

Examining Teachers' Approaches to Teaching in Classroom Contexts:
An Exploration of Learner-Centered Classroom Designs

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ABSTRACT

Examining Teachers' Approaches to Teaching in Classroom Contexts: An Exploration of Learner-Centered Classroom Designs

Mary Ann Doucette

The purpose of this qualitative study was to examine teaching approaches used by teachers in classroom contexts, and to explore how their classroom designs and teaching approaches contributed to learner-centered practices. Using a case study approach, this study involved two elementary classroom teachers who shared their own insights and understandings of learner-centered instruction, and the teaching approaches that they used in their classroom designs. The research design incorporated data collection in classroom contexts over a period of five weeks through: (a) the Approaches to Teaching Inventory questionnaire (Trigwell & Prosser, in press), (b) classroom observations based on the running record instrument developed by Perry (1998), and (c) reflective practice interviews about the teachers' use of teaching activities (Wise, Spiegel & Bruning, 1999), their understandings of learner-centered instruction, and what they considered to be facilitators and barriers to adopting learner-centered practices in classrooms.

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INTRODUCTION

Teachers and students work together in the psychological soup of a classroom, a soup comprised of cognitive, social, cultural, affective, emotional, motivational, and curricular factors (Shuell, 1996). The American Psychological Association's learner-centered psychological principles define the major factors (cognitive and metacognitive, motivational and affective, developmental and social, and individual differences) that influence learning and academic achievement from the perspective of the individual learner. One important application of learner-centered principles is that learners must be involved in the generation, and constant creation of the learning environment. At the same time, we must consider how and in what ways teachers support learners who take responsibility for their learning.

In learner-centered classrooms, teachers must create teaching-learning contexts that foster learning for understanding and self-regulation (Borko & Putnam, 1995). The research on the role of teachers in promoting student regulated learning provides several insights into the knowledge, skills and dispositions classroom teachers need in order to create effective learner-centered classrooms. Student-regulated learning is more likely to develop when teachers guide rather than direct students' learning, acting as facilitators or coaches rather than managers. They embed instruction in activities that will be meaningful to students and responsive in their interactions with children (Perry, 1998).

The studies of teaching approaches indicate that where teachers adopt more student-focused approaches to teaching, their students adopt a deeper approach to learning (Trigwell & Prosser, in press). The research findings indicate that teachers who are strategic learners may be more likely to include coaching of learning as a part of their classroom instruction;

whereas teachers who are less strategic in their approach may not have the knowledge to do so or may not perceive the importance of doing so (Hamman, Berthelot, Saia & Crowley, 2000).

As part of teacher professional development, reflective practice provides teachers with one method of looking at their classroom practices and beliefs and the impact they have on students' attitudes and learning. There is some general agreement that teachers who engage in reflective practice are able to analyze their own teaching strategies and the context in which their teaching occurs; and that they are able to stand back from their own teaching, evaluate the situation and take responsibility for their own action (Farrell, 2001).

The literature review focuses on three areas of research related to learner-centered classrooms: (a) teaching-learning contexts, (b) teaching approaches adopted by teachers, and (c) teachers' engagement in reflective practice.

Teaching-learning contexts for learner-centered classrooms

The notion of learner-centered classrooms stems from constructivist learning theories and recent advances in theory and research in developmental and cognitive psychology. The assumption underlying constructivist theories is that learners construct their knowledge as they attempt to make sense of their environments and their experiences (Smith & Ragan, 1999). In contrast, behavioral and cognitive information processing models regard knowledge as existing independently of the learners, and that learning occurs when knowledge is transferred from outside to within the learner. Although learner-centered instruction is a recurring theme in the overall development of learning theories, the constructivist perspective holds that learners should be actively involved in determining and satisfying their learning needs. The adoption of constructivist theories and approaches in

classrooms suggests the co-involvement of the learners in managing their own learning and teachers in helping learners to engage in their learning and the learning process.

It is only recently that the immense psychological knowledge based on research findings in developmental and cognitive psychology, and on the emotional, motivational, personality, and social processes of individual learners has been transferred to the field of education (Lambert & McCombs, 1998). That knowledge base specifies factors that influence learning and academic achievement from the perspective of the individual learner. The 14 psychological principles, jointly developed by the American Psychological Association and the Mid-Continent Regional Educational Laboratory, are intended to provide a theoretical framework to deal holistically with learners in the context of learner-centered classrooms.

Table 1 lists the learner-centered psychological principles according to four domains (cognitive and metacognitive, motivational and affective, developmental and social, and individual differences), and provides a brief description of each principle. Looking across the domains covered in the learner-centered psychological principles, it becomes apparent that there is emphasis on both the learner and learning.

Table 1

The Learner-Centered Psychological Principles (Lambert & McCombs, 1998)

Principle	Explanation
Cognitive and Metacognitive	
1. Nature of the learning process	The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

- | | |
|----------------------------------|--|
| 2. Goals of the learning process | The successful learner, over time and with support and instructional guidance, can create meaningful, coherent representations of knowledge. |
| 3. Construction of knowledge | The successful learner can link new information with existing knowledge in meaningful ways. |
| 4. Strategic thinking | The successful learner can create and use a repertoire of thinking and reasoning strategies to achieve complex learning goals. |
| 5. Thinking about thinking | Higher order strategies for selecting and monitoring mental operations facilitate creative and critical thinking. |
| 6. Context of learning | Learning is influenced by environmental factors including culture, technology, and instructional practices. |

Motivational and Affective

- | | |
|--|---|
| 7. Motivational and emotional influences on learning | What and how much is learned is influenced by the learner's motivation. Motivation to learn, in turn, is influenced by the individual's emotional states, beliefs, interests and goals, and habits of thinking. |
| 8. Intrinsic motivation to learn | The learner's creativity, higher order thinking, and natural curiosity all contribute to motivation to learn. |
| 9. Effects of motivation on effort | Acquisition of complex knowledge and skills requires extended learner effort and guided practice. |

Developmental and social

- | | |
|--|---|
| 10. Developmental influences on learning | As individuals develop, there are different opportunities and constraints for learning. |
|--|---|

- | | |
|--|---|
| 11. Social influences on learning | Social interactions, interpersonal relations, and communication with others influence learning. |
| Individual differences | |
| 12. Individual differences on learning | Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity. |
| 13. Learning and diversity | Learning is most effective when differences in learners' linguistic, cultural, and social backgrounds are taken into account. |
| 14. Standards and assessment | <p>Setting appropriately high and challenging standards and assessing the learner as well as learning progress.</p> <p>Including diagnostic, process, and outcome assessment, are integral parts of the learning process.</p> |
-

Under the cognitive and metacognitive factors, the first principle, nature of the learning process acknowledges that there are different learning processes and that successful learners are active, goal directed, self-regulating and assume personal responsibility for their learning. The second principle, goals of the learning process, indicates that learners must generate and pursue personally relevant goals in order to develop a goal-directed approach in their thinking and learning strategies. For the construction of knowledge principle, learners must adopt strategies to integrate new knowledge with prior knowledge and to transfer this newly acquired knowledge to other situations. Successful learners use a repertoire of strategies to achieve learning and performance goals and to apply their knowledge in new situations (strategic thinking). The fifth principle, thinking about thinking, involves reflective

thinking and the generation of alternative methods by students to achieve their learning goals. Environmental factors in the learning context can have a strong impact on student learning (context of learning).

The motivational and affective factors involve motivational and emotional influences on learning; intrinsic motivation to learn; and effects on motivation to learn. Motivational and emotional factors impact learning in that thoughts, beliefs, goals and expectations for success or failure can facilitate or interfere with the learner's quality of thinking and information processing. Intrinsic motivation is facilitated on tasks that learners perceive as personally relevant and meaningful and that are representative of real-life situations and offer choice and control. The ninth principle, effects of motivation on effort, indicates that learners must invest considerable energy, strategic effort and persistence in order to acquire complex knowledge and skills.

The tenth and eleventh principles focus on the developmental influences and social influences of learning. To address variations in individual development, learning materials should be appropriate to the specific developmental level of intellectual, social, emotional and physical domains. Classroom settings that provide opportunities for learners to interact and collaborate on instructional activities also encourage learners to engage in flexible thinking and become socially competent.

The last two principles deal with individual differences. As individual preferences for learning may not always be useful in helping learners reach their learning goals, learners need to examine their preferences and adjust them as necessary. Learning environments should be designed to ensure learning is not negatively impacted by differences in language, ethnicity, race, beliefs, and socio-economic background. The last principle, standards and assessments, focuses on the need to have ongoing assessment in order to provide learners and teachers

with feedback about progress towards the learning goals. As well, the assessment practices should enable learners to feel challenged to work towards their learning goals.

Learner-centered models, derived from the American Psychological Association's learner-centered psychological principles, consider the learner, learning and learning context in a holistic manner. However, these models do not articulate what particular form or look learner-centered classrooms should take in order to help teachers design their classrooms and instructional activities.

Generally, learner-centered classrooms are defined as classrooms in which learners take responsibility for their own learning, and learners together with their teachers are actively involved in the learning process. The common image of a teacher standing in front of a class, giving information to 25 or 30 students who are sitting more or less passively at their desks (i.e. teaching by telling and learning by remembering) is simply archaic according to current thinking in psychology and education (Shuell, 1996). Instead teachers are expected to treat learners as co-creators in the teaching and learning process, as individuals with ideas and issues that deserve attention and consideration (Lambert & McCombs, 1998). Lambert and McCombs also advocated that the shared responsibility for learning that occurs between teachers and students is a cornerstone of learner-centered practices.

To address the gap between theory and practice, research studies have focused on the teaching-learning contexts that support learner-centered classrooms. While some researchers have examined the features of learner-centered classrooms through classroom observations, interviews and surveys (Perry, VandeKamp, Mercer and Nordby, 2002; Patrick & Middleton, 2002); other literature has focused on the development of models and conceptual frameworks related to teaching-learning contexts that support learner-centered instruction (Pintrich et al., 1993; Borko & Putnam, 1998; Lambert & McCombs, 1998;

McCombs, 1998). Table 2 lists the six overarching features of teaching-learning contexts for learner-centered classrooms that have emerged in the literature.

Table 2

Features of Teaching-Learning Contexts for Learner-Centered Classrooms

Theme	Explanation	Reference
Teacher's role	Teacher who guides (facilitates) student learning through questioning to clarify, correct, and elaborate, and scaffolding.	Pintrich et al., 1993; McCombs, 1998; Perry et al., 2002.
Types of tasks	Tasks that promote active processing such that students learn through their actions on concepts.	Pintrich et al., 1993; Borko & Putnam, 1998; Lambert & McCombs, 1998; McCombs, 1998; Perry et al., 2002.
Student's role	Students are challenged to invest effort and energy, and to take personal responsibility for their learning.	Alexander & Murphy, 1998; McCombs, 1998; Perry et al., 2002.
Learning environment	Environment that supports positive interpersonal relationships, and provides opportunities for students to exercise personal control and choice.	Pintrich et al., 1993; Lambert & McCombs, 1998; Borko & Putnam, 1998; Perry et al., 2002.

Assessment methods	Assessment methods that are non-threatening reveal students' thinking and highlight the value of learning processes and learning tasks.	Borko & Putnam, 1998; Perry et al., 2002.
Evaluation structures	Evaluation structures that are ongoing, improvement-based, and errors are regarded as opportunities to learn.	Pintrich et al., 1993; Perry et al., 2002.

In learner-centered classrooms, the teacher guides (facilitates) student learning through the use of questions to clarify, correct or elaborate. Through scaffolding, the teacher provides the guidance required for learners to bridge the gap between the current knowledge or skill levels and the desired knowledge or skill levels. As learners are able to complete tasks on their own, the guidance from teacher can be withdrawn. Learners engage in tasks that promote active processing such that they learn through actions on concepts. Reference is often made to open tasks that allow students to learn through experimentation and by solving previously unencountered problems. The role of the students becomes more active and collaborative. Students are challenged to invest effort and energy, and to take personal responsibility for asking questions and guiding their own learning. The teacher builds a safe, trusting and supportive classroom environment by demonstrating real interest, caring, and concern for each student, and by providing students with opportunities to exercise personal control and choice over carefully selected task variables, such as type of learning activity, level of mastery, amount of effort, or type of reward.

The assessment methods are non-threatening, reveal students' thinking and highlight the value of learning processes and learning tasks. The teacher uses appropriate assessments that challenge the learner as well as learning progress (diagnostic, process and outcome assessment). Evaluation in learner-centered classrooms is ongoing, improvement-based, and errors are regarded as opportunities to learn. It consists of teacher, peer and self-evaluation practices that acknowledge students' accomplishments and encourage them to reward themselves and develop pride in their accomplishments.

When designing learner-centered instruction in their classroom practices, teachers must consider the teaching approaches and specific instructional strategies that support their role as guides or facilitators.

Teaching Approaches

Sprinthall, Reiman, and Thies-Sprinthall, (1996) stated that teacher characteristics, attitudes, conceptions of self, and intellectual and interpersonal dispositions in large measure determine both the explicit and the so-called hidden agenda of the classroom. The materials, lesson plan, and objectives represent the formal curriculum, but the informal agenda is the classroom context as indicated by teaching strategies adopted by the teacher. It is only recently that the importance of the teacher in the educational process has received adequate theoretical and research attention.

Student-focused teaching strategies are broad strategies adopted by teachers to change students' conceptions by helping them learn how to learn. In the first stage of their two-part research, Trigwell and Prosser (in press) interviewed university teachers and their first-year science students to investigate whether there were relations between the way teachers approached teaching and the ways their students approached learning. As shown in Table 3, the researchers identified five distinct teaching approaches.

Table 3

Five Categories of Approaches to Teaching (Trigwell & Prosser, in press)

Strategy	Approach
Teacher-Focused	A. Teacher-focused teaching strategy with the intention of transmitting information to students.
	B. Teacher-focused teaching strategy with the intention that students acquire the concepts of the discipline.
Teacher- and Student-Focused	C. Teacher and student interaction teaching strategy with the intention that students acquire the concepts of the discipline.
Student-Focused	D. Student-focused teaching strategy aimed at students developing their conceptions.
	E. Student-focused teaching strategy aimed at students changing their conceptions.

Approaches A and B reflect a teacher-focused teaching strategy, whereas Approaches D and E depict a student-focused teaching strategy. Approach C indicates an interactive combination of student and teacher-focused teaching strategies.

In the second phase of their research study, Trigwell and Prosser developed the Approaches to Teaching Inventory questionnaire to collect data for analysis of relations between teaching strategies and other elements of the teaching-learning environment perceived by the same teacher in the same context. The Approaches to Teaching Inventory questionnaire measures teaching intentions (Information Transmission (IT) and Conceptual Change (CC)), and teaching strategies (teacher-focus (TF) and student-focus (SF)).

In a related study involving middle-school teachers and students, Hamman, Berthelot, Saia, and Crowley (2000), examined types and frequency of coaching of learning and their relation to students' strategic learning. The purpose of their study was to test the premise that teachers who were strategic learners may be more likely to include coaching of learning as a part of their classroom instruction, whereas teachers who were less strategic in their approach may not have the knowledge to do so or may not perceive the importance of doing so. The researchers gathered data through the use of student self-report questionnaires and classroom observations. The findings of this study indicated that teachers' coaching of learning is positively associated with students' strategic-learning activity. The researchers found that the two most common forms of teachers' coaching was describing the cognitive processes that students might go through when accomplishing a task (e.g., "Think about what number you can divide by in the numerator and denominator."), and making suggestions for strategy use (e.g., "You might want to keep your book handy so you could refer to it.")

In contrast to general teaching strategies, instructional strategies include the various aspects of sequencing and organizing instruction and deciding how to deliver it in order to elicit particular student learning outcomes. Recent studies on instructional strategies that support student-focused teaching strategies are based on data collection through classroom observations (Moallem, 1998; Hamman, Berthelot, Saia, & Crowley, 2000) and interviews (Moallem, 1998).

For learner-centered classrooms, the literature supports tasks and instructional strategies that promote problem solving learning (Shuell, 1996; Moallem, 1998; Smith & Ragan, 1999; Hamman, Berthelot, Saia, & Crowley, 2000). Smith and Ragan (1999) stated that the instructional strategies for teachers to introduce the problem-solving activity

involved deploying attention, arousing interest and motivation, establishing instructional purpose and previewing the lesson. The teacher should help students recall prior knowledge by explicitly reviewing prior knowledge and by suggesting ways for learners to reorganize knowledge in a more beneficial way. Information processing can be achieved by verbalizing task requirements and by providing model think-alouds; and attention should be focused to isolate critical attributes of the goals of the task. The teacher should help students employ learning strategies by asking guiding questions and providing hints. Practice should involve the students in identifying and clarifying the task and the learning goals, and feedback from the teacher should involve hints and questions as well as model solutions of the process. At the end of the lesson, the teacher should include a summary and review and help students transfer knowledge to similar problems outside the classroom. Assessment methods should enable students to test their abilities to solve similar but novel problems and to test their abilities to justify solutions, and the feedback should identify the nature of the whether problems (e.g. pattern recognition, explaining solution).

