SCIENCE TEACHERS AND NATIONAL BOARD CERTIFICATION: MOTIVATION

TO PARTICIPATE AND RESULTING TEACHER CHANGE

by

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(Under the Direction of J. STEVE OLIVER)

ABSTRACT

The purpose of this study was to obtain a better understanding of how science teachers are motivated to participate in the National Board (NB) certification process. This study was designed to examine the nature of motivation, rewards and accomplishment and how they are conceptualized and dealt with by teachers across the period of time from considering candidacy to beyond completion of the NB certification process. Also, investigated in this study was teacher change as a result of participation in the NB certification process.

This study was a multiple case study based on a social constructivist framework. The participants of this study were nine high school science teachers who were either participating or who had participated in the NB certification process previously. Data were collected from semi-structured interviews and from researcher field notes. Data analysis was concluded using the constant comparative method with Atlas/ti as an aid.

The results showed that five major categories of teacher motivation for beginning the NB certification process. These five major categories of motivation were money, improving teaching, colleague support, challenge, and prestige/recognition/validation.

Some participants described changes in their motivations and changes in their teaching practices after becoming involved in the process.

This study provides implications for those promoting and for those considering involvement in the NB certification process and for research. In their effort to increase the number of National Board Certified Teachers (NBCTs), promoters of the process should consider the impact of the teacher motivations to participate identified in this study. Those individuals thinking about endorsing or participating in the process need to consider the data in this study that support other studies proposing NB certification as an effective means for improving teaching and carrying out educational reform. An implication for Georgia teachers who become certified after July 1, 2006, is their decision to apply for NB certification may be influenced by new state legislation that limits their teaching only in high-needs schools in order to receive the salary increase associated with accomplishing NB certification. Future research needs to include interviews with the participants in this study regarding their opinions of the revised reward structure.

INDEX WORDS: National Board Certification, Teacher motivation, Teacher change,
                 Monetary rewards, Professional development, Science teachers

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DEDICATION

To my son, Robert, for your love and wonderful sense of humor

and

to my sister, Mary John, for your endless support and encouragement

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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

INTRODUCTION

The National Board for Professional Teaching Standards (NBPTS) was

established in 1987 following two influential reports. The first of these reports was the

1983 report of the National Commission on Excellence in Education, *A Nation At Risk:*

The Imperative for Educational Reform, which sent out a nationwide alarm warning of

the economic and social costs resulting from an educational system that did not keep up

with an ever-changing national and worldwide society. In 1986, the Carnegie Forum on

Education and the Economy's Task Force on Teaching as a Profession, published *A*

Nation Prepared: Teachers for the 21ˢᵗ Century. This second report recommended that

the teaching profession establish standards, certify teachers who met the standards, and

establish the NBPTS. It was the ideas of these members of the Carnegie task force that

served as a basis for the creation of the NBPTS. (http://www.nbpts.org/about/hist.cfm)

In association with the reforms for the teaching profession set forth by the

Carnegie task force, Shulman (1987) examined the content, character, and sources of the

knowledge base required for teaching. He described seven categories of the knowledge

base for teaching. These categories are the following: (1) content knowledge, (2) general

pedagogical knowledge, (3) curriculum knowledge, (4) pedagogical content knowledge,

(5) knowledge of learners and their characteristics, (6) knowledge of educational

contexts, and (7) knowledge of educational ends, purposes, and values, and their

philosophical and historical grounds. According to Shulman, the answer to

differentiating the knowledge base of teaching from other knowledge bases is found at the junction of content and pedagogy.

Also, Shulman (1987) described four sources of these categories of the knowledge base for teaching. These sources were identified as the following: "(1) scholarship in content disciplines, (2) the materials and setting of the institutional educational process, (3) research on schooling, social organizations, human learning, teaching and development, and other social and cultural phenomena that affect what teachers can do, and (4) the wisdom of practice itself" (p. 8). In contrast to inadequate descriptions of teaching that are used by some who determine policy, the understanding of these sources of the knowledge base for teaching, along with the categories of the knowledge base of teaching and the complex pedagogical process, was posited by Shulman as a means of increasing the likelihood of recognizing expert teachers.

From the impetus created by these reports and initiatives the NBPTS was formed. Today, a board of directors composed of 63 members, the majority of whom are classroom teachers, guides the NBPTS. The task of the NB is to set high standards for what accomplished teachers should know and be able to do, to establish and maintain a national system to certify teachers who meet the standards, and to promote related education reforms in order to enhance student learning.
(http://www.nbpts.org/about/hist.cfm)

The NB certification process is open to all teachers who have earned a baccalaureate degree, have taught for at least three years in either a public or private school, and have maintained a valid state license for those three years. Applicants of the NB certification must complete a portfolio assessment composed of multiple

performance-based exercises which include samples of student work, videotapes and written commentaries that analyze teaching methods and student learning. Additionally, upon completion of the portfolio assessment, participants are required to visit a test site and complete several timed, written exercises that measure their content knowledge and their pedagogical content knowledge. (Helms, 2001)

Following the creation of the NBPTS certification process, transferring the enthusiasm felt for this new set of measures of teacher accomplishment into a system of rewards to encourage participation was the next step. Currently, there has been enacted in all 50 states legislative and policy actions that have led to the creation of incentives and recognition for NB certification. In Georgia, National Board Certified Teachers (NBCTs) have received a 10 percent increase in salary as a result of the provisions of "The A Plus Education Reform Act of 2000", and they qualify for this salary increase as soon as they receive notification of their certification. Also, a portion of the application fee for the certification process may be paid by the state for anyone who meets the application requirements listed above, who has paid the initial payment of $300, which is nonrefundable and non-reimbursable, and has satisfactorily completed the screening process established by the Professional Standards Commission.

NB certification is a relatively new means to access the professional and/or expert capabilities of teachers. Through this certification process, teachers can demonstrate and document that they can effectively teach learners in their assigned classroom and that they can understand why their students either do or do not learn. This certification process is voluntary, and there is the need for research that demonstrates why teachers choose to participate.

Purpose of the Study

The study described here is part of a larger research project at The University of Georgia that is funded by the NBPTS. The team of primary investigators for the larger project was invited to a research conference in Chicago in January 2002 and informed of the research priorities of the NBPTS. The team then created a proposal that matched their interests to those of the NBPTS, and that proposal was approved by the NBPTS in the fall of 2002.

This present study was designed to examine issues confronted by science teachers in going through the NB certification process. In particular it deals with motivations, rewards and accomplishments and how those are conceptualized and dealt with across the period of time from considering candidacy to beyond completion of the NB certification process. By examining these issues, the researcher sought to provide evidence that the motivations of teachers for participating in the NB certification process are related to both rewards they believe will come to them and also to their sense of whether or not the NB certification process is an accomplishment. Further, the researcher sought to explore how teachers' feelings relating NB certification to professional development evolve over the period of time from candidacy to the time of receiving NB certification and beyond.

Rationale of the Study

The NB certification process has not been without its critics, both nationally and in Georgia. Chester E. Finn, Jr., President of the Board of Trustees for The Thomas F. Fordham Foundation, has long opposed the NB certification process as a means of identifying accomplished teachers (Education Commission of the States, 2002). The single factor for identifying accomplished teaching according to those associated with

The Fordham Foundation should be student performance. Among the complaints regarding the NB certification process was the charge that no acceptable studies had been done to show that NBCTs have a greater impact on student learning than teachers who are not NB certified (Podgursky, 2001; Finn & Wilcox, 2000).

Also, there has been criticism regarding the salary supplements provided for NBCTs. Thirunarayanan (2004) asserted that NBCTs were undeserving of their pay increases and other incentives because the standards for achieving NB certification were not indicative of accomplished teaching but were instead closer to entry-level standards for teachers. In addition to the equating to entry-level standards, he challenged the conventional wisdom that the impressive title of NB certification did not reflect an improvement in the qualifications of the certified teachers.

In Georgia the question of spending large amounts of state funds for the salary supplements of NBCTs has surfaced more than once. In 2003 and 2004, during large state government budget cuts, Georgia legislators were criticized in editorials of *The Atlanta Journal-Constitution* (*AJC*) for having agreed previously to the salary bonuses paid to teachers upon receiving NB certification (Wooten, 2004; Salzer, 2003). The state's financial crisis placed into question the cost for salary supplements for NBCTs at the current 10% each year for 10 years. With the shortage of funds and the increasing costs for greater numbers of NBCTs in Georgia, the question of whether the NB certification process results in changes in teaching practices and improvement of teachers has attracted greater attention. In an editorial in the *AJC*, Jim O'Neill (2003), a Georgia NBCT, reported that his experience with the portfolio process was neither one of reflection nor improvement of his teaching but, instead, was one of simply telling the

Professional Standards Board what it wanted to hear. He also expressed his doubts that the NB certification process would improve student achievement.

In addition to the opposition mentioned above, there have been responses to these arguments against the NB certification process. Since the time of the alleged charges that there were no differences in performance of students of NBCTs and teachers who were not NB certified, studies have been published showing greater academic achievement by students of NBCTs than those students of teachers who are not NB certified. (Vandevoort, et al., 2004; Bond, et al., 2001). Also, regarding the charges presented by Thirunarayanan, Margolis (2004) wrote a rebuttal to his opinions regarding the NB certification process and its standards. In the rebuttal, Margolis emphasized that the candidates for NB certification must supply extensive evidence that they have accomplished the NB standards at an accomplished level. In defense of the funding spent in Georgia for salary supplements of NBCTs, most responses from NBCTs to the critical editorials in the *AJC* described the portfolio process as one that improved their teaching (Crow, 2003; Rothman, 2004).

Wide support for the NB certification process has been received from sources including governors and legislators from the Democratic and Republican parties, school boards, teachers unions, teacher educators, education organizations, and classroom teachers. In addition to this wide support, the NB has received endorsement from former Presidents, George Bush and Bill Clinton and an array of associations including the National Governors' Association, the National Council for Accreditation of Teacher Education, the National Education Association, and others. (http://www.nbpts.org/about/hist.cfm)

In addition to support from the various education organizations, governmental agencies, and politicians, foundations, corporations and other representatives from the private sector have expressed support for the work of the NB to promote professional development for teachers in order to improve the educational system. Supporters from the private sector include the Carnegie Corporation of New York, The Pew Charitable Trusts, AT&T, IBM, RJR Nabisco, and others. (http://www.nbpts.org/about/hist.cfm)

Evidence suggests that, as a result of participating in the NB certification process, teachers often become more introspective regarding the relationship between teaching and learning (Roden, 1999; Steeves & Browne, 2000; Swain, 2000; Wiebke, 1999). NB certification increases the professional recognition, prestige, and status of teaching (Steeves & Browns, 2000; p.166). This evidence that the NB certification process is a powerful source of teacher professional development serves to identify one of the possible motivations for becoming involved in the NB certification process. In order to better understand why teachers become involved in the NB certification process, the study presented here was conducted regarding motivations, rewards, accomplishments, and changes in teaching. There is reason to believe from this research that having a greater number of teachers involved in the NB certification process will lead to a greater recognition of teaching as a profession. Some researchers also suggest that there is a relationship between NB certification and student learning (Vandevoort, et al., 2004; Bond, et al., 2001). Therefore, this study is important and provides a way to further validate the NB certification process.

