner's parts to meet individual differences of the learner.

Student teacher is able to view the individual difference from the learner's point of view.

Acknowledgement that there is no systematic, effective, single, identifiable solution but rather multiple solutions ordered across time.
APPENDIX D: Description of the Sample

Grades Taught During the Practicum Experience

<table>
<thead>
<tr>
<th>Grade Level</th>
<th>No. of Student Teachers who had this Grade Level</th>
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<tbody>
<tr>
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<tr>
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<td>6</td>
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<td>7</td>
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Student Teachers’ Teacher Education Program Focus

<table>
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<th>Program Focus</th>
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<td>Primary Arts</td>
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<td>Primary Humanities</td>
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<td>Primary Early Childhood Education</td>
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<td>Intermediate French Immersion</td>
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<tr>
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<td>Intermediate Math/ Science</td>
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<tr>
<td>Intermediate ESL</td>
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<td>Intermediate Special Education</td>
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</table>
APPENDIX E: Pre Practicum Reflective Learning Questionnaire

PRE-PRACTICUM
REFLECTIVE LEARNING QUESTIONNAIRE

Name: ____________________________________________________________

Grade(s) you are going to teach for your practicum: __________

Instructions: When you have finished answering the following questions, please place your responses into the attached envelope and seal it. Neither your school sponsor teacher nor your UBC faculty supervisor will see your individual responses. Your responses will not affect your grades or your standing in the UBC Teacher Education Program in any way.
Thank you for your help!
1a. What is your definition of classroom/behaviour management?

1b. What aspects of classroom/behaviour management do you think are likely to be problematic for teaching? Why?

___ Check at left if continuing on the back of the page so I will be sure to read it.

Beginning of Practicum
2a. What is your definition of individual differences among learners?

2b. Which aspects of individual differences will likely have the most impact on the way that you teach during the practicum?

2c. What aspects of individual differences do you think are likely to be problematic for teaching? Why?

Check at left if continuing on the back of the page so I will be sure to read it.

Beginning of Practicum
1a. Describe one of the most serious problems with classroom/behaviour management that you have had in the past 6 weeks.

1b. What steps did you take to try to resolve this problem?

1c. What have been the most important aspects of classroom/behaviour management to take into account when teaching this group of students? Describe one of your most successful experiences with classroom/behaviour management in these past 6 weeks.
2a. Describe the most difficult problem you have had in adapting your teaching to individual differences among your learners.

2b. What steps did you take to resolve this problem?

2c. What have been the most important individual differences to take into account when teaching this particular group of learners? Give an example of an attempt to meet these differences that you were most satisfied with.
la. Describe one of the most serious problems with classroom/behaviour management that you have had in the past 6 weeks. (Now in week 12)

lb. What steps did you take to try to resolve this problem?

lc. What have been the most important aspects of classroom/behaviour management have you had to take into account when teaching this group of students? Describe one of your most successful experiences with classroom/behaviour management in these past 6 weeks. (Now in week 12 of the practicum)

_____ Check at left if continuing on the back of the page so I will be sure to read it. Second Half of Practicum-Week 12
2a. Describe the most difficult problem you have had in adapting your teaching to individual differences among your learners these past 6 weeks. (Now in week 13 of the practicum)

2b. What steps did you take to resolve this problem?

2c. What have been the most important individual differences to take into account when teaching this particular group of learners? Give an example of an attempt to meet these differences that you were most satisfied with during these the last 6 weeks. (Now in week 13)

Check at left if continuing on the back of the page so I will be sure to read it.
Second Half of Practicum-Week 13
1a. How effectively does the student teacher deal with classroom/behaviour management?

   ineffectiveness  mid  effectiveness  management  management

1b. Give an example of a problem the student teacher had with management. Include steps (if any) that the student teacher took to address and/or resolve the problem.

1c. Describe an example of the student teacher's effective management.

___ Check at left if continuing on the back of the page so I will be sure to read it.
Advisor First Half of Practicum-Week 6
2a. How well has the student teacher been able to accommodate individual differences among learners?

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<tr>
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<td>accommodation</td>
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<td></td>
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</tbody>
</table>

2b. Give one or more examples of how the student teacher accommodated individual differences among learners. Please mention the basis of the student teacher's accommodation (ability, motivation, interest, learning style etc.)

___ Check at left if continuing on the back of the page so I will be sure to read it.
Advisor First Half of Practicum-Week 7
1a. How effectively does the student teacher deal with classroom/behaviour management?

1 2 3 4 5 6 7
ineffective  mid  effective
management  management

1b. Give an example of a problem the student teacher had with management. Include steps (if any) that the student teacher took to address and/or resolve the problem.

1c. Describe an example of the student teacher’s effective management.

Check at left if continuing on the back of the page so I will be sure to read it.
Advisor 2nd Half of Practicum-Week 12
2a. How well has the student teacher been able to accommodate individual differences among learners?

1 2 3 4 5 6 7
minimal mid considerable accommodation accommodation

2b. Give one or more examples of how the student teacher accommodated individual differences among learners. Please mention the basis of the student teacher’s accommodation (ability, motivation, interest, learning style etc.)

Check at left if continuing on the back of the page so I will be sure to read it.
Advisor 2nd Half of Practicum-Week 13
APPENDIX J: Case Study Scenarios

Case Study Scenario Problem Focus:

Classroom Management Problem Area:
- Case Study Maggie Lindberg
- Case Study Maxine Korns

Individual Difference Problem Area:
- Case Study Anita Underwood
- Case Study Marsha Warren

Order of Presentation of Case Study Scenarios to Student Teachers:

Time 1 (Beginning of the Practicum)
- Case Study Maggie Lindberg
- Case Study Anita Underwood

Time 3 (End of the Practicum)
- Case Study Maxine Korns
- Case Study Marsha Warren
CASE STUDY
Maggie Lindberg

A first-year teacher is afraid to take her third-grade class on a nature walk because the children's behavior is so poor that she does not believe they can be controlled outside the classroom.

It was already the third week of October, and Maggie Lindberg knew she couldn't put off taking her students on a nature walk much longer. All the other third-grade classes had ventured out and returned with the materials they would study as part of a science lesson. Her students were asking when they were going, and Maggie knew she was running out of time; in another two weeks there would be no more brightly colored leaves to study.

Walking past a bulletin-board display entitled "The Splendor of the Changing Seasons," the results of a nature walk taken by the third-grade class next to hers, Maggie couldn't help smiling to herself. "I guess it would be irresponsible of me to just ignore this annual phenomenon of nature," she thought. But she wished that she could.

This was Maggie's first year as a full-time teacher. She had graduated from college midyear and then substituted in several nearby school districts for the rest of the school year. Littleton had offered her a full-time position starting in September, and she was assigned a third-grade class of twenty-six students. Maggie had been excited by the prospect of teaching her own class. She spent much of the summer defining her objectives for the year and planning activities and curriculum materials to achieve them. Maggie had wanted to be a teacher for as long as she could remember, and now her goal was a reality.

Maggie's experiences as a substitute teacher had shaped her opinions about teaching almost as much as had student teaching. Maggie knew that substitute teaching was often just an exercise in crowd control, and she had 'baby-sat' many classrooms full of unruly children with grace and patience. But she vowed to herself that her own classroom would be orderly and her students better behaved. Unfortunately, that goal was proving elusive.

Maggie also had a specific experience while she was substitute teaching that really frightened her. The incident involved a fourth-grade class scheduled to take a field trip to a local fire station. She vividly recalled the feeling of panic that overtook her when one of the students bolted from the group and ran off the school grounds into nearby wooded area. Maggie had the parents volunteer who was accompanying the class on the field trip take the rest of the students back to their classroom. Maggie then went after the runaway student, eventually located her, and bought her back to the classroom. When she returned, she found the principal with her class. While the principal did not rebuke her, the memory was a constant reminder of what could happen when the students were not in the teacher's control.

At the moment, Maggie was headed for the art room to pick up her class. As she stood in the doorway, she couldn't believe how intent her students seemed to be on their projects. "These kids must love art." She thought. "They never act like this in my class."
Maggie reflected on the reading lessons she had taught earlier that morning. Because the students had art on Tuesday, Maggie felt real pressure to have the reading groups stay on schedule so that she could meet with all three groups between 9:15 and 10:30, when art was scheduled. But the students seemed to be even less cooperative when Maggie most needed them to stay on task.

She had begun the lesson by reminding the students of the morning schedule. “Since today is Tuesday, we really need to get everything done on time so that we can go to the art room with all our reading work finished.”

Some of the children began to clap. Several commented to each other about going to art. Maggie ignored the interruptions and continued, “Look up at the board, and you’ll see the assignments for each group. I want the Chocolate Chips with me first today. Twinkies should be reading the story that starts on page 49 of your reading books and then doing the workbook pages on the board. Oreos have to complete the workbook pages left from yesterday and then start a new story, beginning on page 141 of your reading books.” Maggie pointed to each group’s assignment, which she had written on the chalkboard.

As Maggie was giving the students their directions, many of them were occupied with other activities. Several were walking around the room—some to the pencil sharpener, others to the cubbies to retrieve books or supplies—and a few were gathered at the reading center in the back of the room.

Maggie spoke sharply. “You’re not listening to me! I want the Chocolate Chips at the reading table now. Everyone else, in your seat and doing the work that’s on the board.”

The children began moving toward their places. Four children gathered at the reading table, while others went for their books and then headed to the table. Two children, sitting at their desks, had their hands up. Maggie noticed and said, “Yes, Melody, what is it?”

“Why do we have to do yesterday’s pages? I’m tired of them.”

Other children immediately joined in.

“Yeah, don’t make us do the old stuff.”

“I already did that stuff.”

“All we do is the same stuff all the time.”