While teachers acquire some professional knowledge from "package" educational principles and skills, the bulk of their learning comes through continuous action and reflection on everyday problems (Sparks-Langer, 1992). This suggests that teachers' engagement in reflective practice is an integral component for the development of teaching approaches and specific instructional strategies that support learner-centered practices.

Reflective Practice

Reflection-in-action and reflection-on-action are two main aspects of reflective practice. An individual's ability to think about what they are doing while they are doing it is referred to as reflection-in-action (Schön, 1987). Similar to metacognition, teachers who engage in reflection-in-action are aware of their own thinking and the self-regulatory

behaviour that accompanies this thinking (Driscoll, 1994). On the other hand, reflection-on-action means that teachers are expected to stand back from their own teaching, evaluate the situation and take responsibility for their own future actions (Calderhead, 1992). In this type of reflective practice, teachers describe what they and their students were doing in the classrooms (method), explain why or why not they were doing it (reason), and indicate whether they would change anything based on the information gathered from their descriptions and explanations (justification).

Research studies of teacher reflective practice have been based on analyses of theoretical models (Schön, 1987; Calderhead, 1992; Sprinthall, Reiman & Thies-Sprinthall, 1996). Other investigations of teacher reflective practice have been situated in classroom contexts and studied by means of classroom observations (Mackinnon & Grunau, 1994; Hatton & Smith, 1995; Orrill, 2001); interviews (Mackinnon & Grunau, 1994; Hatton & Smith, 1995; Farrell, 2001; Orrill, 2001; Zeek, Foote & Walker, 2001); questionnaires (Hatton & Smith, 1995; Wise, Spiegel & Bruning, 1999); workshops (Wise, Spiegel & Bruning, 1999); and written journals (Farrell, 2001). The literature on reflective practice has looked at teachers learning to subject their own beliefs of teaching and learning to a critical analysis, and taking more responsibility for their actions in the classroom.

Wise, Spiegel and Bruning (1999) stated that effective professional development can provide teachers with the means to engage in exploration, research-based inquiry, reflection, experimentation, and practice, while providing collegial sharing of knowledge and opportunities to draw on the expertise of others in the community. In workshops with science teachers, Wise et al. (1999) used a reflective practice exercise to provide teachers with one method of looking at classroom practices and beliefs and the impact they have on students' attitudes and learning. The researchers found that teachers often reported student

performance improved with the implementation of a new lesson or strategy. However, many of the teachers could not specify how they came to know this. This led the researchers to conclude that most teachers assessed student performance through informal means.

In the Professional Development Framework model developed by Orrill (2001), teachers worked one-on-one with a professional developer to build a common set of experiences so that reflection on enactment could occur. Then the teachers reflected on how the pieces of what they did worked together and how they were helping their students meet the goals they had set for them. Their reflective practice was refined through repetition of reflective questions that evolved to be more specific and in depth.

In order for reflective teaching to happen, opportunities must be created for teachers to use conscious reflection as a means of understanding the relationship between their own thoughts and actions (Farrell, 2001). Farrell also identified four barriers to the achievement of reflective practice. Teachers (a) generally do not associate reflection with working but one more academic exercise; (b) need time and opportunity for development; (c) may feel vulnerable if they expose themselves to a group of strangers; and (d) consider the ideology of reflection to be quite different than traditional approaches to teacher education.

The foregoing literature review indicates that a discrepancy may exist between theory and research, and how teachers design their own classrooms in an effort to support learner-centered teaching practices. This discrepancy is due in part to the lack of a comprehensive and cohesive learner-centered classroom design framework for teachers to apply in their classrooms, and to the shortage of research studies that have examined the teaching approaches used by teachers in their classroom contexts. This research is necessary to support the ongoing professional development of classroom teachers to adopt teaching

approaches and to design classrooms that promote the shared responsibility for learning between teachers and their students.

The purpose of this qualitative study was to examine teaching approaches used by teachers in classroom contexts, and to explore how their classroom designs and teaching approaches contributed to learner-centered practices. Specifically, this research addresses four questions:

1. What understanding do teachers have of learner-centered practices and do they see evidence of it when they reflect on their classrooms?
2. Do teachers describe their teaching approach as student-focused or as teacher-focused?
3. Is there correspondence between their self-reports and what takes place in practice?
4. What are the facilitators and barriers for teachers to adopt learner-centered practices in classrooms?

Using a case study approach, this study involved two elementary classroom teachers who shared their own insights and understandings of learner-centered instruction and the teaching approaches that they used in their classroom designs. Building on previous research, this study drew upon data collection instruments and procedures used in studies of learner-centered classrooms, teaching approaches, and reflective practice. The research design incorporated data collection in classroom contexts over a period of five weeks through: (a) the Approaches to Teaching Inventory questionnaire (Trigwell & Prosser, in press), (b) classroom observations based on the running record instrument developed by Perry (1998), and (c) reflective practice interviews about the teachers' use of teaching activities (Wise, Spiegel & Bruning, 1999), their understandings of learner-centered instruction, and what they considered to be facilitators and barriers to adopting learner-centered practices in classrooms.

PROCEDURES

Sample and Site

The study participants were volunteers from a sample of 65 elementary classroom teachers. Teachers were informed that their participation in the study would provide them with an opportunity to share their own insights and understandings of learner-centered practices and the teaching approaches that they used in their classroom designs. Also, the teachers were informed that they would receive a copy of the report and that they would be invited to participate in a workshop at the conclusion of the study.

Amanda and Kim (pseudonyms) who had over 15 years teaching experience agreed to participate, and consented to release data from the study for research purposes. The teachers had taught a variety of grades and subjects, and at the time of the study, they were teaching grade 6 students. The study took place in two medium-size schools. Amanda's school was located in the inner city and Kim's school was located in a suburban area.

Access and Permissions

In July 2002 the research proposal was submitted to the school board, and in mid-September approval was received from the school board's research ethics committee to recruit elementary classroom teachers for the study. An invitation was received from the school board to present the research proposal to a group of 65 elementary classroom teachers at a professional development workshop held in late October 2002. During the presentation, the teachers were provided with an overview of the study, and information about what would be required of participants and that their participation in the study was completely voluntary. The teachers were informed that the data from the study would be

kept locked and stored in the Thesis Supervisor's cabinet for up to five years, and that the results of the study would be published in a Thesis. Refer to Appendix A to see a copy of the speaking notes. Each teacher was provided with a package of information that included a letter of invitation (see Appendix B), consent form to participate in the study (see Appendix C), business card (Appendix D) and a return envelope with postage. At the end of the presentation, the teachers were asked to return the consent forms and completed questionnaires by November 6, 2002.

In mid-November the school board was contacted to inform the research advisor that no responses were received from the teachers. The research advisor e-mailed the teachers to remind them about the study. A few teachers called the researcher to obtain more information about the study, or to receive a package of information. In early January 2003, two teachers volunteered and expressed their strong interest to participate in the study. As instructed by the school board, the principals from the teachers' schools were contacted to advise them about the study. The principals also received information about the study from the school board.

Data Collection Strategies

Qualitative methodologies have the potential to increase our understandings of teaching-learning contexts, and how teachers can facilitate positive interactions and build features within the classroom that support students as active learners. Classroom observations allow researchers to look at the interactions between teachers and students, and to understand how events occur in the classroom context (Butler, 2002; Perry, 2002). Interviews enable researchers to complement their observations by allowing respondents to reveal and explain events and experiences in their own words and from their own perspectives (Butler, 2002; Patrick & Middleton, 2002). Self-report surveys provide insights

about an individual's intentions and perceptions; however, the surveys do not tell us how features of a particular learning context can influence what learners and teachers think and do (Perry, 2002).

The study examined (a) features of teaching-learning contexts for learner-centered classrooms, (b) teaching approaches and (c) reflective practice. To address these elements, three primary sources of data were used: self-report questionnaires completed by teachers, classroom observations combined with unstructured post interviews, and reflective practice interviews with the teachers.

The Approaches to Teaching Inventory (Trigwell & Prosser, in press) measures Information Transmission (IT)/Teacher-Focus (TF) approach to teaching and Conceptual Change (CC)/Student-Focus (SF) approach to teaching. The Inventory consists of 16 items on a five-point scale. As shown in the copy of the questionnaire in Appendix E, the teachers were asked to provide the date, name of the school and the teacher's name, and to describe their teaching context (class or subject and grade). By identifying the teaching context at the outset of the questionnaire, teachers were reminded to focus on their experience in that particular context for the full 16 items. Each of the 16 items in the questionnaire represents one of four subscales. Items 5, 8, 15, and 16 form the Intention subscale, and items 3, 6, 9, 14 form the Strategy subscale of the Conceptual Change/Student-Focus (CCSF) approach. Items 2, 4, 11, 13 and 1, 7, 10, 12 form the Intention and Strategy subscales, respectively, of the Information Transmission/Teacher-Focus (ITTF) approach scale.

The Classroom Observation Running Record (see Appendix F) was based on the instrument developed by Perry (1998) to observe classrooms. The first section provided space to record the name of the teacher whose classroom was observed, name of the school, subject, grade, date, the start and end times of the observation and the name of the observer.

The second section provided space to keep a running record of what was going on, including verbatim samples of teachers' and students' speech.

The reflective practice interview guide (Appendix G) included questions to find out about reflective practice in teachers' use of teaching activities, and to find out about their insights and understandings of learner-centered practices. The first section of the guide provided space to record the name of teacher, the name of the school, subject, grade, date, the start and end times of the interview, and the interviewer's name. The teachers were asked to reflect on a teaching activity that was observed in their classrooms, to consider how it worked for their students, why they chose it for the lesson, and whether they would use this activity again. These questions were based on the reflective practice exercise developed by Wise, Spiegel and Bruning (1999). The questions for the second part of the interview were developed by the researcher in order to talk to the teachers about learner-centered and teacher-centered instruction, what the two terms meant to the teachers, how they would recognize them in a classroom setting, and how they fit with the lessons the teachers taught. In the last two questions, teachers were asked what they considered to be facilitators and barriers to adopting learner-centered instruction in their classrooms and in the classrooms of new teachers.

Data were collected over a five-week period beginning in early January 2003 and ending during the first week in February 2003. In January 2003 the teachers returned their completed Approaches to Teaching Inventory questionnaires in the envelopes provided. After the questionnaires were received, the teachers were contacted to schedule the classroom observations and the reflective practice interviews.

As the teachers used mathematics as the classroom context for the completion of the questionnaire, arrangements were made to observe their mathematics lessons in their

classrooms. The observations of the mathematics lessons in the two teachers' classrooms (two visits to each classroom) took place during the last two weeks of January 2003 and the first week of February 2003. The duration of each classroom observation was approximately 45 minutes. During the observations in the classrooms, the researcher was positioned at the back of the classroom in such a way that the teacher and students could be clearly seen and heard without being intrusive. The Classroom Observation Running Record was used to keep a running record of activities, including the times related to specific events and actions, and when possible the verbatim speech of teacher-student and student-student interactions.

After each classroom observation, unstructured interviews were conducted with the teachers to discuss the lesson and to answer any questions. The running records were annotated to add details regarding activities that were not recorded in the classroom, and to fill in gaps (activities, speech) with paraphrases. The running records were re-read and annotated until they captured as many details as the researcher could remember from the visits to the classrooms. Later the running records were transcribed into narrative text as Word documents.

During the first week of February 2003, one-on-one reflective practice interviews were held with the teachers using the reflective practice interview guide. The interviews, which lasted about 45 minutes, were audio taped and written notes were made during each interview. After the interviews were completed, narrative texts (Word documents) were transcribed from the audiotapes and written notes. The researcher reviewed the transcripts by listening to each audiotape and filling in any details that were missed.

Data Analysis Approach

The analysis was run separately for each data source across cases. For the classroom observation and interview data, terms used by the teachers were selected as key words and

codes for the data source (e.g., "I throw out questions to the kids." was coded as teacher's role). The keywords and codes were summarized according to six theoretical categories of teaching-learning contexts that emerge in the literature about learner-centered classrooms. The theoretical categories included: (a) teacher's role, (b) types of tasks, (c) student's role, (d) learning environment, (e) assessment methods and (f) evaluation structures. Codes and categories were constantly compared across cases to create the most comprehensive descriptions incorporating differences as well as similarities across cases. As well, the classroom observation data were reviewed a second time to identify codes and keywords that related specifically to the teachers' instructional strategies and activities. For example, the phrase "What is this graph about?" was coded as deploying attention. A description of the scoring procedures for the instruments follows.

Approaches to Teaching Inventory Questionnaire. Mean, median and mode scores and standard deviations were determined for the intention and strategy sub-scales in the questionnaire. The score groupings for the descriptive statistics included items 5, 8, 15, and 16 (Intention subscale – Conceptual Change), items 3, 6, 9, 14 (Strategy subscale – Student-Focus), items 2, 4, 11, 13 (Intention subscale – Information Transmission), and 1, 7, 10, 12 (Strategy subscale – Teacher-Focus). Refer to Appendix H to see the relationship between questionnaire items and the sub-scales of the inventory.

Classroom Observation Running Record. With the assistance of a colleague, the researcher used one of the running records to begin the data coding activities. The running record was reviewed and then codes were assigned to the text. After the first review was completed, a list of codes was made. Redundant codes were deleted and similar codes were grouped together. Then a clean copy of the running record was used to assign codes to the text based on the revised list. As new codes were discovered, they were added them to the

list. When the researcher and colleague were satisfied that appropriate codes were assigned to the first running record, the same process to code the three remaining running records was followed. The running records were continually reviewed to make sure the codes were assigned in a consistent manner. The next step involved the assignment of themes to the running records. The themes were based on the six theoretical categories of teaching-learning contexts that emerge in the literature for learner-centered practices (i.e., teacher's role, types of tasks, student's role, learning environment, assessment methods and evaluation structures).

The classroom observation running records were used to code for instances of instructional strategies and activities (how-to teaching techniques) used by the teachers to teach the lessons. The same coding procedures as described above was followed. After the coding activities were completed, themes were assigned to the running records. The themes were related to problem-solving instructional strategies (e.g., deploy attention, establish instructional purpose) that are found in the literature about instructional strategies.

Reflective Practice Interview Guide. The responses to each question in the interview transcripts were coded using the same coding process that was used for the classroom observation running records. The themes assigned to the interview transcripts were categorized into the six theoretical teaching-learning context themes found in the literature for learner-centered practices. The teachers were provided with copies of their interview transcripts to ensure the assigned codes captured the essence of their discussions. Although no changes were suggested to the coding, the teachers made some revisions to the content of the transcripts. For example, the phrase "involved in a substantial way" was changed to "involved in a substantial way (activate and stimulate thinking)" and the term "process" was changed to "process not product".

As the final step in the coding process, summary documents were prepared that included the list of themes, codes and examples of text that related to teaching-learning contexts (see Appendix I) and to instructional strategies for problem-solving activities (see Appendix J). The classroom observation running records, interview transcripts and the list of theoretical codes were given to a second rater who was asked to re-code the running records and transcripts. The resulting inter-rater reliability was .84 and any coding differences were reconciled between the second rater and the researcher.

Establishing Rigor of the Study

Quantitative and qualitative approaches to research have different criteria for evaluation. Educational research authors generally address evaluation criteria for qualitative studies according to three themes: philosophy, procedures and participation. In order for the researcher to focus on the procedures of conducting qualitative research, the eight procedural criteria outlined by Creswell (2002) were used to evaluate this qualitative research study. Specifically, emphasis was placed on the procedures for writing qualitative research questions, conducting rigorous data collection and using multiple levels of analysis.

Creswell's first criterion states that the study employs rigorous data collection, extensive data and a long period in the field collecting data. The data for this study was collected over a short period of time due to the school board's restrictions regarding access to teachers in the classrooms. To overcome some of the limitations of a short data collection period, the teachers' classrooms were observed more than once. The two visits to each classroom helped to reduce the chance of giving too much weight in the analysis to the observation of an unusual or idiosyncratic activity that just happened to occur during one classroom visit.