Theoretical Framework

Experiences in the classroom have taught this researcher that students learn as a result of their peer-to-peer interactions, as well as the other social interactions they have with teachers and with others throughout their day. After becoming aware of social constructivism and Lev Vygotsky's concept of the zone of proximal development (ZPD), this researcher recognized a similarity between the theoretical framework of social constructivism and her experiences with classroom activities and student interactions. This similarity prompted the researcher to look at this theoretical framework as a way to explain how those various classroom activities occurred. In classrooms that reflect the social constructivism point of view, teachers guide students, rather than deliver knowledge, and students actively create knowledge, rather than passively receive knowledge. Also, according to Wink and Putney (2002) the classroom that operates from a Vygotskian point of view has the teacher and students jointly engaged in exploration and collaboration within an inquiry-based curriculum.

Social constructivism posits that interactions with adults and peers lead to the construction of a child's reasoning. The higher cognitive skills are developed as a result of exchanges during social interactions. The historical, social, and cultural relations with other people lead to understanding. Vygotsky offered an explanation of how instruction precedes and sustains development through the interaction of two concepts: scientific, or schooled, concepts and spontaneous, or everyday, concepts (Kozulin, 1990). He explained that the spontaneous, or everyday, concepts come from the observations and experiences of the child, and though needed, the spontaneous, or everyday, concepts are not adequate for the child to begin the acquisition of scientific, or schooled, concepts

taught in the classroom. Therefore, Vygotsky posited that the spontaneous, or everyday, concepts create the experiential course for the development of the scientific, or schooled, concepts. The development of these scientific, or schooled, concepts begins with assistance from an adult or a more capable peer. Vygotsky believed that what the child is able to do with the help of an adult when the spontaneous, or everyday, concept meets the scientific, or schooled, concept presented by education should be the focus of assessment and is the acceptable way to know what the child has the potential of knowing or doing individually.

The zone of proximal development was defined by Vygotsky (1978) as the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers (p. 86). Vygotsky suggested that we are able to recognize with the zone of proximal development the knowledge toward which the child is advancing. With this framework we see that after a child receives assistance from someone who is more capable with regard to that particular situation, the child then internalizes the new concept and is more capable to perform without assistance when a similar situation arises. With regard to Vygotsky's view that learning precedes development, Wink and Putney (2002) suggested that this view "raises the bar for teachers and makes it possible to assume that good teaching can lead to good learning, which in turn can lead to more development"(p. 95).

In their discussion of Vygotsky and the zone of proximal development, Tharp & Gallimore (1988) indicated that teachers also have their own zones of proximal development, and like their students, they need assisted performance. Seven means of

assisting performance that guided psychology during the last century were the following: modeling, contingency, managing, feedback, instructing, questioning, and cognitive structuring. Depending upon which of these means of assistance might have been needed by participants during the NB certification process, there were opportunities provided from various teacher-affiliated state organizations and university groups for assistance related to the portfolio preparation process. Assistance for participants was usually available in one-on-one and in small group situations. Also, teachers who went through the process with teachers in their own school or department had the opportunity for collaborative assistance from these other participants. These examples of opportunities for assistance for NB certification participants show the paths by which they could move through their own zone of proximal development during the portfolio creation process.

Also related to the zone of proximal development and the issue of assistance, a description by Tharp & Gallimore (1988) and others was presented regarding activity settings as those situations in which teaching occurs and in which opportunities should be provided for the various means of assistance. While activity settings for students may include "whole-class settings, laboratory partners, cooperative-learning small groups, debates, or drama rehearsals", activity settings for teachers may include "faculty committees, peer coaching groups, workshops, individual teacher consultation by outside experts, grade-level committee meetings, curriculum revision groups" (Tharp & Gallimore, 1988, p.190).

The potential for an activity setting in the NB certification process occurs when participants choose to collaborate with other teachers during the process. Such an activity setting would be composed of a group of candidates who choose to meet together

from time to time and who do learn from one another. The groups may be composed of only teachers from the same school or of teachers from throughout a district or state. Each participant creates a unique portfolio; however, throughout the process the collaboration may occur. These collaborative opportunities available to the NB certification participants as they move through their own zone of proximal development during the portfolio creation process seem to the researcher to relate well to the theoretical framework of social constructivism.

In addition to the collaborative aspects of the NB portfolio creation process, the theoretical framework of social constructivism relates in other ways to teachers as they participate in the portfolio process. During the process, teachers reflect upon their pedagogy and students' learning; their ways of assisting their students can be related to their teaching, which occurs according to social constructivism at that point in the zone of proximal development where the student needs assistance. The professional development aspect of the NB certification process aligns itself well with social constructivism because the teacher provides evidence of his or her active involvement in the school and community cultures that influence students' cognitive development. With a better understanding of these cultures, the teacher has the opportunity to improve the learning environment in the classroom by making it more relevant to the lives of the students. This aspect of the portfolio process can be seen as a way to enhance the teacher assistance of students through their zone of proximal development. The sources of evidence provided by the teachers include students' work samples, videotapes of classroom practice, and documentation of accomplishments outside the classroom.

The theoretical framework of social constructivism and the concept of the zone of proximal development provide a lens through which to view this research study. Not only is the portfolio process at the heart of the NB certification process, but it is also at the heart of an explication of teaching. Aligned with this theoretical framework, the NB certification process provides an opportunity for professional development for participants as they provide a thorough body of evidence and explanation of what an accomplished science teacher, in a particular certificate area, should know and be able to do in order to effectively engage students in learning experiences.

Research Questions of the Study

This study deals with the motivations of science teachers with regard to NB certification. Also, the perceptions of science teachers were examined with regard to the accomplishment and reward that result from the portfolio process. Further, this research examined the perceptions of these science teachers regarding the nature of change in their teaching practices as a result of their participation in the portfolio preparation process. The research questions utilized in this study are listed below.

1. What is the nature of science teacher perception of the motivation that led them to participate in NB certification?

   - What do NBPTS participants perceive to be their primary motivation for participating in the NB certification process?

   - What do NBCTs perceive to have been their primary motivation for participating

     in the NB certification process?

- How do the perceptions of the primary motivation of participants or
recipients in the NBPTS certification process change over time, based on
their recollection during an interview?

2. What is the nature of science teacher perception of the accomplishment and
reward that result from participation in and completion of NB certification?

    - What do NBPTS participants perceive to be their primary accomplishment
    and reward in completing the NBPTS certification process?

    - What do NBCTs perceive to be their primary accomplishment and reward
    in completing the NBPTS certification process?

    - How do the perceptions of the primary accomplishment and reward of
    participants or recipients in the NBPTS certification process change over
    time, based on their recollection during an interview?

3. What is the perception of science teacher participants and NBCTs in this study
as the nature of change in teaching practices resulting from the NB
certification portfolio creation process?

The first research question addressed why science teachers participate in the
portfolio creation process. Participants in the study were asked by interview and through
personal retrospection to discuss what motivations led them to participate in the NB
certification process. They were also asked to discuss any changes in the primary
motivation that occurred during the progression of the portfolio process.

The second question addressed the nature of science teacher perception of the
accomplishment and reward that result from participation in and completion of NB
certification. Reward, for the purpose of this study, is defined as money or compensation

given in return for merit (*Webster's New World College Dictionary*, 1997). It can be a tangible reward, such as a salary increase, or it can be an intangible reward, such as a look of congratulations. Accomplishment, for the purpose of this study, is characterized as the completion of a process in order to earn a result. The teachers were asked to discuss how, at different stages in the portfolio preparation, their views of whether they were striving for a reward or for recognition may have been a factor at that moment. Similarly, the teachers were asked to describe how their own learning in contrast to professional development or renewal was a primary consideration as they were putting together the material for the portfolio. Additionally, they were asked how their perceptions of the primary accomplishment and reward for participating in and completing the portfolio creation part of the NB certification might have changed throughout the experience.

The third question addressed the nature of change in the teaching practices of those NB certification participants who had just completed the portfolio assembly process. These science teachers were interviewed regarding anticipated changes in their teaching practices. Also, the participating science teachers, who had completed the NB portfolio creation in previous years, were interviewed regarding the changes that had occurred in their teaching practices as a result of that experience.

<div align="center">Epistemological Framework</div>

In order to understand how the researcher can know what are the motivations of the participating teachers and what happens with these motivations during the NB certification process, interview questions were created related to the research questions regarding teacher motivations. Likewise, interview questions related to the research

questions regarding reward/accomplishment were created in order to understand how the researcher might know what are the perceptions of the teacher participants regarding reward/accomplishment. Also, interview questions related to the research questions about teaching changes resulting from the participating in and completing the NB certification process were created in order to understand how the researcher can know what these teaching changes are. It was believed that examination of each of the responses to the interview questions set forth in the two interview protocols and related to motivation would help to understand how it is known what motivations are and how they change during the NB certification process. Likewise, it was believed that examination of the teacher responses to the interview questions related to rewards and accomplishments would provide help in understanding how it is known what perceptions are held by the science teachers in this study regarding rewards and accomplishments. Finally, it was believed that examination of the responses to the interview questions regarding teaching changes resulting from participation in and completion of the NB certification process would provide help in understanding how it is known what perceptions are held by these participants regarding these teaching changes.

<div align="center">Summary</div>

In Chapter 1 the development of the NBPTS and the NB certification process were discussed. Questions were presented that have arisen regarding the NB certification process and the funding costs for enrollment fees and for salary supplements of those who become certified through this process. These issues, in particular those related to motivation, teaching change, and accomplishments, led to the creation of the rationale for this study and the development of the research questions. The examination of the

research questions in this study has provided additional evidence that the NB certification process is an innovative process that provides opportunities for professional development, promotes teaching change and promotes needed changes in classrooms and learning. The body of research to which this study is related and supplementary is included in Chapter 2.

CHAPTER II

LITERATURE REVIEW

The design of the study presented here included an examination of teachers'

perceptions of their motivations for beginning the NB certification process. Considering

the NB certification process as a professional development, it was felt that the role of

professional development in defining the NB certification process was a topic to be

examined in the literature review. Also, the design of this present study included the

examination of teachers' responses regarding their perceptions of any teaching changes

resulting from their participation in the NB portfolio creation process. The literature

review that follows will inform the study in these areas.

How is the NB Certification Process a Professional Development Experience?

