Preservice teachers' beliefs about teaching and learning

Helga M. Gudenschwager

University of Northern Iowa

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Preservice teachers' beliefs about teaching and learning

Abstract
Research shows that knowing what preservice teachers believe about teaching and learning helps their instructors to reinforce those beliefs that are compatible with current approaches in education and challenge those that promote the perpetuation of antiquated and ineffective teaching practices.

Four main research questions guided this study: 1. To what extent the beliefs expressed by participants aligned with traditional or constructivist perspectives? 2. Do elementary and secondary majors differ in terms of their preference for practices aligned with these perspectives? 3. Do elementary and secondary majors differ in terms of their beliefs about the goals of education and effective strategies to enhance students' learning. 4. What are participants' motivations and concerns about becoming a teacher and career expectations?

In general, elementary majors expressed more concern about the impact of constructivist oriented practices on students' discipline, whereas secondary majors were more worried about the pertinence of these strategies when used with children. Differences between both majors were also observed regarding their opinions about diverse assessment criteria and fair evaluation and their rationale for endorsing interesting and challenging activities to promote students' motivation. Implications for teacher education are discussed.
An Abstract of a Thesis
Submitted
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

Helga M. Gudenschwager
University of Northern Iowa
May 2000
ABSTRACT

Research shows that knowing what preservice teachers believe about teaching and learning helps their instructors to reinforce those beliefs that are compatible with current approaches in education and challenge those that promote the perpetuation of antiquated and ineffective teaching practices. Four main research questions guided this study:

1. To what extent the beliefs expressed by participants aligned with traditional or constructivist perspectives?

2. Do elementary and secondary majors differ in terms of their preference for practices aligned with these perspectives?

3. Do elementary and secondary majors differ in terms of their beliefs about the goals of education and effective strategies to enhance students’ learning.

4. What are participants’ motivations and concerns about becoming a teacher and career expectations?

Seventy elementary and 23 secondary majors were asked to complete a questionnaire regarding demographic data, vocational aspects, and career expectations and a vignette instrument that presented six educational situations and alternative points of view to resolve them.

Data were analyzed quantitatively and qualitatively. The results show that elementary and secondary majors presented more similarities than differences regarding vocational characteristics and beliefs. A serious commitment to children was observed, which contrasted with a lack of commitment to the teaching profession. The majority of
all preservice teachers endorsed practices that were aligned with constructivist approaches to teaching and learning. More frequently their decision between more traditional and constructivist perspectives was based on these approaches’ impact on students’ learning and motivation.

Differences between majors were observed in the degree participants endorsed the use of discovery learning and in the kind of reasoning they used to support their choices. In general, elementary majors expressed more concern about the impact of constructivist-oriented practices on students’ discipline, whereas secondary majors were more worried about the pertinence of these strategies when used with children. Differences between both majors were also observed regarding their opinions about diverse assessment criteria and fair evaluation and their rationale for endorsing interesting and challenging activities to promote students’ motivation. Implications for teacher education are discussed.
PRESERVICE TEACHERS' BELIEFS ABOUT TEACHING AND LEARNING

A Thesis
Submitted
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts in Education

Helga M. Gudenschwager
University of Northern Iowa
May 2000
This Study by: Helga M. Gudenschwager

Entitled: Preservice Teachers’ Beliefs about Teaching and Learning

Has been approved as meeting the thesis requirement for the Degree of Master of Arts

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CHAPTER I
INTRODUCTION

The study of preservice teachers' beliefs has gained importance in the literature during the last two decades as conceptions of teaching, learning, and the teachers' role have been shifting to a more constructivist perspective (Richardson, 1996). This perspective, in contrast with a traditional perspective, assumes that learners do not passively absorb knowledge, but actively construct it from their experiences and social interactions (Falk, 1996). Although a unique or unified conception of constructivism does not exist, Black and Ammon (1992) state that in general, constructivist learning, in comparison to a traditional perspective,

\[
\text{is viewed as more concerned with understandings achieved through relevant experience than with accumulated facts received from others, more imbued with meaning, more domain or situation specific, more influenced by social and cultural contexts, and in general, less purely cognitive and less governed by abstract principles... (p. 324)}
\]

This paradigm shift in education has required new approaches to teaching and learning, new goals for schooling, as well as changes in school settings and teacher education programs. In this new scenario, teachers are viewed paradoxically as fundamental agents of change and as obstacles at the same time. Teachers are expected to be key elements in the implementation of constructivist principles and practices in schools; however, the "absorptionist" view of learning and a "transmission" approach to teaching that many teachers and preservice teachers have, are not consistent with this constructivist perspective (Prawat, 1992).
Using survey methodology, the current study was designed to explore the beliefs held by elementary and secondary preservice teachers at the University of Northern Iowa. The first purpose of this study was to uncover to what extent the beliefs expressed by the participants reflect a traditional or a constructivist orientation toward teaching and learning. A second purpose was to examine if elementary and secondary preservice teachers differ in terms of their preference for practices aligned with a traditional or a constructivist perspective. A third purpose was to examine if elementary and secondary majors differed in their understandings of the goals of high school education and what they believed to be effective strategies to enhance students’ learning. In addition to these participants’ beliefs, the current study examines aspects of their choice of the teaching profession. These include: (a) vocational characteristic, (b) motivations and concerns about becoming a teacher, (c) career expectations, and (d) demographic characteristics.

This study does not attempt to judge the accuracy of preservice teachers’ beliefs because, as the constructivist approach emphasizes, “no individual’s viewpoint thus constructed should be viewed as inherently distorted or less correct than other’s, although it is certainly true that one individual perspective can be more useful than other” (Derry, 1992, p. 415). Neither is the purpose of the study to determine if their beliefs reflect what they would actually do if they were in a real classroom situation. For the purpose of the current study, responses can be judged as more or less compatible with the constructivist orientation that these preservice teachers are expected to enact once they practice teaching.
By the time a student gets to college to learn to teach, he/she has already developed well-established beliefs about teaching, learning, and his/her self-perception as a teacher (Anderson et al., 1995; Calderhead & Robson, 1991; Holt-Reynolds, 1992; Pajares, 1992). Researchers have suggested that these beliefs are the result of common lay theories about how children learn and personal experiences and observations as students at school, the university, and in their communities (Holt-Reynolds, 1992; Lortie, 1975; Richardson, 1996; Sugre, 1996; Weber & Mitchell, 1996a; Zulich, Bean, & Herrick, 1992). Lortie (1975) for example, uses the term “apprenticeship of experience” to make reference to the beliefs about the nature of teaching that preservice teachers construct based on their experiences during 12 years as students. These personal experiences and memories have a considerable impact on what preservice teachers believe, as they consider these experiences as prototypes upon which they construct generalizations about educational issues (Holt-Reynolds, 1992).

A number of researchers (Anderson et al., 1995; Calderhead & Robson, 1991; Kagan, 1992) have suggested that beliefs held by preservice teachers act as “filters” in the construction of their knowledge during their education programs. What students perceive, how they interpret the content of teacher education courses, and what they learn from their university experiences are strongly influenced by their beliefs, which “act as frameworks for viewing and standards for judging what they see” in their education programs (Feiman-Nemser & Buchmann, 1985, p. 56). Holt-Reynolds (1992) explained the influence of beliefs on formal studies of teaching when she said, “There are . . . times when students’ lay concepts are not quite contextualizing, illuminating, and helpful so
much as they are powerful, potentially misleading, and unproductive resources for learning the principles we hope to teach” (Holt-Reynolds, 1992, p. 327). Therefore, when these beliefs are unexplored or unchallenged during the university courses they may be responsible for the “perpetuation of antiquated and ineffectual teaching practices” (Pajares, 1992, p. 328). Von Wright (1997) notes, “In order to have a fruitful encounter between teacher education and the students’ development into professional teachers, it is important that the students themselves are confronted with their own initial beliefs and get opportunities to challenge and problematise them . . .” (p. 265).

A number of studies have been conducted to examine the impact of teacher education programs in changing ineffectual preservice teachers’ beliefs about educational issues. The results of these studies are, however, inconclusive (Richardson, 1996). Some of them conclude that beliefs do change during training (e.g., Hollingsworth, 1989; Lonka, Joram, & Bryson, 1996). Others argue that beliefs are difficult to change and that teacher education courses have little impact on preservice teachers’ initial beliefs (e.g., Weinstein, 1989). Richardson (1996) notes that the changes observed in preservice teachers’ beliefs may be “transitory or artificial and turn out not to drive their actions when they become teachers” (p. 113). Prawat (1992), on the other hand, argues that changes in practices do not necessarily imply changes in beliefs.

In summary, there is enough evidence to suggest that explicitly exploring, understanding, and challenging preservice teachers’ beliefs is an essential task for teacher educators. Exploring preservice teachers’ beliefs will (a) help promote awareness among preservice teachers about their own beliefs, (b) help preservice teachers’ instructors
understand the incoming beliefs through which students will make sense of new knowledge and experiences they encounter in their program, and (c) serve as the starting point in engaging preservice teachers in conceptual change. This can be accomplished by instructors promoting preservice teachers' reflecting on the contrast between their initial beliefs and those fostered in their teacher education courses.
CHAPTER II

REVIEW OF LITERATURE

This review of literature is organized into the following topics: (a) constructivist perspective on learning and teaching; (b) the concept of belief and its role in the practice of learning to teach; (c) measurement issues in the area of preservice teachers’ beliefs; and (d) the beliefs held by preservice teachers about teaching and learning, the role of the students, the role of the teachers, and the goals of education.

Constructivist Perspective on Learning and Teaching

The constructivist perspective is grounded in the ideas of Vygotsky, Piaget, Bruner, Bartlett, and Dewey (Woolfolk, 1998). Although one unified definition of constructivism does not exist, constructivism as a broad approach challenges the behaviorist model of learning. This latter model is the dominant or traditional perspective that is being challenged by current reform based on the principles of constructivism. Prawat (1992) argues that “while there are several interpretations of what [constructivist] theory means, most agree that it involves a dramatic change in the focus of teaching, putting the students’ own efforts to understand at the center of the educational enterprise” (p. 357).

General Assumptions

According to Woolfolk (1998), Vygostsky’s constructivist view of learning, in contrast with a traditional perspective, is based on the following assumptions:
1. Knowledge is influenced by the learner’s culture, language, beliefs, social interactions, and learning experiences. It is not, therefore, an established body of facts or skills to acquire from a teacher.

2. Learning implies a collaborative construction of socially defined knowledge and values. It is not the acquisition of information and skills through guided practice and drill.

3. Teaching implies co-constructing knowledge with the students and not transmitting or telling knowledge to them.

4. The teacher’s role is to guide and facilitate the learning process, to listen to the students’ interpretations, and to construct with them a different view of knowledge. It is not, therefore, to act as a manager who tells which answers are wrong and gives the right answers.

5. The students’ role is of an active social participator, who co-constructs knowledge, thinks, explains, interprets, and examines in an active way. Their role is not to receive information passively while listening or following directions.

Constructivist practices invite students to participate in active meaning-making and conceptual change processes and to discover, search, and experiment while learning. Children are challenged to question, communicate, reason, acquire and use evidence, modify previous understandings, create new knowledge, and solve meaningful problems (Falk, 1996; Glatthorn & Fox, 1996). Therefore, when constructivist principles of learning are placed into practice, classrooms become active places with a workshop-like climate (Falk, 1996).
The constructivist perspective on teaching considers, according to Falk (1996), that: (a) learning occurs in rich and varied contexts that offer authentic tasks to the students, (b) social interaction is an indispensable part of learning and should be encouraged by the teachers, (c) students’ diversity and differences should be valued by the teachers, (d) time should be provided for students’ deep understanding and valued over speed, (e) curriculum should be integrated around big ideas or themes, (f) teachers should consider students’ interests and strengths in their plans, and (g) assessments should be diverse.

These conceptualizations of learning and teaching have concrete implications for teaching. Some of these consequences affect the degree of control that students and teachers have in the learning process, the role of students’ diversity in the evaluation process, the use of alternative motivation strategies, and the use of specific instructional methods.

Implications

Control. Educational reform, based on a constructivist perspective, emphasized the “empowerment” of the teachers by increasing their professional authority in policy implementation and curricular and instructional decisions (Prawat, 1992). Therefore, teachers are encouraged by the educational reform to assume greater responsibility for student learning and to be more responsive to the students’ and community’s needs and interests (Darling-Hammond, 1993).

In this new scenario, viewing the curriculum as a “fixed agenda” contradicts the constructivist perspective, which supports a more dynamic and interactive attitude to
curriculum. Many constructivists support the idea that curriculum “should be viewed more as a matrix of ideas to be explored over a period of time than as a road map. One would enter this matrix at various points, depending on where students are in the current understanding” (Prawat, 1992, p. 358). Prawat notes that the traditional understanding of the curriculum as a set of fixed means and predetermined ends, sets teachers in the position of choosing between the students’ needs or the curriculum demands. When teachers decide to give higher priority to the students’ needs, they worry that the decision to eliminate some contents may generate problems later (Prawat, 1992). Brooks and Brooks (1996) emphasize that constructivism does not promote the elimination of topics from the curriculum in case teachers or students do not like them. The purpose of constructivism is to make curriculum more meaningful for the students.

In relation to students’ control, the constructivist perspective emphasizes giving students greater responsibility for their learning and providing them with opportunities to experiment and choose (Castle & Rogers, 1993). Teachers are encouraged to act as facilitators of the learning process, trust in their students’ abilities, value what the students know, and withhold their own answers to engage students in the exploration of responses. Teachers need, therefore, to be flexible and give students many opportunities to be active learners. Students would be responsible for, for example, enforcing their own rules, negotiating with their teachers the goals and sequence of instruction, driving instructional strategies, modifying the class content, generating new understandings, and guiding with their questions the lessons’ evolution (Brooks & Brooks, 1996; Falk, 1996; Jonassen, 1991; Kamii, Clark, & Dominick, 1994).
Diversity and evaluation. Because constructivism claims that knowledge is a function of how each person creates meaning from his/her experiences, the students' understanding and representation of knowledge are expected to be somewhat different and, to some extent, unique (Jonassen, 1991). Constructivism proposes that learning is always a personal and subjective process (Glatthorn & Fox, 1996).

Jonassen (1991) argues that to accommodate constructivist assumptions in instruction, evaluation of learning needs to become less criterion-referenced, consider a larger variety of responses, and be less a control device and more a self-analysis tool. From a constructivist point of view, assessment should be flexible and allow diverse learners to demonstrate their knowledge in diverse ways (Falk, 1996). "The learner best learns when he or she can internalize what is being learned, representing it through learner-generated symbols, metaphors, images, graphics, and models" (Glatthorn & Fox, 1996).

Motivation. The constructivist perspective emphasizes that learning implies a process of knowledge construction in which the learner is intrinsically motivated. Constructivism considers that "learners learn best when they are personally curious, deeply involved, or in a social situation that requires them to take and defend a position" (Kamii et al., 1994, p. 13). Students’ motivation is, therefore, basically promoted by building the curriculum on students’ interests and strengths (Falk, 1996). Extrinsic motivation is secondary. In fact, many advocates of a constructivism, such as Kimii et al. (1994), argue that the use of rewards and punishments at schools hinders the development
of autonomous students, those who have the ability to be self-governing in the moral and intellectual areas.

Constructivism favors a number of instructional approaches that emphasize students’ intrinsic motivation, control, and social learning with peers. Among the instructional approaches are discovery learning, problem-solving, and cooperative learning.

Discovery learning. Discovery learning emphasizes “understanding the structure of a subject being studied, the need of active learning . . . and the value on inductive reasoning in learning” (Woolfolk, 1998, p. 338). Given a problem or example, discovery learning encourages students to experiment, find principles by themselves, and use inductive reasoning, rather than having the teachers tell them the principles. Brooks and Brooks (1996) note “the construction of deep understandings is usually triggered more by a good question or problem and access to appropriate materials than by a carefully sequenced lesson that purports to introduce concepts piece by piece” (p. 31). Mistakes are part of the process of discovery learning and are, therefore, seen as opportunities to rethink ideas and develop new understandings rather than as students’ failures (Falk, 1996).

Problem solving. The use of problem solving activities is based on the assumption that learning implies knowing and doing (Bridges & Hallinger, 1996). Solving ill-structured and complex problems facilitates learning because problem solving involves the activation of prior knowledge, the incorporation of new knowledge into existing knowledge, the opportunity to use new knowledge, and the possibility to encode
new knowledge in a context that is similar to the real contexts in which this knowledge will be used in the future (Bridges & Hallinger, 1996).

Cooperative learning. Cooperative learning is a classroom arrangement consistent with the constructivist principle that learning is a social process. Students working in small groups, interacting face-to-face, and experiencing positive interdependence while using collaborative skills, characterize cooperative learning. In addition, the groups’ members are individually accountable for their learning and should monitor the group process while working together (Woolfolk, 1998). Cooperative learning provides the students opportunities to learn from each other while being exposed to different perspectives, exchanging and questioning their ideas, talking freely, arguing, and solving problems cooperatively. The literature supports the idea that using cooperative learning enhances students’ information processing, reasoning, comprehension, critical thinking, and the expansion, solidification, and development of the students’ understandings (Falk, 1996; Woolfolk, 1998).

The implications of constructivism exceed the topics discussed here. Nevertheless, the topics just discussed represent the dimensions of constructivism on which the current study of preservice teachers’ beliefs is focused.

The Concept of Belief and its Role in the Practice of Learning to Teach

The Concept of Belief

A significant congruence exists among social psychology, anthropology, and philosophy in the general definition of the concept of belief. Within these disciplines, “beliefs are thought of as psychologically held understandings, premises, or propositions
about the world that are felt to be true” (Richardson, 1996, p. 103). Pajares (1992), however, discusses that in the literature on teachers’ beliefs a clear and homogeneous definition and conceptualization of the concept of belief does not exist and that attention should be given to this fuzzy construct.

For example, the difference between the terms “belief” and “attitude” is unclear in the literature (Richardson, 1996). Richardson explains that while some authors include in their definition of attitude the concept of belief, others consider that these constructs refer to different parts of an entity. Richardson notes, for example,

Fishbein limited the term attitude to the affective component and designated the cognitive as beliefs about objects and the conative as beliefs about what should be done concerning the object. Attitudes, therefore, for Fishbein, become ‘learned predispositions to respond to an object or class of objects in a favorable or unfavorable way.’ (1996, p. 103)

However, not all the authors make this distinction. Richardson (1996) emphasizes that the use of the term “belief” in some studies corresponds to the construct of “attitude” in other studies.

Pajares (1992) considers that beliefs and knowledge are “intertwined” constructs and emphasizes how, some “researchers subsume belief as a type of knowledge and another [Rokeach] subsumes knowledge as a component of belief” (p. 314). Nespor (1987), on the other hand, considers that beliefs constitute the fourth existing category of thought. The other three categories are “internal processing,” “resources,” and “metacognitive processes.” Nespor, based on the ideas of Abelson (1979), makes a distinction between beliefs and knowledge on the basis of four features: “existential
presumption," "alternativity," "affective and evaluative loading," and "episodic structure." The existential presumption of beliefs indicates that they imply a personal and immutable idea that something does exist or not. Alternativity refers to the idea that beliefs include "conceptualizations of ideal situations differing significantly from present entities" (Nespor, 1987, p. 319). The feature of affective and evaluative loading implies that beliefs rely more on feelings, moods, and evaluations than knowledge. The episodic structure of belief refers to the idea that "they are organized in terms of personal experiences, episodes or events" from which their power derived (Nespor, p. 320). Nespor also adds that beliefs are relatively static and difficult to change in the presence of argumentation, and that they are not logically related to reality.

Nespor (1987) argues that because of these typical features—existential presumption, alternativity, affective and evaluative components, and episodic storage—beliefs (a) have a strong influence on the amount of energy that teachers expend in a specific activity, (b) are difficult to change, and (c) are constructed on the basis of the crucial vivid images and memories from the schooling years. Other authors, however, do not make a distinction between the constructs of knowledge and belief as Nespor does (e.g., Kagan, 1990). Richardson's (1996) definition of belief as a proposition that is accepted as true by the individual holding the belief, is going to be used in the current study.

The Influence of Beliefs on Behavior

Beliefs serve an adaptive function in helping people define and understand the world and themselves (Pajares, 1992). It is an accepted assumption that beliefs help
people organize the world into tasks and select the cognitive tools “to interpret, plan, and make decisions regarding such tasks” (Pajares, p. 325). According to Nespor (1987), people especially use their beliefs to define tasks when task’s goals, constraints, and operations are not clearly defined.

These functions of beliefs are essential in teaching since the act of teaching is a highly complex and ambiguous task (Anderson et al., 1995; Nespor, 1987). The complexity of teaching is based, according to Anderson et al. (1995), on the fact that teaching is a multidimensional, uncertain, social, and ethical task. Because of its multidimensionality, the teacher has to deal with multiple goals, agendas, and events at the same time, which cannot be well defined or necessarily related to each other. The uncertainty of teaching is illustrated by the fact that teachers have to make decisions and take actions without a guarantee that the application of general principles is going to produce the expected results. Finally, as an ethical and social task, teaching involves values that impact the students (Anderson et al., 1995). Nespor (1987) adds that teaching is an ill-defined activity because the possible courses of action to resolve problems are not defined, teachers need to employ information that is not contained in the problems, and teachers have to make guesses and assumptions to resolve teaching dilemmas.