Creswell's second criterion states that the study should be consistent with the philosophical assumptions and characteristics of a qualitative study. The characteristics include an evolving design, presentation of multiple perspectives, researcher as an instrument of data collection and a focus on participant's viewpoints. The research design was established at the outset of this study and given the short duration of this study there was little opportunity for the design to evolve. However, the other characteristics of qualitative research were present in this study. An exploration of teaching approaches in classroom contexts was the central focus of this study in which multiple perspectives (i.e. teaching-learning contexts, teaching strategies and reflective practice) were incorporated into the research design. The researcher collected the data for this study and the focus of the data collection phase was on the viewpoints and insights of the participants (i.e., teachers). As a shortcoming of this study, no data was collected from the students to find out how they benefited from the teaching approaches used by their teachers.

According to Creswell's third criterion, the study should adhere to a tradition of enquiry (e.g., case study) as a procedural guide for the research. The procedural guides for case study research developed by Merriam (1988) and Stake (1995) were utilized in this study. Both guides were used for the procedures related to data collection, validation and analysis; whereas, the procedures for developing the research question and designing the case study were based on Merriam's guide only.

The fourth procedural criterion states that the study starts with a single focus on a central phenomenon rather than a comparison or relationship. This criterion was met by focusing on teachers' understandings of learner-centered instruction, and the teaching approaches that they used in their classroom designs. The main interest of this study was to

explore ways that teachers' understandings about learner-centered practices, their teaching approaches and classroom designs contributed to learner-centered practices.

In order to meet the fifth and seventh criteria, the study should be written persuasively so that readers experience being there and are engaged by the narrative of the study. This study's narrative description attempted to engage readers by sharing as much as possible the participants' own words and detailed descriptions of what the researcher observed. In this way, readers were provided with an opportunity to make their own analysis, draw their own interpretations and verify the interpretations made by the researcher.

The sixth criterion states that the analysis consists of multiple levels of analysis to portray the complexity of the central phenomenon. The presentation of findings in qualitative studies may be classified as a descriptive narration, an analytical interpretation, or a theoretical exploration (McMillan & Schumacher, 1989). In a descriptive narration, the findings are presented as a story of the events and they are based on the explanations provided by the participants. In this study, the within case and cross-cases analyses included the teachers' words and illustrations to describe their responses to the four research questions. An analytical interpretation of this study's findings was provided through the researcher's personal reflections and reference to the literature for conceptual ordering of the findings. For example, the teachers' understandings of learner-centered classrooms were compared to the features of teaching-learning contexts for learner-centered practices that emerge in the literature (i.e., teacher's role, types of tasks, role of students, learning environment, assessment methods and evaluation structures). A theoretical dimension was added to the analysis by exploring the similarities and differences of this case study's findings with the findings of studies about the specific teaching approaches and classroom contexts for mathematics instruction.

In order to comply with the eighth procedural criterion, several strategies were used to establish the integrity of this qualitative study. Clear explanations about the basis for selecting teachers to participate in this study and the context for the collection of data were provided. As part of the analysis procedure, copies of the reflective interview transcripts with codes and themes were given to the teachers in order to obtain their feedback. Although the teachers permitted the reflective practice interviews to be audiotaped, the teachers and their principals were not receptive to having the classroom observations videotaped by the researcher. Thick descriptions of the data and findings were presented in this study. Lastly, a journal was kept to record actions taken during the teacher recruitment and data collection processes as well as the decisions made during the data analysis and interpretation stages of the study.

FINDINGS

Within Case Analyses

Each within case analysis begins with an overview of the teacher and her classroom, and a summary of the key findings and descriptions related to the four research questions (a) teachers' understanding of learner-centered classrooms, (b) teaching approaches reported by teachers, (c) what takes place in the teachers' classrooms and (d) the teachers' viewpoints about facilitators and barriers to adopting learner-centered practices in classrooms.

Amanda – Overview

Amanda (pseudonym) was interested in participating in this study as part of her professional development. She acknowledged that she liked to have the opportunity to share her ideas and insights about teaching. She had over 15 years teaching experience and had taught several elementary grades and subjects in various schools within the school board. The following statements made by Amanda during the reflective practice interview provide some insights as to her beliefs and teaching philosophy.

There are different systems in use. I have seen some really good learning centres and some bad ones. You have to go with something that works for you. [It's best] to observe classrooms and try what works best for you. Is my class learner centered? Probably not, or perhaps 50-50.

Being a teacher is black and white. Either you got it or you don't. Yes it's rewarding. You have to love it.

It's the little accomplishments. Sometimes it's a struggle then there's a little spark – Yeah!

What seems little to someone is a lot to others.

At the time of the study, Amanda taught 18 students of various ethnic backgrounds in a grade 6 class at a medium-size school within the inner city. Twelve of the students were males and their behaviour in the classroom was boisterous. It often took several minutes at the beginning of the class before they settled down. The female students were very sociable but they stopped their discussions as soon as the class began. During the second classroom observation the students were quite noisy. Amanda had to remind them of the classroom management practices (e.g., "Nobody is in charge in this classroom, we run it together.") before she continued with the lesson.

The entrance to Amanda's classroom was located at the back of the room. Large windows on the wall opposite to the entrance brought natural light to the classroom. The chalkboard was situated at the front of the classroom; while bulletin boards covered the wall adjacent to the entrance and most of the back wall. On the bulletin boards were samples of the students' work, and charts (e.g., diagram of geometric shapes). The U-shape arrangement of the students' desks allowed all students to see the chalkboard at the front of the classroom. As well, the arrangement of the students' desks allowed Amanda and her students to move around easily. Amanda's desk was located behind the students' desks at the back of the classroom. Two computer workstations with Internet access were located to the right of the chalkboard, and stand with a television, VCR and overhead projector was placed to the left of the chalkboard. Two additional tables and chairs available for group work were located near the front of the classroom. A storage closet and a bookshelf filled with dictionaries and other reference books were located at the back of the classroom.

Amanda greeted the students and she collected their homework assignments as they entered the classroom. The noise level in the classroom was quite high as the students engaged in conversations with each other before the morning bell rang. Just before the morning announcements from the school office began, Amanda walked to the front of the classroom and stood with her back facing the chalkboard. At the time of the study, Amanda was teaching introductory geometry lessons to her class. The mathematics lessons were taught in the morning immediately after the opening school announcements.

In the first of the two lessons observed, Amanda spent a few minutes at the beginning of the lesson to review the previous day's work. In order to keep the students focused, she directed them to "take out your math books. Go to page 172." She instructed the students to look at the diagram (e.g., "What's the picture? What's it called?"). She added, "Take a look at it because there are some things you forgot to put in yours." Through a series of questions, Amanda solicited the correct answers from the students and provided them with a reminder (e.g., "You have to remember to put a title in and to name the axis. Remember title and axis.").

After the review activity, Amanda instructed the students to complete an activity found in their math textbooks. The students completed this activity together with Amanda as she wrote their answers to each step of the exercise on the chalkboard. To help the students solve the exercise, she provided instructions (e.g., "What I want you to do is to take the average of the grades for the class. Add the numbers."); used questions (e.g., "After you add the numbers, what do you do?"); and provided hints (e.g., "Break it down. Can you divide 21 by 27?" "What about 212 by 27? Start with something you know. You already

know it will start with 7."). The pace set by Amanda was very fast and her students were focused on the group activity.

After the group activity was completed, Amanda assigned another exercise from the textbook to her students (e.g., "You know what you are going to do? You are going to do Question 9 a, b, c, d, and e."). She briefly read some instructions from the textbook and then she used a series of questions to help the students get started with the activity (e.g., "What type of graph are you going to start with? What type of numbers would you need? Don't forget the title of your graph. Where do you get the title - what will help you?"). The students mainly worked by themselves but they had opportunities to share information and to help each other. For example, three students (two males and one female) who were sitting next to each other worked quietly on the activity together. Amanda spent most of the time circulating among the students and providing them with assistance as required. For example, she used the following series of questions to help a student complete the exercise, "What predictions can you make? If we were to look at 1995, would the numbers go up or down? Look at your numbers is it the same, up or down? Does it go up a lot or a little?" When the recess bell rang, Amanda told the students to get ready for the morning recess (e.g., "Put math away – snacks out.>").

In the second classroom observation, Amanda began the geometry lesson as soon as the school office completed the morning announcements. She immediately directed her students to look at the activity instruction sheet as she had handed out copies to them. She also handed out one square of graph paper to each student. Amanda then proceeded to read the instructions and to ask questions (e.g., "You are to draw a pattern for a CD cover. You must use 2 or more geometric shapes to draw the pattern. What are some shapes you could

use?"). She repeated the instructions to the students by emphasizing the key points (e.g., "The entire paper must be covered with the pattern - no borders. Then you have to colour each shape a different colour. The same colour cannot touch. No part of the paper may be left showing."). She also drew a sample pattern on her piece of graph paper and showed it to the students. Amanda added that the students should "create as complex a pattern as you can. Make it interesting." After she finished providing instructions and answering the students' questions, she directed them to begin the activity and to "work on this on your own." Amanda spent most of her time during the lesson circulating among the students in order to answer their questions and provide them with help. The students worked on the activity independently but they chatted quietly amongst themselves. When Amanda noticed that some students had finished drawing the pattern, she stated "If you are done drawing your pattern, start to colour it." However, she had to remind one student to finish the pattern before colouring it (e.g., "Finish your pattern first, then you can figure out how to colour it."). A few students approached Amanda to show their patterns to her before they started to colour them. Amanda also provided encouragement to the students who were colouring their patterns by telling them that they were doing "good work" and to "keep going". Many of the students stopped working on the pattern activity when the recess bell rang, however, three students continued to work on the activity a few minutes into the recess period.

Amanda's Understandings of Learner-Centred Classrooms

During the reflective practice interview, Amanda was asked to use her own words to define learner-centered classrooms and teacher-centered classrooms. Amanda's definition of a learner-centered classroom focused on a description of her role as teacher. She said "I

throw out questions to the kids, get feedback and ask some more. She added that "If the answers come from them, they remember more." When Amanda was asked to define teacher-centered classrooms, she provided an explanation rather than a definition. She stated that "Once in a while you have to do it. You know for the theory."

Following the discussion about definitions of learner-centered and teacher-centered classrooms, Amanda was asked to describe the features of her classroom. Amanda's descriptions of her classroom are presented according to the six features (teacher's role, types of tasks, student's role, learning environment, assessment methods and evaluation structures) of teaching-learning contexts for learner-centered classrooms found in the literature. This framework allows for comparisons to be made between the features described in the literature and Amanda's descriptions of teaching-learning contexts.

Table 4

Comparison of the Literature and Amanda's Understandings of Learner-Centered Classrooms

What the literature tells us about learner-centered classrooms.		What Amanda said that she understands and practices in her classroom.
Teacher's role	Teacher who mediates student learning through questioning, clarifying, correcting, elaborating, scaffolding and modelling.	<p>I see myself as the guide (facilitator); lead question with questions.</p> <p>I give them support and direction.</p> <p>I show them how to find rather than give it [answer] to them.</p> <p>I do not write on the board anymore. I give them notes to refer to when it's hands on.</p>

		Usually, I give 5 to 10 minutes of instruction for an activity.
		I go around and answer questions from students.
		I need to see it [students' work] so that I can answer their questions.
Types of tasks	Tasks that promote active processing such that students learn through their actions on concepts.	Hands-on Students experiment and try things out. They start with the activity and they fill in the theory with research. I like activities that encompass many things.
Student's role	Students are challenged to invest effort and energy, and to take personal responsibility for their learning.	I like to see effort. It is important to know the answer but effort is important. If you're unsure, go get the dictionary. It's reference material.
Learning environment	Environment that supports positive interpersonal relationships, and provides opportunities for students to exercise personal control and choice.	Students choose but I tell them to make a wise choice. They can change their choices if it's not working well. [Students] share, team up in working groups. For some activities students pair up.

Assessment methods	Assessment methods that are non-threatening, reveal students' thinking and highlight the value of learning processes and learning tasks.	Don't just put the right answer, show me.
Evaluation structures	Evaluation structures that are ongoing, improvement-based, and regard errors as opportunities to learn.	<p>It [self-evaluation] goes together with peer evaluation. They have a set question. Rate yourself. Rate your friend.</p> <p>The peer evaluation is shared between the student and teacher. The sheet is personal and private.</p> <p>Usually, the peer evaluations are the same as the self-evaluation.</p>

Teacher's role.

In terms of her role as teacher, Amanda stated that "I see myself as the guide (facilitator); lead question with questions." and "I give them support and direction." She added, "I show them how to find rather than give it [answer] to them." Amanda emphasized that teachers have to be able to think on their feet. She explained that "Sometimes I look at an activity, the first part looks great but I don't like the rest of it. I will use the first part, and throw the rest away." Amanda recalled that one of her elementary teachers never moved

from the front of the classroom and "we had to memorize everything." In contrast to her learning experiences, Amanda provided the following description of her teaching approach.

I do not write on the board anymore. I give them notes to refer to when it's hands on. Usually, I give 5 to 10 minutes of instruction for an activity. I go around and answer questions from students. I need to see it [students' work] to answer their questions.

Amanda also spoke about her use of the layered curriculum in her classroom, and provided the following explanation.

You start at a point where everybody can do it. [Then] diverge and go sideways with the ones who can do the activity and those with higher achievement. You can't do this if you are in front of the classroom. [It] also gives you time to go around.

Amanda's understanding of the role of the teacher in learner-centered classrooms was very similar to the descriptions found in the literature. The teacher guides (facilitates) student learning through the use of questions to clarify, correct or elaborate (Pintrich et al., 1993; McCombs, 1998; Perry et al., 2002). As well, Amanda's explanation of layered curriculum closely resembled the definition of scaffolding. Through scaffolding, the teacher provides the guidance required for learners to bridge the gap between the current knowledge or skill levels and the desired knowledge or skill levels (Driscoll, 1994).

Types of tasks.

Frequently, Amanda used the phrase "hands on" to describe the type of activities she used in her classroom. She explained that "Students experiment and try things out. They start with the activity and they fill in the theory with research."

McCombs (1998) indicated that learners engage in tasks that promote active processing such that they learn through actions on concepts. Learning through actions on concepts is related to the phrase "hands-on" that Amanda used to describe her classroom activities. The literature also makes reference to open tasks that allow students to learn through experimentation and by solving previously unencountered problems (Pintrich et al., 1993; Borko & Putnam, 1998; Perry et al., 2002). Again, Amanda demonstrated that she understood what tasks are suitable in learner-centered classrooms by using terms such as "experiment" and "try things out" to describe her classroom activities.

Student's role.

In Amanda's classroom, the students were expected to show effort. Amanda explained that "I like to see effort. It is important to know the answer but effort is important." She also indicated that the students were responsible for doing their own research (e.g., "If you're unsure, go get the dictionary. It's reference material." and "I show them how to find rather than give it [answer] to them.")

In learner-centered classrooms, the role of the students becomes more active and collaborative. Students are challenged to invest effort and energy, and to take personal responsibility for asking questions and guiding their own learning (McCombs, 1998).

Amanda's emphasis on students showing effort and conducting their own research showed that she understood the active role of students in learner-centered classrooms.

Learning environment.

Amanda explained that the students in her classroom "share, team up in working groups and for some activities students pair up." To illustrate the opportunities her students have to control challenge, share ideas and work together, Amanda provided an example of a slide show presentation the students recently completed.

I gave the basics and [told them] the rest is up to you.

They helped each other; some students mainly worked by themselves. Some had pictures, others downloaded their pictures from the computer.

Amanda indicated that the students also had opportunities to choose their activity partners. She emphasized that "Students choose but I tell them to make a wise choice."

Amanda added, "They can change their choices if it's not working well."

The teacher builds a safe, trusting and supportive classroom environment by demonstrating real interest, caring, and concern for each student, and by providing students with opportunities to exercise personal control and choice. (Pintrich et al., 1993; Borko & Putnam, 1998; Lambert & McCombs, 1998; Perry et al., 2002). With respect to the elements of personal control and choice, Amanda clearly understood their importance as evidenced in her discussion about the students' preparation for the slide show presentation. Amanda also demonstrated the importance of building supportive relationships through sharing and group work, and by providing students the opportunity to change their choices when things did not work out.

Assessment methods.

Amanda provided some insights as to the basis for assessing students in her classroom. She explained that she liked to see the students' efforts (e.g., "Don't just put the

right answer, show me." Amanda also stated, "It is important to have the right answer, but effort is important."