Regarding their framework for designing professional development,

Loucks-Horsley, Love, Stiles, Mundry, & Hewson (2003) identified the following

principles that are part of effective professional development: Effective professional

development "(1) is driven by a well-defined image of effective classroom learning and

teaching, (2) provides opportunities for teachers to build their content and pedagogical

content knowledge and examine practice, (3) is research based and engages teachers as

adult learners in the learning approaches they will use with their students, (4) provides

opportunities for teachers to collaborate with colleagues and other experts to improve

their practice, (5) supports teachers to serve in leadership roles, (6) links with other parts

of the education system, and (7) has a design based on student learning data and is

continuously evaluated and improved." (p. 44) The above principles posited by Loucks-Horsley et al. were based on evidence that links effective professional development and teacher expertise with the opportunity for students to learn mathematics and science that present a challenge (Darling-Hammond, 1997; Garet et al. 1999). The NB certification process recognizes accomplished teachers and has been described by participants in the process as an excellent professional development experience (NBPTS, 2001a; NBPTS; 2001b). The following is a comparison of the NB certification process as a professional development experience to the principles of effective professional development described above by Loucks-Horsley et al. The first principle identified by Loucks-Horsley et al. referred to effective professional development as being "driven by a well-defined image of effective classroom learning and teaching". The requirements of the NB certification portfolio process are considered by the NBPTS to be representative of effective classroom teaching and learning, and the participants attempt to establish their mastery of the requirements when they submit their chosen evidence for each of their portfolio entries. Regarding the NB portfolio entries, the well-defined image of effective classroom teaching and learning is left up to the individual participants as to how they represent these aspects in their own classrooms.

The second principle described by Loucks-Horsley et al. explained that teachers should have the chance to increase their content and pedagogical content knowledge and examine practice. The NB certification process requires the participants to examine their practice through great amounts of reflection, analysis, and writing. However, the NB certification process provides the opportunity for teachers to demonstrate in the various

portfolio entries and in the daylong examination following the submission of the portfolio

their accomplished content and pedagogical content knowledge.

Another principle related to effective professional development, according to

Loucks-Horsley et al., was that it is based on research and involves teachers in the

approaches to learning that will be used with their students. The NB certification process

is research based (National Commission on Excellence in Education, 1983; Shulman,

1987). The learning approaches, for example, inquiry, addressed by the NB portfolio

requirements are presented by the participants as evidence of the implementation of those

approaches in their classroom.

The fourth principle listed by Loucks-Horsley et al. for effective professional

development was the opportunity for teachers to collaborate with colleagues and other

experts to improve their practice. This principle is closely aligned with the NB

certification process. During the NB portfolio creation process many participants have

the opportunity to participate in NB related workshops where they may collaborate with

other participants and/or collaborate with NBCTs who serve as facilitators regarding

various aspects of the portfolio creation process, such as critiquing videos or editing of

entries.

The fifth principle of effective professional development offered by Loucks-

Horsley et al. referred to support of teachers to serve in leadership roles. The NB

certification process recognizes accomplished teachers, and in so doing, these teachers

often assume at the local, state, and/or national level leadership roles related to NB

certification, as well as other leadership roles in the profession. Some of the leadership

roles related to the NB certification process might include facilitating workshops for NB

certification participants, speaking to groups of potential candidates for the NB process, or serving on state committees in support of the NB certification process. Leadership positions within a school or local system may also arise as a result of accomplishing NB certification, such as various committee positions regarding school improvement and curriculum planning.

The sixth principle that Loucks-Horsley linked to effective professional development was that the professional development connects to other parts of the education system. The NB certification process is an undertaking by individuals who submit evidence of their teaching practice that reflects accomplished teaching and who complete an examination related to content in their special area of certification. Though this certification process focuses on efforts of individual teachers, it is the goal of the NBPTS is to identify many more accomplished teachers and thereby improve student learning in all schools. So there is a connection between the NB certification process and other parts of the education system, such as improving student performance.

The seventh principle presented by Loucks-Horsley et al. for effective professional development was that the professional development has a design based on student learning data and is continuously evaluated and improved. The NB certification process was not originally based on student learning data because its main focus was the identification of accomplished teachers. However, studies have been conducted that have reported a relationship between the higher performances of students of NBCTs than from students whose teachers were not NB certified (Goldhaber and Anthony, 2004; Bond et al., 2000). In addition, the NBPTS promotes ongoing research related to the NB

certification process in an effort to extend the body of data supporting the process as a significant avenue toward education reform.

 In addition to the effective professional development described above by Loucks-Horsley et al., Berg (2003) described effective professional development as "professional development that improves the quality of teaching by causing changes in teaching practice that result in increased student learning" (p. 13). The characteristics of effective professional development described, according to Berg, with some agreement in the literature (Garet et al., 2001; Hawley & Valli, 1999; Sparks & Hirsh, 1997) were also identified by Berg as demonstrable in the NB certification process, with the stipulation that participation in the NB certification process be carried out by teachers in groups. These effective professional development characteristics that Berg posited as descriptors of the NB certification process, when pursued in groups, included the following: it "enables teachers to use data to identify needs; it is job-embedded and ongoing; it brings teachers together in collaborative problem-solving around teaching and learning issues; it allows teachers to see the impact of their teaching; it provides multiple sources of information and theory on content, pedagogy, and child development; and it should be part of a comprehensive process" (p. 13).

 Regarding the use of data by teachers to identify needs, participation in the NB certification process involves months of collecting and reflecting on various types of data. This data serves as the evidence of teaching and students' learning that is used in the NB portfolio entries. Teachers identify the learning needs of their students through the use of learning standards set by national professional associations, states and/or the schools. Teachers increase their opportunity for professional development when they

work together to review their collected data and to compare it to the teaching standards set by the NBPTS. The collaboration between the teachers may include challenges regarding the evidence discussed, alternative interpretations of the data presented, and suggestions of useful strategies related to learning needs.

As mentioned above by Berg, the NB certification process is job-embedded and ongoing. The individual classroom is the setting for each teacher to collect the data as evidence of the impact of their teaching on their own students. This evidence is then compared to the standards set by the NBPTS as characteristic of accomplished teaching. Some teachers indicate that this process causes them to change their teaching attitudes and actions. According to Berg, teachers are able to understand the control they have on the quality of their teaching when they use their collected evidence as a means of identifying the underlying assumptions of their teaching choices and then help each other to critique them as compared to the beliefs and assumptions which underpin good teaching. By sharing their practice with a group of teachers, individuals can gain a different perspective of their practice and recognize when appropriate changes are needed.

Another characteristic of effective professional development that Berg aligns with the NB certification process is that teachers are brought together in collaborative problem solving related to teaching and learning issues. By undertaking the NB certification process as a member of a group of participants, Berg emphasizes that teachers have the chance to develop a community of practice around shared conceptions of teaching and learning. Also, participants in such a group can collaborate with others to solve problems that are shared and gain from the knowledge of colleagues.

Like effective professional development, NB certification is described by Berg to allow the teacher to recognize the impact of his/her teaching. The NB certification process involves a structured set of directions that guide the teachers through the collection of data, analysis and interpretation of data, and reflecting on the findings. The focus for each participant in the process is that individual's teaching and the resulting learning. According to Berg, this involved study of one's own teaching and the resulting learning provides the opportunity for a better understanding and a feeling of ownership of that teaching. The impact of one's teaching becomes visible as a result of the NB certification process.

Interestingly, Berg included the following characteristic of effective professional development as one that can be evident in the NB certification process, when the process is pursued in groups rather than individually. That characteristic of effective professional development was that it supplies various sources of information and theory regarding content, pedagogy, and child development. The NB certification process is designed for accomplished teachers who know their content area and how to teach the related content to their students. Therefore, the NB certification process does not offer the knowledge base needed to achieve the certification. However, according to Berg, many candidates do find that the NB certification process "helps them to identify gaps in their practice or to recognize inconsistencies between their beliefs about teaching and their teaching choices." (p. 16). In those cases where the NB certification process helps to identify gaps in their practice, participants will need to access multiple sources of information and theory on content, pedagogy, and child development that will assist them in increasing their knowledge and skills where needed. In this way the NB certification process will

serve to improve the quality of teaching in addition identifying those teachers who already meet the standards. When participants in the NB certification process work in groups, members of the group can recommend resources and share their expertise in order to expand the knowledge and skills of other members.

Finally, Berg connected the characteristic of effective professional development, being part of a comprehensive process, to the NB certification process. This connection is easy to understand since the NB certification process has been part of a comprehensive education reform effort since 1987. The NBPTS is striving to improve student learning by raising the standard of quality teaching. The Core Propositions of the NBPTS not only describe what all teachers should know and be able to do, but according to Berg, they also provide a guide for bringing school staffs or school districts together in a joint understanding of quality teaching and learning. These same Core Propositions also provide a guide for establishing a culture that supports improving teaching.

Teacher Motivation to Participate in a Professional Development Activity

The literature is limited regarding teachers' motivation to become involved in the NB certification. However, the NB certification process has been described by NBCTs as an excellent professional development experience (NBPTS, 2000a; NBPTS, 2000b). With this in mind, a review of the literature was conducted related to teacher motivation to participate in professional development activities, along with the limited publications regarding teacher motivation to participate in the NB certification process.

The literature includes reports of different findings and different arguments regarding teacher motivation for becoming involved in professional development. According to Scribner (1999), educational reforms in the 1980s proposed that teachers

were most responsive to extrinsic rewards. However, this belief contradicted those who believed that teachers were responsive to ideas and practices that affected students learning (Bredeson, Fruth, & Kasten, 1983; Smylie, 1988).

In his study, Scribner (1999) addressed what motivates teachers to seek professional development. He examined the professional learning of teachers from three high schools in the same school district, and he posited that there are four major intrinsic motivations and two major extrinsic motivations for teachers to become involved in professional learning activities. The intrinsic motivations were identified as "(a) content knowledge needs; (b) pedagogical skill deficits; (c) challenges to classroom management; and (d) gaps in student-centered knowledge" (p.246). Scribner described the motivations related to content knowledge needs to include a focus on increasing the depth of knowledge in their content area and/or expanding their knowledge into other disciplines. Regarding pedagogical skill deficits professional, teachers in his study expressed the most interest in gaining knowledge regarding procedures directly related to their practice. The intrinsic motivation, challenges to classroom management, served to engage teachers in professional learning activities in order to explore, extensively, the student-centered issues that they considered to be responsible for much of their classroom management challenges. Teachers identified interest in professional learning that related to what they considered the causes of the challenges to classroom management, the difference in student learning abilities and social problems, such as drug abuse, teenage pregnancy, gangs, and lack of parental support. Intrinsic motivation to participate in learning activities regarding the gaps of student-centered knowledge was described by teachers as

their need to address the lack of achievement and motivation by many of their students and their desire to find out what to do in order to have their student population succeed.