Maggie again raised her voice to be heard over the din. “That ‘stuff,’ As you all refer to it, is our work. And you will do it, now. I don’t want to hear any more complaints, and I want to see everyone hard at work or the whole class will stay in and do the work during recess. Chocolate Chips, you should all be at the reading table. Let’s move it.”

Maggie’s frustration was evident in her voice and the set of her shoulders. Ten minutes of an already shortened reading period had been lost getting the children to settle down to their tasks. She sat down with the Chocolate Chips and, trying to lighten her tone, said, “Okay, Chippers, we’re reading on page 76. Emanuel, why don’t you begin.”

Emanuel was quiet. John said, “He don’t got his book.”

“Where’s your book, Emanuel?” Maggie tried to keep the impatience from her voice.

“In my cubby.”

“What good will it do you in your cubby? What have you been doing all this time? Emanuel, you know that one of our class rules is ‘Be prepared,’ but you’re not, are you?” Maggie’s voice again began to reflect her tension. She turned to the rest of the Chocolate Chips. “Does everyone else have a book?”
Of the nine children in the group, three had come to the reading table without their books. Maggie sent them to get their books and tried to keep the other children quiet while they waited to get started. It was taking all her control to remain calm. She was tempted to banish the three children who had not brought their books, to make a point about being prepared, but she knew that they needed the reading time too much. However, as a result of all the confusion and interruptions, all the reading groups spent far less time reading on Tuesday then they should have. That was one of the things that bothered Maggie the most.

Of the twenty-six children in her class, more that half had come into third grade below grade level in reading. Maggie wanted them to leave her class reading far better that they did when they came in, and she needed maximum reading time to accomplish her goal. She also knew that third grade was a crucial time for these children. In order to succeed in the upper grades, where there was more emphasis on reading content than on reading skills, they would have to “break the code” and learn to be efficient readers this year. Maggie wanted to be the teacher who enabled them to meet that goal. But, so far, she had not been very successful.

Maggie’s reverie about the morning was interrupted when the art teacher noticed her in the doorway. She called to Maggie and waved her into the room. The art teacher directed the children to put away their work. As Maggie watched the children clean up the art room, she was fascinated by what she observed. When the art teacher was satisfied with the cleanup, she had the children line up at the door. Maggie found it hard to believe these were the same children who, forty minutes earlier, had been causing her such consternation. However, as soon as the class stepped into the hall, Maggie remembered why the children frustrated here. She walked down the hall trying to keep order.

“Tommy, don’t run ahead of the class. You know the rules.”

“Maria, please try to keep up. Don’t dawdle.”

“Matt, come walk next to me. I’ve told you not to bother the girls. Could we all please keep the noise down?”

Maggie looked at the children straggling into the classroom and thought, “What’s the matter with these kids? Why don’t they listen to me? Is it because I’m so young?”

Eventually Maggie was able to herd the last of the students into the classroom. She looked at the clock and saw that it was 11:25; her social studies lesson was beginning late.

“Okay, everyone in your seat now and take out your social studies books. The students continued talking to each other as they made their way to their desks.

“Please quiet down. I want to see all of you in your seats, because we have a lot of work to do.”

Looking out over her class, Maggie saw that most of the students were ignoring her. Two students were in the library corner; a group of boys had their heads together over a comic book; and one little girl, looking for a pencil, had emptied the contents of her desk onto the floor.

Maggie went over to the boys, took the comic book, and told them to take their seats. The boys complied but continued to talk above the noise of the rest of the class.

As Maggie walked toward the girls in the library corner, she heard a loud crash from the front of the room.

“Miss Lindberg, it wasn’t my fault. Tony was pulling it down too hard.”

Maggie saw the world map crumpled in a heap on the floor in front of the chalkboard.

“Well, why were you pulling the map down? Please sit down, and I will take care of the map.”

The sound of the map crashing to the floor had captured everyone’s attention, and the students listened to hear what would happen next. Maggie was angry enough to raise her voice.
"I mean it. I want all of you in your seats now. Let's get out those social studies notebooks, and if I hear one more word from anyone, there will be no free time this afternoon."

As Maggie walked briskly to the front of the classroom, she looked at the clock. It was 11:35. She would barely have time to introduce the social studies lesson before the lunch bell at 11:45.

The classroom was filled with the sound of rustling papers as the children searched for their books. As Maggie watched them, she tried through sheer force of will to repress her dismay and replace it with the excitement and anticipation she had felt on the first day of class. Maggie did not want to let herself become discouraged; she wanted to teach these children something! But too often they wouldn’t even listen to her, and the idea of organizing the group for a field trip seemed like a nightmare.

Looking out the window, she again noticed how brilliant the leaves had become. She knew she had to take the students on a nature walk, and she had to do it soon. She was sure that they would enjoy some time outside and that a science lesson based on materials they had gathered themselves would be a good learning experience for them. “But,” she thought, “I can’t even control them in here!”
CASE STUDY

Anita Underwood

A week ago I had carefully addressed postcards to unknown names announcing that I would be their third-grade teacher for the new school year. Most of the children's names were unfamiliar to me. An understandable situation since Roosevelt Elementary School in Littleton enrolled six classes of third-graders. As I waited now to see the faces of the children in my class, a surge of emotions raced through my body—eagerness for the journey together to begin, sadness that this was not the previous class that I had so adored, fear that too many would lack basic skills, and concern that there would not be enough of me to go around. I also was filled with hope that we would become a family, a community of caring, sharing learners by the end of the year. I glance around my room one more time, cheering by the brightly colored posters, the activity centers the blank spaces soon to be filled with children's work. Although I was starting my twenty-second year of teaching and my eighth year as a third-grade teacher in Littleton, I still felt the nervous anticipation of a new school year.

It was now 8:40, time to begin. No bell rang but a soft roar had begun and grown to a crescendo as the halls filled with children's voices. I stood at the door of my room and soon Timmy Elliott stood before me, clutching his postcard.

"I'm Timmy," He announced.

"I'm Mrs. Underwood," I replied. "Welcome to Room 311. Choose a desk that fits, put your school supplies away, find a locker you can reach, and then check out the room. I'm glad you're here, Timmy." He looked at me, gave a nervous smile, and some of the apprehension eased from his face.

I greeted twenty-six more children and reassured the parents who accompanied many of them. Some of the parents were as curious as the children and wanted to see what the teacher looked like. Others came to say "hello" or to let me know that they were interested in their child's education. I understood that it took an act of trust to turn their children over to me. I hoped that I would live up to that trust.

Getting acquainted on the first day is a special time, one that can begin to nurture confidence or cause tightness, fear, and anxiety. It seemed to me that children would be comforted to know that the teacher was once in third grade too, so I began with a personal story from my third-grade experience and passed about a picture of myself at that age. Pictures of my family and more memories followed. While they sized me up I did the same.

"My name is Anita." I told them. It helped them to know that I, too, have a name.
I did some quick counts as I introduced myself and heard from them. My observations told me that there were thirteen girls and fourteen boys and fourteen children of color—five Asian-Americans, seven African-Americans, and two Latino children. It's difficult to judge socioeconomic status on the first day of school. Everyone is clean, pressed, and polished like the entryway tiles they walked across. All of their possessions are new. A magnet school, Roosevelt draws students from elegant, historic mansions lining Summit Avenue and graffiti-covered projects fronting Selby Avenue. Those are the extremes. The rest of the children come from what is left of the middle-class families in the community. I know from reading the local papers that there are many single parents raising children here in addition to families who have immigrated from all around the world.

The thing that makes the first day of school wonderful is that it is the only day of the year when all of the children feel equal. I did not yet know where the rough spots would be, which stars were shining, which just beginning to twinkle, and which as yet had not begun to glow. On the first day they were all the same, and in a carefully constructed way I planned to take a first look at their learning needs.

We continued with the business of getting acquainted and comfortable. Susan wondered why I hadn't passed out books yet. This was a great question; it gave me an opening for the speech that described the philosophy that would guide our learning this year. “This is going to be a literature-based classroom. What that means is that we will do all of our learning from ‘real’ materials rather that textbooks. We will read a variety of literature during the year: action, nonaction, poetry, magazines, and some things from materials you will choose. You will have many choices in what and how you learn.”

Susan smiled slightly. “Sounds good to me. Is it legal?”

“I hope so,” I replied. Those that got it giggled, the rest played and squirmed restlessly. I put the philosophy into action by introducing a story called *Never Spit on Your Shoes*. We read and laughed our way through the story, with me pausing at different points to get their reactions and ideas. Everyone was smiling when the story ended, and I felt we'd made a good start.

We took a short break for a snack, and then I passed out note cards. “Please write down three questions that you would like to ask me. You may ask anything that interests you, and I will answer the questions honestly. Spell the words that you know correctly and circle the ones you are not sure of. Be sure to put your name of the upper right-hand corner of the card.”

The cards told me at a glance many things about my new class. Immediately it was clear that there was a huge range of ability. Some students appeared to write in a code that I could not decipher, and they circled nothing. Billy, Joseph, Shamika, Timmy, and Anna wrote sophisticated sentences with few circled words. Toni told me she couldn’t think of anything to ask.

The handwriting was as varied as the skills. Some children were still struggling to print; others attempted cursive. One student, Barry ignored the whole thing and worked silently on the drawing he had begun as soon as he found his seat. He ignored my request to join us. I told the students I would answer the questions on the cards after lunch, and we moved on to another activity.
I gave them oral and written instructions for the construction of an eight-page book that will be titled *The Me Book*. This project allowed the children to demonstrate many skills and provided me with information about their cognitive development, their writing, their fine motor skills and artistic interpretation, their ability to understand a task and follow directions, their neatness and sense of order, and their confidence level. Each student began to create the booklet by folding a large sheet of drawing paper. A few were able to accomplish their task as presented, but most needed help. Several required constant reinforcement, asking as each step, "Is this right?"