Amanda's understanding of assessment methods was closely aligned with the descriptions found in the literature on learner-centered classrooms. The assessment methods are non-threatening, reveal students' thinking and highlight the value of learning processes and learning tasks (Borko & Putnam, 1998; Perry et al., 2002). The students are encouraged to focus on their personal learning progress and to view errors as opportunities to learn (Perry et al., 2002).

Evaluation structures.

In addition to providing students with feedback through her use of questions, Amanda explained that her students also evaluate themselves and their peers.

It [self-evaluation] goes together with peer evaluation.

They have a set question. Rate yourself. Rate your friend. The peer evaluation is shared between the student and teacher. The sheet is personal and private. Usually, the peer evaluations are the same as the self-evaluation.

Evaluation in learner-centered classrooms consists of teacher, peer and self-evaluation practices that acknowledge students' accomplishments and encourage them to reward themselves and develop pride in their accomplishments (Pintrich et al., 1993; Perry et al., 2002.) Amanda's use of teacher feedback that was embedded in her instruction, and the use of peer- and self-evaluation methods indicated that she understood the key features of evaluation structures for learner-centered classrooms.

After the discussion about her understandings of learner-centered classrooms, Amanda was asked to reflect on a specific activity that she used in her geometry lesson. Amanda chose to reflect on the CD pattern activity in which the students "had to use three different shapes and colour them. The same colours couldn't touch." She explained that she chose this activity because "Doing patterns in math is like working backwards instead of theory first. Students experiment and try things out. They make the patterns and then measure them. I like activities that encompass many things." Amanda added, "Since the same colours couldn't touch, the students had to think about it. They enjoyed it." Although the students had to problem solve about the colour scheme, Amanda admitted "The pattern was too easy." She indicated that she planned to use this activity again and she added "I would change the pattern scheme, make it a little harder. I would want them to think about it some more."

Reflective practice provides teachers with one method of looking at their classroom practices and beliefs and the impact they have on students' attitudes and learning. Reflection-on-action means that teachers are expected to stand back from their own teaching, evaluate the situation and take responsibility for their own future actions (Calderhead, 1992). In this type of reflective practice, teachers describe what they and their students were doing in the classrooms (method), explain why or why not they were doing it (reason), and indicate whether they would change anything based on the information gathered from their descriptions and explanations (justification). Amanda's reflections about the CD pattern activity included the three components of reflection-on-action. First, Amanda described the activity (method), then she explained why she used it and the impact the activity had on her students' learning (reason) and lastly, she explained that she would

use the activity again with some modifications to make it more challenging for the students (justification).

Amanda's Self-Report About Her Approaches to Teaching

Table 5 shows how Amanda reported her teaching approaches according to the Information Transmission, Teacher Focus, Conceptual Change and Student Focus sub-scales in the Inventory of Teaching Approaches questionnaire. In addition to Amanda's responses to each item, the table provides the mean, median, mode and standard deviation for each of the four sub-scales.

Table 5

Intention Sub-scale						
Information Transmission	Rating	Total	Mean	Median	Mode	Std. Dev.
		10	2.5	2.5	3.0	0.5
2 Objectives	3					
4 Facts	3					
11 Note taking	2					
13 Answers	2					
Conceptual Change	Rating	Total	Mean	Median	Mode	Std. Dev.
		18	4.5	4.5	5.0	0.5
5 Assessment	5					
8 Prior knowledge	5					
15 Notes	4					
16 Student ideas	4					

Strategy Sub-scale						
Teacher Focus	Rating	Total	Mean	Median	Mode	Std. Dev.
		12	3.0	3.5	4.0	1.4
1 Little knowledge	4					
7 Textbook	3					
10 Pass exam	4					
12 Teach to exam	1					
Student Focus	Rating	Total	Mean	Median	Mode	Std. Dev.
		17	4.25	4.0	4.0	0.5
3 Conversations	5					
6 Discussion	4					
9 Provoke debate	4					
14 Understandings	4					

Likert scale:

- 1 – This item was only rarely true for me in this subject.
- 2 – This item was sometimes true for me in this subject.
- 3 – This item was true for me about half the time in this subject.
- 4 – This item was frequently true for me in this subject.
- 5 – This item was almost always true for me in this subject.

The results show considerable variability in Amanda's responses to the Information Transmission, Teacher Focus, Conceptual Change and Student-Focus sub-scales in the Inventory of Teaching Approaches. From Amanda's responses to the Conceptual Change

and Student Focus sub-scales, it appears that she frequently used student-focused strategies aimed at changing students' conceptions. However, she did not exclude teacher-focused strategies in her approach to teaching. Her responses to the Information Transmission sub-scale suggested that about half the time she considered it important to describe the subject in terms of specific objectives, and to present a lot of facts to the students so that they know what they have to learn for the subject. For the Teacher-Focus sub-scale, Amanda's responses showed that she frequently designed her lessons with the assumption that the students' have little prior knowledge of the topics to be covered and that she frequently structured the lessons to help students pass the formal assessment items. Based on her responses to the Inventory of Teaching Approaches questionnaire, Amanda's overall teaching approach appeared to consist of frequent use of student-focused strategies combined with occasional use of teacher-focused strategies.

What Takes Place in Amanda's Classroom

These findings are based on the observations made during the two visits to Amanda's classroom. The features of Amanda's classroom are presented according to the six features (e.g., teacher's role, types of tasks, role of student, learning environment, assessment methods and evaluation structures) that emerge in the literature on teaching-learning contexts for learner-centered classrooms. There were many consistencies between the observations of Amanda's classroom and the reflective practice interview in which Amanda talked about her understanding of the features of learner-centered classrooms.

Teacher's role.

Amanda guided (facilitated) the learning processes in her classroom, and she enabled her students to progress with just the right amount and level of assistance. In providing directions for the activity-based lessons, Amanda began by reading a few statements from

the instruction sheet, then she asked questions and gave hints. As well, the students helped each other with the activities. The following dialogue illustrates one of the interactions between Amanda and her students during the pattern activity for the CD cover.

Amanda: You are to draw a pattern using two
or more geometric shapes.

Amanda: What are some shapes you could use to
make your pattern?

Student 1: Circle. Square. Cube.

Student 2: Look at the chart at the back of the room
for ideas.

Amanda: Pick three and repeat them – just like wallpaper.

During both classroom observations, Amanda walked around to look at each student's work as soon as the students began the activities. She answered their questions and provided feedback based on what she saw. As well, some students approached Amanda to show her their work and to ask questions. Her tone was always helpful, not critical. For example, she advised one student that "You alternated your pattern, that's why it's not repeating itself" and then she quickly reassured the student (e.g., "That's okay, but it makes it more difficult to draw.").

Types of tasks.

With respect to the types of tasks, Amanda used hands-on activities that involved problem solving, experimentation, creativity and effort. For example, the CD pattern activity allowed students to choose the geometric shapes for the pattern, to colour the patterns so that the same colours did not touch, and then to measure the area of the pattern. The

students appeared to be absorbed in the activities and some students continued to work on their activities past the recess bell.

Student's role.

The students in Amanda's classroom were involved actively in the classroom activities. The students approached Amanda to show their work to her (e.g., CD cover pattern) and they did not hesitate to ask questions when they needed help (e.g., "Can we use circles?"). Her students had opportunities to share information and to help other students. Also, the students shared with Amanda the classroom management responsibilities (e.g., "Nobody is in charge in this classroom, we run it together.")

Learning environment.

The students had many opportunities to learn from one another by working together in pairs and groups and the students were free to find different partners for each activity. When a student asked if they could draw a cube and a square for the pattern activity, another student quickly responded "They're the same". Although all students were assigned the same activity, they had opportunities to choose how they would complete the activity. For example, the students could choose what geometric shapes they would draw and what colours they would use for the pattern.

Assessment methods.

As the pattern activity for the CD cover was process-based, Amanda could observe and assess the students' progress at various intervals, and then provide assistance as required. For example, Amanda was able to review the students' work when they drew the shapes (e.g., "That's good – keep going.") and again when they worked on the colour scheme (e.g., "Yes, but don't use shading for the shapes. You will use colour.").

Evaluation structures.

The evaluation practices observed in Amanda's classroom seemed to be embedded in her instructions to the students. Amanda provided feedback about a previous day's lesson by helping the students discover what was missing from their answers. She began by directing the students' attention to the assignment (e.g., "Take a look at it because there are some things you forgot to put in yours.") and through a series of questions she guided them to identify the missing information (e.g., "What is this graph about? What do you call this information?"). There were several instances when students engaged in spontaneous forms of self-evaluation and evaluation of other students. For example, one of the students in Amanda's classroom exclaimed, "Look I did it!" In another situation, one student looked at another student's work and commented "Your colours are touching."

Instructional strategies include the various aspects of sequencing and organizing instruction and deciding how to deliver it in order to elicit particular student learning outcomes. For learner-centered classrooms, the literature supports tasks and instructional strategies that promote problem solving learning (Shuell, 1996; Moallem, 1998; Smith & Ragan, 1999; Hamman, Berthelot, Saia, & Crowley, 2000). These strategies include (a) deploying attention, arousing interest and motivation, (b) establishing instructional purpose, (c) previewing the lesson, (d) recalling prior knowledge, (e) helping students employ learning strategies by asking guiding questions and providing hints, (f) providing practice and feedback, and (g) closing the lesson with a summary and review to help students transfer knowledge (Smith & Ragan, 1999).

During both classroom visits, Amanda used instructional strategies to deploy the students' attention and to arouse their interest and motivation. She helped students stimulate

information processing by verbalizing task requirements and she helped them employ learning strategies by asking questions and providing hints. The students had opportunities to seek help from other students and from Amanda. At the end of the lessons, Amanda did not provide any summaries or reviews but she related the lessons to situations that the students would encounter in other subjects. While Amanda's overall focus was student-centered, there were some elements missing in the instructional strategies that she used. During the first visit to her classroom, Amanda reviewed work from a previous lesson, however, on the second observation day she jumped directly into the new lesson by reading and reviewing the activity instructions. It should be noted that on the second day, Amanda had to deal with classroom management issues and it was necessary for her to keep the students' attention focused on the completion of the CD pattern activity.

Amanda's Views about Facilitators and Barriers to Adopting Learner-Centered Practices in Classrooms

During the reflective practice interview, Amanda stated that "parents (guardians) who wouldn't like the style of teaching" could pose a barrier. She added that if this situation arose, "I would invite them to the classroom so that they can see what is happening. Hopefully, they would see how well the teacher is doing." In terms of factors that are facilitative, Amanda said that she would like to have "a larger classroom to do learning centres and move around. [It would be] easier to move kids around and able to work in smaller groups."

The discussion was then directed towards what Amanda viewed as barriers and facilitators for new teachers to use learner-centered approaches in their classrooms. She stated that "It is best to observe classrooms and try what works best for you." Amanda

added, "It depends on what you are confident with, your style and how you come across to the kids." Amanda stated that "The universities need to separate the theoretical courses (must have) and spend time on classroom experience." She added that new teachers "could use the help of a mentor."

Kim – Overview

Similar to Amanda, Kim (pseudonym) Kim had over 15 years experience teaching various grades and subjects in various schools within the school board. She was interested in participating in this study to further her professional development and to share her insights about teaching. As well, she was also very interested to find out more about learner-centered classroom and student-focused teaching strategies. The reflective practice interview with Kim revealed that her experience as a beginning teacher influenced her approach to teaching in her classroom.

Early exposure is very important. I was very fortunate that my on-site mentors were hands-on. My mentors had an impact on my teaching philosophy.

During the study Kim taught a class of 14 grade 6 students in a medium-size elementary school in a suburban area. There were an equal number of male and female students in her classroom, and a few of the students were non-Caucasians. Although the students were very sociable, their overall behaviour was subdued.

At the beginning of the semester, the students were given an opportunity to choose their seating partners. The students prepared a written report outlining the reasons why they wanted to sit next to certain students. Through a collaborative process, between the students and Kim, the paired seating arrangements were determined. The students in Kim's classroom took turns as classroom managers and material managers. The classroom

managers were responsible for reminding the students to keep the noise levels down, and the material managers were responsible for distributing activity materials to the students.

The entrance to Kim's classroom was situated at the front of the room. There were a few windows on the wall opposite the classroom entrance. The chalkboard was situated at the front of the classroom; while bulletin boards covered the wall adjacent to the entrance and most of the back wall. On the bulletin boards were samples of the students' work, charts (e.g., diagram of elements of shape) and activities such as mathematics puzzles for the students to complete when they finished their assignments ahead of time. The students' desks in Kim's classroom were arranged in groups of four (two student pairs) and all students faced the front of the classroom where the chalkboard was located. This desk arrangement reflected Kim's teaching strategy (e.g., "I am a group-based teacher.") and allowed the students to have face-to-face interactions. It seemed that the passageways between the clusters of desks were narrow; however, Kim and her students were able to walk around the room with ease. The teacher's desk was located behind the students' desks at the back of the classroom. Located along the back wall of the classroom were two computer workstations with Internet access and two desks for additional student workspace. On the wall adjacent to the entrance to the classroom were storage cupboards and some reference books were placed on a table next to the cupboards.

Kim arrived early in her classroom in order to write the reflection journal activity on the chalkboard and to greet the students as they came in. Most of her students immediately settled themselves at their desks and worked on the reflection journal activity. The two classroom observations occurred when Kim was covering introductory geometry lessons to her class. The mathematics lessons were taught in the morning immediately after the

opening school activities and announcements. Kim positioned herself at the front of the classroom with her back facing the chalkboard.

During the first lesson, the students completed a geometry-related activity in their reflection journals. Kim wrote the following activity on the chalkboard, "When you looked at your surroundings were their angles that appeared more often? What about triangles?" The grammatical error (i.e., use of *their* instead of *there*) was intentional. Kim invited the students to serve as editors to find the error, and for one volunteer to correct it on the chalkboard. For the journal activity, the students could choose to draw, write or do both in their journals. Kim circulated among the students, answered their questions and provided advice (e.g., "If you are pondering or wondering about something, write those questions down. That's part of your learning."). To remind the students that the activity was about to end, Kim stated "Try to get your thoughts concluded in the next few minutes." After the students completed the independent journal activity, Kim assigned a triangle-building activity to the students. The activity required that the students construct triangles consisting of three, four, five, six or seven smaller triangles from a Tangram set (i.e., plastic triangles in various sizes). She briefly read some instructions to the students and added, "You will build as many triangles as you can find from the Tangram set. Work in pairs and write them - represent them on a paper. You will hand this in so that I can mark them." Then to get the students started, she used questions (e.g., "What will you do concerning the angles?") and gave hints ("Boys and girls, I will give you a clue for your recording. There is a chart at the back that will help you plan your recording."). She added that "You will work on your own record using one set [of Tangram pieces] but you have many possibilities when you work together." Kim circulated among the students to answer their questions and to help them

build the triangles (e.g., "What triangles will you use?"). As well, some students walked around to help other student pairs with the activity. For example, one student walked over to a pair students to show them how to build some shapes (e.g., "Take the large triangle. I'm just giving you an idea."). Kim mounted a large chart on the chalkboard for students to draw their triangle shapes and show them to the rest of the class. Kim walked around and reminded pairs of students to share their pieces and to identify their triangles (e.g., "Make sure you label your triangles. Are they obtuse?"). She closed the lesson by helping the students formulate a theory ("What are you starting to notice? If we know that one angle is 90 degrees what size are the other two angles? Is there a mathematical rule that you can state about isosceles triangles?"). After they finished the geometry activity, they worked in groups of four students to solve a mathematics puzzle. Kim provided the following instructions, "Each of you will get a clue. Use the clues with the white dots. It should take you four clues to solve the problem. The clues with the black dots are extra clues." The students were free to walk around the classroom to share their clues with other groups. Just before the recess bell rang a group of students solved the puzzle and shared the answer with the other students. When the recess bell rang, the students put their work away before they left the classroom.

During the second classroom observation, the lesson began with the completion of an activity in the students' reflection journals. Kim wrote the following journal activity on the chalkboard before the students arrived in the classroom, "In you're journals: Without looking at your scrapbook can you name - draw the elements of shape?" The grammatical error (i.e., use of *you're* instead of *your*) was intentional so that students could identify the error and a volunteer editor corrected it on the chalkboard. Again the students could choose

to write, draw or do both in their journals. Kim asked questions (e.g., "How many of you remember two elements?") and provided help as needed (e.g., "We will use one example of the five elements of shape to draw a diagonal, vertical and horizontal line. Take some time to do some doodling.")

After the students completed the journal activity, Kim informed them that their next activity involved math art. The students made geometric pattern designs by weaving yarn on a paper backing. Although this was an independent activity, the students had opportunities to share their ideas with the other students. Kim read a few instructions to get the students started with the activity.