The extrinsic motivations identified in Scribner's (1999) study were remuneration and licensure requirements. Monetary incentives served to influence teacher participation in professional development activities, but the career stage of the teachers affected their participation. Those teachers with less seniority and less income tended to participate in professional development activities that offered remuneration more often than did some teachers with more years of service and higher salaries, who chose not to spend extra time during the school year participating in professional development activities. The state licensure requirements were also an important motivation, but like the remuneration, the licensure requirements did not ensure that the teachers were involved in learning activities that were relevant to their professional development. As in Scribner's study, the study presented here identified both extrinsic and intrinsic motivations that were described by the participants for beginning the NB certification process, a professional development activity for some participating teachers.

<div align="center">Teacher Motivation to Begin the NB Certification Process</div>

In their research on teacher motivation for pursuing NB certification, Kelley and Kimball (2001) reported three factors that influenced teachers' decisions to participate in the process. These factors included the following: "pay incentives and fee support, affirmation and recognition of excellence, and professional growth and career advancement" (p.559). For those teachers in the Kelley and Kimball study to whom pay incentives were available, these included various salary enhancements, depending upon the particular school district and state. The promise of pay incentives was reported by

teachers in the study to have motivated them to participate in the NB certification

process. These teachers explained that the influence on their decision to participate in

NB certification was caused by the financial incentives that raised awareness of the

NBPTS, reinforced teacher interest in working towards excellence, raised the value of

NB certification as compared to other ways for professional development, such as

master's degree, and raised the legitimacy of NB certification in the view of

administrators and other teachers. Many of the teachers in the Kelley and Kimball study

described first hearing about NB certification via news reports, professional associations,

or local district notifications that publicized the NB certification process as a way to earn

additional pay. Even one of the teachers in the Kelley and Kimball study, who did not

receive pay incentives for her NB certification, indicated her support for the financial

incentives because they raise the attention of teachers and also make the program more

legitimate and valuable.

   Also, identified by the teachers in the Kelley and Kimball study as a motivation

for participating in the NB certification, fee support, where available, covered some, or

all, of the $2,000 fee (which currently totals $2,300) for participation. An example of the

significance of the fee support to participating teachers was illustrated in the description

by one the teachers in the Kelley and Kimball study. Though this teacher did not receive

a pay incentive associated with the NB certification, she indicated that the fee support

was the main factor that influenced her decision to participate. It was not until the fee

support was available to her that she decided to go through the process.

   The financial incentives were described by some teachers in Kelley and Kimball

study as providing tangible rewards and recognition for their continued efforts to teach at

an accomplished level. Some teachers expressed the need for some type of benefit that

compensated their efforts to teach at an excellent level. The financial incentives served

to meet this need.

The financial incentives for NB certification participants made this process

comparable to the financial rewards for graduate work, like master's degrees, at

universities. With the financial incentives in place, teachers in the Kelley and Kimball

study explained that they chose to participate in the NB certification process rather than

in a master's degree program because of the value of the NB experience to them, as it

related to their own teaching, their own classroom, and their own students. Also, the

financial incentives for NB certification motivated some participants in the Kelley and

Kimball study who explained that the flexibility of the working in one's own classroom

and planning the analysis and reflective writing for the portfolio around the family

schedule made the NB process an appealing alternative to traveling long distances for

university classes.

The financial incentives of the NB certification process were reported in the Kelly

and Kimball study to have lessened the barriers to participating in and achieving the

certification by increasing the legitimacy of the NBPTS in the eyes of administrators and

other teachers. The study showed that the districts with larger numbers of NBCTs and

higher levels of financial and collegial support reported striking similarities in positive

responses regarding the importance of NBPTS to teacher improvement and school

performance. In such districts, teachers, principals, and administrators viewed NB

certification as a valuable distract goal, instead of just an individual effort. Also, in such

districts, some principals considered having a NBCT as a member of the faculty to be a

point of pride. The study indicated that in those districts where incentives were provided

by the state but not by the district, the teachers and administrators seemed to have a

limited understanding of the NB certification process, but they did recognize and promote

teacher interest in seeking the salary increase associated with the NB certification

process. The districts with no district or state incentives for the NB process showed the

lowest level of interest and understanding regarding NB certification. In these low-

support districts, some administrators viewed the NB certification process as an

individual teacher pursuit and as one of many professional development choices.

In regard to the financial incentives increasing the legitimacy of the process in the

view of teachers who were not pursuing certification, most principals and NBCTs

associated with the Kelley and Kimball study some negative reaction to teachers who

sought NB certification. This negative reaction was most often a comment about the

NBCT simply desiring to attract attention to himself/herself. There was less negative

response from teachers in the districts where financial incentives were available.

Because of the salary increase for NB certification in those districts, many of the teachers

who were not NB certified considered the financial incentives to be a justifiable reason

for other teachers to decide to pursue NB certification.

The second factor identified by the Kelley and Kimball as a motivation for

beginning NB certification was "affirmation and recognition of excellence". Affirmation

was described by a participant in the study as the personal affirmation for pursuing and

completing the process. Also, in a district where financial incentives were not available,

one participant chose to pursue the NB certification because it afforded the opportunity

for affirmation of her teaching abilities. Recognition of excellence was described by this

participant as the external recognition of excellence that hopefully would open doors for professional opportunity.

The third factor identified by the teachers in the Kelley and Kimball as a motivation for beginning the NB certification process was "professional growth and career advancement". Some participants in the study indicated that they sought certification because of the potential leadership roles that might result and because of the chance for professional growth and development. Retrospective comments from the teachers in the study regarding the professional development aspect of the NB certification process were quite positive. All of the participants in this study indicated that going through the NB certification process made them better teachers, by helping them to become more purposive, self-assured, and interested in accepting leadership roles in the profession. Even though the NBCTs were described as excellent before they began the certification process, the NBCTs and the NB certification candidates in the Kelley and Kimball study unanimously reported that the process served to improve their teaching practice by requiring them to reflect more extensively on their teaching strategies and their students' learning.

The Center for the Future of Teaching and Learning (CFTL, 2002) in California reported the results of an extensive survey of NBCTs in California. On the survey, participants were asked to answer the questions by indicating on a scale of one to five whether their choice was (1) critically important, (3) somewhat important, or (5) not important at all. Among the data collected from the teacher surveys, the two motivations for beginning the NB certification process that received the highest percentage of marks in the one and two position on the scale were "personal challenge" and "professional

development or the opportunity to strengthen their own teaching". Personal challenge

was simply described as the motivation for one's own personal self-improvement.

Examples of the professional development or the opportunity to strengthen their teaching

that were mentioned in the report included improving pedagogy, evaluation of students,

and engaging with other teachers or parents. Among the participants in the survey, 84%

indicated personal challenge as a one or two on the scale described above. Regarding the

professional development or opportunity to improve their own teaching, 79% of the

participants indicated that this motivation ranked a one or two on the scale. Other factors

on the survey, for example, monetary rewards, career advancement, and recognition by

others, were chosen by the participants to have less impact on their motivation to pursue

NB certification. Monetary rewards were reported to be less important to older teachers

in the survey. Among the questions regarding monetary rewards, 59% of the participants

ranked a one or two on the scale of importance for a one time state reward, and 54% of

the participants chose a rank of one or two for the potential for increased compensation.

The opportunity for career advancement was ranked by 53% of the teachers surveyed as a

one or two on the scale that is described above. The recognition of others, such as

parents, other members of the school community, and/or the employer and colleagues,

was ranked by 50% of the participants as a one or two on the scale.

In a research study that examined the impact of the NB certification process on

members of the Delta Kappa Gamma Society, the teachers, some currently involved in

the process and others had achieved NB certification by 2002, were asked to describe

their motivations for beginning the process (Hoag, Danielson, Black, Reed, & Ring,

2004). Regarding the motivation to begin the process, the most frequent response from

the participants was related to the challenge of proving their professional qualifications as an accomplished teacher described by the NBPTS and of proving that they could successfully meet the requirements of certification. Other members reported that they were motivated by the desire to improve their teaching and thus make an impact on student achievement. Another motivation described by the members was that of financial remuneration; 53 of the 172 respondents indicated that money was a factor in their decision to participate. A salary increase was acknowledged by 35 of the respondents, while 18 members indicated receiving state financial aid for application fees. Twenty-four of the 172 respondents described the improved status as a motivation for beginning the certification process. Also, the motivation to pursue NB certification was identified by the teachers surveyed to include encouragement and overall support, including emotional support, from family, friends, and colleagues.

Related to the motivation by the encouragement of others and related to the motivation by the opportunity for professional development, Pershey (2001) reported the establishment of candidate support as a way to assist participants in meeting the requirements of the NB certification process and to provide encouragement from and collaboration with other teacher participants. Pershey described a program for supporting candidate teachers in their pursuit of NB certification that included a collaborative group of teacher education faculty members and NBCTs who assisted participants by critiquing the writing and videos prepared for their portfolios and offered encouragement from their own experiences in the NB certification process. The need for this type of candidate support group was suggested by Pershey as a way to address the discouraging statistic that indicated prior to 1997 only about 25 percent of the NBPTS candidates received

certification. Also, perhaps suggesting the need for more candidate support, some NB certification participants have described the arduous task of going through the process without the any network of support (McReynolds, 1999; Roden, 1999; Swain, 1999). Wolfson (cited in Pershey, 2001) explained how the influence of mentors and a support network increased the numbers of teachers who attained certification. There were 912 certified teachers in the United States in 1997, and in that same year, a support initiative was established nationally. By 1999, the number of certified teachers had increased to 4,804, including those candidates who were certified that year. The positive impact of such support systems is evidenced in this increased number of candidates who became NBCTs, and the study presented here is related to this aspect of teacher support as a motivation for beginning the NB certification process.

Reward and Accomplishment Associated with NB Certification

In Chapter 1 of this document, reward was defined as money or compensation given in return for merit. A reward can be tangible, such as a salary increase, or it can be intangible, such as a look of congratulations. Accomplishment, for the purpose of this study, was described in Chapter 1 as the completion a process in order to earn a result. With these descriptions in mind, the literature was examined regarding the reports of teachers' perceptions of the outcomes of becoming a NBCT. The Center for the Future of Teaching and Learning (2002) presented the results of a survey of the perceptions of California teachers regarding the NB certification process. Among the perceptions included in this report were the perceptions related to outcomes of the NB certification process. Analysis of the data identified outcomes that reflected teacher accomplishments and, according to the description used in the CFTL study, were the following:

professional development opportunity, personal challenge, recognition from others of teaching quality, improved ability to help students meet academic content standards, and increased opportunity for collaboration with other teachers. Using the description of a reward included above, the outcome that was identified by these California teachers as a reward was increased compensation.