With the folding completed I listed the title and page-by-page information on the board. A hush fell over the room as the class got down to work. A sudden volley of questions erupted as the students realized they had to make some decisions of their own. "Should I write everything first?"

"Do you want me to put a picture on the front?"

"Do you care how much I write?"

"What if I can't draw my mom?"

"What should I do first, write or draw?"

"I've never seen my dad but I know I have one. Should I put him in too?"

"This is your book, and I would like you to decide what is important to you and surprise me." I told them. Again quiet prevailed as new crayons were carefully opened, long pencils cradled correctly for a while, and minds busily created masterpieces that would surely please me.

I wandered about the room observing. Mai Lin, Xiong, and Leah hadn't started. Barry joined us and was putting lavish detail into the writing of his name. Tomas was still fussing over what it was I wanted him to do. Eddie was having a great time drawing rappers in Cris Cross clothing. Susan muttered something about hating to draw and continued to write. Anna had many drawings of her family and had written several sentences describing them. Drew was still reading the book, *How Things Work*, that he found at the beginning of the day and hadn't heard a word regarding this assignment. Jimmy was doing the tasks as asked but in microscopic scale, and Elliott, who hadn't started either, tugged at my sleeve and asked, "How do you like my new school clothes my daddy bought for me?"

The next day the children would finish their books and share them with each other. Some would read with strong confidence; others would hand theirs to me to read; some would have only pictures to share because they have not yet learned to read and cannot write. The small books will be the first entry into their assessment portfolios.

We cleaned up from this project as lunchtime neared. Again, I observed the students as they wound down this activity. Some stopped as soon as I told them it was getting close to lunchtime, mid-word, mid-sentence, mid-drawing. Others moaned, unwilling to break off their work. A few finished the part they were working on, neatly folded their papers, and gently laid their materials in their desks. I reminded students to take care of their pencils and crayons since they will be responsible for keeping their own materials. Some students ignored this injunction—crayons and pencils were left where they were dropped or fell.
The afternoon of the first day went by swiftly. The children returned from lunch and playground time with an abundance of energy, so we did a “meeting and greeting” activity that helped us remember each others’ names and shifted from moving around the room to sitting as desks. When everyone was seated, I began to answer the questions on their cards. At lunch, I had sorted the questions into those about school, those about my personal life, and general questions. I answered the school questions first and asked for others that these might have raised. Then I responded to the personal ones, asking the students for like information about themselves. We talked about our animals, brothers and sisters, favorite foods and television programs, vacation experiences. Finally, I answered the more general questions—explaining that some of the topics raised by these questions would be the subject of science, social studies, or reading lessons. We talked about how to gather information, discover new ideas, share our questions, listen to other people’s views.

Our final first-day activity was a math game. In the five hours the children had been with me, I had begun to observe and note, formally and informally, their social interactions and language skills. Before the day was over, I wanted to get a sense of how they used numbers, solved problems, thought mathematically. One of the ongoing activities this year would be a trip around the world. Starting in Littleton, we will span the globe, returning “home” in June. We will do reading, writing, science, social studies, and math activities as part of our travels, and I introduced this project by hanging a large map of the world, finding Littleton, and asking students where they would want to go. We listed many places and took some straw votes to identify the most popular choices. Then students calculated distances between different locations. I’d prepared a sheet that gave the miles from Littleton to places that have proved popular in the past. Travel guides that include some information they might need were available as well.

The discussion had been lively, and I noticed that all the students joined in except Elliott and Barry. Drew had put away How Things Work to become an active participant, and he immediately went to work on the problems I had assigned. As earlier, I noticed that some students couldn’t seem to get started without a lot of support and reinforcement, while others eagerly “jumped in” anxious to do the task I presented. With fifteen minutes left until dismissal, I collected the papers, and we all came together in a circle to talk about our first day.

Everyone who wanted to speak was to say one positive thing that happened during the day. I began, reporting that it was a good day for me because I learned so many of their names, and I heard their laughter many times. Many students volunteered and shared observations about meeting new friends and seeing old ones. Others spoke about different classroom activities, lunch, playground, the books and magazines. We ran out of time before we ran out of speakers. As noise filled the halls again, students gathered up their backpacks and lunch boxes and lined up for the trip home. I again stood in the doorway, saying goodbye, watching who left with whom, who forgot things, who seemed to know just what to do.

When the last student left, I sat at the desk and thought about them. After this first day, what conclusions could I draw? What did I know? How would this information guide me? What would we do tomorrow?
CASE STUDY

Maxine Korns

“It’s all right, Malcolm. Shh. . . . it’s all right.” Maxine Korns leaned down and picked up the jumpy, angular 5-year-old, shifting slightly in her child-size chair to keep her balance as she settled him in her lap. She began to rock gently, turning so that one arm entirely encircled the wiggling child and the other held the book open toward the twenty-seven children sitting in a circle on the floor. Maxine wondered how such a small child—he seemed to weigh less that her cat—could maintain such perpetual motion. “Another one who suffers from the sins of the mothers,” she thought briefly even as she returned to her lesson.

“You know that people who write books are called authors, boys and girls. The author of this book is Eric Carle, and he called his book The Very Hungry Caterpillar.” Maxine opened the book to the title page as she spoke. “What do you think The Very Hungry Caterpillar is going to be about?” Maxine smiled and nodded toward the students at her feet while simultaneously holding her chin clear of Malcolm’s bouncing head. She kept up the rocking motion and nodded toward a little girl who was anxiously waving her hand. “Angelina?”

“I think it’s about a bug.”

“That’s an interesting idea. What makes you think that?” queried Maxine.

“The picture on the front.” Replied the child brightly. As she spoke she swished her head from side to side, apparently feeling her long dark hairbrush against her face in motion seemingly unrelated to her response.

“Authors can use more than words to tell their stories when they write books, can’t they?” asked Maxine. “Mr. Carle used a picture on the front to start us thinking, too. Let’s see what happens.” As she spoke Maxine tried to turn the page of the book one-handed, but she could not separate the worn pages with her fingers and simultaneously hold the book. “Dead time”—even a few seconds—was treacherous in this class, and she quickly tried to stretch her other arm around Malcolm to turn the page. The child’s unpredictable movements were hard to judge, though; just as she reached for the book he lurched forward, and in order not to drop the child she had to drop the book.

Three children nearest Maxine’s feet reached for it; two of them knocked heads and began to cry. Several children at the outside edge of the circle began to rock and laugh. Maxine knew the class was on the verge of pandemonium.

“Oh, clumsy Miss Korns!” Maxine admonished herself with a smile and made sure that Malcolm, who had tensed at his near fall, was steady. His frail little body never felt relaxed, but he didn’t seem on the verge of pandemonium. “Hand me my book, please, Les.” Maxine ignored the escalating movement and noise in the room until she had the book in her hand and opened to the first page. “Shh. . . . shh. I’m ready.” She sat quietly and locked eyes with every child whose gaze she could capture. “I am waiting. . . . shh. . . . Richard, watch Miss Korns. Bobby, stop leaning on Jake. Shh . . .” Maxine rocked and tried to remain patient as she waited for order.

Such gentle tactics used to work right away. But in recent years the children seemed to have become rowdier and naughtier and more frustrating. Now, instead of responding to her quiet call for attention, the children’s misbehavior began to escalate.

“Bobby!” Now Maxine raised her voice. “I said to stop bothering Jake. You come sit here
by me." When Bobby did not quickly stand, she spoke even more vehemently, "Now!" The child—one of only four white children in the class—sheepishly left his friend and crawled toward Maxine. His route took him past Jercisse, a large, frequently disruptive boy, who laughed loudly. "Jercisse, please be quiet and listen to this story. Children, hush!" Since she was anchored by Malcolm, Maxine had no choice but to use her voice to command attention; often she left her chair to separate partners in crime or to command attention by grabbing a child’s upper arm. She had become much more physical, she realized, in her past few years of teaching.

Finally, the children settled down enough for Maxine to resume. "Let's read Eric Carle’s story, now: The Very Hungry Caterpillar. ‘In the light of the moon a little egg lay on a leaf.’"

This time Maxine managed to turn the page and balance Malcolm at the same time. "'One Sunday morning the war sun'—Ouch!" Maxine could not help her startled cry as Malcolm’s bobbing head forcefully connected with her jaw, forcing her teeth together and causing her to bite her tongue. She had no idea how such a small child could be so strong. Reflexively, she pushed him off her lap and put her hand to her mouth. Now her rocking was for herself. "Oh, Malcolm, you hurt Miss Korns." She put her hand to her face and tried to smile at him and the class over her pain. She could taste blood.

Malcolm, suddenly adrift amidst twenty-seven rapt witnesses, looked terrified, and Maxine quickly tried to recover. ‘it’s all right, honey . . . I’m all right.” She reached for him and pulled him back onto her lap, returning to her reading before the disruption’s surprise gave way to silliness again. "'One Sunday morning the warm sun came up and... . . .""

"... He was a beautiful butterfly!'” As she closed the book, Maxine gently sat Malcolm on the floor; his wriggling had not really subsided but she was simply too tired to hold him any more, and she needed to talk to the class. He leaned against her leg and at least stayed put. “Was Angelina right? Was this about a bug?” A few children raised their hands and a few others nodded; several paid no more notice to this question than they had the book, but their inattention was not disruptive so Maxine ignored it. The discussion of the book continued haltingly for the few remaining minutes until art.