You will make cuts. Not too deep. I have found that four cuts along one side and two to three cuts on the opposite sides [is easier to work with]. It also helps to use a ruler to make your slits up and down. When you have a good arrangement, I will pass the wool around.

You will use it to design a pattern on your paper.

How many of you have tape and scissors?

She gave hints to help the students with the activity (e.g., "If you make it too tight, the paper will bend. We will tape the sheets to something to straighten them out."). She also provided feedback to the students as they worked on their geometry designs (e.g., "That's an awesome design with the colours."). There was a lot of discussion among the students and many students stood up at their desks to make it easier to wind the long pieces wool around the paper. Six students took their completed work to Kim and she instructed them to display it on the chalkboard. Four more students displayed their work on the chalkboard while Kim

was speaking to other students at their desks. Some students who completed their artwork went to the wall at the back of the room, and selected puzzle activities to work on. At the end of the activity, Kim stated, "Clean up your desks and you can start your snacks [before recess]". After the recess bell rang, two students remained in the classroom to finish their geometry patterns.

Kim's Understandings of Learner-Centred Classrooms

In Kim's definition of learner-centered classrooms, she focused on the interaction between the teacher and the students.

Learner-centered instruction time would be activity-based, self-selection, and self-monitoring processes that would include children's input in organized way. The teacher guides with a plan in mind but the child carries the ball. The teacher has outcomes in mind, the student is the doer [In learner-centered instruction,] there are many solutions that could work.

Kim defined teacher-centered classrooms as traditional classrooms in which the teacher controls the process.

[In teacher-centered instruction], the teacher manipulates the process in a way that children follow the teacher. [They] do not take initiative. Students work in predictable ways according to outcomes defined by the teacher. It's the classic example where the teacher has the answer in her head and students have to come up with the right ones.

Kim's descriptions of her classroom are presented according to the six features (teacher's role, types of tasks, student's role, learning environment, assessment methods and evaluation structures) found in the literature to describe the teaching-learning contexts that support learner-centered classrooms. This conceptual framework allows for comparisons to be made between the descriptions found in the literature and Kim's descriptions.

Table 6

Comparison of the Literature and Kim's Understandings of Learner-Centered Classrooms

What the literature tells us about learner-centered classrooms.	What Kim said that she understands and practices in her classroom.
Teacher's role	<p>Teacher who mediates student learning through questioning, clarifying, correcting, elaborating, scaffolding and modelling.</p> <p>As a principle, engaging and motivating students in a substantial way is what I want to get out of it.</p> <p>The teacher guides (facilitates).</p> <p>The teacher deals more with individuals than groups.</p>
Types of tasks	<p>Tasks that promote active processing such that students learn through their actions on concepts.</p> <p>Involved in the problem solving of the task.</p> <p>Hands-on.</p>

Student's role	Students are challenged to invest effort and energy, and to take personal responsibility for their learning.	Students are responsible for their record keeping. Responsible for the completion and turning in their work.
Learning environment	Environment that supports positive interpersonal relationships, and provides opportunities for students to exercise personal control and choice.	<p>[In last week's class,] I started with an independent activity. Then we did a paired activity. At the end, they did a co-operative group activity.</p> <p>They were engaged, co-operated with each other and tried to share. [They] demonstrated good group skills. [It] allowed everybody to give their thoughts and solutions.</p> <p>The students reflected about triangles. They could write or draw them.</p> <p>There are choices within the activity but not the activity itself. [They are] involved in problem solving, how they go about doing it.</p>

Assessment methods	Assessment methods that are non-threatening, reveal students' thinking and highlight the value of learning processes and learning tasks.	The process, editing their work, is part of it. It's not always the finished product, but how they got there.
Evaluation structures	Evaluation structures that are ongoing, improvement-based, and regard errors as opportunities to learn.	We do not do enough self-evaluation. This is something that I need to work on.

Teacher's role.

The following statement made by Kim captured what she regarded to be her role as teacher, "As a principle, engaging and involving students is what I want to get out of it." She added "If it's lecture, I don't know if they are listening. I strive to make sure the students are involved in a substantial way as a means to activate and stimulate their thinking." Kim also pointed out that the teacher "guides" and "deals more with individuals than groups."

Shared responsibility for learning that occurs between teachers and students is a cornerstone of learner-centered practices (McCombs, 1998). Kim's description of her role as teacher indicated that she understood the shift in teacher and student responsibilities within learner-centered classroom contexts. As well, Kim understood the role of teacher as someone who guides (facilitates) student learning (Pintrich et al., 1993; McCombs, 1998; Perry et al., 2002).

Types of tasks.

Similar to Amanda, Kim used the phrase "hands on" to describe the type of activities she uses in her classroom. Specifically, she chose activities that required the students to adopt a problem solving approach in their learning. For example, "The program of math is very concrete. By solving a problem, the students want to challenge themselves. I assume they were motivated to learn." Kim added, "Occasionally, they do some written work."

The term "hands-on" that both Amanda and Kim used and the phrase "actions on concepts" found in the literature have similar meaning. McCombs (1998) indicated that learners engage in tasks that promote active processing such that they learn through actions on concepts. The literature also makes reference to open tasks that allow students to learn through experimentation and by solving previously unencountered problems (Pintrich et al., 1993; Borko & Putnam, 1998; Perry et al., 2002). Kim's discussion about mathematics activities demonstrated that she understood the relevance of experimentation and problem-solving tasks in learner-centered classrooms.

Student's role.

In Kim's classroom, the students "are responsible for their own record keeping." Kim added "However, they do not realize that this could be on a piece of paper instead of their notebooks. They think it has to be in a special notebook." She added that her students were "responsible for the completion and turning in their work."

In learner-centered classrooms, the role of the students becomes more active and collaborative. Students are challenged to invest effort and energy, and to take personal responsibility for asking questions and guiding their own learning (McCombs, 1998). Kim's discussion about the students' responsibilities to keep records, complete their work and hand

in the work suggested that she understood the importance of the active student role in learner-centered classrooms.

Learning environment.

Kim indicated that as part of her teaching approach, the students were provided with opportunities to work independently, in pairs and in co-operative groups.

In last week's class, I started with an independent activity. The students reflected about triangles. They could write or draw them. Then we did a paired activity. The students used Tangram sets to create new triangles. It involved problem solving to come up with sets of 3, 4 or 5 triangles. At the end, they did a co-operative group activity. They used an activity to find a number in the 100 chart. They worked as groups of four students.

She provided the following insights about the students' interpersonal relationships in her classroom.

They were engaged, co-operated with each other and tried to share. [They] demonstrated good group skills. [It] allowed everybody to give their thoughts and solutions.

With respect to the availability of student choices, Kim acknowledged that "[There are] choices within the activity but not the activity itself. [They are] involved in problem solving, how they go about doing it." On the other hand, she indicated that the students have opportunities to control challenge. For example, [In the reflection journal activity]

"Those who are inhibited by writing can draw. One student drew a picture of a ski lift (triangle) without any words in his journal." Kim also provided the following example of choices and challenges available to her students.

If students have extra time, they can take a puzzle to work on. Some students finish their activity so that they can do something challenging (e.g., puzzles).

In the description of her classroom environment, Kim demonstrated that she understood the importance of personal control and choice and opportunities for students to work together. The teacher builds a safe, trusting and supportive classroom environment by demonstrating real interest, caring, and concern for each student, and by providing students with opportunities to exercise personal control and choice. (Pintrich et al., 1993; Borko & Putnam, 1998; Lambert & McCombs, 1998; Perry et al., 2002).

Assessment methods.

Kim's discussion about her assessment methods focused on how students go about completing the activities.

My classroom is not completely process based (running in the middle). Students are conditioned to thinking if the end product looks like the sample, they will get an A. But they do not realize that the process (editing their work) is part of it. If I had given this as homework, the parents would help the student to get a good finished product. Yet, the students need to be evaluated on the process as well. It's not always the finished product, but how they get there.

Kim's understanding of assessment methods was closely aligned with the descriptions found in the literature on learner-centered classrooms. The assessment methods are non-threatening, reveal students' thinking and highlight the value of learning processes and learning tasks (Borko & Putnam, 1998; Perry et al., 2002). The students are encouraged to focus on their personal learning progress and to view errors as opportunities to learn (Perry et al., 2002).

Evaluation structures.

Kim stated that "We do not do enough self-evaluation. This is something that I need to work on." Kim felt that "teachers do not do enough to encourage students to reflect and evaluate themselves." She explained, "As a teacher you do not get an opportunity to see what the students are getting. Usually the teacher is focused on the next activity."

Evaluation in learner-centered classrooms is ongoing, improvement-based, and errors are regarded as opportunities to learn. It consists of teacher, peer and self-evaluation practices that acknowledge students' accomplishments and encourage them to reward themselves and develop pride in their accomplishments (Pintrich et al., 1993; Perry et al., 2002). Kim's discussion about evaluation structures demonstrated that she understood the importance of including student self-evaluation in her classroom.

In addition to the general reflections about the features of her classrooms, Kim was asked to reflect on a specific activity that she used in the geometry lessons. Kim talked about a geometry activity in which the students built triangles using the Tangram sets (e.g., "It involved the use of manipulators [hands-on activities].").

Kim found that the students "liked the opportunity to process geometric shapes on their own rather than spend time on definitions without the tools to use." She stated, "They

were engaged, co-operated with each other and tried to share. They demonstrated good group skills." Kim said that she would use this activity again but "I realize that they should have had one set of Tangrams [for each pair] to share."

There is some general agreement that teachers who engage in reflective practice are able to analyze their own teaching strategies and context in which it occurs; and that they are able to stand back from their own teaching, evaluate the situation and take responsibility for their own action (Farrell, 2001). Calderhead (1992) stated that in reflection-on-action practice, teachers describe what they and their students were doing in the classrooms (method), explain why or why not they were doing it (reason), and indicate whether they would change anything based on the information gathered from their descriptions and explanations (justification) (Calderhead, 1992). Kim demonstrated her ability to reflect-on-action during her reflections about the triangle activity involving the Tangram sets. Kim described the activity (method), she explained why she used it and the impact the activity had on her students' learning (reason) and she stated that she would use the activity again. However, Kim explained that she would assign only one Tangram set to each pair of students in order to make the activity more challenging (justification).

Kim's Self-Report About Her Approaches to Teaching

Table 7 shows Kim's self-report about her teaching approaches according to the Information Transmission, Teacher Focus, Conceptual Change and Student Focus sub-scales in the Inventory of Teaching Approaches. In addition to her responses, the table provides the mean, median, mode and standard deviation for each of the four sub-scales.

Table 7

Intention Sub-scale						
Information	Rating	Total	Mean	Median	Mode	Std. Dev.
Transmission		7	1.7	1.0	1.0	1.5
2 Objectives	1					
4 Facts	1					
11 Note taking	1					
13 Answers	4					
Conceptual Change	Rating	Total	Mean	Median	Mode	Std. Dev.
		14	3.5	3.0	3.0	1.0
5 Assessment	3					
8 Prior knowledge	3					
15 Notes	5					
16 Student ideas	3					
Strategy Sub-scale						
Teacher Focus	Rating	Total	Mean	Median	Mode	Std. Dev.
		5	1.2	1.0	1.0	0.5
1 Little knowledge	1					
7 Textbook	2					
10 Pass exam	1					
12 Teach to exam	1					

Student	Focus	Rating	Total	Mean	Median	Mode	Std. Dev.
			12	3.0	2.5	2.0	1.4
3	Conversations	5					
6	Discussion	2					
9	Provoke debate	2					
14	Understandings	3					

Likert scale:

- 1 – This item was only rarely true for me in this subject.
- 2 - This item was sometimes true for me in this subject.
- 3 – This item was true for me about half the time in this subject.
- 4 - This item was frequently true for me in this subject.
- 5 – This item was almost always true for me in this subject

The results show considerable variability in the responses to Information Transmission, Teacher Focus, Conceptual Change and Student Focus sub-scales in the Inventory of Teaching Approaches. Kim's responses to the Information Transmission and Teacher-Focus sub-scales indicated that sometimes she used a teacher-focused teaching strategy. It is interesting to note that she frequently felt that she should know the answers to any questions the students may ask. With respect to her responses to the Conceptual Change and Student-Focus sub-scales, Kim appeared to be in the middle. Again there are some variations in her responses to each sub-scale. Under the Conceptual Change sub-scale, Kim indicated that she always feels it is better for students to make their own notes rather than copy her notes. She also indicated it is always true that in her interactions with students she

tries to develop conversations with them about the topics they are covering (Student-Focus sub-scale). Based on her responses to the four sub-scales on the questionnaire, it appeared that for the most part Kim used an equal combination of student-focused and teacher-focused strategies in her interactions with students.

What Takes Place in Kim's Classroom

The features of Kim's classroom are presented according to the six features (e.g., teacher's role, types of tasks, role of student, learning environment, assessment methods and evaluation structures) that emerge in the literature on teaching-learning contexts for learner-centered classrooms. There were many consistencies between the observations of Kim's classroom and the reflective practice interview in which Kim talked about her understandings of the features of learner-centered classrooms.

Teacher's role.

Kim guided (facilitated) the learning processes in her classroom, and she helped her students progress by providing assistance. Kim spent a few minutes at the beginning of the lessons to read some instructions, ask questions and to provide hints to the students. For example, she suggested that the students use a chart displayed on a wall in the classroom to plan how they will record their triangle activity with the Tangram sets. Her conversational interactions with the students involved questioning techniques to help them problem solve and to formulate theories from practice. Kim spent most of her time visiting the students at their desks, answering their questions, observing their work and providing them with feedback. As an example, she provided the following feedback to a pair of students: "You almost have it; you need to adjust this side." Kim was more likely to ask questions that would help students solve a problem than to supply the information directly. For example, Kim used questions to help the students relate the activities to theory. Below is a sample of a

dialogue between Kim and her students related to the triangle pattern activity involving the Tangram sets.

Kim: What are you starting to notice?

1st Student: All the triangles we are making have the same angles. They are isosceles – two long lines.

2nd Student: One angle is 90 degrees.

Kim: What are the other angles? If we know that one angle is 90 degrees what size are the other two angles?

1st Student: 45 degrees.

Kim: Is there a mathematical formula that you can state about the isosceles triangle?

1st Student: Two sides are equal.

2nd Student: The other two angles are 45 degrees for the equal sides.

Types of activities.

Kim chose tasks that involved problem solving, experimentation, creativity and effort. For example, the triangle activity that Kim used in her classroom required the students to build triangles using between three and seven pieces and then to measure the angles of the completed triangles. As well, Kim actively helped her students to use a process-based approach to their learning. For example, she told her students "Put your thinking on paper. You don't have to show the right answers but show what your brain is thinking." The students in her classroom appeared to be absorbed in the activities. For example, during the second classroom observation, some students continued to work on their activities past the recess bell.

Student's role.

The students in Kim's classroom were active and collaborative learners. They guided their learning by asking questions (e.g., "What should it look like?") and by helping each other complete the activities. Kim's students handed in their own work, and some students displayed their work on the chalkboard while Kim was speaking to other students. As well, students who completed the activities ahead of time worked on mathematics puzzles while they waited for the other students to finish. The students participated in the management of the classroom by taking turns as classroom managers and material managers. They also took responsibility for choosing their seating partners.

Learning environment.

In Kim's classroom, the students worked in pairs according to the seating arrangement. For group work, the students were free to move around in the classroom in order to choose their partners. As well, the students readily helped each other complete the activities. For example, one student offered to help another student with the triangle activity ("Take the large triangle, I'm just giving you an idea."). Although all students were assigned the same activity, they had opportunities to choose how they would complete the activity. On many occasions, Kim helped students manage challenging activities by making it possible for them to complete activities in their own way (e.g., "Don't hesitate to use pictures to show what you understand.")

Assessment methods.

As the geometry activities selected by Kim were process based, she could observe and assess the students' progress at various intervals, and then provide assistance as required. For example, Kim could assess the students' progress as they built the triangles using the Tangram sets. Kim frequently reminded her students to focus on the learning process. For

example, she stated "If you are pondering or wondering about something, write those questions down. That's part of your learning."

Evaluation structures.

The evaluation practices seemed to be embedded in the instruction provided by Kim. For example, in reference to their journal writing, she asked the students to explain the grammatical rules for using the words *its* and *it's* in their writing. After one of the students provided the correct answer, she advised them to "check your writing and sound it out. Does it make sense?" There were several instances when students engaged in spontaneous forms of self-evaluation and evaluation of other students. During one of the geometry activities in Kim's classroom, three students showed their finished work to Kim. She taped their work on the chalkboard and then went to help other students with the activity. While she was helping the other students, a few students took the initiative and displayed their finished work on the chalkboard by themselves.