Johnson (1986) described teacher incentives related to the efforts in the early 1980s by state and local governments to reform education. These efforts to reform education were designed to improve the quality of teachers by providing incentive plans in an effort to "recruit, reward, and retain the best teachers" (p.54). The incentives that were directed toward experienced teachers, merit pay and career ladders, were proposed to give financial incentives, varied work conditions, and opportunities for advancement.

Also, Johnson (1986) described intrinsic rewards as mainly internal and intangible, for example, the pride in work and achieving a feeling of efficacy. Related to Johnson's description of intrinsic rewards, a NBCT reported in a NBPTS survey (NBPTS, 2001b) that achieving NB certification resulted in more confidence, an intrinsic reward, to explain, demonstrate, and defend one's own practices. Likewise, Kelly and Kimball (2001) reported that accomplishing NB certification made teachers in their study more confident, an intrinsic reward, in their classroom practice and in new leadership roles outside the classroom.

Johnson described extrinsic rewards as mainly external and material, for example, pay and promotions. She also reminded her readers that the best teachers choose to remain in teaching because of intrinsic rewards, such as the satisfaction felt from reaching one's students, though they may have to leave teaching due to inadequate

salaries, extrinsic, or poor working conditions. The financial incentive, an extrinsic reward, described by Johnson relates to one of the motivations identified by participants in this present study.

<div align="center">Teacher and Teaching Changes</div>

There is a vast amount of literature regarding the subject of teacher and teaching change due to different approaches used by researchers regarding their view of change. Richardson and Placier (2001) presented two positions regarding these changes. The first position looked at individual or small group change that is related to cognitive, affective, and behavioral changes. The second position involved an organizational concept of change, which connected the structure, culture, and politics of school organization to teacher and teaching changes. Since the study presented here involves a small group of teachers and their individual responses to research questions, the first position regarding change was of interest.

Regarding teacher and teaching change, Chin and Benne (1969) described three types of planned change approaches: empirical-rational, normative-re-educative, and power-coercive. The empirical-rational approach to planned change is based on the assumptions that people are rational and that they will accept change that is in their rational self-interest when it is shown to them. Therefore, a change is suggested by a person, or group, who knows of a situation that is worthwhile, efficacious, and aligned with the self-interest of the person, group, organization, or community affected by the change. Based on the assumption that the person, or group, affected by the change is rational and will act on self-interest, it is also assumed that the person, or group, will

accept the suggested change if it can be rationalized and if resulting gain from the change can be shown by the proposer(s). (p.34)

The normative-re-educative strategy for planned change, according to Chin and Benne (1969), does not reject the rationality and intelligence of men, but it is based on designs of action and practice that are advocated by sociocultural norms and by commitments from individuals to these norms. Sociocultural norms are upheld by the attitudes and values of individuals, the normative views supporting their commitments. A pattern of practice will only change, according to the normative-re-educative view, when the people involved begin to change their normative attitudes regarding old patterns of practice and build commitments to new patterns of practice. These changes in normative views include "changes in attitudes, values, skills, and significant relationships, not just changes in knowledge, information, or intellectual rationales for action and practice" (p. 34).

According to Chin and Benne (1969), the power-coercive strategy for planned change is based on the use of power in some form, political, economic, or other. Individuals with less power are expected to comply with the plans and goals of those with greater power. When the applied power or authority is legitimate, it may require the involvement of jurisdiction of the law or administrative policy in support of the change in order for it to be effective. When a person or group has political power in a social system, that person or group may use the power-coercive strategies to effect changes that they consider to be acceptable. At times, those people or groups who are out of power may not notice this application of the power-coercive strategies. Should the person or group who is out of power become aware that their best interests are not being addressed,

this person or group may challenge the coercive power of those in control. An example
of such a situation is illustrated when a teachers' union challenges the coercive control of
a school board in a school system regarding certain rulings. (p. 52)

The two approaches that are most relevant to the study presented here are the
empirical-rational and the normative-re-educative strategies. Until recently, the
empirical-rational strategy was associated with change in the education system and
change related to teachers and teaching (Richardson and Placier, 2001). Within the
empirical-rational strategy, the policymakers and educators viewed teachers as "the
recipients and consumers of research and practice" (p. 906). This strategy for change
begins outside the classroom and is based on research and/or theory. The teacher is
informed about the topic of the change, for example, a new research-based instructional
program, receives explanation of the meaning of the teaching change, for example,
during professional development sessions, and is expected to carry out the teaching
change in the classroom. Because this approach to the change originates from outside the
classroom, teachers are often unreceptive to the change (Fullan, 2001).

Richardson and Placier (2001) report that more recently the literature related to
teacher and teaching changes has moved toward the normative-re-educative strategy
described above (Chin & Benne, 1969). Associated with this approach is the idea that
teacher and teaching change is augmented by reflection on one's beliefs and practices.
Along with understanding of one's beliefs and knowledge and making decisions related
to potential changes of these, dialogue is considered to be an essential part of this strategy
for change. Dialogue, as described by Richardson and Placier (2001, p.906) can occur
with other teachers or with an "other", a person who helps a teacher with change and is

outside of a teacher's classroom. Reflection on one's practice and dialogue with teachers and "others" were essential elements in the NB certification process, as described by the participants in this present study.

Among several groups of factors, identified by Richardson and Placier (2001), that affect change in individual teachers and that relate to the teacher/teaching changes reported in the study presented here were two groups, (1) voluntary and naturalistic changes and (2) formal programs for the improvement of teaching. In regard to the first group of factors, one concept of change is that most teachers change voluntarily all of the time. Cuban (1988, cited in Richardson & Placier, 2001) suggested that such changes might be first- or second-order changes. The first-order changes may include minor changes in the organization of the classroom or curriculum. The second-order changes may include changes in a way of thinking, teaching, or learning. Such changes may result from conversations with other teachers, administrative evaluations, workshops, journal articles, different student populations, etc. These voluntary changes occur throughout a teaching career.

Naturalistic change, according to Richardson and Placier (2001), is often studied in a process of planned change, is frequently voluntary and collaborative, and is centered on teacher change. It promotes individual autonomy and choice and provides support for types of normative-re-educative staff development that are especially effective in the work with teachers who are going through change and who are focused on autonomy and professional expertise, which relates to participants in the NB certification process.

A second group among the factors described by Richardson and Placier (2001) that affect individual teacher change is a formal program for improving teaching. This

second factor is illustrated by a collaborative staff development process developed and carried out by Blumenfeld, Kracjik, Marx, and Soloway (1994). Their collaborative staff development process was established as in effort to assist middle school teachers create and implement project-based instruction in their science classes. The research group examined teacher change by conducting comprehensive interviews, observations, and discourse analysis of the conversations between teachers and between teachers and university researchers. Based on the results of their study, these researchers proposed a model for teacher support that centered on the interaction between collaboration with other teachers, collaboration with university faculty, implementation of new strategies, and reflection about the new strategies and new facts. These factors, collaboration and reflection, are also identified in the study presented in this document as impacting teacher and teaching change associated with the NB certification process.

Another example of a formal program for improving teaching that affects individual teacher change as described by Richardson and Placier (2001) follows. The Practical Argument Staff Development (PASD) process that examined the influence of collaboration on teacher changes in their beliefs and practices (Anders & Richardson, 1991; Placier & Hamilton, 1994; Richardson & Hamilton, 1994). The process was voluntary and collaborative; it was planned to assist teachers to inquire, individually and in groups, into their own beliefs and practices related to recent research on reading and practices explained by other teachers and to support their efforts at change. During a three-year period, these researchers found that the teachers changed their beliefs and practices in ways that related to their dialogues regarding the practices in the teaching of reading. Also, two years later in a follow-up study, these researchers noted that the

teachers continued to change (Valdez, 1992, cited in Richardson & Placier, 2001). Their affinity for change seemed to lead them to reflect endlessly on their teaching and on new practices they tried in their classrooms. Change also included an increase in teacher confidence in making decisions and an acceptance of responsibility for their classroom activities. Through this process, the teachers came to have a definite sense of individual autonomy and a confidence for making purposeful and reflective changes in their classrooms. The description of teacher and teaching changes resulting from the PASD process is similar to the collaboration and reflection associated with changes resulting from participation in the NB certification process as described in retrospect by some of the teachers in the study presented.

<div align="center">NB Certification and Teaching Change</div>

As mentioned at the beginning of this chapter, one of the aspects of the study presented here involved the examination of responses from science teachers with regard to any changes that they perceived in their teaching practice as a result of having gone through the NB certification process. Though participants have freedom regarding how to best represent the assigned features of the four portfolio entries, they are required, among other things, to include analysis and reflective writing regarding the their teaching, their learning, and their students' learning. It is during the self-assessment of their teaching that participants have the opportunity to identify the need for any changes. Also, for some teachers, completing the process may serve as a motivation to encourage future candidates and to use their expertise to mentor others as their attempt the portfolio process.

In one of the first studies of teachers who participated in the NB certification process, Rotberg, Futrell, and Lieberman (1998) asked teachers about the changes, if any, that they perceived in their teaching as a result of completing the certification process. Most of the teachers described positive changes in their teaching related to the following: an increase in reflection on their teaching and its affects on the students, a greater awareness of standards, more collaboration with other teachers, more focus on objectives and their purpose, and a more insightful practice, including the evaluation of teaching techniques.

The NBPTS (2001b) used a comprehensive research survey in early 2001 to examine the impact of the certification process on NBCTs. Ninety-one percent of the NBCTs surveyed reported that the achieving NB certification affected their teaching practices in one or more of the following ways: reinforced current teaching practices, created more thorough lesson plans, used of more student-focused instruction, applied performance standards to their teaching, tried new teaching tools and/or techniques, eliminated ineffective teaching practices, used rubrics in student assessments, and used continual self-assessment. The process itself was reported by sixty-one percent of the NBCTs surveyed to have had a greater impact on them than the actual achievement of the certification. Eighty-three percent reported that they had become more reflective about their teaching, continuously examining and attempting to improve their teaching practice. In addition, sixty-nine percent of those surveyed described positive changes in their students' motivation, engagement, and achievement. They credited the change to their thinking more about the needs of their students and where they are academically.

As a means to verify these findings, the NBPTS also sent surveys to candidates who had recently completed the NB certification process and asked their opinions about the process, along with its impact on their teaching practice (NBPTS, 2001a). The results from the second survey mirrored the findings from the first survey described above. Ninety-two percent of those candidates surveyed reported that the NB certification process made them better teachers, for example, using multiple types of student and continuous self-assessment. Ninety-six percent of the candidates described the NB certification process as an "excellent," "very good," or "good" professional development experience, for example, the analysis and reflection required by the process. Many of the candidates reported that the NB certification process improved their collaboration with other teachers and their interaction with students and parents.