Pajares (1992) suggests that “when a teacher encounters an entangled domain, cognitive and information-processing strategies do not work, appropriate schemata are disconnected and unavailable, and the teacher is uncertain of what information is needed or what behavior is appropriate” (p. 311). In such circumstances, teachers use their beliefs and belief structures to resolve the teaching problems.
In addition to helping define tasks and make decisions, beliefs have an effect on the processing of information and subsequent thinking. Pintrich (1990) argues, "knowledge and beliefs . . . influence a wide variety of cognitive processes including memory, comprehension, deduction and induction, problem representation, and problem solution" (p. 836). Pajares (1992) suggests that the filtering effect of beliefs in the thinking process is determined by their evaluative, affective, and episodic nature. Pajares explains that the " . . . filtering effect of belief structures ultimately screens, redefines, distorts, or reshapes subsequent thinking and information processing" (p. 325) and that beliefs also have an important role in cognitive monitoring.

Therefore, the literature supports the idea that beliefs have an important impact on people's cognitive processes and drive, consequently, on their actions. On the other hand, reflecting on one's own actions may also lead to changes of beliefs, which is a feature of the interactive nature of the relation between beliefs and actions (Richardson, 1996).

The Influence of Beliefs on Preservice Teachers' Learning to Teach

The literature notes that prospective teachers' prior beliefs and knowledge, which are activated in the learning setting, influence their behavior, how and what they learn during their teacher education program (Anderson et al., 1995; Pintrich, 1990). Pintrich (1990) notes that different types of beliefs can be activated: " . . . (a) beliefs about the importance and value of a task (value components), (b) beliefs about one's ability or skill to perform the task (expectancy components), and (c) feelings about the self or emotional reactions to the task (affective components)" (p. 842). Jointly, this components influence
the students’ “... choice of activities to engage in, their persistency at the tasks, and the nature of their involvement in the task” (p. 842).

Beliefs also have an important impact on the manner in which preservice teachers understand the content of their university courses. Students’ misconceptions and naive conceptions about teaching and learning can make it difficult to learn new content and change their previous conceptions about these processes (Anderson et al., 1995; Joram & Gabriele, 1998; Pintrich, 1990). Pintrich (1990) suggests that as a result of their beliefs “... student teachers might perceive different course assignments (e.g., construction of lesson and unit plans, analyses of case studies ...) as more or less useful and decide to become more or less cognitively engaged in the task” (p. 843). In addition, specific beliefs about learning and teaching held by preservice teachers, such as the idea that “experience is the best teacher” (Book & Freeman, 1983), have a strong impact on the students’ attitudes toward their university courses and during their field experiences and student teacher practice (Feiman-Nemser & Buchmann, 1985). Prospective teachers’ beliefs about the best or right way to evaluate knowledge and its concordance or discordance with their teachers’ orientation about this aspect, also influence how and what they learn in university settings (Anderson et al., 1995). Beliefs have also been recognized as potentially limiting teaching (Anderson et al., 1995). For example, if a preservice teacher believes that the students’ abilities to learn depend on their family background, his/her influence as teacher will be diminished (Anderson et al., 1995; Von Wright, 1997).
Joram and Gabriele (1998), based on the work of Kagan (1992), explain that preservice teachers' beliefs influence, for example, the manner in which they interpret and translate the other teachers' performances during classroom observations and university courses. The literature also suggests that preservice teachers' beliefs and understandings can act as a barrier in the communication between teacher educators and their students (Holt-Reynolds, 1992).

Given the importance that teacher educators give to their students' beliefs, one most wonder how these are addressed in the context of teacher preparation. Feiman-Nemser and Buchmann (1985) suggest that preservice teachers cannot be expected to examine their preconceptions and their impact on the teaching practice and students' learning on their own. In their opinion, professors and schoolteachers should help students to examine how their personal experiences influence their perceptions and decisions about the teaching practice. Feiman-Nemser and Buchmann (1985) argue that "a larger and more flexible vision need not result in a rejection of traditional or familiar ideas and practices" (p. 63), but that it would result in a richer understanding of them and a broader perception of different and new alternatives. These recommendations suggest the importance of assessing preservice teacher beliefs.

**Measurement of Preservice Teachers' Beliefs**

**The Difficulty of Measuring Beliefs**

The literature suggests that studying and measuring beliefs is not an easy task because beliefs do not lend themselves to empirical investigation (Pajares, 1992; Widden,
Mayer-Smith, & Moon, 1998). In the literature a number of factors have been identified to explain why belief is a difficult construct to measure.

First, as noted earlier, a clear and homogeneous conceptualization of the concept of belief does not exist. Therefore, when measuring beliefs, researchers have to determine what the construct of belief will mean and how this definition will differ from other definitions (Pajares, 1992).

A second problematic aspect lies in the fact that beliefs cannot be directly observed or measured. Leinhardt (1990) explains that the difficulty in examining beliefs directly derives from the fact that they are generally unconsciously held, teachers sometimes have difficulties finding the words to describe them, or they are unwilling to express unpopular beliefs. Inferring beliefs from a specific behavior is also problematic given that it can be motivated by different beliefs (Kagan, 1992). Other factors that make beliefs difficult to measure are their context-specific nature and their connection to other beliefs within a belief system (Pajares, 1992). Moreover, Von Wright (1997) explains that the same person can "express seemingly incoherent beliefs, without finding them as a problem and without being aware of this inconsistency" (p. 261). This is possible because incompatible beliefs are organized into different clusters. Unless the person is asked to confront these clusters, inconsistencies are not noticed (Green, 1971).

Haertel (1990) suggests that beliefs can be inferred from data derived from interviews, stimulated recall activities, and the participants' performance on experimental tasks. On the other hand, Pajares (1992) suggests that to understand the beliefs held by teachers and student teachers, researchers "... must take into account the congruence
among individuals' belief statements, the intentionality to behave in a predisposed manner, and the behavior related to the belief in question" (p. 326).

**How Have Beliefs Been Measured?**

In their analysis of a large number of studies on learning to teach, Widden et al. (1998) found that different research traditions and methodologies have been used to measure beliefs. Most often, these studies are interpretative in nature and utilize interviews and observations of several people' behavior in similar circumstances. Comparative studies involving quantitative analyses of standard instruments and questionnaires are uncommon in the literature about beliefs. In addition, Widden et al. observed that certain studies used more than one method to collect data (e.g., Kile, 1993; Spalding, 1997). Kile (1993), for example, used multiple data sources to study the preconceptions about classroom teaching held by preservice teachers. They included the course’s required written assignments, audio taped whole class and small group discussions, videotaped microteaching sessions, informal and formal interviews, course and college artifacts, and field notes collected during observations.

Some of the most frequently used data-gathering techniques for examining preservice teachers’ beliefs are inventories; interviews (e.g., Bramald, Hardman, & Leat, 1995; Calderhead & Robson, 1991; Hollingsworth, 1989); educational autobiographies (e.g., Bullough & Gitlin, 1995); drawings (Gulek, 1999; Russell & Haney, 1999; Weber & Mitchell, 1996a; Weber & Mitchell, 1996b); metaphors (e.g., Bullough & Gitlin, 1995; Inbar, 1996; Pullias & Young, 1968; Sugre, 1996; Von Wright, 1997); process tracing techniques (Gomez & Tabachnick, 1992; Zulich et al., 1992); questionnaires; and
vignettes. Inventories, questionnaires, and vignettes, the data gathering techniques used in the current study, are presented next.

**Inventories.** Kagan (1990) argues that Likert-type self-reports scales are the most direct method for examining teachers' beliefs. In her review of a large number of studies, Kagan (1990) observed that inventories have been used to measure different aspects of teacher thinking, such as teachers' orientation to students' control, priorities concerning educational goals, etc. Kagan (1990) notes that scales containing standardized statements present the limitations of responses being influenced by social desirability and potentially presenting bogus data because of the influence of the language used in the scale's construction. Pajares (1992) also claims that belief inventories provide restricted information with which to make inferences, and he suggests that "additional measures such as open ended interviews, responses to dilemmas and vignettes, and observation of behavior must be included if richer and more accurate inferences are to be made" (p. 327).

Examples of inventories to examine beliefs are found in Posner (1996) and Woolfolk, Rosoff, and Hoy (1990). Posner, for example, designed a 49-item Likert inventory designed to assess beliefs in six domains of teaching: control, diversity, learning, role, school and society, and knowledge. Woolfolk et al. (1990) designed a 25-item inventory to measure teachers' beliefs about the use of extrinsic and intrinsic rewards and the teachers' perceptions of the students' satisfaction with and interest in their school.
Questionnaires. Questionnaires and surveys have been used to collect data regarding: demographic characteristics, past educational and teaching experiences, choice of teaching as a career and career aspirations, and perceptions of teachers (see Book, Byers, & Freeman, 1983; Mertz & McNeely, 1992). Mertz and McNeely, for example, examined the perceptions of the role of teachers by asking preservice teachers to rank-order eleven statements about what teaching goals they valued the most and least. Joram and Gabriele (1998) used an open-ended questionnaire to identify preservice teachers’ beliefs about teaching and learning. In that study, participants were asked to define learning and teaching before and after their participation in an introductory educational psychology course. After the course, the students were also asked to describe how their views of learning and teaching had changed as result of the course. The responses were analyzed by using two scales (Constructivist Scale and Active Epistemology Scale) adapted from the scales already developed by Lonka et al. (1996).

Weinstein (1989) used a questionnaire that combined open-ended and fixed-response questions to examine teacher education students’ expectations about their future teaching performance, their explanations for their predictions, and their descriptions of good teaching. For examining preservice and cooperative teachers beliefs about successful teaching, respondents were asked to describe six aspects that they “have in mind” when thinking about a “really good teacher.” Their answers were then examined and grouped according to a 30-category system. Preservice teachers were then also asked to rate, by using a scale from one (not important) to four (very important), 10 items that
referred to attributes of a good teacher, such as: commitment to teaching, organizational skills, creativity, patience, etc.

In the opinion of Weinstein (1989), open-ended questions have the limitation of leaving out some ideas with which the respondents could have agreed if they were presented to them in a fixed format. Joram and Gabriele (1998), however, emphasize that open-ended questions have the advantage of not influencing the participants to answer in a specific way.

**Vignettes.** Vignettes have been used to measure teachers’ orientation to student control (Deci, Schwartz, Scheinman, & Ryan, 1981), teachers’ abilities to utilize knowledge acquired in training to resolve classroom’s problematic situations (Tillema, 1994), and teachers’ beliefs about their sense of self-efficacy (Ashton, Olejnik, Crocker, & Mc Auliffe, 1982), among others. In general, vignettes present a short problematic situation for which the participants have to decide which is the best solution or course of action to follow.

Woolfolk et al. (1990) used “The Problems in School Inventory” developed by Deci et al. (1981) to examine the teachers’ beliefs about classroom management and control. This instrument contains eight different vignettes that describe typical school problems and provides four possible solutions. The solutions point to different degrees of control, from highly controlling (HC) to highly autonomous (HA) solutions. The participants are asked to rate each of the four solutions for each of the problems by using a seven-point scale from “very inappropriate” (1) to “very appropriate” (7).
Dunne (1993) developed a set of seven vignettes that reflected classroom incidents and general educational issues to capture English preservice teachers’ beliefs about which classroom environment best promote learning and which of the teachers’ behaviors best enhance learning. Each vignette presented an educational issue and two scenarios that represented two different possible courses of action. The participants were asked to choose one of the scenarios and express why they preferred it. Using this data gathering technique, Dunne explored the beliefs about three categories of educational issues: (a) “Ways that teachers talk to children; individual discipline; settling a whole class; managing a class discussion;” (b) “Different kinds of learning environment; classroom contexts; group work; the gender issue;” (c) “The wider context of education; the curriculum; postgraduate courses” (Dunne, 1993, p. 75).

In the opinion of Dunne (1993), vignettes serve to promote preservice teachers’ awareness of their beliefs about educational issues and to analyze and understand different possible courses of action and their consequences. Vignettes represent, therefore, a valuable method to examine preservice teachers’ beliefs about “real life” situations and to explore what their course of action can be when having to make teaching related decisions. Dunne concludes, “If growth and change are to be a part of the educational process, and if it is true that examination of beliefs is crucial to this, then it may be that the use of vignettes could become a valuable part of training courses” (Dunne, 1993, p. 87).
Kagan (1990), on the other hand, considers vignettes in the category of short-answer tests and, therefore, attributes to them the limitations of this type of instrument, such as social desirability, the confusing effect of language, etc. Fang (1996) notes, based on the ideas of Payne (1982), that vignettes present three limitations: (a) respondents' judgments can change with time, judgment on the same vignette on different occasions; (b) the wording can affect the judgment of the participants; and (c) fatigue or boredom can affect the participants' judgment.

Preservice Teachers' Beliefs

Using the data collection techniques already mentioned, preservice teachers' cognitions have been typified in the literature. This includes studies of teachers' beliefs (e.g., Joram & Gabriele, 1998), personal history-based lay theories (e.g., Holt-Reynolds, 1992; Sugre 1996), images (e.g., Calderhead & Robson, 1991; Weber & Mitchell, 1996a, 1996b), personal knowledge (Elbaz, 1983) and folk pedagogies (Bruer, 1993). Other authors use the concept 'subject perspective' (e.g., Spalding, 1997) when examining both beliefs and classroom actions together. In the opinion of Pajares (1992), the concepts of attitude, theories, images, preconceptions, and values are, in effect, beliefs in disguise.

This section discusses findings of studies, made in a variety of different cultures, that refer to preservice teachers' (a) beliefs about learning, (b) beliefs about the students, (c) beliefs about teaching, (d) metaphors about the teacher's role, and (e) beliefs about the goals of education.
Beliefs about Learning

The literature shows that students entering teacher education programs in different countries hold clear-cut understandings about the concepts of learning and teaching. Pratt (1992), for example, concluded that four different conceptions of learning existed among Chinese scholars and adult educators he interviewed. These conceptions ranged from a consumer acquiring stable and external knowledge from the expert, to focusing on the social purpose of learning, comprehending old things in new manners, and conceiving learning as a change of the personal perspective of self. In England, Marton, Dall’Alba, and Beaty (1993), presented a similar classification to that described by Pratt (1992), but more extensive and detailed. Based on previous studies of Säljö (1979) and after a six-year longitudinal study, Marton et al. suggested the existence of six different ways to conceptualize learning among preservice teachers. When explaining the different conceptualizations, Marton et al. argued that a distinction should be made between what people believe about (a) what is learned and how it is learned (b) the structural components of the conception of learning and the relations between them and the global meaning of the conceptualization, and (c) the external horizon of the conceptualization (how it is delimited from the context) and its internal horizon (how the component parts are defined and related). In addition, these authors observed the existence of what they described the “essence of learning,” thus is the idea that all conceptualizations of this construct always imply that “learning is to become more able . . .” (Marton et al., p. 283). These authors also distinguished the existence of two phases in the learning process, the acquisition and the application phases. They concluded that learning was
seen by their interviewees as: (a) “increasing one’s knowledge,” (b) “memorizing and reproducing,” (c) “applying,” (d) “understanding,” (e) “seeing something in a different way,” and (f) “changing as a person” (pp. 283-284).

Studies show that one very common conceptualization of learning held by preservice and inservice teachers is that of learning as a passive activity of information memorization and skills rehearsing (Anderson et al., 1995; Joram & Gabriele, 1998; Weber & Mitchell, 1996a). This conception was clearly represented in Weber and Mitchell’s study (1996a) when prospective teachers were asked to draw a teacher. Their drawings reflected a teacher who was passing knowledge to students and using conventional clothing and props (desks, blackboards, and pointers).

Moreover, Joram and Gabriele (1998) concluded that learning was viewed by more than 60% of the participants in the pretest and 50% in the posttest as a process of absorbing or understanding new information. Their findings also showed that a very small number of participants perceived learning as restructuring or creating new knowledge. Lonka et al. (1996) also concluded that the perception of learning as acquiring or assimilating knowledge was very common among preservice teachers and teachers, while the conception of learning as reorganization or construction of knowledge was the most common view among experts (doctoral candidates in an educational psychology program).

The concept of learning in Holt-Reynolds’ study (1992) was basically understood as an issue of motivation. Preservice teachers believed that learning would be easier and most probable if the students were interested and they did not consider learning related to
the use of cognitive strategies to construct knowledge. Knowledge was, in their opinion, something that should be transmitted to, and not constructed by, the students (Holt-Reynolds, 1992).

Elbaz (1983) also observed a close relation between learning and motivation as she studied the practical knowledge of a Canadian English teacher named Sarah through a series of interviews and class-observations. Sarah believed that students need to struggle to be motivated and that they need to be successful to remain motivated during the learning process. These beliefs about learning and motivation implied that the learning task should be structured for the learners because “... otherwise, they [the students] might perceive as insurmountable tasks which, properly ordered, they could easily master...” (Elbaz, 1983, p. 84). In Sarah’s opinion, the teacher should design activities in a way that promotes the students’ sense of being successful. The role of mistakes in the learning process was not an issue in Sarah’s beliefs.

The preservice teachers of Kile’s study (1993) also considered motivation as a relevant aspect of learning. He examined the preconceptions of 22 elementary and secondary preservice teachers, sub grouped as traditional and non-traditional, about classroom teaching. He noted that traditional students not only used an empirical language to describe if the students were learning or not (they said that they could “see” the students learning), but also, that they described learning as being exemplified by enjoying an activity. In the participants’ understanding, learning is a process that can be clearly described as taking place on the basis of behaviors as “laughing” and “having
fun." In their opinion, one of the teachers’ most important tasks is to motivate the students (Kile, 1993).

Beliefs about the Students

Students are frequently described by preservice teachers in the literature, as having a passive role in the learning process (Inbar, 1996; Joram & Gabriele, 1998; Sugre, 1996). For example, in the study of Joram and Gabriele (1998), 97% of the participants suggested that the learners are “objects of education” or somebody in whom understanding or comprehension occurs. In addition, Lonka et al.’s study (1996) concluded that only few participants (less than 20% of the preservice teachers and 10% of the teachers) explicitly recognized that students have an active role in the learning process.

The meaning of what constitutes having an active or passive role during the learning process is, however, not always the same for preservice teachers and teacher educators. For example, the nine preservice teachers interviewed by Holt-Reynolds (1992) advocated, as their professor did, that students should be actively involved with the subject matter. However, preservice teachers included listening to a lecture as an active behavior, which was in fact considered passive by their professor. In these students’ point of view, a lecture did not necessarily imply that the students were passive, because when the topic or lecturer were interesting for them, they will be actively engaged. For these preservice teachers “passive” was a synonym of “not interested” or “bored.” This different understanding of the words “active” and “passive” acted as a
barrier in the communication between the professor and the student teachers in this study (Holt-Reynolds, 1992).

The perspective of the students as passive was also observed by Inbar (1996) when examining the metaphors about the pupil, teacher, principal, and school held by students, principals, supervisors, and teachers in Jerusalem. He observed that more than 25% of the 254 educators he studied perceived the students as “receptacles” or as “clay in the potter’s hand” (p. 83). One of the supervisors who hold this kind of “clay” image explained, “the student is an excellent raw material—can be worked as you wish” (Inbar, 1996, p. 83). In addition to this image, 27.2% of the educators perceived the students as “flora and fauna.” This image implies not only that students are passive and sensitive, but also dependent on the teachers’ actions to develop their potential. “If you water him he [the student] will bloom and stand firm, if not he will barely grow and will wither,” said one of school principals in Inbar’s study (p. 83). The images that educators of this study held show also that they have an authoritative control over “hopeless” students. Inbar argued, “after all, receptacles, clay and even buds and flowers are not capable of making their own decisions, of undertaking responsibility for their actions” (p. 91). This situation, in the opinion of Inbar, explained why one third of the students felt that they were “prisoners” of education and that they cannot complain about or modify their teachers (Inbar, 1996). In the opinion of Prawat (1992),

the fact that teachers view content and students in static, noninteractive terms explains why so much time and attention is advocated to the delivery of content instead of more substantive issues relating to content selection and meaning making on the part of the students.” (p. 357)
Another aspect explored by some studies is students' diversity. In relation with the beliefs about the homogeneity/heterogeneity among students, Kile (1993) found that the majority of the preservice teachers were expecting to find academic homogeneous students in the classrooms they visited. Kile noted that preservice teachers were “surprised” by the large range of abilities they saw and that they felt “disappointed” by the diverse levels of abilities the students showed.

Beliefs about Teaching

The literature shows the existence of many similarities in the conceptualization of teaching held by preservice teachers from different cultures. The evidence also illustrates that teaching, as a process of transmitting knowledge to be absorbed by the students, is a common belief among preservice teachers. Another common understanding of teaching is as a particular kind of relationship between teacher and student.

Joram and Gabriele (1998) noted, for example, that more than half of the preservice teachers in their study believed that teaching “is showing by telling or explaining others something that they did not know” or “... unlocking a young mind and filling it with lasting knowledge” (p. 186). Some preservice teachers conceived the teacher-telling method as a necessary tool given some specific subjects, such as mathematics, which, in their opinion, cannot be taught effectively in other ways (Holt-Reynolds, 1992). Even when teachers and preservice teachers did not believe that teaching implies the transmission of subject knowledge, they did not hold a clear alternative way of understanding subject-matter teaching (e.g., Elbaz, 1983). In some cases novice teachers explained that the school district’s curriculum guidelines pressured
them to use a transmission model of instruction, although they thought it was ineffective for teaching their subject (e.g., Spalding, 1997).