In her twenty-seven years of teaching, Maxine Korns had never felt as physically exhausted and mentally drained after each day in the classroom as she did this year. Only a few credits shy of earning her doctorate in education, Maxine considered herself a professional in the business of child development and education and had really dedicated her life to her work. She had been teaching at Lincoln Elementary School in Alton for twenty- two years and willed herself not to regret the changes that had enveloped the school during the recent past.

Maxine had tried her best to adapt to the different teaching environment caused by the court-ordered bussing which was intended to integrate schools in this northeastern city-suburb. Lincoln was located on the city’s affluent west side and had served the children of Alton’s white middle class successfully for years. Even as poverty, crime, and homelessness crept into Alton’s east side from its adjacent big-city neighbor, Lincoln had enjoyed high test scores, loyal taxpayers, and involved parents. But five years ago, with court-mandated bussing, the school and Maxine’s life had changed forever.

Now, fewer than 30 percent of the students as Lincoln were residents of the neighborhood; most parents had opted for parochial schools as the barely affordable alternative to integration. The school’s staff was largely unchanged—the principal and seventeen of eighteen teachers remained. But the character and spirit of the school had shifted dramatically now that the students
came from such different backgrounds, and the parents were either completely absent or long bus rides away.

As the children returned in a scraggly line from art, Maxine greeted them with smiles and affectionate pats and herded them gently toward the science corner in the large and airy room. In early March the children had begun what Maxine called the "incubator vigil," and right on schedule, four baby chicks had hatched twenty-one days later. Today, Maxine intended to discuss their growth after four days out of the shell and to let the children feed them. Then she would talk about how all animals must eat to grow before the class left for lunch.

"I am proud of your quiet walk back here from art," Maxine crooned as she shepherded the children to the back of the room. "Let's all find a place to stand or sit around the chicks. How do you think Tweety looks today, Jason?" Maxine directed her question at a gently child who had adopted and christened the most pitiful of the hatch. "Is he stronger, do you think?"

Jason knelt and leaned his head far into the box, which was elevated a foot above the floor by a small stepstool. "He's still pretty quiet. Look, he just let Sylvester walk right over his head." Maxine had not been surprised by the cartoon theme of the names the children gave the brood.

Suddenly, Jercisse barged past two other children to reach the edge of the box, and he roughly grabbed its sides. Shaking it violently, he gazed in upon the jostled chicks and cried, "Chicky, chicky, chicky... cluck, chicky." He began crowing like a rooster in the few seconds it took Maxine to reach his arms.

"Stop that! Stop that now! You will hurt them! Stop it!" Maxine's reaction was swift and instinctive—keeping these animals alive in the unforgiving environment of a kindergarten classroom was a constant battle. "You know not to touch the box or the chicks. You know that! I have told you that before!" She turned to the class, most of whom looked quite worried. "I have told you all that before." Maxine turned back to Jercisse and pulled him by the upper arm away from the huddle class. "You know better, Jercisse. You cannot be with us for science today. You sit here until lunch." Maxine sat Jercisse on a stool in the supply closet and closed the door two-thirds of the way. "I can see you in there, and I don't want to hear a sound." Quickly realizing that the rest of the class was unsupervised and the chicks were vulnerable, Maxine returned to the fold and managed, for the hundredth time that morning, to pull her mind back onto the lesson and her emotions back into her heart.

Later, as she walked toward the teacher's lounge for lunch, Maxine eagerly anticipated a brief respite from the constant vigilance required of her in the classroom, but she could not shake thoughts of Jercisse and the chicks. She knew she should not have acted so viscerally, and she regretted her outburst. On the other hand, she had patiently and painstakingly reviewed with the children the proper way to behave with the chicks and had tried to use the project to instill in them a respect for living things.

Maxine was troubled by a nagging knowledge, which she purposefully kept from fully articulating to herself, that she would never have put a student in the closet five years ago. Parents wouldn't have tolerated it. Even though Maxine was pretty sure Jercisse's mother didn't even know where the school was, she was troubled by the knowledge that her teaching was becoming more reactive in spite of her increasing experience and ongoing education.

"At least I'm not alone in this," Maxine thought as she pulled open the door to the lounge. Indeed, the entire district had struggled with its changing student population and with codifying the proper responses to the students' behavior. One result of that ongoing evaluation was the
“Zero Tolerance: policy, which held that school was for learning and that disciplinary problems would not be tolerated. Maxine knew that this policy had begun in the middle schools, targeted for the serious disruption and even crime found there. But it had found its way to the elementary schools, and beginning in kindergarten, students and their parents were asked to review the code of conduct and sign it, indicating by their signatures that they would abide by its rules and live with its sanctions. Maxine supported the code and wished that Anne Ackerby, her principal, would enforce it more consistently. She, like most of the teachers at Lincoln, thought Anne was “too soft.”

Three weeks later, Maxine found herself confronting this concern head on. “I can’t believe I have to argue with my principal to enforce her own rules,” Maxine thought bitterly. Aloud, she repeated the point she had already made three times: “Anne, they were stealing, pure and simple. Either we mean what we say in the guidelines, or we don’t!”

Earlier that day, Maxine had caught Jercisse, Richard, and Juan in the hallway just before snack time, red-handed. She had given them permission to go across the hall to use the restroom and had risked leaving the classroom to find them when they did not return promptly. They had taken some popcorn from Angelina’s lunch bag and were guiltily eating it as they perched on the open cubbies in the hall.

Maxine scolded the boys harshly and reminded them of the penalty for stealing: suspension. She was now arguing with Anne about that sanction.

“I just think suspending kindergartners is too harsh, Maxine. Let’s impose lunch detention, or snack time detention, for a week.” suggested Anne.

“The guidelines clearly list suspension as a punishment for stealing. Why do we publish them if we don’t intend to follow them?”

“Those penalties are meant for 15-year olds, or maybe even 10 year-olds, Maxine, not for babies. I worry about those kids’ self-image and about what their parents will do to them over this.

“I worry about finding their parents to tell them to keep them home,” Maxine countered. “And two of those boys have older brothers in this school. The message we send here isn’t just heard by these 5-year olds. It’s heard by everyone.” Maxine paused, trying to rein in her mounting frustration. “Anne, I am in the classroom with these children all day long. You just don’t know!”

Anne sighed. “Maxine, you know I will support you, and I will leave the final decision up to you. But I want you to give this a little more thought. See me at three o’clock and let me know your position then.”

Alton Public School District

Lincoln Elementary School
Anne Ackerby, Principal

Dear Parents,
Attached is a copy of the Discipline Code designed by our staff of teachers, parents, aides, and administrators. Please read it with your child and then sign the form below, tear it off, and return it to your child’s teacher.

Keep the code and review it with your child from time to time.

Sincerely,

Anne Ackerby

The staff and parents of Lincoln Elementary believe that all children should have a safe, harmonious, and productive school environment, where they can realize their full potential. Therefore, it is necessary to have appropriate behavioural guidelines which are clearly defined, understood, and adhered to by all concerned.

General Guidelines for Public Areas

Hallways

1. Walk quietly at all times.
2. Stay to the right.
3. Maintain orderly lines, respecting personal space.
4. Students must carry appropriate passes at all times.
5. Show respect to classes in session by walking quietly.

Cafeteria

1. Walk in and sit down quietly.
2. No talking for the first five minutes.
3. Talk in conversational tones.
4. Remain seated except when getting lunch and dessert.
5. Use appropriate table manners.
6. Only assigned garbage monitors may take the barrels around.
7. Tables and floors are to be cleaned and chairs pushed in before students leave the cafeteria.
8. Food must not leave the cafeteria.

Playground

1. Exit to the yard through the Main Street door, and enter the building through the Maxwell Avenue door.
2. Stay in the assigned yard when playing.
3. No play-fighting.
4. Play fairly.
5. No snacks are allowed on the playground.
6. No students may throw sand, stones, sticks, or snow on the playground.
7. Line up immediately when called.

We encourage the prescribed behavior through a system of positive reinforcement, such as award assemblies, gold lottos, and other incentives.

For behavior that falls below guideline expectations, the following Discipline Code has been developed. This code covers both detention and suspensions.

Reasons for Detention

1. Profanity in classroom
2. No pass in hall
3. Screaming or running in hall
4. Being in wrong bathroom
5. Harassment anywhere in building
6. Refusal to identify self to school employee
7. Congregating in bathroom
8. Gum chewing
9. Spitting or littering
10. Taking food out of the cafeteria without permission
11. Disruptive behavior that interferes with instructional process
12. Infraction of Hallway, Cafeteria, or Playground guidelines.

Detention will be held three days per week (suggested days: Monday, Tuesday, Friday). Conducted by administrator and aide in room.

Guidelines for Detention

1. Formal detention—in triplicate—copy sent home in mail.
2. Predetermined assignment is used for detention purposes.

Following three detentions, child will be reprimanded to Principal's After-School Detention. (Parent advised.)

Guidelines for Immediate Suspension

1. Anyone—K-6—involved in a fight
2. Verbal abuse of an adult
3. Vandalism or destruction of property
4. Stealing
5. Leaving Classroom without permission
6. Habitual disruptive behavior which interferes with the instructional process
CASE STUDY

Marsha Warren

An experienced third-grade teacher is overwhelmed by the problems created by her heterogeneous class, which includes eight students who have unique home and personal situations that are affecting their schooling.

José glared at Tyrone. “Quit looking as me, you jerk!”

“I wasn’t lookin’ at nothin’, creepy,” replied Tyrone vehemently.

Marsha Warren looked up sharply at the two boys and made a cutting gesture through the air. “That’s enough from both of you. You should both be looking at your books, not each other.”

“I was lookin’ at my books!” protested Tyrone.

“Just stop!” repeated Marsha. “Please continue reading, Angela.”

Angela rolled her eyes at no one in particular and resumed reading aloud in a bored, expressionless tone. Her progress was slow and halting.