In a case study involving 13 teachers who were candidates for NB certification, Bohen (2000, cited in Bohen, 2001) reported the teachers' perceptions during and after the NB certification process. This group of teachers described the portfolio creation process as "a powerful and transforming professional development process" (Bohen, 2001, p. 50). As a result of going through the certification process, these teachers identified changes in their teaching practices in the following ways: (a) they considered their skills and professional judgment to have been strengthened by the considerable amount of reflection and analysis required by the certification process; and (b) they reported a greater concentration on student outcomes that resulted in more deliberate planning and teaching, the use of improved approaches for questioning and assignments, and more frequent use of assessments as devices for learning.

In her account of going through the NB certification, Swain (1999) described some of the changes that resulted in her teaching practice. Among those changes were revisions in teaching strategies, techniques, and methods in the effort to make certain that each student would learn to the best of his or her ability. Also, as a result of the NB certification process, she expressed the continued impact of reflection as she considered those approaches that were successful and those that were not and the ways to make revisions in her practice.

Wiebke (1999) indicated that the portfolio creation process changed the way she went about her teaching, for example, she explained that since completing the portfolio she was much more reflective about everything that she did and much more open to learning new things. Also, she made a renewed effort in her teaching practice to improve in areas she had identified as weak, for example, integrating the arts into her curriculum, during her portfolio self-assessment. Wiebke explained that she changed this aspect of her practice by bringing into the classroom prints by the artist, Frederic Remington and by sharing the score for the ballet, Rodeo, by Aaron Copeland for the social studies unit on Westward expansion. She read professional journals more critically and participated in discussions with colleagues. Additional results of participating in the NB certification process resulted for Wiebke were a "refreshed commitment" to her students and an excitement about her work (p. 2). Wiebke praised the NB certification process as the ultimate example of professional development that held her responsible for reflecting on her practice and helped her to make positive changes, like the ones mentioned above, in that practice.

Summary

Thus far I have presented a review of the literature related to professional development and teacher motivation to participate in professional development activities, as well as the few accounts of teacher motivation to participate in the NB certification process. Rewards and accomplishments have been examined in relation to achieving NB certification. A review of the literature regarding teacher and teaching change has been discussed as it relates to individual and small groups of teachers. In addition, reviews of studies have been included that document changes resulting from participation in the NB certification process. Next, the methodology utilized for this study is discussed in Chapter 3.

CHAPTER III

METHODOLOGY

This study was an exploratory investigation designed to answer the questions posed about teachers' perceptions of their own motivation to become involved in the NB certification process, their perceptions of rewards and/or accomplishments in becoming NB certified, and the impact of the NB certification process on their teaching practices. Semi-structured interviews and field notes served as the primary methods of data collection on teachers' perceptions of accomplishing NB certification. The interview questions were created after close examination of the purpose of and research questions for this present study.

There were nine participants in the study presented here who were public high school science teachers from three different counties within the same state. Five of the nine science teacher participants were going through the NB certification process, and four of these participants had recently gone through the process. Three of the participants who were involved in the NB certification process during the time of the data collection were interviewed twice, using one of the two protocols at each interview. The rest of the participants were interviewed once using both protocols. In addition to audio-taping each interview, the researcher took field notes during and/or after each interview. Member checks were used after each interview. Participants received a transcript of their interview and had an opportunity to respond to the accuracy of the transcription prior to an additional interview. The participants in this study were among those selected for the

larger study of which this study is a part. The larger study included 42 middle and high school teachers of science, math and English language arts.

The semi-structured interviews were audio-tape recorded to ensure accuracy of data records (Bogdan & Biklen, 1992). Audio-tapes were transcribed by the researcher after each interview. The transcribed interviews were transferred into qualitative research analysis software, ATLAS/ti 4.0, for detailed analysis and data management. Each transcript was examined for information related to the research questions of the study presented here. Upon examination of the transcripts five major code categories emerged as motivations described by the participants for their becoming involved in the process; some of these motivations were also considered the same as anticipated accomplishments. These five categories were (1) money, (2) colleagues, (3) improving teaching, (4) personal challenge, and (5) prestige/recognition/validation.

The constant comparative method of Glaser and Strauss (1967) was utilized to analyze the data. The interview data were coded in order to identify emerging categories and the individual data items, incidents, in the emerging categories. Grove (1988) described the four main stages in the constant comparative method of Glaser and Strauss. These stages, along with an example of each from this research, are described below.

The first of Grove's stages was "comparing incidents that apply to each category". One example of comparing incidents that apply to each category happened when the researcher looked for key words within the transcripts. For example, when the words, salary, income, or pay, were used, they were coded as motivations related to monetary compensation.

The second of Grove's stages was "combining categories and their properties". An example of this stage occurred when the shared similarities between categories were examined and decisions were made about the degree to which they were conceptually distinct or overlapping. For instance, this second stage relates to the portfolio preparation process and teacher motivations, such as self-improvement as contrasted to validation. Different participants used these terms in similar ways, and therefore it was concluded that they could be combined into one category.

Grove's third stage was "diminishing the number of working categories in order to place limits on the theory". Related to this stage, the researcher eliminated data that were included in the interview responses but that had no direct relevance to the three main research questions. For example, when a participant did not understand the interview question or lost focus of the question during the response, he or she provided a response that was not related directly to the research or did not answer the question.

The fourth stage described by Grove was "writing the theory". It was the intention of the researcher to describe the relationship among the primary conceptual pieces of this research study. For example, upon examination of the relationship among the various concepts in this study it became clear to the researcher that the reward aspect of the NB certification process went beyond the tangible rewards, such as money, once the participant teacher was well into their involvement in the portfolio process.

The six basic strategies suggested by Merriam (1998) to improve internal validity are the following:

1. Triangulation – using multiple investigators, sources of data, or methods to verify the emerging data.

2. Member checks – taking data and proposed interpretations back to the people from whom they were received and asking them for confirmation that the data are acceptable.

3. Long-term observation at the research site.

4. Peer examination – requesting that colleagues remark on the finding as they occur.

5. Participatory or collaborative modes of research – including the participants in all stages of the research from the beginning of the study through the reporting of the results.

6. Researcher's biases – making clear the researcher's assumptions, worldview, and theoretical orientation at the outset of the study. (p. 204)

The strategies listed above were also among those suggested by Creswell (1998), who recommended that qualitative researchers should included at least two of these strategies in any particular study. Triangulation of data, member checks, and the explanation of the researcher's biases were the primary methods selected for demonstrating the validity of this study.

Triangulation of data was supported by semi-structured interviews and field notes. The researcher used semi-structured interviews guided by the protocols 1 and 2 in Appendix A. Participant responses to the interview questions related to each of the three major research questions were examined in order to verify the emerging data.

The biases of the researcher, as they relate to this study, are acknowledged in the pages that follow. As Lincoln and Guba (1985) have asserted, no one begins a research

study without having expectations of what is to occur. Field notes were written by the

researcher during and/or after interviews. Member checks were utilized in attempts to

diminish the effects of expectations on interpretations. A copy of the transcribed

interview was electronically forwarded to the participant following his or her interview in

order to confirm that the data were acceptable.

The tables that follow provide a list of the three main research questions, along

with the interview questions related to each and an indication of what can be learned

form the respective interview questions.

Table 1

Information Sought Re: Research Question #1

Research Question #1: What is the nature of science teacher perception of the motivation that led them to participate in NB certification?

Interview Question (Protocol #1)	What can be learned?
1. Describe your relationship with the NB certification process?	1. How did the teacher come to learn about the NB certification process? 2. How might that first introduction to NB certification have been related to the motivation to participate in the process?
2. Think back to the beginning of the time when you first considered going up for NB certification, what were your reasons at the time for pursuing NB certification?	1. What are the various motivations of the science teachers? 2. What motivations are shared and what motivations are unique among the group of participants? 3. Were there any changes in motivation during the NB certification process re: the motivation for involvement, and why did these changes happen?
5. How is the NB certification process similar to and different from the pursuit of a graduate degree?	1. How does each teacher compare and contrast the NB certification process with pursuing a degree? 2. Why might the teacher be motivated to attempt NB certification rather than an advanced degree?
6. Are there any negative outcomes that result from pursuit of NB certification?	1. Are there factors or situations that may negatively influence changes in motivation during the NB certification process?

7. Are there things in your life as a teacher or as an individual that are not now getting done with this additional activity added to your schedule?	1. What are the demands of the NB certification process upon the daily schedule of participating teachers?

Table 1 provides a view of the multiple ways by which the researcher has addressed the issues of teacher motivation as they relate to participation in the NB certification process. In the left-hand column are the actual interview items, and in the right-hand column are examples of what can be learned from the respective interview question. For instance, from the second description for what can be learned from interview question 1, the motivation of the teacher's first introduction to NB certification was considered. Motivation came from many sources, and the influence of the first introduction to the certification process may overlap with other types of motivation to participate. For example, the first introduction to NB certification may often time come from other teachers. Also, the motivation to participate may come from having other teachers in the same school who are going up for NB certification or who are NBCTs. These factors are interrelated and can't be separated as motivation. Groups of questions that deal with what was hoped to be learned with regard to the first main research question are linked to all interview questions related to motivation.

According to interview responses regarding the various motivations for beginning the NB certification process, tables were created for ranking participants along a range that was defined by an explicit and an implicit endpoint. Included between these endpoints, positions for that particular motivation were described according to the data provided by the participants. In those tables where two or more participants are located

at the same rank along the range, this should be interpreted to mean that their responses were similar.

Table 2

Information Sought Re: Research Question #2

Research Question #2: What is the nature of science teacher perception of the accomplishments and reward from participation in and completion of NB certification?

Interview Question (Protocol #1)	What can be learned?
3. [Depending on the reasons given for beginning the NB certification process, we would pursue different questions with different people.]	
3a. You mentioned the validation that arises from receiving NB certification, can you talk about the potential this process has to change other people's opinion of you as a professional?	1. What is the perception of the teacher from other people (re: validation from various sources as a reward/accomplishment for achieving NB certification)?
3b. Do you feel that you deserved the certification due to your prior accomplishments as a teacher?	1. What are the perspectives of the teacher re: achieving NB certification?
3c. You talked about the learning that results from participation in the NB certification earlier in your reasons, could you be more specific about this?	1. What are the perceptions of the teachers re: their learning resulting from the NB certification process? 2. Were the activities/lessons presented in the teacher portfolio already in use in that individual's classroom or not? 3. Was NB certification more of a professional development activity than a reward bearing activity?
3d. Could you be more specific re: the ways in which the NB certification process is a professional development activity?	1. Is there more detailed information describing how the teacher perceives the professional development aspect of the NB certification process?
3e. How did the group of people with whom you worked make a difference in your pursuit of this certification?	1. What was the impact on participants by those people with whom they worked?
Interview Question (Protocol #2)	What can be learned?
4. What new insights did you gain related to how students learn when taught using specific instructional styles or specific instructional techniques?	