Kim's classroom had many learner-centered features, however some elements of the learning environment and evaluation structures were missing. Since the student seating arrangements were established for a set period of time, the students could not make any changes if they did not benefit from the partnerships. In terms of evaluation practices, Kim admitted that she needed to work on structures for her students to evaluate themselves.

Instructional strategies include the various aspects of sequencing and organizing instruction and deciding how to deliver it in order to elicit particular student learning outcomes. For learner-centered classrooms, the literature supports tasks and instructional strategies that promote problem solving learning (Shuell, 1996; Moallem, 1998; Smith & Ragan, 1999; Hamman, Berthelot, Saia, & Crowley, 2000). These strategies include (a) deploying attention, arousing interest and motivation, (b) establishing instructional

purpose, (c) previewing the lesson, (d) recalling prior knowledge, (e) helping students employ learning strategies by asking guiding questions and providing hints, (f) providing practice and feedback, and (g) closing the lesson with a summary and review to help students transfer knowledge (Smith & Ragan, 1999).

As part of her overall teaching strategy, Kim employed instructional strategies and activities that promoted problem-solving learning. She introduced geometry activities by deploying attention and arousing interest and motivation (e.g., "We will start with the journal writing and then I have some math art planned for you.") and by previewing the lesson (e.g., reflection journal). She asked questions to help students recall prior knowledge ("How many of you remember two elements? Did we talk about them as elements?"). Kim helped students stimulate information processing by verbalizing task requirements and she helped them employ learning strategies by asking guiding questions and providing hints. The students had opportunities to practice alone, in pairs and in groups and Kim provided feedback in the form of hints and questions. At the end of the lesson, Kim included a summary and review and helped students transfer knowledge to similar problems outside the classroom (e.g., "Is there a mathematical rule that you can state about isosceles triangles?").

Kim's Views About Facilitators and Barriers to Adopting Learner-Centered Practices in Classrooms

Kim did not have any suggestions about making her classroom more learner-centered. However, she stated that the expectations of parents and some of her teaching colleagues prevented her from doing more learner-centered instruction.

I would be inhibited by the expectations of parents
and teaching colleagues. For example, if you are using
math-as-a-way-of-thinking philosophy and other teachers

are not. Unless you are bold and confident about what you are doing, you are not as inhibited. The expectations of parents affect you in a big way. What are they thinking I am doing [in the classroom]? How do I justify what I am doing?

When asked how she handled the expectations of parents, Kim provided the following reply.

Occasionally, I compromise. I do not do as much learner-centered instruction. We do something concrete from the textbook. Parents are satisfied when work comes home.

In her discussion about what she viewed as barriers and facilitators for new teachers to use learner-centered approaches in their classrooms, Kim indicated that new teachers must be informed. She explained, "It depends on what they are originally shown and where they are placed for their classroom practice." Kim concluded the discussion with the following statements: "They need a really well placed practice with a progressive, stimulating teacher. That makes all the difference. The where and who you are with."

Cross-Case Analysis

The purpose of this qualitative study was to examine the teaching approaches used by teachers in classroom contexts, and to explore how their classroom designs and teaching approaches contributed to learner-centered practices. In the first part of the cross-case analyses, Amanda's and Kim's individual practices, beliefs, and reflections were closely examined to construct a picture of their understandings of learner-centered classrooms and teaching approaches. The cross case analysis continues with comparisons of the two teachers' practices in their classrooms and their viewpoints about facilitators and barriers to putting learner-centered classrooms into practice. Comparisons between the two cases were made in order to consider interpretations that might fit each of the individual cases. For example, the literature on instructional choices provided some insights into the teachers' reported use of teacher-focused teaching strategies in their classrooms.

Table 8 shows a comparison of the teachers' descriptions of their classrooms and teaching approaches. The information in the table is presented according to the six features of teaching-learning contexts for learner-centered classrooms that emerge in the literature.

Table 8

What the Teachers Said about Their Classrooms and Teaching Approaches

	Amanda	Kim
Classroom Features		
Teacher's role	Teacher is a guide (facilitator).	Teacher is a guide (facilitator).
Types of tasks	<ul style="list-style-type: none"> • Hands-on activities. 	<ul style="list-style-type: none"> • Process-based activities.

	<ul style="list-style-type: none"> • Encourage students to problem solve and experiment • Students make effort to take responsibility. 	<ul style="list-style-type: none"> • Engage, motivate and involve students in a substantial way (activate and stimulate thinking). Students are responsible for their record keeping.
Student's role	<ul style="list-style-type: none"> • Need to see effort. It is important to know the answer but effort is important. • If unsure, students use reference material to find answers. 	<ul style="list-style-type: none"> • Students are responsible for their record keeping. • Responsible for the completion and turning in their work.
Learning environment	<ul style="list-style-type: none"> • Students share ideas, help each other and work in pairs and groups. • They have choices and control over challenges. 	<ul style="list-style-type: none"> • Students have opportunities to work independently (reflection activities), in pairs and groups. They help each other. • Everybody shares his or her thoughts and solutions. • They have choices and challenges.

Assessment methods	<ul style="list-style-type: none"> • Students need to show their work. • Show how they got the answer. 	<ul style="list-style-type: none"> • The process is part of it. • It's not always the finished product, but how they got there.
Evaluation structures	Students have a process in place to evaluate themselves and their peers.	Students use informal process to evaluate each other.
Teaching approaches	<p>Predominantly student focused strategies with occasional use of teacher-focused strategies.</p> <p>Overall intention aimed at helping students change their conceptions.</p>	<p>Somewhere in the middle between student-focused and teacher-focused strategies.</p> <p>Overall intention aimed at helping students change their conceptions.</p>

What Understanding Do Teachers Have of Learner-Centered Classrooms and Do They See Evidence of It When They Reflect on Their Classrooms?

The understandings that Amanda and Kim had of learner-centered classrooms were very similar. The teachers in this study understood that the teacher's role in learner-centered practices is to guide (facilitate) the students' learning by using questions to clarify, correct or elaborate and to show the students how to find answers. The teachers understood that students in learner-centered classrooms are engaged in tasks that promote active processing and that students learn through actions on concepts. Although the teachers had a clear understanding of the types of tasks that the literature states are found in learner-centered classrooms, they used different vocabulary to describe these tasks. For example, the teachers

used terms such as "hands-on" and "experimentation" to describe tasks that the literature refers to as "actions on concepts". The teachers also understood that the student's role in learner-centered practices becomes more active and collaborative, and that students take responsibility for guiding their own learning by asking questions. In particular, the teachers emphasized the importance of student effort and student responsibility for the completions of activities in learner-centered practices. With respect to the learning environment, the teachers recognized that students in learner-centered classrooms require opportunities to exercise personal control and choice over tasks, to share ideas and work together with other students. Both teachers acknowledged that students in their classrooms were assigned the same task to complete; however, their students had opportunities to choose how they would complete the activities and to share ideas and help each other. The literature on learner-centered practices indicates that the assessment methods are non-threatening and focus on learning processes as well as learning tasks. The teachers clearly understood that learner-centered practices involve assessments of learning processes. For example, the teachers demonstrated their understanding in the following statements, "Don't just put the right answer, show me." (Amanda) and "It's not always the finished product, but how they got there." (Kim). Based on the sixth feature of teaching-learning contexts, evaluation in learner-centered classrooms is ongoing, improvement-based, and it consists of teacher, peer and self-evaluation practices. Although both teachers understood the purpose and types of evaluation practices in learner-centered classrooms, they did not implement the same evaluation practices in their classrooms. Specifically, the students in Amanda's classroom evaluated themselves and their peers whereas Kim stated, "We do not do enough self-evaluation. This is something that I need to work on."

Do Teachers Describe Their Teaching Strategy as Student-Focused or as Teacher-Focused?

Approaches to teaching are composed of two elements – intention and strategy (Trigwell & Prosser, in press). Intentions (e.g., why the teacher does it) range from those involving transmission of information from teachers to students, to those where teachers aim to help students change their conceptions. Teaching strategies (e.g., what the teacher does) range from teacher-focused strategies that help students acquire information to student-focused strategies that help students learn how to learn.

Amanda and Kim reported that their teaching intentions were to help students change their conceptions rather than transmit information to the students. However, there were distinct differences in the teachers' self-reports about their teaching strategies. Amanda reported that she used student-focused strategies predominately and that occasionally she used teacher-focused strategies. On the other hand, Kim reported that she used each strategy about the same amount of time. For example, Amanda's responses showed that she frequently designed her lessons with the assumption that the students' have little prior knowledge of the topics to be covered, and Kim reported that she frequently felt that she should know the answers to any questions the students may ask.

These two teachers' reported use of teacher-focused teaching strategies might be attributable to their beliefs about instructional choices (e.g., activities, social arrangements). Flowerday & Schraw (2000) stated that teachers use of choice in their classrooms was based on student and teacher factors. For example, teachers suggested that students who acquired a certain level of prior knowledge in a subject and attained a certain level of procedural skills benefited the most from instructional choice. Teaching-related factors included course content, teacher management style and teacher efficacy. Teachers believed that course content that required sequencing, such as mathematics, was less suitable for instructional

choice in the classroom. In terms of the teachers' management style, they believed it was important to yield some control of the classroom to students and that choice was an important way to do so. As teachers became more experienced (i.e., teacher efficacy) they offered more choices to students.

The literature on the changing role of teachers also provides some insights about Amanda's and Kim's use of teacher-focused strategies. Clarke (1997) stated that mathematics teachers who were facilitators in their classrooms required considerable knowledge of course content, pedagogy and student learning, and this role placed great demands on their energy levels. Brodie, Lelliott and Davis (2002) suggested that the constraints of having to teach a specified curriculum in a specified time made it challenging for teachers to adopt learner-centered practices.

Is There Correspondence Between Their Self-Reports and What Takes Place in Practice?

A cornerstone of learner-centered practices is the shared responsibility that occurs between students and teachers (McCombs, 1998). The roles of students become more active and they are encouraged to take responsibility for asking questions and guiding their own learning. The teacher no longer delivers the curriculum but instead redirects time and energy from content presentation to the development of activities that focus students on products that they create.

The evidence from the observations showed that Amanda and Kim were guides (facilitators) who incorporated tasks in their instruction that engaged the students in problem solving activities. The students in the teachers' classrooms had opportunities to make choices, control challenge, share ideas and complete the activities in pairs and groups of students. Kim's students participated in the management of the classroom by taking turns as classroom managers and material managers. They also took responsibility for choosing their

seating partners. In Amanda's classroom the students shared responsibility for the management of the classroom with the teacher (e.g., "Nobody is in charge in this classroom, we run it together.") The assessment methods used by Amanda and Kim focused on learning processes and products. On an ongoing basis, Amanda and Kim evaluated the students' progress by viewing their work and answering their questions. As well, students in both classrooms evaluated themselves and gave feedback to other students.

The literature on learner-centered classrooms supports tasks and instructional strategies that promote problem-solving learning (Shuell, 1996; Moallem, 1998; Smith & Ragan, 1999; Hamman, Berthelot, Saia, & Crowley, 2000. Table 9 shows a comparison of the instructional strategies used by Amanda and Kim for problem-solving activities in their classrooms. The table is organized according to the seven problem-solving instructional strategies outlined by Smith and Ragan (1999).

Table 9

Teachers' Use of Instructional Strategies in Their Classrooms

Problem-Solving Instructional Strategies	Amanda	Kim
Deploy attention	Take out your math book. Go to page 172. Look at [Question] #7. What's the picture? What's it called?	This is an art activity that uses what shapes?

Arouse interest and motivation	[No observations made.]	We will start with the journal writing then I have some math art planned for you.
Establish instructional purpose	You are to draw a pattern for a CD. What are some shapes you can use?	You will build as many triangles as you can from the Tangram set.
Preview lesson	[No observations made.]	You each have one set to build triangles with up to 7 pieces.
Recall prior knowledge	[No observations made.]	How many of you remember two elements?
Process information	Then you have to colour each shape a different colour. The same colour cannot touch.	Without looking at your scrapbooks can you name the elements of shape?
Focus attention	What is this graph about?	What are you starting to notice?
Employ learning strategies	Look at the chart at the back of the room for ideas.	Don't hesitate to use pictures to show what you understand.
Practice	You have to draw two or more patterns. No part of the paper may be left showing.	Put your thinking on paper. You don't have to show the right answer but show what your brain is thinking.
Evaluate feedback	The shapes have to be touching.	You almost have it. You need to adjust this side.

Summarize and review	First draw your patterns then decide where you will put your colours.	If you make it too tight, the paper will bend. We will tape the sheets to something to straighten them out.
Transfer knowledge	What predictions can you make?	Is there a mathematical rule that you can state about isosceles triangles?

Amanda and Kim demonstrated that they used student-focused teaching strategies in their classrooms but it was Kim who used a full range of instructional strategies related to problem-solving activities. Amanda did not use any strategies to preview the lessons and to help the students recall prior knowledge. This omission of these strategies was due in part to the classroom management issues that Amanda had to address with her students. On the other hand, Kim began her lessons by deploying attention, arousing interest and motivation and previewing the lesson. Kim also asked questions to help students recall prior knowledge. Kim and Amanda provided feedback in the form of hints and questions, and the students in both classrooms had opportunities to practice alone, in pairs and groups. At the end of the lessons, Kim and Amanda included summaries and reviews, and they helped students transfer knowledge to similar problems outside the classroom.

Although Amanda and Kim stated in their self-reports that they used teacher-focused teaching strategies, the use of these strategies was not evident in the observations of their classrooms. Turner and Meyer (2000) stated that continuous observation of the classroom was required to understand teachers' perceptions in context. Accordingly, the two

observations of the teachers' classrooms did not provide sufficient data to explain how Amanda and Kim acted out the reported use of teacher-focused strategies in their practice.

Amanda and Kim were provided with opportunities to reflect on specific teaching activities they used in their classroom. The purpose of the reflection-on-action practice was to make explicit the decisions and actions taken by the teachers with respect to the activities they chose for the students in their classrooms. Table 10 provides a comparison of the teacher's reflections on a specific teaching activity that was observed in each classroom.

Table 10

Teachers' Reflections on Specific Teaching Activities

Reflections on a teaching activity	Amanda	Kim
Method	Described the pattern activity for the CD cover in terms of learning outcomes and student activities.	Described the triangle activity (Tangram sets) in terms of learning outcomes and student activities.
Reason	Explained how the CD cover activity enabled students to problem solve, to share ideas and have fun.	Explained how the triangle activity enabled students to problem solve, to work co-operatively and share ideas.
Justification	Explained that some changes would be made to the activity to make it more challenging.	Explained that each pair of students would receive one Tangram set (instead of two) to make the activity more challenging.

In terms of their reflections on specific teaching activities, the findings suggest that Amanda and Kim engaged in reflection-on-action that was critical in nature. Critical reflection-on-action involves thinking about the effects upon others of one's actions (Hatton & Smith, 1995). Amanda and Kim systematically examined the geometry activities, discussed what they learned from their classroom experience and redefined how they would make these activities more challenging for students in the future.

What Are the Facilitators and Barriers for Teachers to Adopt Learner-Centered Practices in Classrooms?

During the reflective practice interviews, the teachers discussed what they considered to be facilitators and barriers to adopting learner-centered approaches in their classrooms and in the classrooms of new teachers. The teachers' views about facilitators and barriers to learner-centered classrooms are presented in Table 11.

Table 11

Teachers' Views about Facilitators and Barriers to Learner-Centered Practices

	Amanda	Kim
Teacher's Own Classroom:	A larger classroom to do learning centres and to move around.	No comment.
Facilitators	It would be easier to move kids around and able to work in smaller groups.	
Barriers	Parents (guardians) who wouldn't like the style of teaching.	The expectations of parents affect you in a big way.

New Teachers:	It is best to observe classrooms	It depends on what they are
Facilitators	and try what works best for you.	originally shown.
	It depends on what you are	Also, where they are placed for
	confident with, your style and	their classroom practice.
	how you come across to the kids.	They need a really well placed
	The universities need to separate	practice with a progressive,
	the theoretical courses (must	stimulating teacher.
	have) and spend time on	That makes all the difference.
	classroom experience	The where and who you are
	[New teachers] could use the	with.
	help of a mentor.	
Barriers	No comment.	No comment.