Marsha Warren was a third-grade teacher at the Roosevelt Elementary School in Littleton. She was trying to conduct a reading group with the eight slowest readers in her class of twenty-two while the other children worked in workbooks at their seats. But each time an argument erupted desks snapped to attention to watch the sparks fly.

“You can stop there, Angela,” interrupted Marsha as Angela came to the end of a paragraph. “Bettie Ann, will you read next?” As she spoke, Marshal also put a hand out to tough another child, Katie, on the shoulder in an attempt to stop her from bouncing in her chair.

Bettie Ann didn’t respond. She was gazing out the window at the leafless November landscape, sucking her thumb and twirling her hair with her other hand. “Bettie Ann, I’m talking to you,” repeated Marsha.

“Your turn,” yelled José as he poked Bettie Ann’s shoulder.

“Shut up, José,” interjected Sarah. Sarah often tried to mediate between the members of the group, but her argumentative streak pulled her into the fray as often as not.

“Quiet!” insisted Marsha in a hushed, but emphatic, tone. As she spoke, she turned her head to glance over her shoulder at the rest of the class. The hum of conversation was growing in the room. Tension crept into her voice as she addressed the reading group. “We’re distracting the other children. Do we need to discuss rule 3 again? Everyone pull out the class rules from your notebook, now.”

The chemistry in the reading group—and in the class in general—had been so explosive since September that Marsha had gone beyond her normal first-of-the-year review of rules and procedures. All the children in the class had copied the four class rules into their notebooks, and she had led long discussions of what they meant. Rule 3 was “Be considerate of other people.”

Loud groans from the reading group greeted Marsha’s mention of rules. Simultaneously, a loud BANG sounded in the back of the room. Marsha turned and saw a student reaching to the floor for a book as his neighbor snickered. She also noticed three girls in the far-left row leaning into a conversation over a drawing, and she saw most of the students quickly turn back to their work, as if they were not enjoying the entertainment of the reading group once again.
"That's it!" Marsha exclaimed. She slammed her hand down on the reading-circle table and stood to face the entire class. "Put your heads on your desks, and don't say another word—everyone!" By the time she finished the sentence, Marsha realized she had been shouting, but she didn't care. Her class gazed at her in stunned disbelief. Mrs. Warren had always been so gentle! "Now!"

Marsha quickly turned and walked from the room, not bothering to look back to see if her command had been obeyed. She closed the door to her classroom, managing not to slam it, and tried to control her temper and collect her thoughts. "What in God's name am I going to do with this class?" she asked herself. "I've got to calm down. Here I am in the hallway with twenty-two kids inside who have driven me out—they've absolutely won." Marsha suddenly felt paralysed.

Marsha tried to remember if there was ever a time in her eleven years of teaching when discipline and control were such a challenge. "It's not as though I were a rookie. I ought to know what to do!" she agonized. But Marsha had tried everything she had ever learned or done before to interest and control this group, and the class as a whole, yet there she was, standing in the hall.

Marsha's third-grade class was indeed a difficult group of children. There were a few students who liked school and really tried to learn, but overall it was a class full of children who were just not focused on learning. It was impossible to relax with them. If Marsha let down her guard and tried to engage them on a more friendly or casual level, the class would disintegrate. Marsha's natural inclination in teaching was to maintain a friendly, relaxed manner; she usually enjoyed her students and her enjoyment showed. But with this class she constantly had to be firm and vigilant ("witchlike," she thought) in order to keep the students under control.

Academically the class was fairly average, but Marsha did have two instructional challenges: There were three really bright students, whom Marshal tried to encourage with extra instruction and higher expectations, and there were three students (besides the Hispanic children in her slow-reading group) who spoke little or no English. The most remarkable characteristic of the students, though, was their overall immaturity. Each child seemed to feed off the antics of the others, and every issue was taken to its extreme. For example, wherever one child laughed, the entire class would begin to giggle uncontrollably. The students' behavior was simply inappropriate for their age and grade.

The core of Marsha's problem was the lowest-level reading group. This group provided the spark that set off fireworks in the entire class, day after day. The slow readers were rude and disruptive as a group, and they were instigators on their own.

When Marsha thought of each child in the lowest reading group individually, she was usually able to summon some sympathy and understanding. Each of the eight had an emotional or academic problem that probably accounted, at least in part, for his or her behavior.

José, for instance, topped her list of troublemakers. He was a loud, egocentric child. His mother, Marsha thought, probably had surrendered long ago, and his father did not live with them. José had little respect for or recognition of authority; he was boisterous and argumentative; and he was unable to take turns under any condition. When something didn't go his way, he would explode. This low flash point, Marsha felt, was just one of many signs of his immaturity, even though José was repeating the third grade and was actually older than his classmates.

José had a slight learning disability in the area of organizational skills, but Marsha didn't think this justified his behavior. His mother spoke only Spanish, and—although José was fluent in both Spanish and English—when Marsha sent notes home, she would first have to find someone to
translate for her. Conferring with José’s mother on the telephone was out of the question.

Angela was also repeating the third grade, and Marsha thought the child’s anger over this contributed to her terrible attitude in class. The child just refused to learn. She could be a low-average achiever if she would apply herself, but it was clear that Angela’s agenda was not school. She was concerned with her hair, her looks, her clothes—preoccupations that Marsha found inappropriate for a third-grader. Angela came from a middle-class black family, and her parents were also angry that she had been held back; consultations with them were not usually fruitful. Angela seemed truly upset if Marsha asked her to do any work, and Marsha was sure her frustration with the child was occasionally apparent.

Tyrone, on the other hand, was a very low average learner, but he, at least, worked to his capabilities. He even tried to mediate arguments among the members of the group. But Tyrone had a very stubborn streak, which was typical, Marsha thought, of slow learners. If he was on the wrong track, he just would not get off of it. She frequently asked him to redo work and helped him with his errors, but when he presented it to her the next day as though it were different, it would contain the same mistakes.

Sarah, too, knew right from wrong and generally wanted to do her work, but she was easily pulled into the fray. Sarah had appointed herself protector of Bettie Ann, an overweight, emotionally insecure child who had difficulty focusing on the topic at hand. Bettie Ann was the baby of her family, with several near-adult siblings at home. Marsha wondered if Bettie Ann’s position in the family was the reason she assumed no responsibility for her own actions and no control over her own fate. Bettie Ann seemed hungry for Marsha’s attention, but she exhibited no independence or initiative at all.

Katie was one of the brighter students in the reading group, but her hyperactivity caused her to be easily distracted and argumentative. She could neither sit still physically nor pay attention mentally. Katie had a rich home background, full of books and middle-class aspirations, but Marsha thought she also encountered pressure at home to perform, perhaps to levels beyond her capability.

Rhea, another child with at least average intelligence, was one of the more heartrending cases. Her mother was an alcoholic who neglected her, and Rhea had to do the housework and care for her older brother, who was in a special education class. She had no time for homework, and there were no books or even conversations at home. Rhea had been held back in second grade, and while she tried to do her work, the language deficit at home was so severe that she kept falling further behind.

Finally, there was Maria, a petite, immature native of El Salvador. She had average intelligence and a cooperative spirit, but Spanish was spoken in her home and her limited English vocabulary severely limited her progress.

Marsha tried to analyze what it was among these children that fostered such animosity. Not a day passed that they didn’t argue, fight, or insult one another. The reading group was not the only arena for these combatants; they fought in the playground, in line, on the bus, and in the cafeteria. They were troublemakers in previous grades, and some of the teachers at Roosevelt called them the “Infidels.”

They tended to be at their worst as a group, and so Marsh had tried separating them, but with little improvement. Three weeks before, in early October, she rearranged and reorganized all three reading groups, distributing the students in the lowest section among three new groups. But
she found that the inappropriate behavior did not stop; it only spread. Now all three of her reading
groups, rather that one, were disrupted, and mixing her slow and average readers dramatically
reduced the pace of both groups. Finding this arrangement unfair to her other students, she
reorganized back to her original group assignments last week.

Marsha also tried other remedies. She introduced poplar reading material for the reading
groups and tried innovations such as having the children act out the stories they have read. She
wrote a contingency contract with the groups when she reconstituted them last week, promising
that they could use the school’s audiovisual equipment to make filmstrips illustrating their current
book if they behaved, but so far that wasn’t working either.

Marsha did not think she was generally too lax. She had procedures for incomplete work
(the students had to come to her room during lunch hour or after school to finish); she had rules for
appropriate behavior in school; and she never hesitated to involve parents. She praised the
children for completing work, and she sent positive notes home when they did so. She also sent
home disciplinary cards (much more frequently, unfortunately), which parents were supposed to
sign, and she telephoned parents when she thought it would help.

Marsha also tried punishment. She sent individual troublemakers to the office, and she
held detention during lunch. She isolated children for misbehavior by separating their desks from
the rest of the class, and she used denial of privileges (the children really liked using the class
computer, so she withdrew that privilege frequently). Marsha even tried talking honestly with the
children, giving them pep talks about the value of education and their need to read and write and
think in order to participate in life. But nothing was fundamentally altering the course of the
class’s behavior.

Besides having the desire to teach the “Infidels,” Marsha knew that the progress of the rest
of the class was being slowed because of the time she was forced to spend on policing. Her
patience, her ideas, and her fortitude were fast evaporating, and she knew she had to solve the
problem even though she felt like giving up.