Interview Question (Protocol # 2)	What can be learned?
4a. What insights did you gain related to how learners are motivated? 4b. What insights did you gain related to ways of making connections between the real world and science teaching?	Did the participants consider the gains in insight resulting from having gone through the NB certification process as rewards or accomplishments?

Table 2 provides a view of the different ways by which the researcher has attempted to find out about the issues regarding the teacher's perception of accomplishment and reward resulting from participation in and completion of the NB certification process. For instance, the sub-questions linked to interview question 3 provided various avenues for the further explanation by the participants to relate their particular reasons for beginning the NB certification process to the issues of reward and accomplishment. An example of one of the paths for further data collection was sub-question 3d where the participant was asked to specifically describe any ways that the NB certification process might be related to reward and accomplishment. Also, in Table 2, interview questions 4, 4a and 4b from Protocol #2 provided a view of the participant perceptions of the gains in insight and the relationship of these insights to reward and accomplishment resulting from the NB certification process.

Table 3

Information Sought Re: Research Question #3

Research Question #3: What is perceived by teacher participants and the NBCTs in this study as the nature of change in teaching practices resulting from the NB certification portfolio creation process?

Interview Question (Protocol #2)	What can be learned?
1. How do/did you perceive that your teaching practices will change as a result of your participating in the NB certification process?	1. What is the change in teaching practice that relates to the whole process and not just the portfolio process?

Interview Question (Protocol #2)	What can be learned?
2. What parts of the portfolio process impact teaching change?	1. What teaching change was impacted specifically by the portfolio process?
3. How does your learning, as you put together the portfolio, impact teaching practice?	1. How does new learning change your teaching as a result of the portfolio creation process?
4. What new insights did you gain related to how students learn when taught using specific instructional styles or specific instructional techniques?	1. How do specific instructional techniques/ styles relate to student learning?
4a. What insights did you gain related to how learners are motivated?	1. How do specific instructional techniques/ styles relate to student motivation?
4b. What insights did you gain related to ways of making connections between the real world and science teaching?	1. How do specific instructional techniques/ styles relate to making connections with the real world or applications?
5. If I came into your classroom, what evidence would I see that would indicate how your teaching has changed as a result of participating in the portfolio creation process?	1. What do teachers count as evidence that their teaching has changed?

Table 3 provides a view of the various ways that the researcher has addressed the issue of change in teaching practice as a result of participation in the NB certification portfolio creation process. For instance, in interview question 2 the participant's perceptions of teaching change due to the impact of the various parts of the portfolio process were examined. These perceptions of the participants provide a look at the impact of the various parts of the portfolio process and allow a comparison of the degree to which each of these parts impacts teaching change.

The interview questions 4, 4a and 4b from Protocol #2 were also included in Table 2. Interestingly, the questions can address the reward and accomplishment aspect of this study, but they also provide a way to examine the impact on teaching change by the portfolio creation process. For example, insights gained by the participants regarding new or better ways of making the connections between the real world and science

teaching may have had an impact on their teaching practice as well as have been considered a reward for having been involved in the portfolio creation process.

In each of the previous three tables, the questions indicating what can be learned are considered by the researcher as the means by which it is demonstrated that the research questions have been fully addressed by the semi-structured interview. Also, the interview questions were given considerable thought by the researcher during the development of the questions, and the protocol was validated through discussions held by all members of the research team. The questions were specifically designed to address the three major research questions of this study.

<div align="center">Researcher's Perspective</div>

It was the early and recurrent exposure to the love of nature and the biological sciences by my parents, as well as the insistence of these wise parents regarding elective college courses, that strongly influenced the educational paths that have ultimately resulted in my teaching science. I grew up in a small, rural town in the South. Though my family lived in town, we owned a small farm about nine miles out of town. I have many memories of experiences on that farm including not only the times of helping to gather and preserve the vegetables from the garden, but also the times of fishing in the ponds, flying kites in the fields, catching insects, tadpoles and salamanders on summer days, and riding the horse that my father bought reluctantly at my urging.

It was not surprising to my family that when I left home for college the biological sciences were the focus of my undergraduate studies. However, at the insistence of my parents since I was uncertain what I planned to do with a science degree, I did enroll in education courses as electives. Upon receiving a B.S. degree in zoology, I became

employed by a cancer research institute. However, after two years by budget freezing

due to difficulties with grant funding, I decided to leave and enter a graduate program.

Three years later I earned a M.S. degree in microbiology, and I was married and joined

my husband in New England, where he was pursuing a career in textile manufacturing.

As the marriage partner of someone with a career in textile manufacturing, I

committed myself to a life of frequent residential relocations within and between several

states and to unpredictable employment opportunities for myself. My first employment

as a newlywed in New England was with a state public health laboratory. However, this

job was short lived because within less than a year we received our first notice of

relocation, and that move was back to the South. The new location was a very small,

rural town where the textile manufacturing plant was the largest employer, and needless

to say, there were no research laboratories. It was at that point that my parents' wisdom

regarding those elective education courses in undergraduate school became apparent.

After enrolling at a college in a neighboring county, I completed a few graduate courses

in education and my practice teaching experience in order to meet the state requirements

for certification to teach science.

Upon receiving state certification, I was employed as a science teacher for four

and one half years in the same county where we lived. Though certified to teach and

holding a master's degree, what an education those first years of teaching were for me. I

learned to relate to students from cultures different than my own and from home

environments different from any I had known in my sheltered life while growing up. At

the end of those four and one half years, my teaching career was ended temporarily due

to the birth of my son and the job relocation for my husband, which resulted in our

moving across the state. When my son was one year old, I did teach science again for one year, and then we relocated once again back to New England, which resulted in a four year stay.

Though I had gained some teaching experience and had enjoyed teaching science during those first four and one half years, the uncertainty of the length of time of our residence in a given state made the decision to apply for different states' certification requirements a daunting one. While in New England, I did have the opportunity for two years to work at a university-affiliated hospital in the cancer research division of the department of medicine. Except for this brief return to cancer research, I remained in temporary retirement from teaching for a period that spanned 13 years. During those 13 years, we relocated four more times to four different states.

Our last relocation occurred in 1991, and when my son became a teenager I decided to once again enter the teaching profession. After becoming state certified, I began teaching middle school science in 1994, and I have continued to do so until the present time. All of the relocations between the various states have postponed my teaching career, but I have finally been able to do what I truly enjoy, teach. Over the past 11 years I have worked with a variety of people as school enrollment numbers have resulted in changes in assignments of teachers within my school. Throughout these 11 years I have enjoyed being a part of the learning community in my school; there are times for subject area and grade level meetings and collaboration. When I first joined the faculty at this school, I received the support of veteran expert teachers whose experience and encouragement were invaluable to me professionally and personally. As I have

continued teaching I have tried to communicate that same support and willingness to share ideas with those new teachers who have joined our faculty.

Though my 16 years of teaching experience have not been consecutive, these years have had a common thread, required staff development/professional development sessions. Early on in my teaching career, staff development meant sitting and listening to presenters address topics that had been deemed significant by the decision makers at the local or state education department. These sessions were followed by the distribution of copious amounts of handouts, which most often I filed for future reference upon return to the demands of the classroom. Through the years there have been those occasional staff development/professional development sessions from which a few teaching applications could be drawn, e.g. effective discipline strategies, managing cooperative groups, or implementing new curriculum guidelines. However, none of my previous experiences offered to me what I heard explained during a voluntary, system-wide meeting regarding NBPTS in 1999.

I decided to attend that informational meeting in 1999 regarding NBPTS because I wanted to know more about how the NB certification process related to professional development and career goals. A former NB certification participant was the enthusiastic presenter at the meeting. She explained some of the time and organizational requirements of the process, but she also described the financial and professional benefits. Also, she described available state funding for help with the cost of the process.

Some of the teachers in attendance were considering enrolling in an advanced degree program, and this information gave them another option for designing their own career ladder. The presenter answered a large number of questions, and at the end of the

meeting, she distributed packets containing the plethora of information that had been discussed. Because of my involvement in a doctoral program, I chose to review the information and keep it for later consideration. Even though I did not pursue the certification process due to the previous doctoral commitment, the potential for this process to provide a professional development process unlike any that I had heard of or participated in before made a lasting impression upon me. Little did I know at that time that a few years later I would have the opportunity to become involved in research related this very subject.

The data collection for my research study related to the NB certification began in 2003, and all of the participants in my study were high school science teachers. They followed the requirements of the portfolio creation process, Adolescence and Young Adulthood/Science. Completion of this particular portfolio process required the submission of four separate entries. These entries, which are described below, measured different aspects of what accomplished teachers know and are able to do.

The first entry is entitled, Teaching a Concept Over Time; this entry involves documenting how you develop a concept in your teaching and demonstrating how your planned, sequential instruction, illustrated in three separate activities, leads to the further understanding by the students of the major idea in science. In addition, evidence is provided of student responses, as well as the feedback provided to the students. The teacher's written commentary includes an analysis and assessment of student progress leading to the understanding of this selected main idea and reflection of the teaching strategies used to implement the students' learning over time.

Here is why I think that this entry is an important aspect of assessing expert teaching. In my own teaching, I have seen the importance of a planned series of activities to be used over a period of time during the study of a major idea, such as various forces cause changes and movement in the Earth's crust. Student activities have included construction and use of fault models in order to discuss and predict the results on the Earth's surface of different movements in the Earth's crust. Also, related to this major idea is the student activity of creating a simulation of two different volcanic eruptions, followed by student explanations of the similarities and differences in their observations and the different effects on the Earth's surface. A third type of activity included in the instruction of this major idea over time, is a computer activity. Once the students have been introduced to information regarding earthquakes, an extension of this study is a game presented on a USGS web cite. Students can measure their understanding of earthquakes by answering a series of questions. Points are earned by correct responses to these questions, and then these points determine how effective the student is in the effort to rescue the greatest number of victims who are isolated and in danger due to a fictional earthquake. Each of these activities has been well received by my students, and upon reflection of student understanding of this major idea, I think that the variety of activities does serve to reinforce this major idea. Because I have seen in my own classroom how student understanding is enhanced by my planning of a sequence and variety of learning activities focused upon a major idea that is taught over time, I agree that this entry in the portfolio creation process is an important part of the assessment of accomplished teaching. My views regarding the significance of this entry in the portfolio process may be considered a bias regarding the assessment of accomplished teaching.

The second entry in this portfolio creation process is entitled Active Scientific Inquiry and requires that the participant submit a written commentary that describes the context, analysis and evaluation of the teaching conducted during the scientific inquiry process. Also included in this entry is a 20-minute videotape containing three different segments that focus on teacher-student interactions during different stages of a scientific inquiry activity. The focus of the three separate stages of the inquiry process includes one segment showing teacher interaction with students as they begin the inquiry process and the teacher's identification of significant questions, acceptable methods and possible data sources. In a second segment the teacher is to show his/her interactions with students as they collect and/or evaluate their data during the inquiry process. The third segment of the videotape is to show how the teacher involves the students in the analysis, interpretation and synthesis of the results of the investigation.