The conception of teaching as telling has also been found among preservice teachers in China, Ireland, and England. For example, Sugre (1996) suggests the existence of a cultural archetype in Ireland that conceives teaching as the transmission of knowledge from a dominant teacher to a passive and obedient student. In Sugre’s study (1996) some of the definitions given by the preservice teachers were: “communicating your knowledge to them [the students],” “a way to passing on traditions,” or “like an injection” (p. 164). In other words, it is helping people to improve by putting something in them. A study conducted to examine thirty-eight Chinese adult educators’ beliefs about learning and teaching concluded that the conception of teaching as delivering content to be absorbed by the student, was one of the three main ways to understand teaching. The other two were “teaching as the development of character” and “teaching as a particular type of relationship” (Pratt, 1992, pp. 313-315). The first two understandings of teaching, “... as the delivery of content” and “... as the development of character,” imply that teachers have the central role in the educational process, as they act as experts in knowledge or moral models for their students. The third conception of teaching “... as a particular relationship” shifts the focus to the teacher-learner relationship, which was characterized as a relation of “mutual understanding, honesty, trust, caring and respect” (p. 315). Pratt (1992) also observed that some participants held diverse conceptions of teaching simultaneously and used them selectively.
Calderhead and Robson (1991) found diversity among seven English sophomore primary preservice teachers. While one of the participants emphasized the importance of a good teacher-student relationship as in Pratt's study, others focused on understanding the students' personalities and moods, properly organizing the materials and routines, controlling the students' behaviors and preparing good lessons, or helping students to learn by motivating them to ask questions, etc. There were also cases in which students did not have an articulated perception about teaching.

When asking Australian preservice teachers about the things they could do to enhance their students' learning, Dunkin, Precians, and Nettle (1994) found the existence of a significant difference between first and third year preservice teachers' perspectives. First year preservice teachers made significantly more reference to the interpersonal relationship with the students than third year preservice teachers as an important dimension. In general, however, both groups made more references to task dimensions (provide structure and specific activities) than to affective dimensions (related with motivational and teacher-student relationship) as a way to promote their students' learning.

The literature suggests that different images held by preservice teachers about teaching and learning influence their interpretations of the classroom practices, such as classroom management and their attempts to teach in a specific way (Calderhead & Robson, 1991).
Beliefs about the Teacher’s Role

Three major images of emerge from the literature (a) the teacher as the authority, (b) the teacher as a parent, and (c) the teacher as the expert. Weber and Mitchell (1996a) found that the majority of the preservice teachers in their study held a very conservative image of teachers.

The majority of the teachers portrayed in the preservice teachers' drawings were not only female, but also a certain 'kind' of female. A significant number were portrayed wearing long skirts, with their hair pinned back in severe buns, evoking the stereotype of an 'old maid.' (Weber & Mitchell, 1996b, p. 120)

The images drawn by preservice teachers reflected, in the opinion of Weber and Mitchell, the persistence of culturally transmitted stereotypes about teachers and the power of childhood experiences. However, they argued that these images are also a reflection of participants’ actual experiences of schooling and teacher education programs which show that the majority of teachers (a) are women, (b) conform a dress code, (c) are usually pleasant, and (d) represent authoritative figures that transmit information. Some preservice teachers, however, consciously challenged this traditional conception of teachers in their drawings, and used the drawing activity to recognize their own struggles and ambivalence in relation to the governing image of teaching established in their culture (Weber & Mitchell, 1996b).

One frequently described image of teacher held by preservice teachers (Weber & Mitchell, 1996a) and by school students (Inbar, 1996) is that of the teacher as an authoritarian person. In this role, teachers take care of the classroom climate and control the students’ behavior, which are considered as the “defining factors in the
accomplishment of the goals of teaching” by many preservice teachers (Kile, 1993, p. 223). Being able to control the students’ behavior is a major concern of preservice teachers (Book et al., 1983; Weber & Mitchell, 1996a). This concern was clearly expressed by one of the female participants of Weber and Mitchell’s study as she wrote, “it is important that they respect me as a teacher;” “I must dress and act in away that commands respect” (p. 309). In these studies having the students’ respect and controlling their behavior were considered fundamental teacher duties, which preservice teachers believed could be handled in diverse ways. In the case of the traditional preservice teachers of Kile’ study (1993), for example, the use of a variety of methods, rewards programs, and series of trials and errors were seen as the way to handle classroom management. In relation to the authoritarian image of teachers, Sugre (1996) noted,

It is generally accepted that student teachers and beginning teachers are preoccupied initially with fear of being unable to maintain ‘proper order’ in classrooms. However, unless these anxieties are dealt with constructively during their most formative years in initial teacher education and as beginning teachers, the dominant aspects of school culture such as control and transmission of information are likely to be privileged over developing more sophisticated teaching methodologies. (Sugre, 1996, p. 165)

Feiman-Nemser and Buchmann (1985) also note this danger, and suggest that student teachers need to be helped in order to relate classroom management with students’ learning. They concluded, “One can learn to be in charge without learning to teach children something” (p. 56).

This dominant image of teacher as authority appears, however, to be contradictory when held in the same group of participants. In the study conducted by Inbar (1996) in
Jerusalem, for example, almost half of the students hold an image of teachers as authoritative and rigid figures (e.g., policeman, jailer, guard), while one third of the group had a positive image of them, such as “creators” and “intellectual artists.”

The most common views held by preservice teachers about teachers are centered in the social aspect of their role. Teachers are commonly seen, for example, as parents, helpers, therapists, animators, companions, storytellers, husbands, and devil’s advocates (Book et al., 1983; Bullough, 1991; Bullough & Gitlin, 1995; Calderhead & Robson, 1991; Fischer & Kiefer 1994; Spalding, 1997; Sugre, 1996; Weber & Mitchel, 1996a, 1996b). The image of teacher as “helper,” reveals, for example, that he/she is perceived as one who asks questions and provides guidance and encouragement (Calderhead & Robson, 1991). The image of the teacher as an “gardener” shows him/her as somebody who “will nurture learners and help them to ‘bloom’” (Sugre, 1996, p. 166).

Weber and Mitchell (1996a) found that many female preservice teachers have a “nurturing” image of themselves as teachers, whose role was described in terms of “caring,” “warmth,” and “empathy.” One of the preservice teachers wrote about her drawing of a teacher, “My teacher has a big head, so that he/she has the capacity to remember each child and each child’s problems and accomplishments” (Weber & Mitchell, 1996a, p. 310). This image is consistent with the findings of Book et al. (1983), who determined that preservice teachers held an image of teaching as an “extended form of parenting” (p. 10). One preservice teacher, after teaching an art class to junior-high students, wrote that a teacher as a parent is “An adult that sets goals and limits, rewards a job well done or a valiant effort . . .” (Bullough & Gitlin, 1995, p. 58).
Another image of teacher, particularly in secondary schools is that of the teacher as "one who knows," an expert or master (Bullough & Gitlin, 1995). The findings of Kile (1993) showed that secondary preservice teachers perceived their work as centered in the subject matter content and not in the students. Moreover, Kile notes that this group exhibited a sense of "intellectual superiority" in relation with elementary preservice teachers, who, in their opinion, needed to learn educational theories. Preservice teachers thought that they could show their expertise about subject matter by giving lectures to their students (Holt-Reynolds, 1992). One preservice teacher, for example, said, "They're going [the students] to think you're dumb if you don't know it [the content] off the top of your head." This image of the teacher as an expert involves that the learners "become disciples, imitators, or mimics of those in the know" (Bullough & Gitlin, 1995, p. 67). This role of the students reflects the belief that students need to be told the knowledge and be filled like empty receptacles with it. This belief about the students' role also matches with the image of the teacher as "a bridge" between the content that needs to be taught and the students' personal lives (Bullough & Gitlin, 1995).

As Bullough and Gitlin (1995) explained, it is essential to note the consequences of metaphors held by teachers as these "... both enable and limit students' opportunities to learn" (p. 68). For example, the metaphor of a teacher as a "policewoman" puts the student in the place of the criminal. The nurturing-parenting image of teaching also sets limits. When teachers must conform to standards of femininity, they may think, for example, that they should "be nice" all the time (Weber & Mitchell, 1996a).
The images of teachers held by preservice teachers have the importance of implying a conceptualization of the students’ role in the learning process and of serving as a fundamental guide for preservice teachers’ future teaching practice. Beliefs about the teachers’ role are, however, not fixed. As a result of a negotiation process with the context (school personnel, parents, and students’ expectations and behavior) and the university and school experiences, they change over time (Bullough & Gitlin, 1995).

Beliefs about the Goals of Education

The literature shows that preservice teachers believe that one of the major goals of education is to develop students’ personality. Specifically, the enhancement of students’ self-confidence (Von Wright, 1997) and self-concept (Book et al., 1983; Mertz & McNeely, 1992) are considered the most valued aims for schools.

Book et al.’s (1983) study showed, for example, that beginning teacher candidates at the elementary level believed that enhancing students’ self-concept was a more important goal than promoting academic achievement and largely more important than creating a good learning environment. In this study, preservice teachers at the secondary level considered, however, that promoting students’ self-esteem and their academic achievement were important goals of teaching. The study conducted by Mertz and McNeely (1992) concluded that half of the preservice teachers would mainly emphasize in their classrooms, “to help students develop self-esteem and feelings of self-worth” and “to develop and expand students’ abilities to think and reason.” The statements that were ranked as least important in this study were “to develop good, productive citizens” and
“to help students develop appropriate moral and personal codes of conduct” (Mertz &
McNeely, 1992).

In summary, the literature reviewed for this study supports the idea that preservice
teachers have clear-cut beliefs about learning, teaching, and the teachers and students’
role. Although diverse conceptualizations of learning have been found, the most
common is that learning implies a passive process of knowledge acquisition or absorption
through memorization and skills rehearsal. Teaching, on the other hand, is commonly
conceptualized as a process of knowledge transmission. Students are frequently
perceived as passive receptors of the information that is told or explained by the teacher.
The most common perceptions of the teacher’s role found among preservice teachers is
of the teacher as an expert, authority, and parent. These beliefs contrast with the
principles of the constructivist approach, which guide the current educational reform.

**Elementary and Secondary Preservice Teachers’ Beliefs**

A limited number of studies that examine differences in preservice teachers’
beliefs depending on whatever they are elementary or secondary majors were found by
this researcher. Book and Freeman (1986) and Kile (1993) found, for example, that
while elementary preservice teachers were more student-oriented, secondary majors were
more subject-matter oriented. In relation to preservice teachers’ self-concept, Ben-Peretz
(1990) observed that secondary majors had a higher self-concept than elementary majors.
This finding can be related with Kile’s study (1993) that found a self-perception of
“intellectual superiority” among secondary majors in relation to elementary majors.
Soodak and Podell (1997) also examined efficacy beliefs of secondary and elementary
preservice teachers. The authors reported that secondary majors had a lower perception of their teaching-efficacy than elementary majors did.

In a study that explored preservice teachers conceptions of caring and order, Weinstein (1998) observed that secondary majors emphasized pedagogy more than elementary majors as a way for achieving order and express caring for the students. Elementary majors, on the other hand, emphasized more management and interpersonal strategies.
CHAPTER III
METHODOLOGY

Using survey methodology, the current study is a comparative study of the beliefs about teaching and learning held by elementary and secondary preservice teachers of the University of Northern Iowa, United States of America. Four main questions were examined in the current study:

1. To what extent the beliefs expressed by elementary and secondary preservice teachers on the following topics are aligned with a traditional or a constructivist perspective:
   a. The use of cooperative learning activities
   b. Teachers’ vs. students’ input over curriculum choices
   c. The use of discovery learning activities
   d. Teacher’s vs. school’s control over curriculum decisions
   e. Students’ diversity and fair assessment
   f. Using intrinsic versus extrinsic motivation strategies

2. Do elementary and secondary preservice teachers differ in terms of their preference for practices aligned with a traditional or a constructivist perspective?

3. Are there differences in the beliefs expressed by elementary and secondary preservice teachers on the following topics:
   a. Goals of a high school education
   b. Importance of alternative strategies to enhance students’ learning
4. What are these participants’ motivations and concerns about becoming a teacher and their career expectations?

The methods and procedures involved in conducting this study are specified in this chapter. The chapter is divided into two major sections: (a) pilot study (participants, instruments, and data analysis and results) and (b) final study (participants, instruments, procedure, and data analysis).

Pilot Study

A pilot study was conducted to test four different instruments and determine their usefulness as data collection devices to assess preservice teachers’ beliefs.

Participants

The pilot sample was formed by secondary preservice teachers who were enrolled in the fall 1999 semester in one of the required courses for second-year and fourth-year students in two teacher education programs at Universidad de la Frontera, Chile (N = 66). The instruments were piloted with this population because, originally, that was the population of interest for the current investigation. However, unforeseen difficulties for collecting data in a timely fashion precluded conducting the final study with this population. Instead, data for the final study were collected from a sample of U.S. preservice teachers.

Instruments

Four paper-and-pencil instruments were pilot tested. All participants completed a version of these instruments in the Spanish language. The participants responded to the instruments in the following order. The first instrument, “My Approach to Enhance
Students' Learning,” is an adaptation of the interview questions used by Dunkin et al. (1994) to explore student teachers’ “cognitions” regarding teaching. The instrument included the following open-ended questions:

1. What are the most important things you can do to enhance students’ learning?
2. What things do you need to take into consideration in deciding the best ways to enhance students’ learning?
3. How do you evaluate your success as a teacher?

The second instrument tested is an adaptation of “The Teachers’ Belief Inventory” developed by Posner (1996). The original instrument explores the respondents’ perspective on teaching in six domains: (a) Control, (b) Diversity, (c) Learning, (d) Teacher’s Role, (e) School and Society, and (f) Knowledge. For the purposes of the study, a translation of this inventory to the Spanish language was used (Montecinos et al., 1999). The domain “School and Society” was not explored in this version of the instrument. Respondents are asked to express the extent to which they agree or disagree (four-point Likert scale) with each of 40 statements. The issues addressed include questions regarding:

1. Control. Who should control what goes on in teaching, and what should be the range of their control?
2. Diversity. How unique are learners and how should one treat learners on the basis of their differences?
3. Learning. How do people learn in terms of both the process of learning and the motivation for it?
4. Role. How formal (versus personal) should teachers be in their relationship with the learners?”
5. Knowledge. What is knowledge? Is knowledge a given set of facts, concepts, and generalizations to be transmitted, or is it more a personal or social
construction developed by processes of reasoning and negotiation? (Posner, 1996, p. 46)

The third instrument, “Vignettes about Educational Issues,” was devised by the researcher with assistance from two thesis committee members. Following a brief description of an educational issue, two different teachers describe their points of view on this matter. Respondents are asked to choose with which teacher they agree most and provide reasons for that choice. Six educational issues were addressed: learning and motivation; degree of parents’, students’, and school board’s control over teaching decisions; teacher role; diversity; and knowledge. Two versions of the instrument (Vignettes A and B) with six different educational scenarios each were developed.

The fourth instrument, “Personal Data Questionnaire,” was constructed by the researcher on the basis of the literature reviewed (Book et al., 1983; Montecinos & Nielsen, 1997). It consists of 14 close-ended questions, designed to explore vocational aspects regarding respondents’ choice of a career in teaching. These include: the decision to become a teacher (when? and why?), the main reasons and major influences in their decision, their desire to work as teachers, their confidence about their career choice, and their alternative occupation choice in case they do not want to work as teachers. Additionally, it requests demographic data.

Analysis and Results

1. The participants’ responses to “My Approach to Enhance Students’ Learning” questionnaire were reviewed and coded. In general, the responses were very short (one or two sentences), failing to yield clear information about the participants’ thinking.
Most of the participants only answered question one: What are the most important things you can do to enhance students’ learning? Based on the responses coded, this question was adapted and included in the final version of the “Personal Data Questionnaire” (see Appendix A).

2. The participants’ responses to the adaptation of “The Teachers’ Belief Inventory” were analyzed by examining the distribution of responses. Results showed little disagreement among students within and between grade levels on 38 of the 48 statements. Diversity in perspectives was observed in statements referring to parents’ control in teaching activities, learners’ control over sequence of activities, teachers’ involvement in administrative decisions, students’ diversity, the role of errors in the learning process, teachers’ attention to students’ emotional development, and the benefits of integrated subjects. These results showed interesting preliminary evidence about areas in which preservice teachers’ thinking tended not to be homogeneous. However, it only provides general data about the participants’ thinking (agree or disagree). Therefore, on the basis of this limitation, the researcher decided not to use this instrument as part of the final study.

3. Vignettes about Educational Issues. One group of 12 preservice teachers answered version A of this instrument and a second group of 18 preservice teachers answered version B.

Preservice teachers’ responses on any given vignette tended to show little variability in their choice of a preferable point of view to address the problem described in the vignette. They also showed difficulty in justifying their choice. The responses,
although weakly elaborated, did show some general areas of concern such as: the possibility to lose the control of the classroom if parents visit it, the importance of quality over quantity when deciding what to teach, and the use of cooperative learning activities to promote students’ social relations, motivation, and general well-being.

Six vignettes were selected for the final instrument with the purpose of making the instrument shorter and more directly related with dimensions of teachers’ beliefs of interest of the study. The vignettes that were eliminated described situations dealing with motivation strategies (competition versus collaboration), general instruction strategies (traditional versus constructivist), student-teacher relationship (formal versus informal), and teaching emphasis (content versus thinking skills). The vignettes that were selected for the final instrument were reviewed and adapted with the purpose of making the contrasting points of view presented more similar in their length (number of words) and richness (number and quality of explanations).

4. The “Personal Data Questionnaire” was effective in capturing data needed. The majority of its questions and alternatives were kept without modifications for the final study. Four questions were added for the final version in order to explore respondents’ interest in pursuing post-graduate studies and examine their beliefs about two broad educational aspects: the main goals of high school education, and the importance of different strategies to enhance their students’ learning.
Main Study

Subjects

Participants for the study were preservice teachers enrolled during fall 1999 semester in four sections of the course Learning and Instruction in Classroom Contexts that were taught by two professors. Every teacher education major is required to take this course, which main focus of study is "cognitive, affective, and psychomotor learning processes; including behavior modification, concept learning, problem solving, creativity, attitude formation, and skill learning" (University of Northern Iowa, 1998, p. 178). From the original 115 students enrolled in these sections, 93 students identified their major as elementary education ($n = 43$), elementary/childhood education ($n = 14$), elementary/middle education ($n = 13$), and secondary education ($n = 23$) (total elementary preservice teachers $n = 70$ and secondary preservice teachers $n = 23$). Those students who identify their major as K-12 Endorsement (music, art, physical education), early childhood, and special education were excluded from the sample.

Instruments

Two instruments were designed to collect data for the final study: Personal Data Questionnaire and Vignettes: Resolving Educational Issues.

Personal Data Questionnaire. It consists of 18 close-ended questions dealing with (a) the decision to become a teacher (when and why?) and influences on that decision, (b) concerns about becoming a teacher, (c) career expectations: working as teacher and postgraduate studies, (d) beliefs about the main goals of high school education, (e) beliefs
about the importance of different strategies to enhance high-school students' learning, and (f) demographic data (see Appendix A).

**Vignettes: Resolving Educational Issues.** The instrument presents a school context and six different educational scenarios enacted by a couple of teachers who have contrasting points of view about the issue. Respondents are asked to side with one of two teachers and select the main factor(s) for their choice from a set of five factors. Then, they are asked to give a brief written explanation about why they selected that factor(s). The instrument consists of the following situations:

1. Vignette one describes a situation dealing with the use of cooperative learning during mathematics classes in 3rd grade when students are noisy and moving a lot around the room.

2. Vignette two describes a situation dealing with the degree of control students can have on instructional activities, focusing on its effects on teachers' planning.

3. Vignette three describes a situation dealing with advantages of using discovery learning versus a direct instruction method when teaching a 6th grade science class.

4. Vignette four describes a situation dealing with the use of problem-solving activities when they imply deviating from the school's curriculum guidelines.

5. Vignette five describes a situation dealing with students' diversity and fairness in evaluation (standard versus multiple criteria).
6. Vignette six describes a situation dealing with the benefits of using extrinsic or intrinsic motivation strategies to get 8th and 9th grade students more involved in the learning process (see Appendix B).

Procedure

The two instruments were administered during regular class hours by the researcher. The professor introduced the researcher who, in turn, explained the purpose of the study, the nature of the response tasks, and the voluntary and anonymous nature of students’ participation in the study. Emphasis was placed on the fact that there were no wrong or right answers, and future uses of the study’s results were explained. Finally, it was stressed that students’ decision to participate was not going to influence their grades in the course. All students volunteered to participate.

First, students received the instrument “Vignettes: Resolving Educational Issues.” The participants were asked to read the directions and raise their hand if they had questions. After they finished responding to this instrument, they received the “Personal Data Questionnaire.” The instruments were administered in the sequence already described to avoid having responses to the vignettes be influenced by the questions and response alternatives offered by the “Personal Data Questionnaire.”

Finally, once they finished with both instruments, the participants were asked to write down a code word on the first page of both questionnaires so that the researcher could match them together. Participants turned the protocols in after they finished responding to both of them. Total administration time ranged between 30 to 45 minutes.
Data Analysis

The "Personal Data Questionnaire" responses were analyzed by computing the frequency count for each response alternative for each question. Frequencies were computed for the total groups as well as for the secondary and elementary sub-groups.

Participants were asked to give three responses for each vignette: selection between point of view A or B, selection of one or more factors, and explanation of the factor(s) chosen. The responses were analyzed quantitatively and qualitatively. For the quantitative analyses, percentages were calculated in relation to the selection of points of view (A or B). The frequency with which participants selected each one of the five factors influencing their choice was also computed separately for each point of view (A or B).