Marshall stood on tiptoe to look through the window of the classroom door. The children
were sitting in their places looking at each other uneasily and at the door, clearly wondering what
would happen next. With a sigh, Marsha turned the knob.
APPENDIX K: Case Study Scenario Reflection Interview Questions

Case Study Scenario Reflection Interview Questions
(Sources: Copeland, D’Emidio-Caston, 1998; Copeland et. al., 1994; Pultorak, 1993)

1. Understanding Question:
Tell me about the case study scenario you read. Explain your understanding of what you read.

2. Probing Question:
   a. What were the positives associated with the case scenario?
   b. What were the challenges of the case scenario?
   c. What steps does the teacher need take to address the challenges of the case scenario?
APPENDIX L: Effective Teaching Profiles

EFFECTIVE TEACHING PROFILE (Sugai, 1993)

Instructions: Rate the extent to which the student teacher displays the following effective teaching practices by circling a number on the rating scale YES 1 2 3 4 5 6 7 NO

YES 1 2 3 4 5 6 7 NO 1. Structured and scheduled opportunities to learn.
YES 1 2 3 4 5 6 7 NO 2. Curriculum aligned with desired outcomes.
YES 1 2 3 4 5 6 7 NO 3. Curriculum is delivered directly.
YES 1 2 3 4 5 6 7 NO 4. Students successfully interacting (engaged) with curriculum.
YES 1 2 3 4 5 6 7 NO 5. Brisk pacing.
YES 1 2 3 4 5 6 7 NO 6. Continuous monitoring and structuring of students and activities.
YES 1 2 3 4 5 6 7 NO 7. Specific explanations and instructions for new concepts.
YES 1 2 3 4 5 6 7 NO 8. Allocated time for guided practice.
YES 1 2 3 4 5 6 7 NO 9. Cumulative review of skills being taught.
YES 1 2 3 4 5 6 7 NO 10. Regular and varied assessments of learning of new concepts.
YES 1 2 3 4 5 6 7 NO 11. Regular and active interactions with individual students.
YES 1 2 3 4 5 6 7 NO 12. Frequent and detailed feedback.
YES 1 2 3 4 5 6 7 NO 13. Varied forms of positive reinforcements.
YES 1 2 3 4 5 6 7 NO 14. Effective and varied questioning strategies.
YES 1 2 3 4 5 6 7 NO 15. Reinforcement for task completion.
YES 1 2 3 4 5 6 7 NO 16. Appropriate selection of examples and non-examples.
YES 1 2 3 4 5 6 7 NO 17. Clearly defined and enforced behavioral expectations.
YES 1 2 3 4 5 6 7 NO 18. Appropriate use of model/demonstration.
YES 1 2 3 4 5 6 7 NO 19. Appropriate use of behavioral rehearsal.
YES 1 2 3 4 5 6 7 NO 20. Effective, planned, & smooth transition within & between lessons.
YES 1 2 3 4 5 6 7 NO 21. High rates of correct student responding.
YES 1 2 3 4 5 6 7 NO 22. Positive, predictable, and orderly learning environment.
YES 1 2 3 4 5 6 7 NO 23. High expectations for achievement.
YES 1 2 3 4 5 6 7 NO 24. Students attention secured & maintained within & across instructional activities & materials.
SELF-ASSESSMENT EFFECTIVE TEACHING PROFILE (Sugai, 1993)

Instructions: Rate the extent to which you display the following effective teaching practices in your teaching during the practicum by circling a number on the rating scale YES 1 2 3 4 5 6 7 NO.

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<td>2. Curriculum aligned with desired outcomes.</td>
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<tr>
<td>YES 1 2 3 4 5 6 7 NO</td>
<td>3. Curriculum is delivered directly.</td>
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<td>4. Students successfully interacting (engaged) with curriculum.</td>
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<td>5. Brisk pacing.</td>
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<td>6. Continuous monitoring and structuring of students and activities.</td>
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<td>7. Specific explanations and instructions for new concepts.</td>
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<td>8. Allocated time for guided practice.</td>
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<td>9. Cumulative review of skills being taught.</td>
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<td>10. Regular and varied assessments of learning of new concepts.</td>
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<td>11. Regular and active interactions with individual students.</td>
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<td>13. Varied forms of positive reinforcements.</td>
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<td>YES 1 2 3 4 5 6 7 NO</td>
<td>14. Effective and varied questioning strategies.</td>
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<td>YES 1 2 3 4 5 6 7 NO</td>
<td>15. Reinforcement for task completion.</td>
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<td>18. Appropriate use of model/demonstration.</td>
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<td>19. Appropriate use of behavioral rehearsal.</td>
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<td>21. High rates of correct student responding.</td>
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<tr>
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<td>22. Positive, predictable, and orderly learning environment.</td>
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<tr>
<td>YES 1 2 3 4 5 6 7 NO</td>
<td>23. High expectations for achievement</td>
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<td>YES 1 2 3 4 5 6 7 NO</td>
<td>24. Students attention secured and maintained within &amp; across instructional activities &amp; materials.</td>
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APPENDIX M: Concept Map Interview Questions

Concept Map Interview Questions

Concept Map Interview Questions at Time 1 (Beginning of the Practicum):

1. Tell me everything you can about your concept map.

2. Were there concepts you weren't sure where to put?

3. Which aspect of your map are you the most certain of? Can you tell me more?

4. Which aspect of your map are you least certain of? Can you tell me more?

5. What area of your map represents the greatest teaching challenge for you?
Concept Map Interview Additional Questions at Time 2 & Time 3:

6. Did you change your map from the one you drew last time? Tell me about these changes. Can you tell me more?

7. Can you identify where this (these) change(s) came from?

8. Was there anything that you read, heard, saw, or did that influenced the changes you made in your map?

9. What made you want to change your map?

10. Can you elaborate?
APPENDIX N: Description of the Problem Codes

00 = 0 components or aspects of the problem situation, or problem objective, or problem strategy noted or used.

01 = 1 component
02 = 2 components
03 = 3 components
04 = 4 components
05 = 5 components
06 = 6 component
07 = 7 components
08 = 8 components
09 = 9 components
10 = 10 components...
APPENDIX O: Faculty Advisor Rating Criteria and Examples of Classroom/Behaviour Management Area

Rating Forms Observations

1  Ineffective Management

- Relatively little note taken by the student teacher of students' behavioral reactions to instruction.
- "Indifferent to managing the class for productive learning."
- "Not very involved with this aspect of teaching yet."
- "No evidence of managing the classroom."
- "Student is still trying to follow lesson plan and ignoring cues from the students."

2

- Discipline is reactionary and implemented after the problem has escalated to the point where all instruction has ceased.
- Discipline is focused on the 'trouble maker' or the class as a whole without much attention given to individuals or details of the problem.
- "Used what's in place before arrival."
- "Treat all behavior problems with the same solution, for example, detention."
- "Singled out one student for reprimand."
- "Used the last resort of sending the student to the principal first."
- "Heavy handed method of group control which outweighed the deed."

3

- Discipline is reactionary and uni-directional from student teacher to learner.
- Reprimands happen sooner and more closely match the deed.
- Limited personal interest taken in learners.
- "Although discipline problems may be differ in intensity, students are handled in the same way."
- "Class is taught as a whole."
4 Mid or Moderately Effective Management
• While discipline is reactionary, the focus is on positive rather than negative behavior.
• One means of managing the classroom is mentioned.
• Simple classroom rules or behavior expectations may be stated and an attempt is made to be consistent.
• "Difficulty being consistent in enforcing the rules."
• "Trying to catch them being good."
• "Movement around the classroom."
• "Some non-verbal cues are used to control behavior."

5
• Student teacher uses preventative means to manage classroom problems.
• Focus moves from just discipline to classroom management in the context of instruction.
• Two means of managing the classroom are mentioned.
• "Management using high student involvement activities."
• "Exemptions and different goals for different individual needs."
• "Lessons are usually well organized and interesting which helps to keep students focused, motivated and interested."

6
• Individual needs shape the activities, curriculum choices, and techniques selected for classroom management.
• Monitoring and feedback are means identified to assess student needs and classroom management problems.
• "Classroom meeting to determine rules all could live by."
• "Frequent use of cooperative groups or partners in which students are partners in their own learning."

7 Effective Management
• Effective two way, bi-directional nature to manage student teacher and learner interactions.
• Student teacher attempts to take the child's point of view in all interactions.
• Student is an equal partner in determining how he/she will be managed.
• "Open-ended assignments, student choice, student determined consequences."
• "Students are held responsible for their own learning, achievement, and behavior."
APPENDIX P: Faculty Advisor Rating Criteria and Examples: Individual Differences Problem Area

Rating Forms Observations

1. Minimal Accommodation
   - Relatively little note take by the student teacher of the possibility of individual differences among learners.
   - "Indifferent to individual differences."
   - "Not very involved with this aspect of teaching yet."
   - "No evidence of adjusting work to individual student needs."

2. Instruction is uni-directional from student teacher to learner.
   - Instruction is geared to meet the needs of the whole group or subgroups without much attention given to the needs of the learners within these groups.
   - "Used what's in place before arrival."
   - "Treat subgroups of individual differences i.e. ESL, the same, same instruction given."

3. Instruction is uni-directional from student teacher to learner.
   - Limited personal interest taken in learners.
   - "Although writing activities may be divergent in nature, students are given the same workload."
   - "Class is taught as a whole."

4. Mid Accommodation
   - Some individualized instruction is given to students.
   - One area or one way of accommodating individual differences is mentioned.
   - "Individual tutoring occurs."
   - "Group or buddy teaching is used to pull in students who participate minimally in activities."
   - "Use of visual aids for motivation and illustration of concepts."
• Student teacher is able to receive some feedback from the learners.
• Two areas of individual differences or two ways in which individual differences are accommodated are noted.
• “Accommodation according to interest and ability.”
• “Assessment used to determine levels of ability.”
• “Exemptions and different goals for different individual needs.”
• “Challenging students to think on their own.”
• “Given both written and verbal instructions when required.”