In contrast to Kim who did not make any suggestions about what would facilitate the use of learner-centered approaches in her classroom, Amanda stated that she would like to have "a larger classroom to do learning centres and to move around." It seems that her suggestion would facilitate four features of learner-centered classrooms (i.e., her role as guide, types of tasks, student's role as active learner and learning environment that enables students to share and work together). Both teachers identified the expectations of parents (guardians) as a barrier to implementing learner-centered classrooms. Although Amanda had not experienced any criticism from parents (guardians) about her teaching approaches, Kim admitted that "Occasionally, I compromise. I do not do as much learner-centered instruction. We do something concrete [rather than process work] from the textbook. Parents are satisfied when work comes home." The research on teacher professional

development has recognized that teachers work in a complex and value laden area with many competing beliefs about good teaching-learning practices (Calderhead, 1992).

Both Amanda and Kim identified early classroom experience and the use of mentors as facilitators for new teachers to adopt learner-centered approaches in their classrooms. The literature on teacher professional development supports the teachers' views about the use of mentors. Generally, new teachers and their mentors focus on the component processes of telling and listening, and demonstrating and imitating (Schön, 1987). Amanda and Kim made no suggestions about barriers that would prevent new teachers from using learner-centered practices in their classrooms.

DISCUSSION

The purpose of this qualitative study was to examine teaching approaches used by teachers in classroom contexts, and to explore how their classroom designs and teaching approaches contributed to learner-centered practices. Findings from this case study are preliminary and cannot be generalized beyond these two teachers' insights and understanding of learner-centered practices, and the teaching approaches that they used in their classroom designs. However, it is hoped that these findings may provide some insights into the value of examining learner-centered classroom contexts and teaching approaches.

The discussion covers (a) summary of findings, (b) limitations of this study, (c) reflecting on the research process and (d) research issues related to learner-centered classroom contexts and teaching approaches.

Summary of Findings

The findings of the study showed similarities between these two teachers' understandings of learner-centered classrooms and the six key features (e.g., teacher's role, types of tasks, role of students, learning environment, assessment methods and evaluation structures) that emerge in the literature about teaching-learning contexts for learner-centered practices.

As the findings of this study suggest, these two teachers reported that their overall approaches to teaching were based on student-focused strategies with the intention of helping students to change their conceptions. However, the findings also showed that these two teachers reported the adoption of teacher-focused strategies in their classroom practices.

The findings of this study illustrated that there was correspondence between these two teachers' understandings of learner-centered classrooms and their actual classroom designs. The findings revealed that these two teachers used student-focused teaching strategies in their classrooms whereas their self-reports indicated that they used both teacher- and student-focused teaching strategies.

Last, the findings indicated that the expectations of parents (guardians) who did not understand the teaching approaches used by these two teachers were a potential barrier to implementing learner-centered practices in classrooms.

Previous research on the role and beliefs of mathematics teachers may provide a contextual understanding of the findings in this study related to these two teacher's reported use of teacher-focused teaching strategies. The move to problem solving or enquiry-oriented approaches to mathematics instruction has involved changes to the role of teachers and their beliefs and practices (Clarke, 1997; Stipek, Givvin, Salmon, Valanne & MacGyvers, 2001; Brodie et al., 2002). In these instructional contexts, teachers are expected to undergo a conceptual change in which they regard mathematics as a tool for problem solving and their role is to support and guide the students' learning processes (Stipek et al., 2001). As well, teachers are expected to shift away from the exclusive use of textbook-based teaching in which students are expected to learn mathematics operations to get the correct answer.

The research has found that teaching practices in mathematics instruction are influenced by teachers' beliefs about course content and challenges related to the teacher's role as guide. Due to the required sequencing in mathematics, teachers indicated that the use of various activities were not always suitable for mathematics instruction (Flowerday and Schraw, 2000). Teachers also believed that they would require considerable knowledge about content, pedagogy and student learning in order to adopt problem-solving and enquiry-based

teaching practices (Clarke, 1997), and they believed the constraints of having to teach a specified curriculum in a specified time made it difficult to adopt learner-centered practices (Brodie et al., 2002).

In this study, the findings related to the reported use of teacher-focused and student-focused strategies point to these two teachers' beliefs about balance in mathematics instruction. Stipek et al. (2001) stated that the nature of mathematics (as rules and procedures to achieve one right answer or tools for thought and creative problem solving) and the teacher's role (teaching rules or guiding enquiry) are not necessarily contradictory. This suggests that teachers should not be expected to abandon teaching mathematical rules to students; however, there is an expectation that rule-based teaching practices will not be the primary focus of mathematics instruction.

Limitations of this Study

This research study was beset with problems related to the recruitment of classroom teachers, limited time for data collection activities and the unavailability of students to participate in the study. Consequently, it was not possible to conduct an in-depth exploration of how these two teachers' classroom designs and teaching approaches contributed to learner-centered practices.

Although a variety of recruitment methods (e.g., presentation at workshop, e-mail and telephone contact) were used, only two teachers from a sample of 65 volunteered for this study. It is not known to what extent these two teachers' classroom designs and teaching approaches were representative of the sample group. The lack of data from teachers who describe their teaching strategies as predominately teacher-focused, prevented this study from comparing classroom designs of two groups of teachers (i.e., student-focused vs. teacher-focused approaches to teaching).

Due to delays in recruiting teachers and the limited access to teachers at certain periods of the school year (e.g., report cards, meetings with parents (guardians), only five weeks were available for the data collection activities. As a result, only two visits each were made to these two teacher's classroom. It is not certain whether the observations were reflective of these two teachers' overall teaching approaches or whether they adapted their instructional strategies for the specific lessons. If more time had been permitted, the data collection phase of the study would have corresponded to an entire teaching segment (e.g., geometry). The longer period would have permitted viewing the classroom context and teaching approaches from the macro level (introduction, practice lessons and assessment activities) and micro level (specific activities within a lesson). Extending the period of observation would have strengthened this study's internal validity through more accurate interpretations of the data collected. Internal validity deals with the questions of how the researcher's findings match reality (Merriam, 1998). Long-term observations or repeated observations in the classrooms permit researchers to gather data both in depth and breadth. Furthermore, some events do not begin to emerge until some time has passed, and the teachers and students in the study have become familiar with, and willing to trust, the researcher (Fraenkel & Wallen, 1996).

Two important components of teachers' instruction is helping students learn how to learn (Hamman, Berthelot, Saia & Crowley, 2000), and encouraging students to take responsibility by asking questions and guiding their own learning (McCombs, 1998). As permission to gather student data was not granted, this study could not explore how the students benefited from the teachers' classroom designs and teaching approaches. The inclusion of student data from test results, surveys or interviews would have allowed this study to provide insights as to how students perceive particular classroom designs and

teaching approaches, and how these perceptions influence their beliefs as learners and their participation in their own learning.

Reflecting on the Research Process

This research study has brought to light the challenges of doing applied research with teachers in classroom contexts. Specifically, this study faced major obstacles in terms of teacher recruitment and the limited length of time for data collection activities.

Only a few studies involving classroom teachers have provided detailed information about their recruitment procedures. For example, Moallem (1998) provided a thorough account of how she recruited an expert teacher for her ethnographic study, and Perry et. al. (2002) explained the steps taken by the research team to work collaboratively with teachers as a community of professionals. In contrast, the study conducted by Orrill (2001) provided insights into difficulties experienced by the researcher to recruit teachers from the field. In order for novice researchers to avoid the pitfalls of gaining entry into the field, it would be beneficial for researchers in educational technology to share their experiences (both successes and failures) with respect to the recruitment of classroom teachers.

Generally, the literature indicates that the length of time required to collect data from classroom teachers, ranges from four months or one semester (Hamman et. al., (2000); Orrill, 2001; Patrick & Middleton, 2002) to a full school year (Moallem, 1998; Perry et. al., 2002). This suggests that studies of learner-centered classroom contexts require the researcher to be present in the classroom on an ongoing basis in order to make observations across activities and various subjects (e.g., mathematics, social studies). By being present throughout the school year, researchers can establish working relationships with teachers that will help them capture important information about the unique aspects of the classrooms and help them uncover teachers' conceptions of teaching. The working

relationship between the researcher and teachers is strengthened when the researcher chooses the role of participant-as-observer. In this role, the researcher participates fully in the activities in the classroom, gains insights as an insider into the classroom and teaching practices, and builds a foundation from which to interpret the results.

Research Issues Related to Learner-Centered Classrooms and Teaching Approaches

Learner-centered teaching is a robust concept but it has different meanings for different people (Brodie et al, 2002). There are three main reasons for the multiple meanings associated with the study of learner-centered classrooms. First, there is no common definition of learner-centered practices among researchers who use this term. Generally, the definitions found in the literature focus on learner-centered premises and principles. Lambert and McCombs (1998) suggested that there were five general premises of learner-centered models: (a) learners have distinctive perspectives or frames of reference; (b) learners have unique differences; (c) learning is a constructive process; (d) learning occurs best in an environment that contains positive interpersonal relationships and interactions; and (e) learning is seen as a fundamentally natural process. Brodie et al., (2002) proposed that two key principles of learner-centered practices included (a) learning that entailed the construction and reconstruction of knowledge by the learner and (b) that there was integrity to a learner's activity at any point in time. Second, the research base on learner-centered classrooms does not provide an adequate description of learner-centered classrooms. Instead, the literature has identified six key features (i.e., teacher's role, types of tasks, student's role, learning environment, assessment methods and evaluation structures) related to teaching-learning contexts for learner-centered classrooms. For example, Pintrich et al. (1993) described evaluation structures as improvement-based and mistakes are seen as positive, and Perry et al. (2002) indicated that evaluation structures should encourage

students to focus on personal progress and view errors as opportunities to learn. Finally, the study of learner-centered classrooms is made more challenging by the uniqueness of individual classroom contexts. Most research on classroom contexts has examined variables that focus on different parts of the classroom (e.g., beliefs, perceptions, classroom management and social relations). Guskey (1995) cautioned that what works in one context may not work in another situation, and Turner and Meyer (2000) stated that the various contexts within a classroom were difficult to define because they were simultaneous and interdependent. Without theoretical and operational definitions of learner-centered classrooms, further research attempts to understand these classroom contexts would not add any value to our existing knowledge of learner-centered practices. However, researchers should continue to investigate the multiple and interconnected contexts within classrooms in order to obtain powerful descriptions that support the researchers' interpretations of what occurs in classrooms as well as how and why it occurs (Moallem, 1998; Patrick & Middleton, 2002; Perry et al., 2002; Turner & Meyer, 2000).

In contrast to the small research base on learner-centered classroom contexts, there is considerable research as to what constitutes effective learner-centered teaching approaches. This literature focuses on the relationship between teachers and their students, and the roles and responsibilities of teachers in learner-centered practices. In learner-centered practices, the relationship between teachers and students becomes more collaborative, students have more voice and there is an underlying trust and respect (McCombs, 1998). The role of the teacher shifts from information provider to facilitator (Orrill, 2001), and teachers guide students' learning through questioning, clarifying, correcting, elaborating, modelling and scaffolding (Orrill, 2001; Stipek et al., 2001; Meyer & Turner, 2002; Perry et al., 2002.). Borko and Putnam (1995) stated that learner-centered

approaches do not rule out direct teacher instruction but these approaches emphasize the role of teacher as mediator of learning. The studies about teacher responsibilities suggest that teachers who are guides (a) use non-routine problems as the starting point and focus of instruction, (b) adapt materials and instruction according to local contexts, and (c) use a variety of classroom organizational styles (Clarke, 1997), and that they (a) design active learning tasks, (b) involve students in the design of assessments and (c) create options for structuring and individualizing learning based on learning styles or multiple intelligences (McCombs, 1998). Despite the emphasis on learner-centered teaching approaches in the literature and practice, research studies have indicated that the ideals of learner-centered teaching were not often attained by teachers (Brodie et al, 2002). In these situations, the teachers incorporated some elements of learner-centered teaching (e.g., group work) but not others (e.g., student choice).

Teachers' beliefs and values about teaching and learning affect their teaching practices. Research studies on teacher conceptual change and reflective practice have provided insights into our understandings about the impact of teachers' beliefs and perceptions on changing their teaching practices. When a teacher employs an activity within a classroom, it is embedded also in the teacher's set of beliefs and premises. Changing teacher practice centres on the degree to which teachers take control of their classroom activities and theoretical justifications and the degree to which these justifications relate to their belief and intentions (Richardson, 1990). The literature on teacher change conceptual models indicates that practice in itself will not result in significant and lasting changes in performance. Practice may lead to changes in perception and attitude, but there is little evidence that practice alone can influence or produce changes in performance (Tillema & Imants, 1995). Stipek et. al. (2001) suggested that influencing teachers' beliefs may be

essential to changing their classroom practices. In order for teacher conceptual change to occur, the link between teacher beliefs (why) and practices (what and how) must be recognized and both must be emphasized in teacher professional development.

The current research indicates that teachers need to engage in reflective practice in order for meaningful and lasting change to occur and that teachers' engagement in reflective practice is an integral part of their professional development and teaching practices. The complexity and uniqueness of events in classrooms require teachers to reflect in the midst of their actions, and to make immediate professional judgements and decisions during instruction (Moallem, 1998). Turner and Meyer (2000) stated that teachers base their practice on understanding individual students in context. This situated knowledge is important for teachers who reflect on their practice and desire to become guides who involve students in learning. Cole & Knowles (2000) viewed teaching as a form of enquiry in which teachers learn from and through the process of teaching. This approach involves teachers making the focus of their study on the day-to-day interactions with students, curricular decisions, and the relationship between that curriculum and their instructional techniques or the contexts that facilitate or hinder their ongoing professional development

How and in what ways can research help teachers, in their professional development, to become guides and facilitators of student learning in their classrooms? There is a need for researchers to move away from examining what constitutes effective learner-centered teaching practices to exploring how and why teachers' beliefs influence their adoption or resistance to becoming guides (facilitators) of student learning. Researchers also need to acknowledge the importance of reflection on teaching practices in classrooms and its impact on changing teachers' beliefs. Research studies need to explore how and why teachers use reflective practice before, during and after instruction. If teachers implement learner-

centered teaching practices in their classrooms while engaging in reflective practice, they might ultimately change their beliefs about helping students learn how to learn. In this regard, engagement in reflective practice may provide teachers with a means to become personally responsible for their professional development.

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APPENDIX A

Speaking Notes for Meeting with Teachers

October 2002

Thank you for inviting me to speak about my research project that was approved by the school board. The title of my study is Promoting Learner-Centered Classrooms Through Student-Focused Teaching Strategies and Reflective Practice. The results will be published as a Thesis for the Degree of Masters of Arts at Concordia University. During my presentation, I will provide you with a brief overview of my study, explain what is required of participants, and invite you to participate in this study. If you have any questions, I will be pleased to answer them at the end of my presentation.

Purpose of Research

Although some research studies have examined student-focused teaching strategies in actual classrooms, the studies of teacher reflective practice have focused on student teachers with some reference to the classroom context. Based on my review of the existing research, I believe there is much to be learned about promoting learner-centered classrooms by supporting classroom teachers to adopt student-focused teaching strategies and to engage in reflective practice. My study is designed to explore features of learner-centered classrooms, and how teachers' use of student-focused teaching strategies and reflective practice can promote learner-centered classrooms. Participants in the study will be able to share their own insights and understandings as to how teachers use student-focused teaching strategies and reflective practice to promote learner-centered classrooms.

What Is Required of Participants?

For my research study, I am looking for junior teachers who will consent to release data for research purposes. All interested teachers are welcome to participate in the first part of the study. I will notify the principals of your schools once interest in participating in this study is confirmed.

Under the first phase of the study, teachers will be asked to complete the Consent Form to indicate their written consent to participate in the study, and to complete the Approaches to Teaching Inventory questionnaire. It will take 15 to 20 minutes to complete the questionnaire. After I receive the completed Consent Forms and questionnaires, I will invite, by telephone, four teachers to participate in phases two and three of the study. The teachers will consist of two groups of two teachers who represent very different teaching strategies (for example, student-focused or teacher-focused strategies).

Phase two will involve two observations of each teacher's classroom (30 to 45 minutes each visit). During the classroom observations, I will not administer any tests, questionnaires or other devices to gather data from the students.

In phase three, individual interviews will be held with the four teachers about reflective practice in their use of a new teaching strategy or activity. The interview will last about 30 minutes and it will take place at the school or at another suitable location. The dates and times for the classroom observations and interviews will be arranged according to the teachers' schedules.