A qualitative, inductive, analysis was conducted of the students' written responses. In qualitative analysis, rather than having preconceived categories and codes, the categories emerge from the data (Charmaz, 1983). A coding system was developed for each vignette on the basis of the responses given by the students who participated in the classes but who were not preservice teachers. First, responses were separated by choose point of view A or B. Within each alternative the basic coding strategies was to identify keywords that clustered responses into a theme. This technique, which includes reading and organizing the data (participants' responses) in order to uncover themes, is known as open coding (Strauss, 1991). The goal of the open coding is to "open up the inquiry" by scrutinizing participants' responses word by word or line by line (Strauss, 1991, p. 29). The researcher independently generated different themes based on students'
responses. These themes or categories were modified during the data analysis process in order to verify that each code really fit with the data and to examine possible relationships between categories and subcategories. A second person, independently, evaluated how the responses fit in the themes. In case of disagreement, both raters conferred to decide which themes best captured the diversity and similarities in students’ responses. This latter was done with the purpose of testing for reliability, thus is credibility of the study’s results.
CHAPTER IV

RESULTS

The results presented in this chapter have been organized into two main sections. The first reports the results of a quantitative analysis of the demographic data gathered with the purpose of describing sample demographic and vocational characteristics. This section responds to the question: What are these participants' motivations and concerns about becoming a teacher and their career expectations? The second section reports the findings from quantitative and qualitative analysis carried out to examine the other three research questions guiding the current study. These questions are:

1. Are there differences in the beliefs expressed by elementary and secondary preservice teachers on the following topics:
   a. Goals of a high school education
   b. Importance of alternative strategies to enhance students' learning

2. To what extent the beliefs expressed by elementary and secondary preservice teachers on the following topics are aligned with a traditional or a constructivist perspective:
   a. The use of cooperative learning activities
   b. Teachers' vs. students' input over curriculum choices
   c. The use of discovery learning activities
   d. Teacher's vs. school's control over curriculum decisions
   e. Students' diversity and fair assessment
   f. Using intrinsic versus extrinsic motivation strategies
3. Do elementary and secondary preservice teachers differ in terms of their preference for practices aligned with a traditional or a constructivist perspective?

Sample Characteristics

Demographics

Seventy elementary and 23 secondary preservice teachers participated in the current study. The majority (70%) of the participants were sophomores or juniors (that is, began their major in teaching during 1998 or 1997), were female (76%), and 20–22 years old (80%). Almost one fourth of the elementary and one third of the secondary education preservice teachers indicated that their mother’s job was in the educational field (i.e., teacher, teacher aid, special educator, or school principal). Elementary (6%) and secondary (2%) majors less frequently reported that their fathers held an education-related job.

Vocational Characteristics

The decision to become a teacher. Four aspects of the participants’ decision to become teachers were examined in the current study: moment at which they made the decision, reasons for their decision, influences on their decision, and concerns about their choice of teaching as a profession. As shown in Table 1, secondary majors (39%) more frequently than elementary majors (26%) made their decision to become a teacher after studying another major in college. About a third of the elementary majors made their decision during high school as compared to 13% of the secondary majors. When compared to secondary majors (13%) twice as many elementary majors (27%) indicated that they had always wanted to become teachers.
Table 1

Moment Participants Decided to Become a Teacher by Major (percentages)

<table>
<thead>
<tr>
<th>Moment</th>
<th>Elementary (n = 70)</th>
<th>Secondary (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>In high school</td>
<td>34%</td>
<td>22%</td>
</tr>
<tr>
<td>Always</td>
<td>27%</td>
<td>13%</td>
</tr>
<tr>
<td>After studying another major</td>
<td>26%</td>
<td>39%</td>
</tr>
<tr>
<td>In elementary/middle school</td>
<td>4%</td>
<td>9%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>After working</td>
<td>3%</td>
<td>9%</td>
</tr>
<tr>
<td>Did not respond</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>After obtaining results from college entrance exams</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Participants were asked to indicate, from a list of 12 reasons often cited in the literature, their three main reasons for wanting to become a teacher. The majority of the responses clustered around four reasons. First, wanting to make a difference in other people's life was selected by 77% of the participants as one of their top three reasons (45%, 20%, and 12% respectively selected it as first, second, or third main reason). As shown in Table 2, the trend for the whole group was largely replicated for the first and second main reasons given by both majors.
Table 2

Main Reasons to Become a Teacher by Major (percentages)

<table>
<thead>
<tr>
<th>Reason to become a teacher</th>
<th>Elementary (n = 70)</th>
<th>Secondary (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make a difference in life of others</td>
<td>80%</td>
<td>69%</td>
</tr>
<tr>
<td>Help students to feel successful . . .</td>
<td>74%</td>
<td>48%</td>
</tr>
<tr>
<td>Work with people</td>
<td>54%</td>
<td>39%</td>
</tr>
<tr>
<td>Help students to be willing to learn</td>
<td>30%</td>
<td>26%</td>
</tr>
<tr>
<td>Like to teach</td>
<td>21%</td>
<td>7%</td>
</tr>
<tr>
<td>Contribute to society</td>
<td>11%</td>
<td>9%</td>
</tr>
<tr>
<td>Other</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Like to work in schools</td>
<td>6%</td>
<td>13%</td>
</tr>
<tr>
<td>Like the subject matter</td>
<td>6%</td>
<td>48%</td>
</tr>
<tr>
<td>Like to learn</td>
<td>4%</td>
<td>13%</td>
</tr>
<tr>
<td>Like the school schedule</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Like autonomy of teachers job</td>
<td>3%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Note. Each percentage on the table reflects the percentage of people who selected the item as their first, second, and third main reason altogether.

Helping students to feel successful and enhancing their self-esteem, a more specific description of how a teacher can make a difference in a person’s life, was selected as one of the top three reasons by 68% of the participants. For 20% it was first, for 29% it was second, and for 16% it was third main reason. As shown in Table 2, this reason was more frequently given by elementary majors (74%) rather than by secondary
majors (49%). Third, "I like to work with people" was selected by 50% of the participants as one of the top three reasons for becoming a teacher. For 15% it was their first reason, for 17% it was the second, and for 18% it was the third main reason. Fourth, "I like the subject I am studying" was selected by 16% of the participants as one of the three top reasons. Whereas 4 of the 70 elementary majors (5%) selected it as one of their main reasons, 11 of the 23 secondary majors (48%) identified this as one of their three main reasons.

Eighty percent of the participants indicated that one of the three major influences in their decision to become a teacher was their prior experience in working with children and/or adolescents. This influence was stronger in elementary education majors (77%) than in secondary education majors (57%). A teacher they had had in the past was reported by 56% of all participants as one of the major influences in their decision. This incidence was stronger in secondary education majors (52%) than in elementary majors (40%). Thirty-six percent of the elementary majors mentioned that a parent was a major influence in their decision; whereas 17% of the secondary majors indicated this source of influence. Although they were asked to identify three influences, about half of the respondents only identified two on their decision to become teachers (see Table 3).

When asked how confident they felt about their decision to become a teacher, 87% of the participants reported feeling very confident or confident (see Table 4). Only two elementary, but no secondary majors, expressed regret for it. Among those who felt unsure or regretted their decision, the most cited reason (33%) was that they did not know if they had the personality characteristics they associated with teaching.
Table 3

Influences in the Decision to Become a Teacher by Major (percentages)

<table>
<thead>
<tr>
<th>Influence</th>
<th>Elementary (n = 70)</th>
<th>Secondary (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience with children</td>
<td>77%</td>
<td>57%</td>
</tr>
<tr>
<td>Teacher</td>
<td>40%</td>
<td>52%</td>
</tr>
<tr>
<td>Parent</td>
<td>36%</td>
<td>17%</td>
</tr>
<tr>
<td>Did not respond</td>
<td>24%</td>
<td>32%</td>
</tr>
<tr>
<td>Other relatives/friends</td>
<td>11%</td>
<td>26%</td>
</tr>
<tr>
<td>Interest in university degree</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>Other explanations</td>
<td>6%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Note. Each percentage on the table reflects the percentage of people who selected the item as their first and second, altogether.

Table 4

Confidence About their Choice to Become a Teacher by Major (percentages)

<table>
<thead>
<tr>
<th>Level of Confidence</th>
<th>Elementary (n = 70)</th>
<th>Secondary (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very confident/confident</td>
<td>86%</td>
<td>81%</td>
</tr>
<tr>
<td>Unsure/very unsure</td>
<td>11%</td>
<td>9%</td>
</tr>
<tr>
<td>Regret decision</td>
<td>3%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Career Expectations

These prospective teachers' thinking about their professional future was examined in regards to three issues: how long they expected to work as classroom teachers, alternative occupational choices, and plans for post-graduate education. Over 90% of all the participants reported that it is probable or very probable that they are going to work as schoolteachers once they graduate (see Table 5).

Table 5

Probability of Working as a Teacher and Length of Time Participants Would Like to Work as a Teacher by Major (percentages)

<table>
<thead>
<tr>
<th>Working as Teacher</th>
<th>Elementary (n = 70)</th>
<th>Secondary (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Probable/Probable</td>
<td>93%</td>
<td>96%</td>
</tr>
<tr>
<td>Improbable/Very Improbable</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Length of Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>37%</td>
<td>26%</td>
</tr>
<tr>
<td>Entire professional life</td>
<td>34%</td>
<td>35%</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>11%</td>
<td>13%</td>
</tr>
<tr>
<td>1 to 5 years</td>
<td>9%</td>
<td>17%</td>
</tr>
<tr>
<td>11 to 15 years</td>
<td>9%</td>
<td>9%</td>
</tr>
</tbody>
</table>
When asked how long they would like to work as schoolteachers, the responses were diverse. A third of them reported that they expected to remain classroom teachers throughout their entire professional life and one third of the participants indicated to be unsure. More elementary majors (37%) than secondary majors (26%) indicated feeling unsure about the length of time they would work in a classroom (see Table 5).

Table 6 shows the differences between the groups in terms of alternative occupations in case they do not remain in teaching. Elementary education majors most frequently cited shifts to school administration and counseling. Secondary education majors also reported interest in the counseling area. In addition, several people in this last group expressed that they would like to work in their discipline but not as teachers (independent work). Others noted an interest in becoming college professors.

Table 6

<table>
<thead>
<tr>
<th>Alternative Occupation</th>
<th>Elementary (n = 42)</th>
<th>Secondary (n = 17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>28%</td>
<td>11%</td>
</tr>
<tr>
<td>Education Administration</td>
<td>24%</td>
<td>6%</td>
</tr>
<tr>
<td>Counseling</td>
<td>21%</td>
<td>29%</td>
</tr>
<tr>
<td>Business</td>
<td>12%</td>
<td>12%</td>
</tr>
<tr>
<td>Mother and wife</td>
<td>10%</td>
<td>6%</td>
</tr>
<tr>
<td>Independent work</td>
<td>5%</td>
<td>18%</td>
</tr>
<tr>
<td>College professor</td>
<td>0%</td>
<td>18%</td>
</tr>
</tbody>
</table>
A high percentage of elementary (71%) and secondary (78%) education majors expressed that it is very probable or probable that they would pursue post-graduate studies (see Table 7).

Table 7

<table>
<thead>
<tr>
<th>Probability of Pursuing Post-graduate Studies by Major (percentages)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Probability</td>
</tr>
<tr>
<td>----------------------------</td>
</tr>
<tr>
<td>Very probable/probable</td>
</tr>
<tr>
<td>Improbable/very improbable</td>
</tr>
</tbody>
</table>

The areas in which participants expressed interest were diverse. Counseling was the area of interest most cited by 27% of elementary and 34% of secondary education majors. Elementary majors also expressed interest in general education (23%), while the secondary education major participants expressed a desire to pursue post-graduate studies in the specific subject they would teach (26%).

In summary, the results show that elementary and secondary majors presented more similarities than differences. Both groups were similar in regarding their reasons to become a teacher, the principal influence in their decision, the level of confidence in their decision to become a teacher, and the probability to work as schoolteachers and to pursue post-graduate studies. Differences between the majors were observed regarding the moment at which they decided to become teachers, the percentage of participants that
were unsure about whether they would remain in classroom teaching throughout their professional life, and the degree of interest in pursuing occupations unrelated to classroom teaching.

Beliefs About Teaching and Learning

Participants’ beliefs and differences between elementary and secondary majors regarding the following eight issues were examined:

1. Goals of a high school education
2. Importance of alternative strategies to enhance students’ learning
3. The use of cooperative learning activities
4. Teachers’ vs. students’ input over curriculum choices
5. The use of discovery learning activities
6. Teacher’s vs. school’s control over curriculum decisions
7. Students’ diversity and fair assessment
8. Using intrinsic versus extrinsic motivation strategies

The first two issues were examined through the use of questions that required students to select or rate from a list of possible response alternatives. The next six issues were assessed through the use of six vignettes. Each described a situation reflecting each issue, followed by two approaches teachers could take as they resolved the issue. Since different preservice teachers can endorse a course of action for different reasons, participants were asked to identify what factors they were considering in selecting alternative A or B as their preferred approach in response to the situation described in the vignette. Furthermore, they were also asked to explain the reasons for considering that
factor(s). The factors involved the impact of the situation described in the vignette on aspects such as: students' learning, students' social relations, student-teacher relations, curriculum guidelines, students' reasoning, motivation, discipline, teacher's role, etc.

Results of a quantitative analysis of the factors and qualitative analysis of the rationale offered by participants are reported separately for each issue. It is important to note that participants' explanations are quoted as the participants wrote them.

Beliefs about the Goals of High School Education

Participants were asked to select, from a list of eight statements, the three most important goals of secondary education. Table 8 shows the participants' preferences. About 60% of the elementary majors reported that the three most important goals were to develop knowledge and skills, student's self-esteem and self-confidence, and good thinking skills. These were also the top three goals secondary majors saw for a high school education (see Table 8).

In addition, a third of all of the participants thought that one of the main goals of high schools was to foster in students the development of appropriate codes of moral and social behavior. Notwithstanding these similarities, the development of thinking skills was more frequently selected as an important goal by secondary (82%) than by elementary majors (61%). About two thirds of the elementary majors, as compared to 55% of the secondary majors, identified the development of knowledge and skills as a main goal of high school education.
Table 8

Beliefs about the Goals of High School Education by Major (percentages)

<table>
<thead>
<tr>
<th>Goal</th>
<th>Elementary (n = 70)</th>
<th>Secondary (n = 23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop knowledge and skills</td>
<td>66%</td>
<td>55%</td>
</tr>
<tr>
<td>Develop good thinking skills</td>
<td>61%</td>
<td>82%</td>
</tr>
<tr>
<td>Develop self-esteem and self-confidence</td>
<td>61%</td>
<td>59%</td>
</tr>
<tr>
<td>Develop appropriate codes of moral and social behavior</td>
<td>33%</td>
<td>36%</td>
</tr>
<tr>
<td>Prepare students to be good citizens</td>
<td>27%</td>
<td>14%</td>
</tr>
<tr>
<td>Prepare students for the world of work</td>
<td>19%</td>
<td>18%</td>
</tr>
<tr>
<td>Prepare students to acquire information that is expected in an educated person</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>Prepare students to pass university entrance exams</td>
<td>7%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Note. Each percentages on the table reflects the percentage of people who selected each goal as the first, second, and third most important goal altogether.

Beliefs about Strategies to Enhance Students' Learning

Given a list of 12 strategies, participants were asked to indicate how important each one is for enhancing their students' learning. Table 9 shows that the majority of the participants in both groups tended to consider as very important or important ten of the twelve strategies presented. For 85% of the elementary majors it was important that teachers present themselves as models to be imitated by the students, thus developing
appropriate personal characteristics. Only two thirds of the secondary majors rated this as important (see Table 9).

Table 9

Beliefs about the Importance of 12 Strategies to Enhance Students' Learning by Major (percentages)

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Very Important/ Important</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Elementary</td>
</tr>
<tr>
<td>1. Environment of mutual acceptance and respect in the classroom.</td>
<td>100%</td>
</tr>
<tr>
<td>2. Teach meaningful knowledge and skills for daily-life.</td>
<td>97%</td>
</tr>
<tr>
<td>3. Keep students' attention by making learning fun.</td>
<td>94%</td>
</tr>
<tr>
<td>4. Understand students' personalities and moods.</td>
<td>87%</td>
</tr>
<tr>
<td>5. Promote students' self-esteem and personal development.</td>
<td>99%</td>
</tr>
<tr>
<td>6. Manage a classroom with few discipline problems.</td>
<td>93%</td>
</tr>
<tr>
<td>7. Use methodologies and learning materials that enhance students' interest for learning.</td>
<td>92%</td>
</tr>
<tr>
<td>8. Integrate the students' families into the school's activities.</td>
<td>91%</td>
</tr>
<tr>
<td>9. Use strategies that match students' characteristics and interests.</td>
<td>87%</td>
</tr>
<tr>
<td>10. Present myself as a model to be imitated and develop appropriate personal characteristics.</td>
<td>85%</td>
</tr>
<tr>
<td>11. Establish a relationship of friendship with the students.</td>
<td>57%</td>
</tr>
<tr>
<td>12. Use of incentives and rewards.</td>
<td>40%</td>
</tr>
</tbody>
</table>
Whereas a majority of elementary majors (57%) rated “establish a relationship of friendship with the students” as very important or important, only 39% of the secondary majors agree with this opinion. The use of incentives and rewards was considered very important/important by 40% elementary and only 26% secondary majors.

To develop an environment of mutual acceptance and respect in the classroom was considered by all of the participants as a very important/important strategy to enhance students’ learning. The totality of secondary majors also believed that teaching meaningful knowledge and skills for daily-life, keeping students’ attention by making learning fun, and understanding students’ personalities and moods were highly valuable strategies to promote students’ learning. Over 95% of the elementary majors, on the other hand, agreed that teaching meaningful knowledge and skills for daily-life and promoting the self-esteem and the students’ personal development were very important/important strategies.

**Beliefs about Cooperative Learning**

The following vignette was used to examine participants’ beliefs about the use of cooperative learning:

- “Ms. Jones and Ms. Petersen disagree on the use of cooperative learning during Mathematics classes in 3rd grade. Both realize that when teachers use this approach, the classroom becomes noisier and students tend to move around the room a lot.
A. Ms. Petersen argues that the noise and students moving around the class negatively affects classroom discipline. She believes that it is difficult for students to learn when the classrooms are not orderly and quiet.

B. Ms. Jones argues that noisy classroom and students moving around reflect that students are learning. She believes that being quiet is not necessarily a condition for learning."

The majority of elementary (86%) and secondary majors (65%) selected the alternative that endorsed the use of cooperative learning (alternative B). Table 10 shows that, in justifying their choice, a total of 132 factors were selected by the 92 participants who responded to this item, yielding an average of 1.4 factors per respondent.

Among those who endorsed cooperative learning, the frequency with which the following factors were identified as guiding their choice was: 72% students' learning, 26% social relations, 21% motivation, and 13% discipline (see Table 10). Among those who rejected the use of cooperative learning (alternative A), the frequency with which the following factors were identified as guiding their choice was: 53% discipline, 53% students' learning, 12% social relations and 12% motivation. It is noteworthy that discipline was selected six times among the 12 selections made by elementary majors (50%). Secondary majors, however, as was the case among those who endorsed cooperative learning, appeared to be more concerned with students' learning (50%) than with discipline (see Table 10).
Results from a thematic analysis of the reasoning supporting students’ selection of these factors among those who endorsed cooperative learning are described first, followed by an analysis of the reasons offered by those who rejected this approach.

Table 10

Factors Influencing their Decisions on the use of Cooperative Learning (C. L.) by Major (frequencies)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Major</th>
<th>Students' Learning</th>
<th>Social Relation</th>
<th>Discipline</th>
<th>Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>E</td>
<td>4</td>
<td>0</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>(n = 17)</td>
<td>(n = 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(n = 7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>E</td>
<td>43</td>
<td>15</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>(n = 75)</td>
<td>(n = 60)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>11</td>
<td>5</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(n = 15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. A = rejection of C. L.; B = endorsement of C. L.; E = elementary majors; S = secondary majors.

Reasons for endorsing cooperative learning. One hundred and twelve explanations were recorded among those who endorsed the use of cooperative learning (averaging 1.5 explanations per person). The participants’ explanations were classified into four main themes: learning through social interaction, the impact of noise on learning, learning by doing, and other reasons. Table 11 summarizes the frequency in which these themes were addressed by major.
Table 11

Explanations Offered by Participants who Endorsed Cooperative Learning by Major (frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 60)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. Learning through social interactions among peers enhances:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning</td>
<td>37</td>
<td>11</td>
<td>48</td>
</tr>
<tr>
<td>Social skills and social relations</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Motivation</td>
<td>9</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>2. Impact of noise on learning:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being quiet is not a necessary condition for</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>learning</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Noise should be expected</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Noise does not interfere with discipline</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>3. Learning by doing</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>4. Other explanations</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. E = Elementary majors; S = Secondary majors.

The first theme, presented by 63% (71 out the 112) of the explanations, reflected the belief that learning occurs through social interactions, that is, when students interact with each other, work together, teach each other, and discuss and share their ideas. The participants explained that interacting and working together enhances three different
aspects: students' learning, students' motivation, and students' social skills and social relations:

- Students can learn a lot from each other, interaction is an important part of learning for students. (Secondary major)

- ... for some children cooperative learning is more beneficial because of shared ideas and reasons. Being taught by or teaching a peer is valuable to learning. (Elementary major)

- Cooperative learning allows students to recognize other ideas and redefine their own [ideas]. (Elementary major)

Some responses further explained the impact of cooperative learning on students' recall and understanding of what was learned:

- Students' learning experience is improved by cooperative learning, one student may be able to explain the problem to another who doesn't understand, in turn giving each student a better understanding of the problem. (Secondary major)

- They [the students] explain it to their classmates. When they teach it, they will remember better. (Elementary major)

Beyond its impact on learning, 13 explanations emphasized that learning through social interaction enhances students' motivation. Proportionally, elementary and secondary majors expressed this reasoning with almost equal frequency. According to the participants, students become more interested in learning and in their schooling, and more motivated when working together with their peers. Some responses that expressed this belief read:
• Working in groups tends to be more interesting than listening to the teacher all time. (Elementary major)

• Students are better motivated when they are having fun, are allowed to discuss with others their ideas, and are able to receive help and give help. (Secondary major)

Ten explanations referred to how interactions among students promote the development of social skills and social relations. The participants refer to them as “social interaction skills,” “getting along,” “team work,” “social relation,” and “social skills.” This reasoning was more commonly expressed by elementary (9 explanations) than by secondary majors (1 explanation). Some responses that exemplified this reasoning are:

• Allowing students to interact freely may increase social relations. (Elementary major)

• Students not only learn from the teacher, but also from each other. Therefore, also learning social interaction skills that they will have to use for the rest of their lives. (Secondary major)

A second major theme, relation between noise and learning, was found in 27 of the 112 explanations (24%). Table 11 shows that elementary majors more often than secondary majors justified their decision of accepting cooperative learning by noting that noise was unrelated to learning. Two elementary majors explained their reasoning this way:

• Students can still be productive even if the noise level increases.
• The class may be learning a lot from working together, and I don’t think that being quiet means the students are learning, and being noisy means they aren’t learning.