6

• Individual needs shape the activities and curriculum choices.
• Monitoring and feedback are means identified to assess individual differences.
• “Each child creates their own spelling lists from words with which they are unfamiliar.”
• “Individualized learning programs.”

7 Considerable Accommodation

• Two way, bi-directional nature to student teacher and learner interactions.
• Student teacher attempts to take the child’s point of view in all interactions.
• Student is an equal partner in determining what they will learn.
• “Open-ended assignments, student choice exists.”
• “Expectations for work produced by student differs from individual to individual.”
• “Students are held responsible for their own learning and achievement.”
### APPENDIX Q: Concept Map Emerging Theme Categories and Types of Entries

Represented

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<thead>
<tr>
<th>Superordinate Concepts</th>
<th>Examples of Subordinate Concepts</th>
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<tbody>
<tr>
<td>Classroom Management</td>
<td>Understanding communication, classroom management: making it work, instructions about behaviour, management of certain misbehaving students, line between teacher and friend, freedom and control</td>
</tr>
<tr>
<td>Instructional Planning</td>
<td>Planning, new ideas, lesson plans, curriculum, planning where we are going, lesson objectives met, resources</td>
</tr>
<tr>
<td>Teaching/ Instructional Strategies</td>
<td>Variety of teaching strategies, actually teaching pacing of lessons while teaching, creating innovative, creative, interactional, activities for students, multiple intelligences</td>
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<tr>
<td>Time Management/ Organization</td>
<td>Time management, organization, multitask time balance</td>
</tr>
<tr>
<td>Assessment/Evaluation</td>
<td>Assignment and evaluation, marking assessment strategies</td>
</tr>
<tr>
<td>Student Needs</td>
<td>Designing lessons to meet needs of all kids, different levels of learning, student concerns, English as a second language, learning assistance centre, inclusion, understanding school, community, and neighbourhood</td>
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### APPENDIX R: Sources of Concept Map Change Codes

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<th>Code</th>
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<td>03</td>
<td>Faculty Advisor</td>
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<td>Student Teaching Peer</td>
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<td>Student teaching experiences in general</td>
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<td>Experiences with students</td>
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<td>Experiences with other teachers, support staff (SEAs, TA)</td>
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<td>Conferences or professional development activities attended</td>
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<td>Reflection/ Self-Evaluation/ Metacognition</td>
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<td>Personal growth and development, role confidence</td>
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<td>Greater percentage of teaching load</td>
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APPENDIX S: Chapter Five Numerical Tables
Table S.1

Frequency Table for Levels of Problem Representation (PR) on the Reflective Learning Questionnaire at the Beginning of the Practicum for Classroom/Behaviour Management Problem Area

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Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
Table S.2

Frequency Table for Levels of Problem Representation (PR) During the First Half (6th Week) of the Practicum for Classroom/Behaviour Management Area

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Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
Table S.3

Frequency Table for Levels of Problem Representation (PR) During the Second Half (12th Week) of the Practicum for Classroom/ Behaviour Management Problem Area

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<tr>
<td>Total</td>
<td></td>
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</tr>
</tbody>
</table>

Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
Table S.4

Frequency Table for Levels of Problem Representation (PR) on the Reflective Learning Questionnaire at the Beginning of the Practicum for Individual Differences Problem Area

<table>
<thead>
<tr>
<th>PR Level*</th>
<th>Frequency (n=18)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorimotor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>00.0</td>
</tr>
<tr>
<td>Interrelational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>Dimensional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>22.2</td>
</tr>
<tr>
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</tr>
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<tr>
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<td></td>
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<td>0</td>
<td>00.0</td>
</tr>
<tr>
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<td>00.0</td>
</tr>
<tr>
<td>Total</td>
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<td>99.9</td>
</tr>
</tbody>
</table>

Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
Table S.5

Frequency Table for Levels of Problem Representation (PR) During the First Half (7th Week) of the Practicum for Individual Differences Problem Area

<table>
<thead>
<tr>
<th>PR Level*</th>
<th>Frequency (n=18)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorimotor</td>
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</tr>
<tr>
<td>Interrelational</td>
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<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
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<td>0</td>
</tr>
<tr>
<td>Total</td>
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<td>99.8</td>
</tr>
</tbody>
</table>

Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
Table S.6

Frequency Table for Levels of Problem Representation (PR) During the Second Half (13th Week) of the Practicum for the Individual Differences Problem Area

<table>
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<tr>
<th>PR*</th>
<th>Frequency (n=18)</th>
<th>Percent</th>
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</thead>
<tbody>
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<tr>
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<td>00.0</td>
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<td>3</td>
<td>27.7</td>
</tr>
<tr>
<td>Interrelational</td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>27.7</td>
</tr>
<tr>
<td>Dimensional</td>
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<td>4</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>Vectorial</td>
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<td>1</td>
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<tr>
<td></td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
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<td>99.6</td>
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</tbody>
</table>

Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
Table S.7

Frequency Table for the Student Teachers' Description of the Problem

Representation of the Classroom Management Problem Area on the Reflective

Learning Questionnaire During the Sixth Week of the Practicum

<table>
<thead>
<tr>
<th>No. of Aspects*</th>
<th>Problem Situation</th>
<th>Problem Objective</th>
<th>Problem Strategy</th>
</tr>
</thead>
<tbody>
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<td>Total</td>
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<td>99.7</td>
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</tr>
</tbody>
</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.8

Frequency Table for the Student Teachers' Description of the Problem Representation in Classroom Management Problem Area on the Reflective Learning Questionnaire During the Twelfth Week of the Practicum

<table>
<thead>
<tr>
<th># of Aspects*</th>
<th>Problem Situation</th>
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<th>Problem Strategy</th>
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</thead>
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<td>4</td>
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</tr>
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<td><strong>Total</strong></td>
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<td>18</td>
</tr>
</tbody>
</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.9

Frequency Table for the Student Teachers' Description of the Problem Representation of the Individual Differences Problem Area on the Reflective Learning Questionnaire During the Seventh Week of the Practicum

<table>
<thead>
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<th>Problem Objective</th>
<th>Problem Strategy</th>
</tr>
</thead>
<tbody>
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<td>%</td>
<td>F</td>
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<tr>
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<td>0</td>
<td>0.0</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>5.5</td>
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<td>2</td>
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<td>7</td>
<td>2</td>
<td>11.1</td>
<td>0</td>
</tr>
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<td>8</td>
<td>3</td>
<td>16.6</td>
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</tr>
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<td>9</td>
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<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>99.6</td>
<td>18</td>
</tr>
</tbody>
</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.10

Frequency Table for the Student Teachers' Description of the Problem Representation of the Individual Differences Problem on the Reflective Learning Questionnaire During the Thirteenth Week of the Practicum

<table>
<thead>
<tr>
<th># of Aspects*</th>
<th>Problem Situation F %</th>
<th>Problem Objective F %</th>
<th>Problem Strategy F %</th>
</tr>
</thead>
<tbody>
<tr>
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<td>8 44.4</td>
<td>0 0.0</td>
</tr>
<tr>
<td>1</td>
<td>1 5.5</td>
<td>6 33.3</td>
<td>0 0.0</td>
</tr>
<tr>
<td>2</td>
<td>2 11.1</td>
<td>3 16.6</td>
<td>1 5.5</td>
</tr>
<tr>
<td>3</td>
<td>6 33.3</td>
<td>0 0.0</td>
<td>7 38.8</td>
</tr>
<tr>
<td>4</td>
<td>2 11.1</td>
<td>1 5.5</td>
<td>4 22.2</td>
</tr>
<tr>
<td>5</td>
<td>2 11.1</td>
<td>0 0.0</td>
<td>2 11.1</td>
</tr>
<tr>
<td>6</td>
<td>3 16.6</td>
<td>0 0.0</td>
<td>4 22.2</td>
</tr>
<tr>
<td>7</td>
<td>2 11.1</td>
<td>0 0.0</td>
<td>0 0.0</td>
</tr>
<tr>
<td>8</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
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<tr>
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<td>18 99.8</td>
<td>18 99.8</td>
</tr>
</tbody>
</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.11

Student Teachers' Level of Problem Representation (PR) of the Classroom Management Problem Area on the Case Study Scenarios at the Beginning, and End of the Practicum Experience

<table>
<thead>
<tr>
<th>PR*</th>
<th>Beginning PR</th>
<th>%</th>
<th>13th Week PR</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorimotor</td>
<td>3</td>
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<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>11.1</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td>6</td>
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<td>5</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>27.7</td>
<td>5</td>
</tr>
<tr>
<td>Interrelational</td>
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<td>5</td>
<td>27.7</td>
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</tr>
<tr>
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<td>0</td>
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<td>2</td>
</tr>
<tr>
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<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
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<td>Dimensional</td>
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<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Vectorial</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
F = Frequency
Table S.12

Student Teachers' Level of Problem Representation (PR) of the Individual Differences Problem Area on the Case Study Scenarios at the Beginning, and End of the Practicum Experience

<table>
<thead>
<tr>
<th>PR*</th>
<th>Beginning PR</th>
<th></th>
<th>13th Week PR</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
</tbody>
</table>

| Sensorimotor | 3  | 0  | 0.0 | 0  | 0.0 |
| Interrelational | 1  | 5  | 27.7 | 0  | 0.0 |
|               | 2  | 4  | 22.2 | 8  | 44.4 |
|               | 3  | 4  | 22.2 | 4  | 22.2 |
| Dimensional   | 1  | 5  | 27.7 | 5  | 27.7 |
|               | 2  | 0  | 0.0  | 1  | 5.5 |
|               | 3  | 0  | 0.0  | 0  | 0.0 |
| Vectorial     | 1  | 0  | 0.0  | 0  | 0.0 |