Participation in this study is completely voluntary and teachers may withdraw at any time. To ensure the confidentiality of this study, I will assign pseudonyms to the teachers, and the names of the schools will be concealed. All data collected from the study will be kept locked and stored in my Thesis Supervisor's cabinet for up to five years. At the end of

the study, I will submit a final report to the Ottawa-Carleton Research Advisory Committee and send a summary project report to the schools and teachers who participated in the study. After my Thesis is completed, I will invite teachers who participated in the study to a workshop.

Invitation to Participate

I would like to invite you (or if you know of another teacher from your school) to participate in my study. In your handouts, you will find a covering letter, my business card, copies of the Consent Form, and the Inventory of Teaching Approaches questionnaire as well as a return envelope with postage. If you (or another teacher) are interested in participating in this study, please return the completed Consent Form and Inventory of Teaching Approaches questionnaire in the envelope provided by November 6, 2002.

This concludes my presentation, do you have any questions?

Thank you very much for your time, and enjoy the rest of your workshop.

APPENDIX B

Letter of Invitation to Teachers

October 2002

Dear Teacher:

I am writing to invite you to participate in the Promoting Learner-Centered Classrooms Through Student-Focused Teaching Strategies and Reflective Practice research study that has been approved by the Ottawa-Carleton Research Advisory Committee. The purpose of my research is to explore the features of learner-centered classrooms, and how teachers' use of teaching strategies and reflective practice can promote learner-centered classrooms.

Your participation in this study is completely voluntary and you may withdraw at any time. I will assign pseudonyms to the teachers to protect the confidential information provided by them. As well, the data collected from the study will be kept locked and stored in my Thesis Supervisor's cabinet for up to five years. The results of my study will be published as a Thesis under the requirements for the Degree of Masters of Arts (Educational Technology Programme) at Concordia University. I will submit a final written paper to the Ottawa-Carleton Research Advisory Committee and send a summary project report to the schools and teachers who participated in the study. In addition, I will invite teachers who participated in the study to a workshop after my Thesis is completed.

If you wish to participate in this study, please complete the attached Consent Form, and the Inventory of Teaching Approaches questionnaire. It will take 15 to 20 minutes to

complete the questionnaire. Please return the completed Consent Form and Inventory of Teaching Approaches questionnaire in the envelope provided by November 6, 2002.

After I receive your written consent and the completed questionnaire, I may call you to invite you to participate in two other phases of the study. Further participation in this study would involve two observations of your classroom (30 to 45 minutes each visit), and an interview about reflective practice in your use of a new teaching strategy or activity. The interview will last about 30 minutes and it will take place in your school or at another suitable location. I will not gather any data from your students for this study.

If you have any questions about this study, please contact me at 957-9741 (work) or by e-mail at Mary-Ann.Doucette@ccra-adrc.gc.ca, or you may contact my Thesis Supervisor at the e-mail address provided on the business card attached to this letter.

Mary Ann Doucette

Masters Student (Educational Technology Programme),

Department of Education, Concordia University

Cc Dr. Allyson Hadwin

Thesis Supervisor,

Concordia University

Attachments (4)

APPENDIX C

Teacher's Consent Form to Participate in Research

This is to state that I agree to participate in this program of research being conducted by Mary Ann Doucette (Masters Student) of the Department of Education of Concordia University.

A. PURPOSE

I have been informed that the purpose of the research is to explore features of learner-centered classrooms, and how teachers' use of teaching strategies and reflective practice can promote learner-centered classrooms.

B. PROCEDURES

I have been invited to complete the Approaches to Teaching Inventory questionnaire. I have been informed that it will take about 15 to 20 minutes to complete the questionnaire, and that I should return the completed questionnaire to the researcher. As well, I have been informed that I may receive a telephone call from the researcher to invite me to participate in two other phases of the study. Further participation in this study would involve observations of my classroom during two class periods, and an interview about reflective practice in my use of a new teaching strategy or activity. The interview will last about 30 minutes and it will take place at my school.

After the study is completed I will be invited to a workshop. The purpose of the workshop will be to discuss the results of the study. As well, I will receive a summary report of the project.

C. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at anytime without negative consequences. If I decide to withdraw my consent, I can do this by notifying the researcher (Mary Ann Doucette) by contacting her by telephone at 613-957-9741 or by e-mail at Mary-Ann.Doucette@ccra-adrc.gc.ca. Alternatively, I may contact the Thesis Supervisor (Allyson Hadwin) by e-mail at allysonh@education.concordia.ca. I have received a business card that includes the information noted above.

- I understand that my participation in this study is CONFIDENTIAL and that pseudonyms will be used so there is no way to identify the teachers who are participating in this study. Both the school and the school board will also be concealed and reference will be made to 'a school in the greater Ottawa area'.

- I understand that the data from this study will be kept locked and stored in the Thesis Supervisor's cabinet for up to five years. I am also advised that the results of the study will be published in a Thesis, and possibly as an article in a journal.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOLUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

NAME (please print) _____

SIGNATURE _____

WITNESS SIGNATURE _____

DATE _____

Thank you for your participation.

APPENDIX D

Business Card

Mary Ann Doucette

Masters Student (ETEC),

Department of Education

Concordia University

Telephone: 613-957-9741

E-mail: Mary-Ann.Doucette@ccra-adrc.gc.ca

Thesis Supervisor: Dr. Allyson Hadwin

E-mail: allysonh@education.concordia.ca

APPENDIX E

Approaches to Teaching Inventory

(Trigwell & Prosser, in press)

Date _____

School _____

Teacher _____

This inventory is designed to explore the way that teachers go about teaching in a specific context (class/subject). This may mean that your responses to these items in one context may be different to the responses you might make on your teaching in other contexts or subjects. For this reason we ask you to describe your context (class/subject) and grade level of your response to this questionnaire below:

Class/Subject _____

Grade _____

Continued on next page.

For each item please circle one of the numbers (1-5). The numbers stand for the following responses:

- 1 - this item was **only rarely** true for me in this subject.
- 2 - this item was **sometimes** true for me in this subject.
- 3 - this item was true for me **about half the time** in this subject.
- 4 - this item was **frequently** true for me in this subject.
- 5 - this item was almost **always** true for me in this subject.

Please answer each item. Do not spend a long time on each: your first reaction is probably the best one.

		Only rarely		About half the time		Always
1	I design my teaching in this subject with the assumption that most of the students have very little useful knowledge of the topics to be covered.	1	2	3	4	5
2	I feel it is important that this subject should be completely described in terms of specific objectives relating to what students have to know for formal assessment items.	1	2	3	4	5
3	In my interactions with students in this subject I try to develop a conversation with them about the topics we are studying.	1	2	3	4	5

- | | | | | | | |
|----|---|---|---|---|---|---|
| 4 | I feel it is important to present a lot of facts to students so that they know what they have to learn for this subject. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 5 | I feel that the assessment in this subject should be an opportunity for students to reveal their changed conceptual understanding of the subject. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 6 | I set aside some teaching time so that the students can discuss, among themselves, the difficulties that they encounter studying this subject. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 7 | In this subject I concentrate on covering the information that might be available from a good textbook. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 8 | I encourage students to restructure their existing knowledge in terms of the new way of thinking about the subject that they will develop. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 9 | In teaching sessions for this subject, I use difficult or undefined examples to provoke debate. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 10 | I structure this subject to help students to pass the formal assessment items. | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 11 | I think an important reason for running teaching sessions in this subject is to give students a good set of notes. | 1 | 2 | 3 | 4 | 5 |

- | | | | | | | |
|----|---|---|---|---|---|---|
| 12 | In this subject, I only provide the students with the information they will need to pass the formal assessments. | 1 | 2 | 3 | 4 | 5 |
| 13 | I feel that I should know the answers to any questions that students may put to me during this subject. | 1 | 2 | 3 | 4 | 5 |
| 14 | I make available opportunities for students in this subject to discuss their changing understanding of the subject. | 1 | 2 | 3 | 4 | 5 |
| 15 | I feel that it is better for students in this subject to generate their own notes rather than always copy mine. | 1 | 2 | 3 | 4 | 5 |
| 16 | I feel a lot of teaching time in this subject should be used to question students' ideas. | 1 | 2 | 3 | 4 | 5 |

Thank you for your participation.

APPENDIX F

Classroom Observation Running Record (Perry, 1998)

Section A

Teacher _____ School _____

Subject _____ Grade _____

Date _____ Start time _____

End time _____

Observer _____

Section B

Running record ("What is going on")

APPENDIX G

Reflective Practice Interview Guide

Teacher _____ School _____

Subject _____ Grade _____

Date _____ Start time _____

End time _____

Interviewer _____

Introduction

In the first part of this interview, we will talk about a teaching strategy or activity you used in the lesson that I observed in your classroom. I will ask you to reflect on the teaching strategy or activity, consider how it worked for your students, why you chose it for the lesson, and whether you will use this strategy or activity again.

In the second part of the interview, we will talk about learner-centered and teacher-centered instruction, what the two terms means to you, how you would recognize them in a classroom setting, and how they fit with your classroom. We will also talk about what you consider to be facilitators and barriers to promoting learner-centered instruction in your classroom and in classrooms of new teachers.

The interview will take about 45 to 60 minutes. I will take notes during the interview, and use an audiotape in case some information is missing from the written notes.

The information obtained during this interview will be treated confidentially, and the interview documents will be locked and kept in my Thesis Supervisor's drawer for up to five years. The results of the study will be published in a Thesis, and possibly as an article in a journal. Your participation is completely voluntary, and you are free to stop the interview at any time. Do you have any questions?

Part 1 Interview Questions

(Adapted from Wise, Spiegel, & Bruning (1999))

To start, I would like you to describe a teaching strategy or activity that you used to teach the lesson that I observed in your classroom.

Why did you use this teaching strategy or activity for this lesson? What factors did you consider in deciding to use the teaching strategy or activity to teach this lesson? Was it the subject, students?

How do you think your students responded to your use of this teaching strategy or activity?

Will you use this teaching strategy or activity again to teach this lesson? Why or why not? If yes, will you change anything?

Part 2 Interview Questions

(Guided Reflection)

Now let's talk about learner-centered and teacher-centered instruction. How would you define learner-centered and teacher-centered instruction?

How would you recognize each type in a classroom setting? If you were watching a scene about a traditional classroom in a movie or on a television program, what would you see? What would you see if the scene were about a contemporary classroom?

Learner-Centered Instruction

-
-
-
-

Teacher-Centered Instruction

-
-
-
-

Going back to your list, what features of learner-centered and teacher-centered instruction do you think were present in the lesson that I observed in your classroom? Look at the list of items in each column and circle the ones that fit in with the lesson you taught. Tell me why you chose to teach the lesson with those features.

Generally, studies about learner-centered instruction have identified four elements:

- teacher as mediator of student learning,
- academic tasks that promote active processing,
- supportive learning environments, and
- methods of assessment that reveal students' thinking.

Here is a list of some of the features we may find in a learner-centered classroom.

Are there any items in the list that you used to teach the lesson that I observed in your classroom? Do you recognize any items in this list that apply to your classroom? Is there anything else?

Types of tasks (open or closed)

Types of choice

What

Who

Where

When

Control over challenge (sharing ideas, drawing pictures to get ideas down)

Self and peer evaluation

Teacher evaluation (mastery, personal progress, errors are opportunities to learn)

Teacher support

Peer support

What would help you or hold you back from using learner-centered instruction in your classroom? What about curriculum, students, resource materials, and expectations of parents/guardians? Can you tell me more about that?

For my last question, what do you think would help or hold back a new teacher from putting learner-centered instruction into practice? What about curriculum, students, resource materials, and expectations of parents/guardians. Why do you think it is so?

Conclusion

This is the end of the interview. Do you have any questions or comments?

Thank you for participating in the interview. If there is something else that you want to discuss about this study, you can contact me at 613-957-9741 or by e-mail at

Mary-Ann.Doucette@ccra-adrc.gc.ca.

APPENDIX H

Relationship of Question Items and Sub-Scales on the Approaches to Teaching Inventory Questionnaire

Intention Sub-scale			
Information Transmission (IT)		Conceptual Change (CC)	
2	I feel it is important that this subject should be completely described in terms of specific objectives relating to what students have to know for formal assessment items.	5	I feel that the assessment in this subject should be an opportunity for students to reveal their changed conceptual understanding of the subject.
4	I feel it is important to present a lot of facts to students so that they know what they have to learn for this subject.	8	I encourage students to restructure their existing knowledge in terms of the new way of thinking about the subject that they will develop.
11	I think an important reason for running teaching sessions in this subject is to give students a good set of notes.	15	I feel that it is better for students in this subject to generate their own notes rather than always copy mine.
13	I feel that I should know the answers to any questions that students may put to me during this subject.	16	I feel a lot of teaching time in this subject should be used to question students' ideas.

Strategy Sub-scale

Teacher-Focus (TF)

- | | |
|--|---|
| <p>1 I design my teaching in this subject with the assumption that most of the students have very little useful knowledge of the topics to be covered.</p> | <p>3 In my interactions with students in this subject I try to develop a conversation with them about the topics we are studying.</p> |
| <p>7 In this subject I concentrate on covering the information that might be available from a good textbook.</p> | <p>6 I set aside some teaching time so that the students can discuss, among themselves, the difficulties that they encounter studying this subject.</p> |
| <p>10 I structure this subject to help students to pass the formal assessment items.</p> | <p>9 In teaching sessions for this subject, I use difficult or undefined examples to provoke debate.</p> |
| <p>12 In this subject, I only provide the students with the information they will need to pass the formal assessments.</p> | <p>14 I make available opportunities for students in this subject to discuss their changing understanding of the subject.</p> |

APPENDIX I

Examples of Themes, Codes and Text for Teaching-Learning Contexts in Learner-Centered Classrooms

(Data Source: Reflective Practice Interview Transcripts)

Themes	Codes	Text	
		Amanda	Kim
Teacher's role	guide (facilitator)	I see myself as the guide. I throw out questions to the kids. If it comes from them, they remember more.	The teacher guides with a plan in mind. The teacher has outcomes in mind, the student is the doer.
Types of tasks	hands-on activities problem solve experiment engage and motivate activate and stimulate thinking	Doing patterns in math is like working backwards, instead of theory first. Students experiment and try things out.	Instruction would be activity based, self-selection and self-monitoring processes. They are involved in problem solving, how they go about doing it.
Student's role	require effort and take responsibility	Effort is expected. Don't just put the right answer, show me.	Students are responsible for the completion and turning in their work.

Learning environment	students share ideas help each other work in pairs and groups choices and control over challenges	Opportunity to share ideas. They helped each other.	It allowed everybody to give their thoughts and solutions. They were engaged, cooperated with each other and tried to share. There are choices within the activity.
Assessment methods	students show their work how they got the answer	It's important to know the answer but effort is important.	It's not always the finished product, but how they got there.
Evaluation structures	process to evaluate themselves and peers	They do peer evaluation. Rate yourself. Rate your friend.	Peer evaluation depends on who is sitting with whom.

APPENDIX J

Examples of Themes, Codes and Text for Problem-Solving Instructional Strategies

(Data Source: Classroom Observation Running Records)

Themes	Codes	Text	
		Amanda	Kim
Deploy attention	Attention	What is this graph about?	This is an art activity that uses what shapes?
Arouse interest and motivation	Interest	[No observations made.]	We will start with the journal writing then I have some math art planned for you.
Establish instructional purpose	Problem-solve activity	You are to draw a pattern for a CD. What are some shapes you can use?	You will build as many triangles as you can from the Tangram set.
Preview lesson	Increasing complexity	[No observations made.]	You each have one set to build triangles with up to 7 pieces.
Recall prior knowledge	Previous problem solving activities	[No observations made.]	How many of you remember two elements?

Process information	Verbal instructions Think alouds	Then you have to colour each shape a different colour. The same colour cannot touch.	Without looking at your scrapbooks can you name the elements of shape?
Focus attention	Specific features of problem	[No observations made.]	What are you starting to notice?
Employ learning strategies	Questions Hints	Look at the chart at the back of the room for ideas.	Don't hesitate to use pictures to show what you understand.
Practice	Simple to complex	You have to draw two or more patterns. No part of the paper may be left showing.	Put your thinking on paper. You don't have to show the right answer but show what your brain is thinking.
Evaluate feedback	Questions Hints	The shapes have to be touching.	You almost have it. You need to adjust this side.
Summarize and review	Suggestions	First draw your patterns then decide where you will put your colours.	If you make it too tight, the paper will bend. We will tape the sheets to something to straighten them out.
Transfer knowledge	Relate to problems outside classroom	What predictions can you make?	Is there a mathematical rule that you can state about isosceles triangles?