The eight participants who believed that noise should be expected in a classroom explained that being quiet is contrary to children’s nature and grade level, especially when they are expected to work in groups. Two elementary majors wrote:

• Kids will be kids. If they sit for along time being quiet, they will become frustrated. When they finally do release, it will be harder to calm them down.

• ...there is communication during group work, so the class should be a little bit noisy.

In addition, according to other participants (7), noisy classrooms are not contrary to good discipline. In their opinion, noise is not synonym of misbehavior and noise would not have to interfere with learning. In the opinion of some of them, teacher’s management skills can ensure that classroom discipline is maintained regardless of noise. Two responses that exemplified this belief read:

• A teacher can use cooperative learning and have a well-managed class. (Elementary major)

• A class can be managed very well while also being loud. I think as long the teacher has a good management over her class, it will work well. (Elementary major)
Finally, a group of six participants highlighted that cooperative is a useful strategy because it promotes learning by doing. Hands on activities, in their opinion, help students to learn and “store” more information. One example of this belief read:

- When students use hands-on activities or nontraditional methods it can engage more students and help to store the information long term.

Reasoning behind a rejection of cooperative learning. Twenty-five explanations were given by those who rejected the use of cooperative learning (averaging 1.5 explanations per person). Table 12 shows that almost half of the explanations (12) referred to silence and organization as necessary conditions for students’ learning. These explanations emphasized that when students talk the classroom becomes too noisy and students are not able to “pay attention,” “focus” and “learn.” One secondary education major described her position with total conviction:

- Most students need it [the environment] quiet; without this, they can’t do any work. Those that need noise can do it in their heads.

One elementary major participant with a clear traditional perspective about learning, who rejected the use of cooperative learning because of the same reason, mentioned:

- I believe that a certain amount of organization is needed for information to be passed from teacher to student.

According to other explanations offered (6), this methodology is especially problematic given this subject matter (math computations), students’ young age, and specific needs of those who are “less talented” or “slower.” Two secondary education major explained:
• I believe that cooperative learning can be good with students... math, however, is more an individual process, so cooperative learning would not be beneficial.

Table 12

Explanations Offered by Participants who Rejected Cooperative Learning by Major (frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E (n = 10)</th>
<th>S (n = 7)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A quiet and organized environment is a condition for learning</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>2. C. L. is inappropriate to subject matter, students' age, and certain students</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>3. Teacher loses control when using this method</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4. C. L. does not promote task involvement of all students</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5. Other explanations</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. C. L. = Cooperative learning. E = Elementary majors; S = Secondary majors.

Four explanations given by elementary participants highlighted that the teacher might lose control over the class when using cooperative learning activities. In their opinion, cooperative learning is not compatible with good discipline. In addition, it may
be difficult for the teacher to control students' learning while using this method. One elementary major participant wrote:

- Although students should learn, things easily can go out of control if too much freedom is given to them--then little learning takes place.

An additional reason for explaining why cooperative learning is detrimental to students' learning was that it does not promote all students' participation. Two participants argued that during cooperative learning activities only "a few do the work while the rest just talk."

**Beliefs about Discovery Learning**

The following vignette was used to examine participants' beliefs about the use of discovery learning:

- "Mr. Red and Mr. Truman are discussing what methodology is best to use when teaching the experimental method to students in a 6th grade Science class.

  A. Mr. Truman suggests that it is best to present students with a worksheet detailing a set of instructions to follow as they conduct the experiments. It is important to minimize the possibilities of errors during learning, so students do not get frustrated with science.

  B. Mr. Red suggests that it is best to present students with a worksheet that defines a problem and to ask the students to figure out the procedures for conducting experiments. Students can learn from their mistakes without necessarily getting frustrated with science."
Sixty two percent of all participants selected the alternative that endorsed the use of discovery learning (alternative B). The results also show that while 66% of the elementary majors agree with this approach, only 52% of secondary majors did so. The 92 participants who responded to this item, selected a total of 118 factors when explaining the reasons behind their choice, yielding an average of 1.3 factors per respondent.

Among those who endorsed discovery learning the frequency with which the following factors were identified as guiding their choice was: 83% students’ reasoning and thinking skills, 22% knowledge acquisition, 16% students’ motivation and emotions, 3% discipline, and 3% chose the other factors alternative (see Table 13).

Among those who rejected the use of discovery learning (alternative A), the frequency with which the following factors were identified as guiding their choice was: 44% students’ reasoning and thinking skills, 44% students’ motivation and emotions, 18% knowledge acquisition, 12% discipline, and 12% other factors.

Results of a thematic analysis of the reasoning behind participants’ selection of these factors among those who endorsed discovery learning are described first, followed by an analysis of the reasons offered by those who rejected this approach.
Table 13

Factors Influencing their Decisions About the Use of Discovery Learning by Major

(frequencies)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Major</th>
<th>Reasoning and Thinking Skills</th>
<th>Motivation Emotions</th>
<th>Knowledge Acquisition</th>
<th>Discipline</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (n = 34)</td>
<td>E (n = 23)</td>
<td>11</td>
<td>10</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>S (n = 11)</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>B (n = 58)</td>
<td>E (n = 46)</td>
<td>38</td>
<td>7</td>
<td>10</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S (n = 12)</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. A = rejection of discovery learning; B = endorsement of discovery learning; E = elementary majors; S = secondary majors.

Reasons for endorsing discovery learning. One hundred and twenty four explanations were recorded among those who endorsed the use of discovery learning (averaging 2.1 explanations per person). Table 14 shows the five main themes found when analyzing the reasons participants gave for endorsing the use of discovery learning: Benefits of learning on their own v/s being told what to do, usefulness of learning from mistakes, promotion of learning by doing, facilitation of teacher's assessment, and other explanations.
Table 14

Explanations Offered By Participants Who Accepted Discovery Learning By Major

(frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 46)</td>
<td>(n = 12)</td>
<td></td>
</tr>
<tr>
<td>1. Learning on one’s own v/s being told what to do, enhances:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thinking skills</td>
<td>12</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Problem solving skills</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Learning</td>
<td>9</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Remembering</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Understanding</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Meaningful learning and transfer</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Motivation</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Knowledge acquisition</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2. Learning from one’s mistakes:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General</td>
<td>13</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Trial and error</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>3. D. L. promotes learning by doing</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4. D. L. Facilitates teacher’s assessment</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5. Other explanations</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors; D. L. = Discovery Learning.
The first theme reflected the benefits of learning on one's own instead of being told or "spoon-fed" by the teacher. This reasoning was addressed in 52% of the explanations (64 out of 124). The most common cited advantage of learning on one's own (25%) is that it enhances the person's thinking skills (creativity, critical thinking, analysis, reasoning, questioning, and capacity to generate ideas). The importance of thinking skills was most often cited by secondary majors than by elementary majors. Some responses that exemplify this conception are:

- If the students have to reason out the problem and work to find their own answer they will develop critical thinking skills . . . (Elementary major)
- The students are allowed to explore their knowledge beyond basics facts by devising their own plan of experimentation. The teacher can help them if they do get frustrated, but the assignment promotes their creativity. (Secondary major)

Learning on one's own, in the participants' opinion, also enhances students' problem solving skills. These skills are viewed as important tools in the classroom and in "real life situations." The advantages of learning problem solving skills were cited three times more often by elementary majors than by secondary majors. Some responses that demonstrate their reasoning are:

- This approach is better for problem solving skills; which are skills used in real life situations. (Elementary major)
- Doing things M. Red's way not only teaches kids science, but it also teaches problem solving skills . . . (Secondary major)
Another way in which learning on one's own is, in the participants' opinion, more beneficial than being told what to do is because this strategy is more effective in promoting learning. While many explanations (11) noted that by learning on their own students “learn better” or “learn more,” others described this advantage of discovery learning (D. L.) on learning in more specific terms: Discovery learning promotes recall (10) or understanding (6). The following examples show these three conceptions:

- When a student is allowed to work and try different things—they often are learning more than if they are just following the steps on a worksheet. (Elementary major, D. L. enhances learning)
- Students remember things more if they provide their own knowledge first . . . This really sticks in their minds. Otherwise, when they get spoon-fed, they don’t retain as much. (Elementary major, D. L. enhances recall)
- Exploring their own ideas will allow the students to really understand how to do a problem. (Elementary major, D. L. enhances understanding)

Other participants emphasized that learning on one’s own makes learning more meaningful and transfer easier (6), enhances motivation (5), and promotes knowledge acquisition (2).

The second key reason for endorsing discovery learning emphasizes that students can learn from their mistakes. Fifteen percent of the explanations for endorsing the constructivist approach (19 out of the 124 explanations) argued this reason. Proportionally, elementary and secondary majors cited this reason with equal frequency.
While the majority of the participants explicitly wrote that making “mistakes” is fine and a good way to learn (16), others refer to the same idea as learning through trial and error (3). Two elementary majors explained:

- I am not sure if Mr. Truman gave 6th graders enough credit, I personally remember my mistakes and don’t make them a second time.

Students learn from their mistakes. I feel it is much more beneficial for students to be presented a problem that they must work out, rather than to be told the answer or “right” way to do things.

A third theme was that discovery learning promotes learning by doing. Four of the five participants who emphasized the importance of learning by doing (hands-on activities) also made reference in their responses to learning from mistakes through trial and error. One secondary major explained:

- Through trial and error and hands on activities, the students learn more. The process is not just lectured to them.

Finally, three responses made reference to the fourth theme, the benefits of discovery learning on teacher’s assessment. They highlighted that through discovery learning the teacher can really know if the students understand or are getting the “right” answer. One elementary major student justified:

- The teacher can go over them after the kids are done and can see why what they discover was right or wrong.

**Reasons for rejecting discovery learning.** Seventy-four explanations were recorded among those who rejected the use of discovery learning (averaging 2.2
explanations per person). Table 15 shows the four main themes found when analyzing the reasons participants gave for rejecting the use of discovery learning: Students need directions to follow, lack of direction produces frustration, discovery learning is not adequate for 6th graders, and lack of direction is contrary to good discipline.

Table 15

Explanations Offered by Participants who Rejected Discovery Learning by Major (frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E (n = 23)</th>
<th>S (n = 11)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Students need directions to follow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General explanation</td>
<td>8</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Students need to know the “right” procedure</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Students need to get acquainted with science first</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>2. Lack of direction produces frustration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General explanations</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Students will give up</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Other consequences</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>3. D. L. is not adequate for 6th graders</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>4. Lack of direction is contrary to good discipline</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. D. L. = Discovery learning. E = Elementary majors; S = Secondary majors.
The first explanation, students need directions to follow, was given by 70% of all participants. This reason was more commonly addressed by elementary (78%) than by secondary (56%) majors to explain their reluctance to implement discovery learning. According to them, students need directions, a basic outline, or a plan of action to follow otherwise they “get lost.” Responses that exemplify the first reasoning (students need directions) read:

- You need to give a student some sort of direction. If you don’t, how will they even know where to begin? (Elementary major)
- They [students] won’t feel lost, they will have a plan of action to follow. (Elementary major)

According to six explanations given by elementary majors, students not only need to learn a procedure to follow, but they also need to know which one is “the correct or right procedure.” These explanations not only reflect that the teacher should know and teach the right procedure, but also that a unique right way to do experiments exists. One participant, who was concerned about the risks of not knowing the right procedure, wrote:

- They need to learn the right way to do it. If they come up with a wrong theory then it may become permanently attached in their minds that their way was right.

Other participants (7) did not reject discovery learning completely. Instead, they recommend providing students with a structure to follow first and then introduce the use of discovery learning in the future. This reasoning is exemplified by these responses:
• The students may not know how to go about the procedure. I would suggest starting with detailed instructions and work toward having the students figure out the procedure. (Secondary major)

• It [worksheet with directions] allows students to focus on the experiments while practicing the experimental method. After enough practice, the list can be put aside (like a roadmap is not longer used when you are familiar with the route). (Elementary major)

A second major theme derived from participants’ responses is the belief that a lack of direction produces frustration among students. This belief was very common among elementary (52%) and secondary majors (63%). Frustration was seen as a problem on its own and also because of its posterior consequences: students will give up, students may lose motivation if frustrated, students do not learn from their mistakes when frustrated, frustration is contrary to making learning fun, students will not concentrate if they are frustrated, students are going to hate science, and frustrated students will use trial and error. Therefore, what participants more or less explicitly suggest is that teachers should tell the students what to do thus reducing the possibility of making mistakes. Some responses that show this concern read:

• I think students should be able to know where they are going with the experiment without all the frustrations of figuring out the procedures. (Elementary major)
• A student that does not understand an assignment will become very frustrated and will not be able to concentrate on alternatives to resolve the problem.
  
  (Secondary major)

• Students do not like to fail. Therefore, reducing the number of possible errors right away, will reduce the number of frustrated students making mistakes and giving up.

The third key reason for rejecting the use of discovery learning is that this method is not adequate for these students’ grade level. This explanation, given by elementary and secondary majors as well, noted that sixth graders are too young to learn through discovery learning and, therefore, without the teacher’s directions. Two participants explained:

• I do not believe that many 6th graders would benefit from option B because of their level of cognitive development (Piaget). I don’t think that they would institute a control group--or other more developed concepts and just become frustrated and get off task. (Secondary major)

• 6th graders are a little young to figure out things without instructions. It is better to let them see how a procedure would look like. (Elementary major)

The fourth kind of explanation for rejecting the use of cooperative learning emphasized its impact on discipline. One elementary major wrote:

• Students will only mess around and not do anything if they have no direction.

Beliefs about Students’ Input Regarding Classroom Activities

The following vignette was used to examine students’ beliefs about students’ input over classroom activities:
Ms. Lewis and Ms. Collins co-teach a 10th grade History class. Their students expressed a desire to visit a local museum in their history class. This is the second field trip students have suggested to take this year in this class. The teachers agreed with the first trip. Both teachers are concerned that if they agree with one more trip, they will not have time to cover all of the topics they wanted to teach this semester in this subject.

A. Ms. Collins thinks that they should redesign this unit, taking into account the students' interests and the activity the students suggested. The teachers can ask students to write comments about their impressions of the trip as an assignment.

B. Ms. Lewis thinks that they should teach the classes as planned. She suggests that students go to the museum during their free time. Those who go to the museum can write a report for extra credit.

The majority of elementary (83%) and secondary majors (78%) selected the alternative that argues that students should participate in deciding the class activities (alternative A). Table 16 shows that the participants who responded to this issue selected a total of 135 factors, yielding an average of 1.5 factors per respondent. Among those who endorsed the idea that students should participate in class activities decisions, the frequency with which the following factors were identified as guiding their choice was: 63% students' motivation, 46% students' learning, 28% students-teachers social relations, 13% curriculum guidelines, and 9% other factors (see Table 16). Among those who rejected the students' participation (alternative B), the frequency with which
the following factors were identified as guiding their choice was: 47% students learning, 35% curriculum guidelines, 29% motivation, and 24% students-teachers social relations. Motivation was selected 36% of the time by elementary with 50% of the secondary majors selecting this factor.

Table 16
Factors Influencing their Decisions on Students’ Input by Major (frequencies)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Major</th>
<th>Motivation</th>
<th>Students’ Learning</th>
<th>Students-Teachers’ Relations</th>
<th>Curriculum</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (n = 76)</td>
<td>E (n = 59)</td>
<td>35</td>
<td>30</td>
<td>18</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>S (n = 17)</td>
<td>13</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>B (n = 17)</td>
<td>E (n = 12)</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>S (n = 5)</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. A = students’ input should be considered; B = students’ should not have input; E = elementary majors; S = secondary majors.

Results of a thematic analysis of the reasoning underlying students’ selection of these factors among those who endorsed students’ input regarding classroom activities are described first, followed by an analysis of the reasons offered by those who rejected this approach.
Reasons for endorsing students' input regarding classroom activities. One hundred and thirty-three explanations were recorded among those who endorsed the idea that teachers should redesign the lesson plans to take into account the students' interests and suggestions (averaging 2 explanations per person).

The participants' explanations were classified into five main themes: Curriculums that consider students interests motivate them to learn, field trips are valuable learning activities, teachers' attitudes, issues of fairness, and other explanations. Table 17 summarizes the frequency with which these themes were addressed by major.

The first theme, a curriculum that considers students interests motivates them to learn, constitutes almost 40% of the responses. Proportionally, this idea was more commonly argued by secondary than by elementary majors. This reasoning emphasizes that teachers should adapt the curriculum in order to take advantage of students' interest, keep them motivated, and promote their learning. One elementary education major wrote:

- Going to the museum is educational and the students already said they like it, so in order for the kids to learn, the teachers should try to go toward the kids' interests.

According to other participants (25 explanations out of 133), field trips should be encouraged because they are very valuable experiences for the students. Going to a museum allows students to learn through "hands-on activities," by "experiencing," "seeing," and "manipulating" things. In addition, going to a museum can be a more meaningful activity than staying in the classroom because it allows students to really
understand certain topics by relating them to their lives. One response that demonstrates this belief read:

- Students will see the actual parts of history they are studying and field trips make it more real and easy to relate to for the students. (Elementary major)

Table 17

<table>
<thead>
<tr>
<th>Themes</th>
<th>E (n = 59)</th>
<th>S (n = 17)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A curriculum that considers students' interests motivates them to learn</td>
<td>39</td>
<td>14</td>
<td>53</td>
</tr>
<tr>
<td>2. The value of field trips:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students learn through hands on activities</td>
<td>12</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>They make learning more meaningful</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>3. A teacher who considers students desires shows to be:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flexible</td>
<td>14</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Caring and respectful</td>
<td>12</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Avoiding angering students</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>4. It is not fair to ask students to go on their own</td>
<td>8</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>5. Other explanations</td>
<td>9</td>
<td>2</td>
<td>11</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.
Thirty-six of the responses emphasized that being disposed to modify the curriculum considering students' interests reflects a positive teacher attitude. Caring and respectful teachers behave in this way. Others mentioned that teachers should be flexible and willing to adapt the curriculum when necessary. This rationale was more frequently mentioned by elementary majors than by secondary majors. Two elementary majors' responses, which exemplify these two aspects, read:

- The students should know that their desires and ideas are respected by the teacher . . .
- Teachers have to be flexible in their planning. It students show an interest in field trips—great.

A smaller number of participants explained that teachers "should" act according to the students' desires to avoid angering them. A secondary major wrote:

- If you don't express concern with their ideas and interests, they will begin to resent you or will be turned off to learning.

Finally, the fourth key explanation, argues that it is unfair to ask the students to go to the museum on their own (10). They recognized that not all the students have the resources (car, money for the bus, etc.) to go to the museum alone and, therefore, they would not have an equal opportunity to receive the extra-credit. This reasoning is exemplified in this response:

- I do not agree with B because some students may not have the means to visit the museum on their own; 50% are low income. (Secondary major)
Reasons for rejecting students' input regarding classroom activities. Twenty-three explanations were recorded among those who rejected students' input (averaging 1.4 explanations per person). The participants' explanations were classified into three main themes: students should learn what the curriculum dictates, students are trying to have fun and take control, students should pursue their interests on their own, and other explanations. Table 18 summarizes the frequency in which these themes were addressed by major.

Table 18

| Explanations Offered by Participants who Reject Students' Input by Major (frequencies) |
|---------------------------------|---|---|---|
| Themes                         | E  | S  | Total |
|                                 | \(n = 12\) | \(n = 5\) |
| 1. Student should study what the curriculum/teacher established | 6  | 3  | 9  |
| 2. Students are trying to have fun and take the control | 4  | 3  | 7  |
| 3. Student should go on their own | 2  | 3  | 5  |
| 4. Other explanations           | 2  | 0  | 2  |

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.

Almost half of the explanations argued that in order to learn more, students should study what the curriculum established. Therefore, students cannot “have a say” regarding
classroom activities. This reasoning, expressed by elementary and secondary majors with equal frequency, is represented in the following responses:

- The school probably has so much material that you [teacher] need to cover.  
  (Secondary major)

- Students will learn more by staying in the classroom. (Elementary major)

Other participants argued that students want to go to the museum in order to have fun and/or take the control of the class. The teacher should, in their opinion, be cautious to not lose his/her control. This reasoning is well represented by this comment from an elementary major:

- If students can change a teacher’s curriculum that easily they will keep trying and trying to get their way more and more. It could cause a power struggle.

Finally, 5 of the 23 explanations emphasized that students should not go to the museum during class time, rather they should go on their own time. One secondary major, who also thinks that students only are trying to have fun, explained:

- If students are interested in the museum they can go on their own. I am sure many of the students want to go on the trip because field trips are fun and they are away from school rather than they are educational.

**Beliefs about Teacher’s vs. School’s Control over Curriculum Decisions**

The following vignette was used to examine participants’ beliefs about the relative control that teachers and schools should have over curriculum decision:

- “For the eleventh-grade Language Arts classes, Ms. Jefferson and Ms. Sun are considering implementing problem-solving activities. The teachers are concerned
that when students are asked to work on these types of activities, they must spend more time on each unit. Therefore, they might not be able to cover all the topics recommended by the school's curriculum guidelines.