Note:
PR = Problem representation
*Lowest to Highest Levels of Problem Representation
F = Frequency
Table S.13

Frequency Table for the Student Teachers' Description of the Classroom

Management Problem Representation for the Case Scenarios at the Beginning of the Practicum

<table>
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<th>Problem Situation F</th>
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<th>%</th>
<th>Problem Objective F</th>
<th>F</th>
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Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.14

Frequency Table for the Student Teachers' Description of the Classroom

Management Problem Representation for Case Scenarios During the Thirteenth Week of the Practicum

<table>
<thead>
<tr>
<th># of Aspects*</th>
<th>Problem Situation</th>
<th>Problem Objective</th>
<th>Problem Strategy</th>
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<td>F</td>
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</tr>
<tr>
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</tr>
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<td>Total</td>
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</tr>
</tbody>
</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.15

Frequency Table for the Student Teachers' Description of the Individual Differences Problem Representation for Case Scenarios at the Beginning Week of the Practicum

<table>
<thead>
<tr>
<th># of Aspects*</th>
<th>Problem Situation F</th>
<th>%</th>
<th>Problem Objective F</th>
<th>%</th>
<th>Problem Strategy F</th>
<th>%</th>
</tr>
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<td>0.0</td>
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<td>16.6</td>
</tr>
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<td>4</td>
<td>22.2</td>
<td>3</td>
<td>16.6</td>
<td>5</td>
<td>27.7</td>
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<td>3</td>
<td>7</td>
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<td>6</td>
<td>33.3</td>
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<td>0.0</td>
<td>4</td>
<td>22.2</td>
</tr>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
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<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
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<td>0.0</td>
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<td>0.0</td>
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<td>0</td>
<td>0.0</td>
</tr>
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<td>18</td>
<td>99.8</td>
<td>18</td>
<td>99.8</td>
</tr>
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</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.16

Frequency Table for the Student Teachers’ Description of the Individual Differences Problem Representation for Case Scenarios During the Thirteenth Week of the Practicum

<table>
<thead>
<tr>
<th># of Aspects*</th>
<th>Problem Situation F</th>
<th>%</th>
<th>Problem Objective F</th>
<th>%</th>
<th>Problem Strategy F</th>
<th>%</th>
</tr>
</thead>
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<tr>
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<td>0.0</td>
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<tr>
<td>1</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>11.1</td>
<td>1</td>
<td>5.5</td>
<td>6</td>
<td>33.3</td>
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<td>11</td>
<td>61.1</td>
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<td>7</td>
<td>38.8</td>
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<td>22.2</td>
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<td>0.0</td>
<td>3</td>
<td>16.6</td>
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<td>5.5</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>11.1</td>
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<td>6</td>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0.0</td>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
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<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
<td><strong>99.9</strong></td>
<td><strong>18</strong></td>
<td><strong>99.9</strong></td>
<td><strong>18</strong></td>
<td><strong>99.8</strong></td>
</tr>
</tbody>
</table>

Note:
*Least to Largest number of aspects noted
F = Frequency
Table S.17

Frequency Table for Advisors' Ratings of the Effectiveness of Student Teachers' Classroom/ Behaviour Management During the First Half (7th week) of the Practicum

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency (n = 18)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ineffective Management</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Mid</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Effective Management</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>
Table S.18

Frequency Table for Advisors' Ratings of the Effectiveness of Student Teachers' Classroom/ Behaviour Management During the Second Half (13th Week) of the Practicum

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 18)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ineffective Management</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Mid</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>16.6</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>16.6</td>
</tr>
<tr>
<td>Effective Management</td>
<td>7</td>
<td>10</td>
</tr>
</tbody>
</table>
Table S.19

Frequency Table for Advisors' Ratings of Student Teachers' Accommodation of Individual Differences During the First Half (7th week) of the Practicum

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency (n = 18)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Accommodation</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Mid</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Accommodation</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Considerable</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Accommodation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table S.20

Frequency Table for Advisors' Ratings of Student Teachers' Accommodation of Individual Differences During the Second Half (13th Week) of the Practicum

<table>
<thead>
<tr>
<th>Rating</th>
<th>Frequency (n = 18)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Accommodation</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Mid</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Accommodation</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Considerable</td>
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<tr>
<td>Accommodation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table S.21

Frequency Table for Student Teachers' Self-Assessment Ratings on the Effective Teaching Rating Scale During the First (7th Week) and Second (Week 13) Halves of the Practicum

<table>
<thead>
<tr>
<th>Rating</th>
<th>Total Number of Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 2</td>
</tr>
<tr>
<td>Most Effective</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Mid Effective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Least Effective</td>
<td>7</td>
</tr>
</tbody>
</table>
Table S.22

Frequency Table for Faculty Advisors' Ratings of Student Teachers on the Effective Teaching Rating Scale During the First (7th Week) and Second (13th Week) Halves of the Practicum

<table>
<thead>
<tr>
<th>Rating</th>
<th>Total Number of Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Time 2</td>
</tr>
<tr>
<td>Most Effective</td>
<td>1</td>
</tr>
<tr>
<td>Effective</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Mid Effective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Least Effective</td>
<td>7</td>
</tr>
</tbody>
</table>
Table S.23

Summary of the Types of Concept Bubbles Over the Course of the Practicum

<table>
<thead>
<tr>
<th>Time Period</th>
<th># of Bubbles</th>
<th># of Links</th>
<th># of Cross Links</th>
<th># of Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>Maximum</td>
<td>67</td>
<td>67</td>
<td>8</td>
<td>257</td>
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<tr>
<td>Total</td>
<td>630</td>
<td>630</td>
<td>15</td>
<td>2356</td>
</tr>
<tr>
<td>TIME 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>39</td>
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<tr>
<td>Maximum</td>
<td>53</td>
<td>53</td>
<td>6</td>
<td>286</td>
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<tr>
<td>Total</td>
<td>515</td>
<td>516</td>
<td>23</td>
<td>2438</td>
</tr>
<tr>
<td>TIME 3</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
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<td>2</td>
<td>0</td>
<td>36</td>
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<tr>
<td>Maximum</td>
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<td>54</td>
<td>4</td>
<td>173</td>
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Table S.24

Summary of the Types of Concept Bubbles Over the Course of the Practicum

<table>
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<tr>
<th>Time</th>
<th># of Concepts</th>
<th># of Statements</th>
<th># of Questions</th>
<th># Exclamations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
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</tr>
<tr>
<td>Maximum</td>
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<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>271</td>
<td>39</td>
<td>0</td>
</tr>
<tr>
<td>TIME 2</td>
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<tr>
<td>Minimum</td>
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<td>0</td>
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<tr>
<td>Total</td>
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<tr>
<td>TIME 3</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
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<td>0</td>
</tr>
<tr>
<td>Maximum</td>
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<td>18</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>272</td>
<td>188</td>
<td>17</td>
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</table>
Table S.25

Summary of Total Number of Bubbles in Each Layer of the Concept Map over the Course of the Practicum

<table>
<thead>
<tr>
<th>Time Period</th>
<th># in Layer 1</th>
<th># in Layer 2</th>
<th># in Layer 3</th>
<th># in Layer 4</th>
<th># in Layer 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
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<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>10</td>
<td>40</td>
<td>26</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>340</td>
<td>174</td>
<td>26</td>
<td>4</td>
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<tr>
<td>TIME 2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>0</td>
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<tr>
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<td>0</td>
</tr>
<tr>
<td>TIME 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>8</td>
<td>42</td>
<td>19</td>
<td>4</td>
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</tr>
<tr>
<td>Total</td>
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<td>302</td>
<td>81</td>
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</table>
Table S.26

Teaching Challenges Superordinate Concept Theme Summary

<table>
<thead>
<tr>
<th>Superordinate Concepts</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Time 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom Management</td>
<td>21</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>Instructional Planning</td>
<td>16</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Teach/Instructional. Strategies</td>
<td>7</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Time Mgmnt/Org/Pacing</td>
<td>9</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Assessment/Evaluation</td>
<td>4</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Student Needs</td>
<td>12</td>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Note:

Teach/Instructional Strategies = Teaching/ Instructional Strategies

Time Mgmnt/Org/Pacing = Time Management/ Organization/ Pacing
Table S.27

Summary of Selected Student Teachers’ Levels of Problem Representation Over the Course of the Practicum

<table>
<thead>
<tr>
<th>TIME 1</th>
<th>Reflective Learning Questionnaire</th>
<th>Case Study</th>
<th>FA Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code #</td>
<td>CM ID</td>
<td>CM ID</td>
<td>CM ID</td>
</tr>
<tr>
<td>#6 Jill</td>
<td>00 04</td>
<td>01 04</td>
<td>- -</td>
</tr>
<tr>
<td>#9 Carole</td>
<td>05 03</td>
<td>04 02</td>
<td>- -</td>
</tr>
<tr>
<td>#13 Kim</td>
<td>05 04</td>
<td>04 03</td>
<td>- -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME 2</th>
<th>Reflective Learning Questionnaire</th>
<th>Case Study</th>
<th>FA Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code #</td>
<td>CM ID</td>
<td>CM ID</td>
<td>CM ID</td>
</tr>
<tr>
<td>#6 Jill</td>
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<td>05 06</td>
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Note:
CM = Classroom/ Behaviour Management Problem Area
ID = Individual Differences Problem Area
FA = Faculty Advisor Ratings

*Student Teachers’ Overall Level of Problem Representation
#6 Jill Interrelational Stage of Problem Representation
#9 Carole Dimensional Stage of Problem Representation
#13 Kim Dimensional Stage of Problem Representation
Table S.28

Summary of Concept Map Interview Sources of Change at Time 2 and Time 3

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<th>Question #8</th>
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