A. Ms. Sun suggests teaching all the topics that the curriculum establishes first and then, if there is time left, they could implement these problem-solving activities.

B. Ms. Jefferson suggests implementing these problem-solving activities even if they can't cover all the topics recommended in the curriculum.”

Seventy percent of the participants (67% of elementary majors and 78% of the secondary majors) selected the alternative that endorsed the use of problem solving strategies, and therefore, the idea that the teacher can decide to modify the curriculum (alternative B). The 93 participants who responded to this item selected a total of 120 factors when explaining the reason behind their choice, yielding an average of 1.3 factors per respondent (see Table 19).

As shown in Table 19 among those who endorsed the idea of the teacher making decisions about the curriculum, the frequency with which the following factors were identified as guiding their choice was: 51% content learning, 43% thinking skills, 14% motivation, 9% curriculum guidelines, and 9% others. Among those who believe that the school should decide the curriculum, the frequency with which the following factors were identified as guiding their choice was: 75% curriculum guidelines, 43% content learning, 11% motivation, and 7% thinking skills.
Results from a thematic analysis of the reasoning behind students’ selection of these factors among those who endorsed discovery learning are described first, followed by an analysis of the reasons offered by those who rejected this approach.

Table 19

Factors Influencing their Decisions Whether or not Teachers Can Deviate From Curriculum Guidelines (frequencies)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Major</th>
<th>Content Learning</th>
<th>Curriculum</th>
<th>Motivation</th>
<th>Thinking Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (n = 28)</td>
<td>E (n = 23)</td>
<td>10</td>
<td>17</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S (n = 5)</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>B (n = 65)</td>
<td>E (n = 47)</td>
<td>25</td>
<td>5</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>S (n = 18)</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. A = adherence curriculum guidelines; B = teachers can deviate from curriculum guidelines; E = elementary majors; S = secondary majors.

Reasons for endorsing the idea of the teacher making curriculum decisions.

Eighty-nine explanations were recorded among those who endorsed the idea that the teacher can decide to engage in activities that might deviate them from adherence to the schools’ curriculum guidelines (averaging 1.4 explanations per person).
Table 20 shows three main themes found when analyzing the participants’ reasons: benefits of engaging students in problem solving (skill for life, promotes active learning and promotes motivation), characteristics of curriculum guidelines, and other explanations.

Table 20

Explanations Offered by Participants who Favor the Deviation from Curriculum

Guidelines by Major (frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 47)</td>
<td>-----</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>(n = 18)</td>
<td>-----</td>
<td>-----</td>
<td>-------</td>
</tr>
<tr>
<td>1. Time spent on problem solving is worthwhile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaches skill for life</td>
<td>17</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>Promotes active learning</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Students’ motivation</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>2. Curriculum guidelines:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Should integrate problem solving activities to content</td>
<td>17</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>Should favor depth over breadth</td>
<td>13</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Should be flexible</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3. Other explanations</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.
The first theme reflects the idea that the teacher should implement problem-solving activities regardless the curriculum guidelines because these activities provide the students with an important tool for their lives. In their opinion, students will have to solve many “real problems” in the “real world,” “everyday situations,” or “future life.” In addition, having this “skill” is going to help them to be more successful. This reasoning, proportionally more frequently cited by secondary majors, was reflected in one third (30 out the 89) of all explanations. Some responses that exemplify this conception are:

- It is important for students to utilize proper problem-solving strategies. Breaking down a seemingly impossible problem into smaller parts and solving it will allow them to apply that strategy in all areas of their lives and improve their lives. (Secondary major)

- At that grade level, students need to be able to start, if they haven’t already, to work with problem-solving activities in order to prepare them to the “real world.”

The value of engaging students in problem-solving activities resides, also, in that it promotes active learning. Elementary (15%) and secondary majors (11%) emphasized that students learn “more” or “better” and develop their thinking skills when actively working (with problem solving activities) than just by listening to the teacher or reading a book. Two responses that exemplify this reasoning are:

- Students will learn more when they are actively doing something to help them learn. They will also develop their skills in reasoning because they have to actually think about what they are doing. (Elementary major)
• I think that students learn more by solving problems than just being presented with a lot of information. (Elementary major)

Finally, in the opinion of some participants, teachers should use problem-solving activities because they make the class more “interesting” or “fun”; therefore, they promote the students’ willingness to learn. Only elementary majors (5) suggest this reason. As an example, one participant wrote:

• They will be more involved in the class and want to learn more because of the fun activities.

A second theme is related to the characteristics that curriculum guidelines should have. According to 41 out of the 89 explanations, the curriculum should integrate problem-solving activities, favor the depth of the topics reviewed instead of the breadth of them, and be flexible. Table 20 shows that more elementary (66%) than secondary majors (56%) gave explanations illustrating this reasoning. According to many participants (19), problem-solving activities should be “incorporated” to the curriculum and should constitute a “regular” method to review different topics. In their opinion, learning the content and learning how to learn the content are both important ingredients that should be present in a regular class. Responses that reflects this reasoning read:

• Not only are we here to teach them, we are here to help them to learn how to learn, to be able for them to know to solve questions. (Elementary major)

Other participants emphasized that the curriculum should favor the depth of the topics reviewed instead of their breadth. In the participants’ opinion (18), reviewing too many
topics does not make sense because the students are going to forget them later. One secondary major explained:

- These activities [problem-solving] are important to student development. This is something the students will remember as opposed to content learning--most content is forgotten anyway.

Only four participants directly mentioned that the curriculum should be flexible and that the teacher can decide which activities to do. These participants did not focus in the advantage of problem solving activities but rather in the teacher's control over curriculum guidelines. One secondary major explained:

- If teachers believe that the students will benefit from new activities, they should do them.

**Reasons for endorsing the idea that teachers should adhere to school curriculum guidelines.** Forty-four explanations were recorded among those who endorsed the idea that the school should decide the curriculum and the teacher, therefore, should not use the problem-solving activities (averaging 1.6 explanations per person). Table 21 shows the three main themes found when analyzing the participants' reasons: teachers should follow curriculum guidelines, teachers can use problem solving activities after following school curriculum guidelines, and other explanations. The first explanation, teachers should follow school curriculum guidelines, was very commonly addressed by elementary and secondary majors.
### Table 21

**Explanations Given by Participants who Reject the Deviation from Curriculum Guidelines by Major (frequencies)**

<table>
<thead>
<tr>
<th>Themes</th>
<th>E (n = 23)</th>
<th>S (n = 5)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teachers should follow school curriculum guidelines:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To prevent students' lack of knowledge in next grade</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Because it is mandatory</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>To provide students the basic required skills</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>To avoid having problems with the school administration</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2. Teachers can do problem solving activities after following</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>curriculum guidelines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Other explanations</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

**Note.** The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.

According to the participants who gave the first kind of explanation, teachers should follow the curriculum guidelines to prevent students’ lack of necessary knowledge in the next grade, because the curriculum is mandatory, to provide students with the basic knowledge addressed in the curriculum, and to avoid having problem with the school administration. These reasons are clearly expressed in the following comments:
• Leaving out part of your curriculum could harm your students' learning in the future. (Elementary major)

• The school board has requirements of what needs to be met by the end of the year. (Secondary major)

• The curriculum guidelines aren't met the teachers could be in trouble by administration. (Elementary major)

The second main idea argued by the participants is that teachers can decide to include problem-solving activities in their classes but only after having covered the material and activities recommended by the school. This less extreme position, only argued by elementary majors, recognizes the benefits of implementing problem solving activities if time permits. This response shows this reasoning:

• It is important to follow curriculum because it is based by the school. However, if there is time left, they [the teachers] can teach what they want. (Elementary major)

Beliefs about Students’ Diversity and Assessment

The following vignette was used to examine participants' beliefs about the fair assessment of diverse students:

□ “Ms. Morse and Ms. Grass are discussing how to handle students' individual differences when evaluating them. Second grade students present varied levels of academic abilities, economic, and ethnic backgrounds.

A. Ms. Morse believes that teachers need to have high expectations for all students. Teachers should establish the same learning goals for all
students and have standard evaluations that all students must complete; it is only fair to treat all learners equally.

B. Ms. Grass believes that teachers need to have high expectations for all students. Teachers should consider students’ individual differences and employ multiple criteria to evaluate them; it is only fair to treat different learners differently.”

Seventy percent of all participants selected the alternative that endorsed the idea that it is only fair to treat different learners differently (alternative B). The majority of the elementary majors (86%) and secondary majors (78%) agree with this approach. The 92 participants who responded to this item, selected a total of 122 factors when explaining the reason behind their choice, yielding an average of 1.3 factors per respondent (see Table 22).

As shown in Table 22, among those who endorsed the idea of the teacher treating all learners equally, the frequency with which the following factors were identified as guiding their choice was: 50% diversity and equity in education, 43% students’ learning, 29% social relations, 29% other, and 14% motivation. Among those who believe that teachers should treat different learners differently, the frequency with which the following factors were identified as guiding their choice was: 44% diversity and equity in education, 41% students’ learning, 22% motivation, 12% social relations, and 9% others.

Results from a thematic analysis of the reasoning behind participants’ selection of these factors among those who endorsed discovery learning are described first, followed by an analysis of the reasons offered by those who rejected this approach.
Table 22

Factors Influencing their Decisions on how to Address Students’ Diversity by Major (frequencies)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Major</th>
<th>Diversity And Equity</th>
<th>Students’ Learning</th>
<th>Motivation</th>
<th>Social Relations</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>E</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>(n = 14)</td>
<td>(n = 10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(n = 4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>E</td>
<td>26</td>
<td>26</td>
<td>15</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>(n = 78)</td>
<td>(n = 60)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>(n = 18)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. A = fairness involves equal treatment; B = fairness involves unequal treatment; E = Elementary majors; S = Secondary majors.

Results from a thematic analysis of the reasoning behind participants’ selection of these factors among those who endorsed discovery learning are described first, followed by an analysis of the reasons offered by those who rejected this approach.

Reasons for endorsing the idea of a different treatment for different students. Ninety-nine explanations were recorded among those who endorsed the idea that teachers should use multiple criteria to assess students’ learning and treat different learners differently (averaging 1.3 explanations per person). Table 23 shows the four main themes found when analyzing the participants’ reasons: Difference in students require
differences in teaching and assessment, students will feel frustrated and try less if treated equally, the focus of assessment should be individual progress, and other explanations.

Table 23

Explanations Offered by Participants who Favor the Idea of Providing Different Treatments to Different Students by Major (frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 23)</td>
<td>(n = 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Students are different</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students have different ways to learn</td>
<td>23</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Students have different abilities</td>
<td>20</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>Students have different backgrounds</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>2. Students are going to feel frustrated and try less if they are treated equally</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>3. The focus of assessment should be individual progress</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>4. Other explanations</td>
<td>19</td>
<td>2</td>
<td>21</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.

As shown in Table 23, the majority of the explanations (65 out of the 103) highlighted that students are different and therefore should be treated and assessed differently. This understanding was very common among elementary and secondary majors (more than two explanations per person in average showed this thinking in both
The participants emphasized the existence of three areas of differences to take into consideration when teaching: pace in learning, ways one learns, and learning styles; abilities (and weaknesses); and background (family, ethnicity, etc). These views are reflected in the following comments:

- Fair is not always equal. You need to be able to take into consideration the different learning styles of all your students. (Elementary major)
- All students learn in different ways and teachers should try to help each student learn to their potential. (Secondary major)
- To give a child an F in an assignment because he/she may have a disability of some sort is not fair. The assignment may need to be altered to suit their needs. (Elementary major)
- Not all students learn the same because of their academic levels, economic, and ethnic background. Teachers should understand this and let all students learn at their own pace. (Elementary major)

It is interesting to note that from the 26 explanations that made reference to students' diverse abilities, only seven explicitly mentioned the possibility of teaching and assessing students with disabilities. All of these explanations corresponded to elementary majors.

The second major theme is that when teachers do not take into account individual differences, some students may feel frustrated and discouraged to learn or to work. This belief, proportionally more common among secondary majors, is exemplified in these responses:
• Some students will lose motivation if they know they have to do something especially if it is difficult for them. If they see other students succeeding while they struggle they will bring themselves down and may lose motivation to try. (Elementary major)

• Students at lower learning levels may become frustrated if unable to understand a topic, they may even fall behind. (Secondary major)

In the opinion of other participants, using multiple criteria to assess students' learning is fair because it allows the teacher to focus on personal progress rather than in the group's average performance. In addition, multiple ways to assess allow students to demonstrate their knowledge instead of showing their limitations or lack of proficiency in reading or writing. Two participants wrote:

• Knowledge can be demonstrated in a variety of ways. What is important is what the student understands, not if they can take tests well. (Elementary major)

• Well, since these are 2nd graders, I think it is more important to stress improvement and (many are still developing and will catch up later) high expectations than standard.

**Reasons for endorsing the idea of an equal treatment for all students.** Twenty-three explanations were recorded among those who endorsed the idea that teachers should have standard criteria to assess students' learning and treat all learners equally (averaging 1.6 explanations per person). Table 24 summarizes the four main themes found when analyzing the participants' responses: differences among learners do not imply differences in teaching those learners, students will work less and feel less efficacious if
treated differently, all students have potential and should be treated the same, and other explanations.

Table 24
Explanations Offered by Participants who Reject the Idea of Different Treatments for Different Students by Major (frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E (n = 10)</th>
<th>S (n = 4)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Differences among learners do not involve differences in teaching</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2. Students are going to try less and feel inadequate if treated differently</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>3. All students have potential and should be treated the same</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4. Other explanations</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.

The first theme is reflected by those participants who recognize that students are different, learn differently, have different needs, etc. but do not see these differences as having implication for the use of differential teaching approaches. This belief was more common among elementary than among secondary majors. Some responses that reflect this view read:
• I agree that each student has individual deficits and special qualities. The teacher needs to try and find a way to reach each student and bring them to their highest potential. (Elementary major)

• Some kids are at different levels but should be treated the same. (Elementary major)

A second key explanation for endorsing an equal treatment emphasizes that when students are treated differently, they are less encouraged to perform well and can feel inadequate or less smart. Elementary majors only mentioned this reasoning. One elementary major, who expressed this belief, explained:

• All students need to be treated equally. Some students would feel inadequate knowing they were being evaluated differently, making them try less. (Elementary major)

Finally, another group of participants explained that all students should be treated equally because they all have potential and need to be challenged. It seems that for these participants treating people differently entails necessarily setting lower expectations for some learners. This explanation was given once by elementary majors and five times by secondary majors. One response that exemplifies this thinking stated:

• All have an equal chance to perform. (Elementary major)

Beliefs about Motivation

The following vignette was used to examine participants’ beliefs about the use of different strategies to enhance students’ motivation:
“Mr. White and Mr. Adams are discussing which motivation strategies are best to use in their Science classes for the 8th and 9th grade students. How can teachers enhance the motivation of disinterested students and maintain motivation among those who are already motivated?

A. Mr. White suggests that it is best when teachers use interesting and challenging activities as the main way to motivate the students. These kinds of activities are most effective in getting students involved in the learning process.

B. Mr. Adams suggests that it is best when teachers use rewards, positive feedback, and grades as the main way to motivate the students. These kinds of incentives are usually most effective in getting students involved in the learning process.”

Eighty four percent of all participants selected the alternative that endorsed the use of interesting and challenging activities that promote intrinsic motivation (alternative A). The results show that 86% of the elementary majors and 78% of secondary majors agreed with this approach. The 90 participants who responded to this issue selected a total of 118 factors to explain their reasons for their choice, yielding an average of 1.3 factors per respondent (see Table 25).

Table 25 shows the frequency which each factor was identified as guiding their choice for activities that promote intrinsic motivation: 58% motivation, 53% students’ learning, 16% values that the school should promote, 3% discipline, and 1% other. Among those who endorsed the use of rewards and grades (extrinsic motivation,
alternative B), the frequency with which each of the following factors were identified as guiding their choice was: 64% motivation, 36% students’ learning, 21% discipline, 7% values that the school should promote, and 7% chose other factors.

Table 25

Factors Influencing their Decisions Regarding the Use of Motivation Strategies by Major (frequencies)

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Major</th>
<th>Students’ Learning</th>
<th>School’s Values</th>
<th>Motivation</th>
<th>Discipline</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (n = 76)</td>
<td>E (n = 58)</td>
<td>32</td>
<td>6</td>
<td>35</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S (n = 18)</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>B (n = 14)</td>
<td>E (n = 9 )</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>S (n = 5 )</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. The participants could choose more than one factor each time. A = intrinsic motivation; B = extrinsic motivation; E = Elementary majors; S = Secondary majors.

Results from a thematic analysis of the reasoning behind their selection of these factors among those who endorsed the idea of using interesting and challenging activities to enhance students’ motivation are described first, followed by an analysis of the reasons offered by those who rejected this approach.

Reasons for endorsing the idea of using interesting and challenging activities to enhance students’ motivation. Ninety-two explanations were recorded among those who
endorsed the idea that teachers should use activities that enhance students' intrinsic motivation (averaging 1.2 explanations per person). Table 26 shows the five main themes found when analyzing the participants' reasons: interesting and challenging activities increase students' learning and motivation, extrinsic rewards have negative effects, interesting activities favor intrinsic motivation, and other explanations.

As shown in Table 26, close to half of the explanations (41 out of the 90) highlighted that interesting and challenging activities have positive effects on students learning and motivation. This belief was, proportionally, more common among elementary than among secondary majors. Some participants emphasized that this kind of activities makes students become more “engaged,” “motivated” or make learning more “fun” or “interesting.” Others highlighted that these activities make students “learn more,” “learn better,” or “do better.” Participants explained these aspects in the following manner:

- If students are interested in what they are learning and it is entertaining, they will be engaged and their motivation level will increase. (Secondary major, motivation increases)

- I believe that students learn more from activities they find interesting . . . and the knowledge they acquire becomes authentic and memorable. (Elementary major, learning increases)
Table 26

Explanations Given by Participants who Favor Interesting Activities by Major

(frequencies)

<table>
<thead>
<tr>
<th>Themes</th>
<th>E (n = 58)</th>
<th>S (n = 18)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Challenging and interesting activities make students</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn more</td>
<td>18</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>More motivated</td>
<td>18</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>2. Negative effects of rewards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not all students can get rewards</td>
<td>5</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>Students do things for the wrong reason</td>
<td>3</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>When failing to win the rewards, students get frustrated and lose their desire to learn</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3. Interesting activities favor intrinsic motivation</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>4. Both approaches together (interesting activities and rewards)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>5. Other explanations</td>
<td>9</td>
<td>1</td>
<td>10</td>
</tr>
</tbody>
</table>

Note. The participants could give more than one explanation for their decision. E = Elementary majors; S = Secondary majors.

The second kind of explanation highlighted the negative effects of using rewards and grades to motivate. This explanation, proportionally more common among secondary than elementary majors, noted that the use of rewards is not positive because: (a) not all the students can get rewards, (b) rewards encourage students to do things only
to get rewarded, and (c) when absent, rewards frustrate students and make them lose their
motivation to learn. This thinking is expressed in the following examples:

- Rewards are never good values if punishment the non-gifted students. (Elementary
  major, not all students get rewards)
- ... if a student is taught to value things that produce rewards and not value
  those that don’t the student will miss out a lot throughout life. (Secondary
  major, doing this for the wrong reason)
- Rewards often decrease motivation if a reward is not longer present.
  (Secondary major, rewards will not always be present)

The third reason given for supporting the use of challenging and interesting activities is
that they promote intrinsic motivation. This belief, expressed more often by secondary
(50%) than elementary majors (16%), emphasized the idea that through these activities
students “will want to learn,” are going to be “self-motivated,” or “will learn for the sake
of learning” instead of for receiving rewards. Only two of the 18 explanations classified
in this category used the concept of “intrinsic motivation.” Some explanations stated:

- Students should be motivated because they want to learn. (Secondary major)
- Students shouldn’t expect rewards for doing their job. Their motivation should
  be intrinsic, not extrinsic. (Secondary major)

Finally, a small group of participants (4 explanations) supported the idea that interesting
activities and rewards can/should be used together. One elementary major explained:

- They should focus in interest and challenge but also promote rewards--motivate
  an occasionally reward.
Reasons for endorsing the idea of using rewards and grades to enhance students' motivation. Nineteen explanations were recorded among those who endorsed the idea that teachers should use rewards and grades to enhance students' motivation (averaging 1.4 explanations per person). Table 25 shows that 9 of the 67 elementary majors (13%) and 5 of the 23 secondary majors (22%) chose this approach. Almost all of the reasons given fell under one theme (16): rewards and good grades motivate students because they want to get them. Some responses that exemplified this thinking stated:

- If a student knows they will receive some type of award they will be more willing to work toward a certain task. (Elementary major)
- Rewards, positive feedback and grades are very motivating. (Secondary major)
- If they don't do it, they don't get the reward. Therefore, they would have to manage their time and have to do it. (Elementary major)

In addition, three participants wrote more specific reasons when explaining the benefits of using rewards. They emphasized that rewards increase motivation because of their emotional consequences: students had “pleased themselves, the teacher or others,” rewards increase their feelings of “self-worth” or “being successful.”

Cross-Issues Analysis

This section presents a summary of the main results of the study and consistency with which participants selected across the vignettes an alternative that more closely aligned with the recommendations of constructivist or with a traditional perspective on teaching and learning. Table 27 shows a summary of the vocational characteristics and career expectations of the participants of the current study.
Table 27

Results Sample Characteristics: A Summary

<table>
<thead>
<tr>
<th>Results</th>
<th>Elementary</th>
<th>Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>In high school</td>
<td>34%</td>
<td>22%</td>
</tr>
<tr>
<td>Always</td>
<td>27%</td>
<td>13%</td>
</tr>
<tr>
<td>After studying another major</td>
<td>26%</td>
<td>39%</td>
</tr>
<tr>
<td>Reason to Become a Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make a difference in life of others</td>
<td>80%</td>
<td>69%</td>
</tr>
<tr>
<td>Help students to feel successful</td>
<td>74%</td>
<td>48%</td>
</tr>
<tr>
<td>Like to teach</td>
<td>21%</td>
<td>7%</td>
</tr>
<tr>
<td>Like to learn</td>
<td>4%</td>
<td>13%</td>
</tr>
<tr>
<td>Influence in the Decision to Become a Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience with children</td>
<td>77%</td>
<td>57%</td>
</tr>
<tr>
<td>Level of Confidence about their choice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very confident/confident</td>
<td>86%</td>
<td>81%</td>
</tr>
<tr>
<td>Probability of Working as a Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Probable/Probable</td>
<td>93%</td>
<td>96%</td>
</tr>
<tr>
<td>Probability of pursuing post-graduate studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very probable/probable</td>
<td>71%</td>
<td>78%</td>
</tr>
<tr>
<td>Length of Time they Would Like to Work as Teachers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>37%</td>
<td>26%</td>
</tr>
<tr>
<td>Entire professional life</td>
<td>34%</td>
<td>35%</td>
</tr>
</tbody>
</table>

(table continues)
Table 28 shows a summary of the topics addressed in the vignettes developed to examine students’ beliefs. The data show that the majority of the elementary and secondary education majors reported having a preference for approaches that reflect a constructivist orientation toward teaching and learning. This is true for five of the six vignettes examined, where 66% or more of the responses favored an alternative aligned with constructivism. In the sixth vignette (discovery learning), whereas 66% of the elementary majors endorsed the use of discovery learning, only 52% of secondary majors endorsed it. When compared to elementary majors (14%), twice as many secondary majors (30%) did not favor the use of cooperative learning activities.

The number of explanations given by those participants who endorsed more traditional or constructivist approaches in the diverse vignettes was examined. The result of this analysis shows that, in average, the exact number of explanations (1.6) was given when supporting either one of these approaches.
Table 28

Participants' Choice of More Traditional or Constructivist Perspectives by Major

(Percentages)

<table>
<thead>
<tr>
<th>Participants' Perspectives</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cooperative Learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise is a problem</td>
<td>14%</td>
<td>30%</td>
<td>18%</td>
</tr>
<tr>
<td>Noise is not a problem</td>
<td>86%</td>
<td>65%</td>
<td>81%</td>
</tr>
<tr>
<td>2. Students' control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher makes all the decisions</td>
<td>17%</td>
<td>22%</td>
<td>18%</td>
</tr>
<tr>
<td>Students participate in decisions</td>
<td>83%</td>
<td>78%</td>
<td>82%</td>
</tr>
<tr>
<td>3. Discovery Learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher directly teaches procedures</td>
<td>33%</td>
<td>48%</td>
<td>37%</td>
</tr>
<tr>
<td>Students figure out procedures</td>
<td>66%</td>
<td>52%</td>
<td>62%</td>
</tr>
<tr>
<td>4. Teachers' vs. school's control over curriculum decisions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School decides curriculum</td>
<td>33%</td>
<td>22%</td>
<td>30%</td>
</tr>
<tr>
<td>Teacher decides curriculum</td>
<td>67%</td>
<td>78%</td>
<td>79%</td>
</tr>
<tr>
<td>5. Students' diversity and fair assessment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fairness is treating all learners equally</td>
<td>14%</td>
<td>17%</td>
<td>15%</td>
</tr>
<tr>
<td>Fairness is not treating all learners equally</td>
<td>86%</td>
<td>78%</td>
<td>84%</td>
</tr>
<tr>
<td>6. Motivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extrinsic motivation</td>
<td>13%</td>
<td>22%</td>
<td>16%</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
<td>86%</td>
<td>78%</td>
<td>84%</td>
</tr>
</tbody>
</table>

Note. The percentages only reflect the opinions of those participants who responded each vignette. E = Elementary majors; S = Secondary majors.
Table 29 shows a summary of the themes underlying the participants' reasoning when addressing or rejecting constructivist-oriented practices. In general, elementary majors expressed more concern about the impact of constructivist-oriented practices on students' discipline, whereas secondary majors were more worried about the pertinence of these strategies when used with children. Differences between both majors were also observed regarding their opinions about diverse assessment criteria and fair evaluation and their rationale for endorsing interesting and challenging activities.

Table 29

Themes in Analysis of Participants’ Reasoning by Major (percentage)

<table>
<thead>
<tr>
<th>Issues</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooperative Learning (C. L.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endorse C. L.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning through social interactions</td>
<td>59%</td>
<td>84%</td>
<td>63%</td>
</tr>
<tr>
<td>Impact of noise on learning:</td>
<td>28%</td>
<td>5%</td>
<td>24%</td>
</tr>
<tr>
<td>Learning by doing</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Reject C. L.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A quiet and organized environment is a condition for learning</td>
<td>53%</td>
<td>40%</td>
<td>48%</td>
</tr>
<tr>
<td>C. L. is inappropriate to subject matter, students’ characteristics</td>
<td>20%</td>
<td>30%</td>
<td>24%</td>
</tr>
<tr>
<td>Teacher loses control when using this method</td>
<td>27%</td>
<td>0%</td>
<td>16%</td>
</tr>
<tr>
<td>C. L. does not promote task involvement of all students</td>
<td>0%</td>
<td>20%</td>
<td>8%</td>
</tr>
</tbody>
</table>

(table continues)
<table>
<thead>
<tr>
<th>Issues</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discovery Learning (D. L.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endorse D. L.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning on one’s own v/s being told what to do</td>
<td>66%</td>
<td>70%</td>
<td>67%</td>
</tr>
<tr>
<td>Learning from one’s mistakes</td>
<td>18%</td>
<td>17%</td>
<td>18%</td>
</tr>
<tr>
<td>D. L. promotes learning by doing</td>
<td>5%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>D. L. Facilitates teacher’s assessment</td>
<td>4%</td>
<td>0%</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Reject D. L.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students need directions to follow</td>
<td>49%</td>
<td>33%</td>
<td>44%</td>
</tr>
<tr>
<td>Lack of direction produces frustration</td>
<td>32%</td>
<td>39%</td>
<td>35%</td>
</tr>
<tr>
<td>D. L. is not adequate for 6th graders</td>
<td>11%</td>
<td>22%</td>
<td>15%</td>
</tr>
<tr>
<td>Lack of direction is contrary to good discipline</td>
<td>8%</td>
<td>6%</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Students Input Regarding Classroom Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endorse students input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A curriculum that considers students’ interests motivates them to learn</td>
<td>37%</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>The value of field trips</td>
<td>18%</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>Teacher positive attitude</td>
<td>29%</td>
<td>21%</td>
<td>27%</td>
</tr>
<tr>
<td>It is not fair to ask students to go on their own</td>
<td>8%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Reject students input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student should study what the curriculum/teacher established</td>
<td>43%</td>
<td>33%</td>
<td>30%</td>
</tr>
<tr>
<td>Students are trying to have fun and take the control</td>
<td>29%</td>
<td>33%</td>
<td>30%</td>
</tr>
<tr>
<td>Student should go on their own</td>
<td>14%</td>
<td>33%</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Teacher’s v/s School’s Control over Curriculum Decisions</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endorse deviation from curriculum</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time spent on problem solving is worthwhile</td>
<td>46%</td>
<td>58%</td>
<td>49%</td>
</tr>
</tbody>
</table>

(table continues)
<table>
<thead>
<tr>
<th>Issues</th>
<th>E</th>
<th>S</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum guidelines:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reject deviation from curriculum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers should follow school curriculum guidelines</td>
<td>61%</td>
<td>75%</td>
<td>64%</td>
</tr>
<tr>
<td>Teachers can do problem solving activities after following curriculum guidelines</td>
<td>39%</td>
<td>0%</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Students' Diversity and Assessment**

**Endorse multiple criteria**

- Students are different | 62% | 63% | 63% |
- Students will feel frustrated and try less if they are treated equally | 9%  | 21% | 12% |
- The focus of assessment should be individual progress | 6%  | 5%  | 6%  |

**Reject multiple criteria**

- Differences among learners do not involve differences in teaching | 47% | 13% | 35% |
- Students will try less and feel inadequate if treated differently | 40% | 0%  | 26% |
- All students have potential and should be treated the same | 7%  | 63% | 26% |

**Motivation**

**Endorse intrinsic motivation**

- Challenging and interesting activities increase students' learning and motivation | 55% | 19% | 45% |
- Negative effects of rewards | 15% | 35% | 21% |
- Interesting activities favor intrinsic motivation | 14% | 35% | 20% |
- Both approaches together (interesting activities and rewards) | 3%  | 8%  | 4%  |

**Endorse extrinsic motivation**

- Rewards enhance motivation | 82% | 86% | 88% |
- Rewards have positive emotional benefits | 18% | 14% | 16% |
An analysis was performed to examine the consistency with which participants selected across the vignettes an alternative that more closely aligned with the recommendations of constructivist or with a traditional perspective on teaching and learning. Results showed that 30% of the elementary majors and 22% of the secondary major selected, in all cases, a more constructivist approach to the issue presented in the vignette. Another 36% of the elementary majors, with 17%, of the secondary majors, selected in all but one case, the more constructivist approach. About half of the secondary majors (49%) selected a more constructivist alternative in four out of the six vignettes, with 19% of the elementary students showing this response pattern. No person selected alternatives more close aligned with a traditional orientation consistently across all six vignettes, with only three participants selecting four or five times these alternatives. In summary, 58% of the participants exhibited a high degree of internal consistency, favoring a constructivist orientation, in their thinking across the wide range of educational situations depicted in these vignettes. Among those who choose a more traditional perspective, these choices seemed to be more issue-drive than the reflective of an overall traditional orientation toward teaching and learning.
CHAPTER V

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

The current study adds to the growing literature related on the beliefs preservice teachers have regarding different aspects of teaching and learning. In some respects the findings of this study are similar to those reported in previous research. However, in contrast to several previous works, most of the preservice teachers that participated in the current study endorsed practices that closely aligned with constructivist perspectives of teaching and learning. This chapter presents a summary and a discussion of the most important results, the limitations of the research as well as some suggestions for further research.

Summary

The first question focused on the extent to which the beliefs expressed by elementary and secondary preservice teachers aligned with a traditional or a constructivist perspective. Results indicate that the majority of the participants endorsed practices that closely align with a constructivist perspective on teaching and learning. These include:

1. The use of cooperative learning, because they believed that social interaction with peers promotes students’ learning and motivation.

2. The use of discovery learning, because they believed students learn more when they figure out things on their own rather than when information is “spoon fed” by the teachers.

3. The use of alternative assessments as a way of promoting equity in teaching and learning.
4. The use of motivational strategies that foster intrinsic motivation by engaging students in interesting and challenging tasks.

5. Giving students' the opportunity to have some input over classroom activities.

6. Giving teachers' the freedom to deviate from the schools' curriculum guidelines if these do not consider things teachers deem important.

The second question explored participants' beliefs about the goals of high education and effectiveness of various strategies for enhancing student learning. When asked about the goals of a high school education, the majority of the participants rated as most important the development of knowledge and thinking skills as well as the development of students' self-esteem and self-confidence. When asked to rate the importance of strategies that enhance students' learning, in all, except two cases, the participants indicated that the strategies that were task-oriented (teaching meaningful knowledge) were as important as strategies that would engage students' affective involvement, as well as their personal and social development.

A third research question asked if participants' beliefs would differ as a function of their major (elementary versus secondary teaching). Findings show these two groups of preservice teachers are more alike that different regarding their inclination toward endorsing more constructivist approaches to teaching and learning. Although statistical analysis of the responses were not performed to judge if there were statistically significant differences in how these two groups responded to these educational issues, on some issues there appears to be some differences that might have some practical significance. These are discussed here as a way of presenting suggestions to further
explore questions regarding differences between elementary and secondary preservice teachers’ beliefs about educational issues.

Differences were observed in the situation dealing with the use of discovery learning, where 66% of the elementary majors and 52% of the secondary majors endorsed it. When compared to elementary majors (14%), twice as many secondary majors (30%) did not favor the use of cooperative learning. When examining the reasons why elementary majors oppose the use of discovery and cooperative learning activities they appear to be more concerned with their impact on discipline and teacher control over the classroom. Secondary majors, on the other hand, focused their attention on the limitations that stem from children’s characteristics, such as their age.

Another area in which secondary and elementary majors appear to think differently is regarding the use of multiple criteria in assessments, as a way to accommodate individual differences among learners. Among those who endorsed the use of multiple criteria, for two of the three reasons given similar proportions of elementary and secondary students gave that reason. On the third reason, however, more often secondary majors believed that students would be frustrated and work less if they are treated equally. Regarding those participants who rejected the use of multiple criteria we can see differences between these majors on all three reasons. More often elementary majors believed that differences among learners do not entail differences in teaching and that students work less if they are treated differently. In addition, more often secondary majors reasoned that by using multiple criteria a teacher is not recognizing that all students have the potential to learn and succeed.
When examining the reasons elementary and secondary majors offered for endorsing practices that foster intrinsic motivation (i.e., using interesting and challenging activities instead of external reward) it was found that elementary majors tended to be more one-dimensional in their thinking. Their focus was on the benefits of interesting and challenging activities on learning and motivation. Secondary students on the other hand tended to both explain the benefits of intrinsic motivation as well as the limitations of using rewards.

A third aspect examined in the current study referred to vocational characteristics of the participants regarding their choice of teaching as a profession. Both groups noted that:

1. The main reasons to become a teacher were their desire to make a difference in other peoples' life and help students to feel successful.

2. The principal influence in their decision was their previous experience in working with children.

3. They feel very confident or confident about their decision to become a teacher.

4. It is very probable or probable that they are going to work as schoolteachers once they finish their training. However, only a third see themselves a working as a classroom teacher throughout their professional life.

5. It is very probable or probable that they are going to pursue post-graduate studies.
Again, in the absence of statistical analysis, no claim can be made about whether the differences between majors observed regarding some vocational characteristics are statistically significant. The largest difference was observed in their responses about the moment at which they decided to become teachers. About two thirds of the elementary majors made their decision before coming to college and only about half of the secondary majors made their decision before they started college. Additionally, when asked for an alternative occupational choice if they left teaching, more often, elementary majors chose a profession that kept them working in schools (i.e., counseling and administration). Secondary majors, more often than elementary majors, indicated that they would pursue work outside of k-12 schoolwork.

Discussion

Results of this study are discussed in three areas: vocational characteristics, goals of education, and preservice teachers' beliefs. Recommendations for teacher education programs are also mentioned.

Vocational Characteristics

In terms of vocational characteristics, findings of the current study coincide with previous studies. Montecinos and Nielsen (1997) examined university students' decisions to become elementary teacher education majors. In both studies, participants indicated that the main reason for deciding to become a teacher was their commitment to children (i.e., “I want to make a difference in other people’s lives”). They also mentioned that the main factor that influenced their decision was their experience in
working with children. Book et al. (1983) also reported in their study that “first-hand experiences” with children was the most common reason to become a teacher.

Findings indicate that the participants have a serious commitment to children but not to the teaching profession. Only 7% of the secondary majors and 21% of the elementary majors expressed that a major reason to become a teacher was their desire to teach. This finding can be directly related with the fact that only one third of the participants expressed that they would like to work as schoolteachers during their entire lives. In addition, they mentioned that their area of major interest to pursue post-graduate studies was counseling, and expressed that their major concern about becoming a teacher was their perception of not having the personality characteristics that they thought a teacher should have. Secondary majors, but not elementary, seemed to be more interested in their subject matter than in teaching in general. Therefore, there is a certain consistency in these participants’ thinking that propels them away from classroom teaching. These findings are important aspects to be considered by teacher education programs’ instructors who might need to ensure that they provide their students with good skills, attitudes, and knowledge for effective teaching and foster their interest in the teaching profession.

The findings suggest that current efforts at recruiting people into teacher education programs need to be coupled with efforts for retaining teachers. Retention efforts such as induction and mentoring of beginning teachers need to be supported throughout their professional socialization as preservice teachers. Research about the perception young people have of teaching and the personal characteristics of teachers can
assist teacher educators’ efforts at fostering among preservice teachers a commitment to teaching.

Goals of High School Education

Teaching is a multidimensional activity with multiple purposes, such as the transmission of the cultural heritage, the socialization of the young into accepted social roles, the training of children and adolescents for being responsible citizens, the development of necessary skills and knowledge to live in modern society, and the promotion of the emotional and social development of those who are taught (Johansen, Johnson, & Henniger, 1993). The relative importance a given teacher gives to any one of these goals has a direct influence on how this teacher defines his/her professional role and the activities he/she will focus on while teaching. In the current study, preservice teachers reported having a commitment to a holistic development of students as they privileged both their cognitive/academic and emotional and social development. Previous research that has examined preservice teachers’ beliefs about the goals of education showed discrepancies among preservice teachers. For example, Book et al. (1983) found that elementary and secondary majors valued enhancing students’ self-esteem more than promoting their academic achievement. Mertz and Mc Neely (1992), however, found that for over half of their participants, promoting students’ self-esteem and students’ thinking skills were fundamental goals of education. The findings of the current study support Mertz and Mc Neely’s findings in this respect. However, the current study does not concur with other findings reported by these authors. Mertz and Mc Neely found that very few participants thought that the development of appropriate
codes of moral and social behavior (0%) and the preparation of students to be good citizens (2%) were valuable goals of education. In the current study, however, participants were more likely to endorse these goals.

The conclusion that preservice teachers are concerned with cognitive and emotional development is validated when one examines the reasoning they offered to explain their beliefs about a number of topics related to teaching and learning.

Beliefs

The study of beliefs presents same major challenges. For example, Pajares (1992) and Widden et al. (1998) noted that beliefs do not lend themselves to empirical investigation. The difficulty of measuring beliefs is related to the fact that an homogeneous conceptualization of the concept does not exist, beliefs are generally unconsciously held, they are context-specific, unpopular beliefs are not commonly expressed, and beliefs change over time, etc. (Kagan, 1992; Leinhardt, 1990; Pajares, 1992). These problems are important to keep in mind when one attempts to compare findings across studies. Any similarities or differences can be an artifact of the instrumentation used, the operational definition of the concept of belief employed, and the specific variables examined in different studies. Therefore, it is with great caution that I try to draw some conclusions regarding the relationship of the findings of the current study with those of previous research regarding preservice teachers' beliefs.

Findings indicate that participants do not favor the use of rewards, and they do not believe that having a relation of friendship with the students is an effective strategy to enhance their learning. Participants were very consistent in the two instruments in
explaining that using incentives, rewards, and grades is not something they favor. It is possible to conclude that in contrast to the findings of Kile (1993), preservice teachers did not think that rewards are natural consequences of students’ positive behavior or effective learning. On the contrary, most preservice teachers favor the use of activities that promote students’ intrinsic motivation.

Elementary majors (40%) more frequently than secondary majors (26%) favor the use of rewards to enhance students’ learning. However, when exploring the benefits of rewards on students’ motivation, more secondary (22%) than elementary majors (13%) endorsed them. The reasoning presented by those participants who supported the decision of using rewards was simplistic or one-dimensional: rewards motivate students to do things in order to get them. In the current study, however, those participants who rejected the use of rewards mentioned multiple reasons for their decision. They mentioned not only the disadvantages of rewards, but also the benefits of using interesting and challenging activities and the possibility of using rewards and activities that favor intrinsic motivation at the same time.

Establishing a friendly relationship with the students was not seen as an important strategy to enhance their learning. However, maintaining a friendly relationship with the students was a reason addressed by some participants when they accepted the idea of taking students’ suggestions about classroom activities and lesson planning into consideration. The main idea was not to upset the students. Although most participants did not believe that it is important to have a relationship of friendship with the students, it is important not to overlook the significance of being “afraid” to upset them. Instructors
of these participants should challenge this latter belief because when planning, it is necessary to have very clear in mind that whatever activity they design is for the purpose of promoting learning and not only to keep the students happy. In addition, controlling students' misbehavior, making decisions not all students agree with, etc. can be very difficult tasks for a teacher who is afraid of students' anger.

With respect to effective strategies to enhance students' learning, the findings of the present study show that preservice teachers value both task oriented and affective oriented strategies. This finding is dissimilar to that of Dunkin et al. (1994), who reported that preservice teachers gave more importance to strategies that were task oriented (provide structure and specific activities) than affective oriented to enhance students' learning. The participants of the present study gave high importance to emotional oriented strategies: promote an environment of mutual acceptance and respect, make learning fun, understand students' personalities and moods, and enhance students' self-esteem and personal development. This finding supports the idea, already mentioned in the section about the goals of high school education, that participants value not only students' cognitive needs but also their socio-emotional needs.

The results show that a common belief among those participants who did not endorse constructivist practices was that the curriculum is a fixed agenda. The reasons, given by those preservice teachers who supported the idea of complying with the students' input centered around the notion that doing some of the things students want to do enhances students' motivation. This reflected teachers' positive attitude. However, a common belief among those participants who rejected the idea of considering students'
interests and among those who rejected the idea of teachers making changes to the curriculum, was that the curriculum is not flexible and teachers should follow it. Many participants felt that teachers should conform to the demands of the curriculum guidelines in order to make sure that the students are not going to miss something important in their learning process. This concern is addressed by Prawat (1992) who noted that it is one of the "questionable" beliefs that instructors should challenge in order to promote that preservice teachers adopt a constructivist approach to teaching and learning. Another explanation for following the curriculum was to avoid having problems with or upsetting the school's authorities. The belief that curriculum can or should not be altered contradicts the current educational reform, which promotes teachers' empowerment to make decisions and students' participation. This is especially important here in the United States, where a national curriculum does not exist and each state designs its educational guidelines. Teacher education programs should prepare teachers with the necessary knowledge, creativity, and self-determination to adapt and design curricula that better match the particular needs of their students.

When participants in this study rejected cooperative learning and discovery learning, the majority explained that these strategies have a negative impact on students' discipline. In general, participants of this study did not show being concerned about losing control over classroom activities as was the case in the studies of Weber and Mitchell (1996a) and Book et al. (1983). This concern was, however, mentioned by this study's participants who rejected the idea of using cooperative learning in third grade and discovery learning strategies with sixth graders. As described by Florio and Lensmire
(1990), preservice teachers felt that approaches to instruction that are not well organized and strictly sequenced are a problem for the teachers, disturb them, and jeopardize students’ learning. The results show that proportionally, elementary majors seemed more worried than secondary majors about losing control over the students (e.g., teacher loses control when using cooperative learning, a quiet and organized environment is necessary condition for learning, lack of direction is contrary to good discipline, etc.). The implications of this concern, which reflect a teacher-centered classroom approach, can be multiple for participants’ future practices if it is not challenged. Teachers may, for example, behave in authoritarian ways in order to ensure controlling students’ learning and discipline, or they may avoid giving students the opportunity to participate in classroom decisions in order to avoid making students think that they control the class.

Those participants who rejected the idea of using cooperative learning and discovery learning also mentioned that these strategies were inadequate for the students’ level and age. Those who were concerned about students’ age and abilities were, mainly, secondary majors, which can indicate their limited knowledge of children’s cognitive development and abilities. The majority of the participants who rejected using constructivist oriented strategies mentioned that the teachers’ role is to provide the students with an outline of what to do and to ensure that they know which one is the right procedure to carry out experiments. This reasoning reflects the belief that teachers should “tell” the students what to do, how to do it, and that there is only one way to do things correctly.
However, the majority of the participants in this study endorsed the use of cooperative learning and discovery learning. When participants supported cooperative learning and discovery learning, they considered its impact on students’ learning as a more important issue than its impact over emotional, social, or disciplinary aspects. One of the most cited reasons for supporting the constructivist approach was that students can learn better and more when teachers promote activities that require their active involvement and collaboration and provide them with opportunities to figure things out on their own instead of being “spoon-fed.” The results of this study seem to contrast, therefore, with preservice teachers’ common conceptualization of learning as a passive way of acquiring knowledge that is transmitted by an expert—the teacher—commonly described in the literature (Anderson et al., 1995; Joram & Gabriele, 1998; Weber & Mitchell, 1996a). It is not possible to conclude what the causes of this discrepancy with previous studies are. As mentioned earlier, the differences found between this study and other studies can be the result of the instrumentation or the operational definitions of the variables examined.

The participants in this study were mostly sophomores with relatively general knowledge of teaching. This can be seen when they explained why they endorsed cooperative learning. According to constructivist approaches, cooperative learning develops many skills such as: information processing, reasoning, questioning, understanding of ideas, comprehension, and critical thinking (Woolfolk, 1998). However, the participants of the current study seldom mentioned the impact of collaborative learning on specific thinking skills. For many of them this strategy mainly
promoted memorizing and recalling. Although it is not possible to conclude that these participants held a conceptualization of learning as memorization or recalling, this finding may show a naïve understanding of the cognitive processes involved in the learning process. Therefore, it seems to be necessary to review in more specific terms with preservice teachers the cognitive processes promoted by particular teaching strategies.

Preservice teachers in this study attributed a high importance to motivation in the learning process. This finding is similar with that of Holt-Reynolds’ study (1992), which concluded that the preservice teachers believed that learning would be easier and most probable if the students were interested and motivated. This belief was also observed among those participants who endorsed the use of cooperative learning, students’ input over classroom activities (field trips), and interesting and challenging activities. Participants of this study expressed that these strategies and activities promoted students’ motivation which in turn enhanced learning. Many participants who supported the constructivist perspective also explicitly reported that learning occurs when students are “having fun.” This finding coincides with Kile’s study results (1993) regarding the importance attributed to motivation in the learning process. It seems that for many participants being motivated and having fun were seen as sufficient conditions for learning, conditions that automatically ensure students’ learning. This belief, if not challenged, may lead these students to focus during planning and instruction only in promoting “fun” activities and not to pay enough attention to the educational purpose of
the activities they design and implement. For, even games and entertaining activities should be designed and selected having a learning objective in mind.

In relation to the topic of diversity and assessment, participants in this study supported the idea that in order to treat students fairly, teachers should treat them differently and use multiple criteria to assess their learning. For most of them, working with diverse students was not a problem as reported by Kile (1993). Many preservice teachers, however, presented a contradictory belief about this topic, as was the case in the Mc Diarmid’s study (1991). In this research and in Mc Diarmid’s study, many participants believed that they should treat all students fairly and, therefore, treat them all the same. However, they also believed that children are different and that the teacher should take their individual characteristics into consideration when planning a lesson or a course. The reason for this contradictory perspective cannot be concluded. One possible reason is that this particular topic was not part of the program of studies of the courses in which this study was conducted. One participant explained, in fact, that she could not resolve the dilemma presented in the vignette because she did not know what her opinion about it was. Having incoherent beliefs is, according to Von Wright (1997), not uncommon. Students can in fact hold different beliefs without being aware of their inconsistency and without feeling disturbed because of them. Participants’ beliefs about students’ diversity and assessment should be a necessary topic of discussion in teacher education programs because contradictory beliefs can lead preservice teachers to develop contradictory practices in a society where working with diverse learners is more the norm than the exception.
In summary, it is possible to conclude that the majority of the participants supported the constructivist approach about teaching and learning. Despite the fact that they were mainly sophomores and juniors, they “knew” what the current approaches about educational issues are and supported strategies that concurred with constructivist approaches. However, the rationale underlying their constructivist conception of learning and teaching was rather general and it was not supported with clear and complete examples or ideas.

This study presents some limitations. First, the exclusive use of vignettes as a device to examine preservice teachers’ beliefs was a limitation that hindered the development of the project because of three aspects. The length of the document made it possible that fatigue or boredom affected the quality of participants’ responses. Although using vignettes allows presenting students a “real situation,” it considerably limits the possibility to cross-examine the participants and the underlying sense of their answers. In addition, the fact that participants were directly asked which approach or point of view (traditional oriented or constructivist oriented) they preferred, could have influenced their choice. It is not possible to conclude, nor was it the purpose of this study to affirm, that those participants who supported constructivist-oriented practices are going to necessarily behave in a way that reflects this orientation.

Second, the subjects in this study were four groups. Two of them studied with one instructor and the other two groups had a different instructor. The study, however, does not examine the influence of preservice teachers’ instructors over their beliefs. This aspect could have been important because it is known that preservice teachers’ beliefs are
not only the result of a personal construction, but also the result of the culture in which they participate, their teacher education program, the courses they take, and the instructors they work with. In addition, the literature supports the idea that teacher education programs may influence more preservice teachers' beliefs when more consensuses on norms of discourse exist between professors.

Third, another important limitation is that the influence of the years of training to become teachers was not examined. Studying this aspect could have reported interesting results about the influence of the teacher education program at the University of Northern Iowa on its students.

**Recommendations for Further Research**

The following recommendations are made based on the results of this study:

1. Implement a longitudinal study that examines the impact of the teacher education program on the students' beliefs.

2. Develop a follow-up study with the same participants by using open-ended questions and other similar case studies or vignettes.

3. Develop further studies that examine preservice teacher's beliefs just upon their entry to teacher education programs.

4. Analyze preservice teachers' beliefs by using data-gathering techniques that combine vignettes or cases studies and interviews.

5. Replicate this study with a larger sample of preservice teachers.

6. Replicate this study with a more diverse population of preservice teachers of diverse cultures in order to examine impact of the context and culture on them.
7. Consider the results of this research in the implementation of diverse activities design to challenge those beliefs that may seem contradictory, with the current knowledge about the best practices in education.

8. The vignettes applied in this study can be used as case studies to help pre-service teachers understand their thinking about educational issues.
REFERENCES


APPENDIX A

PERSONAL DATA QUESTIONNAIRE

1. Major: ____________________________

2. Year you began your present major: __________

3. Gender:  
   □ Male  
   □ Female

4. Age:  
   □ 17 – 19 years old  
   □ 20 – 22 years old  
   □ 23 – 25 years old  
   □ 26 years old or more

5. What is (was) your mother's occupation?  
   ____________________________

6. What is (was) your father's occupation?  
   ____________________________

7. When did you decide to become a teacher? (Check ONE response alternative)
   □ I always wanted to be a teacher
   □ When I was in elementary or middle school
   □ When I was in high school
   □ After getting the university entrance exam results (SAT)
   □ After studying another major
   □ After working in other occupations
   □ Other (explain) ____________________________

8. According to the studies, people usually decide to become a teacher because of one or more of the reasons listed below. Please, rank the three main reasons you decided to become a teacher from the most to the least important (1 = most important, 2 = second most important, and 3 = third most important).

   □ I like to work with people
   □ I like to learn
   □ I would like to work in schools
   □ I like the subjects I am studying
   □ I would like to contribute to society
   □ I would like to make a difference in the life of other people
   □ I like the schools' schedule
   □ I would like to help the students to feel successful and enhance their self-esteem
   □ I would like to help the students to feel willing to learn more
   □ I like the autonomy that teachers have in their classrooms
   □ I like to teach
   □ Other (explain) ____________________________

   ____________________________
9. Which are the main factors that influenced your decision to become a teacher? If you have more than one, please rank them according to their importance (1 = the main factor that influenced your decision, 2 = second most important factor, and 3 = third most important factor).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Rank</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other relatives/friends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience working with children and/or adolescents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest in having a university degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (explain)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. How confident do you feel about your decision to become a teacher? (Check ONE response alternative)

<table>
<thead>
<tr>
<th>Confidence Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel very confident about my decision</td>
<td></td>
</tr>
<tr>
<td>I feel confident</td>
<td></td>
</tr>
<tr>
<td>I feel unsure</td>
<td></td>
</tr>
<tr>
<td>I regret my decision</td>
<td></td>
</tr>
</tbody>
</table>

11. If you feel unsure, very unsure or regret your decision to become a teacher, choose from the following list the most important reason for this feeling. (Check ONE response alternative)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am afraid I can fail in my studies</td>
<td></td>
</tr>
<tr>
<td>I do not know if I have the personality to be a teacher</td>
<td></td>
</tr>
<tr>
<td>I feel unsure about the possibilities to find a job as teacher</td>
<td></td>
</tr>
<tr>
<td>I do not like the salary of teachers</td>
<td></td>
</tr>
<tr>
<td>I do not like the working conditions of teachers</td>
<td></td>
</tr>
<tr>
<td>I am afraid my health is incompatible with the teacher’s job</td>
<td></td>
</tr>
<tr>
<td>I do not have the support of my parents, friends and other important people</td>
<td></td>
</tr>
<tr>
<td>Studying to become a teacher is not seen by others as a very intellectual and challenging activity</td>
<td></td>
</tr>
<tr>
<td>Other (explain)</td>
<td></td>
</tr>
</tbody>
</table>

12. How probable is it that you are going to work as a school-teacher once you graduate? (Check ONE response alternative)

<table>
<thead>
<tr>
<th>Probability Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very probable</td>
<td></td>
</tr>
<tr>
<td>Probable</td>
<td></td>
</tr>
<tr>
<td>Improbable</td>
<td></td>
</tr>
<tr>
<td>Very improbable</td>
<td></td>
</tr>
</tbody>
</table>

13. How long would you like to work as a school-teacher? (Check ONE response alternative)

<table>
<thead>
<tr>
<th>Duration Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 5 years</td>
<td></td>
</tr>
<tr>
<td>6 - 10 years</td>
<td></td>
</tr>
<tr>
<td>11 - 15 years</td>
<td></td>
</tr>
<tr>
<td>For my entire professional life</td>
<td></td>
</tr>
<tr>
<td>I am not sure how long I would like to work as a school teacher</td>
<td></td>
</tr>
</tbody>
</table>
14. If you do not plan to remain in teaching, what other profession or job would you like to have?


15. How probable is it that you are going to pursue post-graduate studies (e.g., a Master’s degree, Ph. D., or Ed. D.) after completing your teacher education program? (Check ONE response alternative)

- Very probable
- Probable
- Not very probable
- Improbable

16. If you decide to pursue post-graduate studies, in which of the following areas are you most interested? (Check ONE response alternative)

- My subject area
- Education area in general
- Counseling area
- Students with disabilities area
- School administration area
- University or college professor and research area
- An area not related with education

17. What should be, in your opinion, THE MAIN GOALS OF HIGH SCHOOL EDUCATION? Please, rank the three main goals from the most to the least important (1 = most important, 2 = second most important, and 3 = third most important).

- Develop appropriate codes of moral and social behavior.
- Prepare students to successfully pass the university entrance exams.
- Develop the self-esteem and self-confidence of the students.
- Develop good thinking skills
- Prepare students for the world of work.
- Develop knowledge and skills in the students.
- Prepare students to be good citizens.
- Prepare students to acquire information that is expected in an educated person.

18. You are going to read a list of different strategies that high-school teachers can use TO ENHANCE THEIR STUDENTS’ LEARNING. Indicate the importance of the 12 following strategies to reach this goal according to this criterion: 1 = Very Important, 2 = Important, 3 = Somewhat Important, 4 = Not Important. Put an X in the corresponding box next to each strategy.

<table>
<thead>
<tr>
<th>V. I.</th>
<th>I.</th>
<th>S. I.</th>
<th>N. I.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop and maintain an environment of mutual acceptance and respect in the classroom.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use incentives and rewards (grades, trips, etc.) to enhance the students’ motivation.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teach meaningful knowledge and skills for daily-life.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop and maintain a relationship of friendship with the students.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use teaching and evaluation strategies that match students’ characteristics and interests.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Present myself as a model to be imitated and develop appropriate personal characteristics.

Use methodologies and learning materials that enhance students' interest for learning.

Promote the self-esteem and personal development of the students.

Integrate the students' families into the school's activities.

Keep students' attention by making learning fun.

Manage a classroom with few discipline problems

Understand students' personalities and moods
APPENDIX B

Vignettes: Resolving educational issues

This instrument presents you with a description of an educational setting and seven educational issues often faced by teachers in schools. As is often the case, these situations can be seen and handled differently by different teachers. For each issue:

1. **Read** the points of view proposed by two teachers and **choose** between them (A or B) the one that, in your opinion, is most consistent with your point of view. **Write** the corresponding letter (A or B) in the space provided (e.g. I agree most with A ).

2. After deciding with which teacher you agree most, determine which of the listed factors (a, b, c, d or e) is the MOST important in your decision. Please circle the corresponding letter (e.g. The most important reason(s) for my choice is (are): C related to the principal's role because...).

3. After deciding the most important factor, write a brief and clear explanation for your decision (e.g. The most important reason(s) for my choice is (are): C related to the principal's role because... principals have the responsibility and the knowledge necessary for making this kind of decision). Please be aware that a response like because... "It's better" or "It is good" are UNCLEAR responses. It is very important for us not only to know what you think is better, but also WHY you think so.

4. Please be sure to respond to all the questions and justify all of your answers.

Thank you very much for your cooperation!

---

Context:

South School is located in a city of 80,000 inhabitants. The school encompasses grades 1–12 and has a strong college-bound orientation. The student population comprises approximately 50% low income, 30% middle income, and 20% percent of high-income students. Twenty percent of the students are from minority groups. Half of the students express the desired to continue formal education after graduation. The other half wants to search for a job in the "big city" or help their families with their agricultural activities. The majority of the teachers have been working at the school since it started, twenty years ago. Most teachers are often engaged in professional development activities to improve the education the school offers to its students. The community considers this school to be a good school. The following scenarios occur at South School.
Ms. Jones and Ms. Petersen disagree on the use of cooperative learning during Mathematics classes in 3rd grade. Both realize that when teachers use this approach, the classroom becomes noisier and students tend to move around the room a lot.

A. Ms. Petersen argues that the noise and students moving around the class negatively affects classroom discipline. She believes that it is difficult for students to learn when the classrooms are not orderly and quiet.

B. Ms. Jones argues that a noisy classroom and students moving around reflect that students are learning. She believes that being quiet is not a necessary condition for learning.

I agree most with ________. The most important reason (s) for my choice is (are):

a) related to students' social relations because...

b) related to classroom discipline and management because...

c) related to students' motivation because...

d) related to students' learning because...

e) Other (explain)
Ms. Lewis and Ms. Collins co-teach a 10th grade History class. Their students expressed a desire to visit a local museum in their history class. This is the second field trip students have suggested to take this year in this class. The teachers agreed with the first trip. Both teachers are concerned that if they agree with one more trip, they will not have time to cover all of the topics they wanted to teach this semester in this subject.

A. Ms. Collins thinks that they should redesign this unit, taking into account the students' interests and the activity the students suggested. The teachers can ask students to write comments about their impressions of the trip as an assignment.

B. Ms. Lewis thinks that they should teach the classes as planned. She suggests that students go to the museum during their free time. Those who go to the museum can write a report for extra credit.

I agree most with _________. The most important reason (s) for my choice is (are):

a) related to students' motivation because...

b) related to students–teachers' relations because...

c) related to students' learning because...

d) related to the district's curriculum guidelines because...

e) Other (explain)
Mr. Red and Mr. Truman are discussing what methodology is best to use when teaching the experimental method to students in a 6th grade Science class.

A. Mr. Truman suggests that it is best to present students with a worksheet detailing a set of instructions to follow as they conduct the experiments. It is important to minimize the possibilities of errors during learning, so students do not get frustrated with science.

B. Mr. Red suggests that it is best to present students with a worksheet that defines a problem and to ask the students to figure out the procedures for conducting experiments. Students can learn from their mistakes without necessarily getting frustrated with science.

I agree most with _________. The most important reason(s) for my choice is (are):

a) related to students' motivation and emotions because...

b) related to students' reasoning and development of thinking skills because...

c) related to students' knowledge acquisition because...

d) related to classroom discipline and management because...

e) Other (explain)
For the eleventh-grade Language Arts classes, Ms. Jefferson and Ms. Sun are considering implementing problem-solving activities. The teachers are concerned that when students are asked to work on these types of activities, they must spend more time on each unit. Therefore, they might not be able to cover all the topics recommended by the school’s curriculum guidelines.

A. Ms. Sun suggests teaching all of the topics that the curriculum establishes first and then, if there is time left, they could implement these problem-solving activities.

B. Ms. Jefferson suggests implementing these problem-solving activities even if they can’t cover all the topics recommended in the curriculum.

**I agree most with _______. The most important reason (s) for my choice is (are):**

a) related to the importance of learning content because...

b) related to the importance of following the curriculum guidelines because...

c) related to students’ motivation because...

d) related to students’ reasoning and development of thinking skills because...

e) Other (explain)

_____________________________  
_____________________________  
_____________________________  
_____________________________  
_____________________________  
_____________________________  
_____________________________  
_____________________________  

Mr. Bullock and Mr. Cox were surprised when, during the first parent-teacher meeting at the beginning of the school year, the parents asked to discuss their teaching methods and curriculum. Some of them also indicated they would like to have the opportunity to visit some of the classes these teachers teach.

A. Mr. Bullock argues that teachers should inform parents about classroom activities, but he believes that parents are not prepared to offer ideas about educational issues. He will suggest to the parents that classroom visits might not be a good idea as it is likely to be disruptive for the class. If they want to talk further with the teachers, parents are welcome to ask for an individual appointment.

B. Mr. Cox agrees that teachers should inform parents about classroom activities. In addition, teachers and students can benefit when parents give suggestions about what to teach and how to teach it. He is excited about having parents visit his classes and enlisting their participation as helpers in some of the activities they might plan together.

I agree most with ________. The most important reason (s) for my choice is (are):

a) related to the teacher's role because...
   
   
   
   
   

b) related to students' learning because...
   
   
   
   
   

c) related to parents' role in schooling because...
   
   
   
   
   

d) related to students' motivation because...
   
   
   
   
   

e) Other (explain)
   
   
   
   
   

Ms. Morse and Ms. Grass are discussing how to handle students' individual differences when evaluating them. Second-grade students present varied levels of academic abilities, economic, and ethnic backgrounds.

A. Ms. Morse believes that teachers need to have high expectations for all students. Teachers should establish the same learning goals for all students and have standard evaluations that all students must complete; it is only fair to treat all learners equally.

B. Ms. Grass believes that teachers need to have high expectations for all students. Teachers should consider students' individual differences and employ multiple criteria to evaluate them; it is only fair to treat different learners differently.

I agree most with ________. The most important reason(s) for my choice is (are):

a) related to social relations in the classroom because...

b) related to topics of diversity and equity in education because...

c) related to students' motivation because...

d) related to students' learning because...

e) Other (explain)
Mr. White and Mr. Adams are discussing which motivation strategies are best to use in their Science classes for the 8th and 9th grade students. How can teachers enhance the motivation of disinterested students and maintain motivation among those who are already motivated?

A. Mr. White suggests that it is best when teachers use interesting and challenging activities as the main way to motivate the students. These kinds of activities are most effective in getting students involved in the learning process.

B. Mr. Adams suggests that it is best when teachers use rewards, positive feedback, and grades as the main way to motivate the students. These kinds of incentives are usually most effective in getting students involved in the learning process.

I agree most with ________ . The most important reason (s) for my choice is (are):

a) related to students' learning because...

b) related to the values schools instill in students because...

c) related to students' motivation because...

d) related to classroom discipline and management because...

e) Other (explain)