In my own teaching I recognize that I need to include more inquiry-based activities. However, the time required for inquiry-based activities poses a problem due to the concern about covering the required curriculum within an allotted amount of time. Also, an additional challenge for me has been the limited exposure to inquiry-based investigations with which my students come into my classroom. They are most often accustomed to receiving a list of steps to perform in an investigation. Because of their inexperience with inquiry-based activities, I feel strongly that my efforts to expose my students to this process are worthwhile. Also as is emphasized by the NBPTS, it is through my support of the students in their collecting and processing of data and in their analysis and communication of their findings that I can help them to develop scientific understanding through inquiry.

In my efforts to integrate inquiry-based activities in my teaching I have included an inquiry lab during the study of topographic mapping. Once the students are familiar with the rules for reading topographic maps, they are all provided with copies of the same topographic map. The students work together in pairs to design their own set of clues leading to wherever they choose to hide their treasure. Once the clues are completed, they are exchanged between the pairs of students, and the partners use their mapping skills to interpret the clues and locate the hidden treasure. Explanations of and comments regarding the challenges during the hunt for the treasures are shared during a follow-up session involving the whole class. Also, as part of the total grade for the activity, the students are provided with grading rubrics for assessing the quality of the clues they were provided for the hunt. The example of the inquiry lab described above affords me the opportunity to provide my students an activity by which they demonstrate their understanding and application of information in order to solve a problem. Instead of memorizing the mapping rules and listing them on a test, they can use their knowledge of reading topographic maps in order to find a hidden treasure. The initial hesitancy of my students at the beginning of the school year to become engaged in an inquiry-based activity has motivated me to try to include more of these activities in my teaching in order to provide the opportunity for inquiry skill development. My efforts to include inquiry-based activities in my teaching has influenced my feelings regarding the importance of developing scientific understanding through inquiry and can be a bias in how I view the necessary inclusion of this entry in the portfolio creation process.

The third entry in the portfolio creation process is entitled Whole Class Discussion About Science and requires a 20-minute continuous videotape that shows how

you engage students in significant discussions of science through questions that you present and through interactions you promote. In addition to the videotape, evidence in this entry includes a written commentary addressing the instructional context, the planning for the class discussion, an analysis of the videotape, and a reflection of the class discussion to include the parts that were effective in accomplishing the goals with this group of students.

Whole class discussions are an important part of my teaching science.   However, I have come to appreciate the importance of establishing with students, early on, the ground rules for conducting these activities, such as the respect for contrasting opinions and the equity of time allowed for contributions. I have found helpful the use of a demonstration at the beginning of class in order to stimulate student thinking and to motivate a class discussion. An example of this approach used to begin a class discussion is provided below.

In our study of the ocean and changes in location of ocean water, I have used a demonstration that illustrates the relationship of cold water to hot water and salt water to fresh water. So that the students can observe any changes, blue food coloring is added to the cold and the salt water, while red food coloring is added to the warm and the fresh water. The students are asked to record the results in any water movements when warm water is placed above cold water and visa versa. Also, the students are asked to record the results in any water movement when salt water is placed above fresh water and visa versa. After time for consideration of the results, the students are asked to explain why the water moves in some trials and not in others. Depending upon the group of students, I may assign them to work with a partner in order to come up with their explanation of

their observations. Then the students are led by questions from the teacher to discuss the effect of temperature and salinity on the density of water, what makes the temperature and salinity of ocean water decrease and increase, and why some parts of the ocean turn over in the spring, while others do not. The potential for the whole class discussion to improve student understanding has become evident to me from my students' responses to brief formative assessments following the discussions. The students are asked to respond to a couple of general questions that focus on their understanding of the scientific ideas discussed. Usually, the student responses indicate an understanding of the concepts discussed. If confusion about the concept is indicated in a student's responses to the assessment questions, the confusion is addressed individually with the student during the next class. My experience has shown me that whole class discussions can be effective means of promoting student understanding of scientific concepts. Therefore, I consider this particular entry to be an important part of the portfolio creation process, and my position can be viewed as a bias.

The fourth entry in the portfolio creation process is entitled Documented Accomplishments: Contributions to Student Learning. This entry involves the documentation of your strategies for communicating and working with students' families and the community, as well as colleagues and other professionals in order to promote student learning. Also, evidence is required that describes your efforts to improve your own learning and teaching through participation in professional development in areas that are related to your particular teaching situation.

From my experience, I consider this entry to be another important aspect of the portfolio process. In addition to the standard times for parent conferences that are set up

by the school system, I make myself available to parents for individual conferences. Also, my use of and quick response to parental e-mails and telephone calls helped to keep parents informed and involved in their student's learning process. Parents have expressed appreciation of my entering on line the weekly and long-range class and homework assignments. At times, I have recruited parents to assist with laboratory activities. These various types of communication with parents allow me to create a pleasant rapport with the parents and the conveyance of my desire to include them in their child's learning process.

Also related to this portfolio entry, I have found great benefit from the participation in the learning community in my school. Time is allotted for grade level, as well as subject area, meetings where collaboration between faculty members does assist us in promoting student learning. One way that these meetings have helped me has been in the planning of interdisciplinary units, such as the planning with math teachers for teaching scientific measurements and planning with social science teachers for teaching skills required for map reading. Also, a beneficial aspect of the collaboration during subject area meetings has been the opportunity the contribute and to receive ideas regarding successful approaches to teaching particular topics and some ways to address misconceptions of scientific concepts that students may have.

Also, my learning community has extended into my school system. This learning community has involved collaborative sessions where I have met with other science teachers from the school system who teach my same grade level. We have worked to design assessments for use by all science teachers of our grade level to be implemented in conjunction with the state-adopted science curriculum.

These examples from my own experiences of communicating with and involving parents, community, peers, and other professionals in the promotion of student learning illustrate how I have seen benefits from these practices. Also, the professional development resulting from some of my graduate studies has allowed me to address the learning needs of some of my students, for example, one course regarding the characteristics of gifted learners assisted me in my efforts to better differentiate my students' learning activities. Because I consider the communication with and the involvement of parents, community, peers, and other professionals by the teacher to be essential in the effort to promote student learning, my support of this aspect of the portfolio creation process can be considered a bias.

These portfolio entries reflect my beliefs about what makes good teaching and relate to why I am motivated to continue in the teaching profession. The motivation to always try to improve what I am doing in the classroom in order to better promote students' understanding in science keeps me centered in my job. Those moments when classes work well, such as when students can explain science concepts as they relate to class activities, and when I know that student understanding has occurred, such as when I hear the excited words, "I get it", are what I am driven to repeat. My search never ends for more effective ways to engage my students in their learning process or to communicate to them an idea or a concept. Because of my love of science, I am motivated by the desire to make student understanding of science an interesting and integral part of their lives. The motivation of this desire to transfer my love of science to my students keeps me going back into the classroom in an effort to move toward that end.

Significance of the Research

The study presented here described the motivations of teachers to participate in the NB certification process, their perceptions regarding the rewards and accomplishments associated with the process, and their perceptions of teacher and teaching change as a result of participating or having participated in the process. The need for understanding of teacher motivation for voluntarily participating in the process is significant because the support and tangible rewards for participation in the NB certification process are not the same across the nation. Examination of data comparing the number of NBCTs in each state to the financial support and rewards offered by each state shows a greater number of NB certified teachers in those states offering the greatest amount of support (Kelly & Kimball, 2001). Research, such as this present study, that verifies and clarifies the motivations for participating in and the perceived rewards and accomplishments of achieving NB certification will contribute to the success and future of the NB certification process. Also, a significant contribution of the study presented here is the participants' descriptions of teaching changes that serve to support the NB certification process as an effective means of implementing educational reform.

Limitations of the Research Study

This study was designed to examine important issues regarding teachers participating in the NB certification process; these issues included teacher motivation, rewards and accomplishments, and teaching changes. As a result of this study, additional data will enhance the validity and clarification of the accomplishments of the NB certification process as an opportunity for innovative professional development for teachers. Though there are additional questions that need to be addressed regarding the

NB certification of teachers, this study serves to inform a larger study that focuses on

NBCTs and their students' achievement.

The issue of researcher bias, described earlier in this chapter, is a concern when

the researcher serves as the main collector of the data. Prior to beginning this research

study, this researcher considered the goals of the NBPTS to be representative of

accomplished teaching, and it was with this perspective that the researcher collected and

analyzed the data. This researcher also considered the requirements of the portfolio

entries in the NB certification process to provide a means for implementing educational

reform and improving teaching. According to Merriam (1998) including the researcher

as the main data collector in a study can allow for advantageous opportunities for

collecting and reporting significant   information; however, biases can interfere with data

collection and analysis and should be acknowledged and considered.

Summary

The methods for collecting and analyzing data in the study presented here

involved qualitative techniques. Audio-taped semi-structured interviews were conducted

with each of the nine participants using a set of protocol questions created to address the

three main research questions. The interview tapes were transcribed, and member checks

were used to confirm with the participant that the data was accurate. The transcribed

interviews were transferred into the qualitative research analysis software, ATLAS/ti 4.0,

for analysis and data management. Five main categories related to teacher motivation

emerged from the data analysis on the ATLAS/ti 4.0 program; these four categories were

money, colleagues, improving teaching, challenge, and prestige/recognition/validation.

In the following chapter, the findings and analysis of the data collected by the methods described above will be presented.

CHAPTER IV

ANALYSIS AND FINDINGS

In the preceding chapters, the purpose, rationale and methodology used for examining teachers' motivation to become involved in the NB certification process have been examined. At this point, the data, the analysis of that data, and the findings that resulted from that data analysis are introduced.

As was described in Chapter 3, the data were analyzed and coded using the analysis software, ATLAS/ti 4.0 and the constant comparative method of Glaser and Strauss (1967). Ultimately, five categories of influence on teacher motivation arose through this coding process. The analysis and findings will be grouped according to the five main categories of teacher motivation for becoming involved in NB certification that were coded from participant interview transcripts (see Table 4). The analysis of the data includes for each of five main motivation categories the placement of the participant response data along a range that is defined by endpoints selected from among the participant responses to the interview questions for that category. The perspectives of the participants regarding whether each of the motivations was an accomplishment or a reward of the NB certification process are used to develop an understanding of the relationship of these perspectives to the motivations for becoming involved with the NB certification process. Also, the data from the participants' responses related to any changes over time in the impact of their initial motivations are compared and contrasted in order to gain a better understanding of changes in motivation during or after the process. Any recollection of changes in teaching behaviors that were reported by

participants and which were related to the portfolio creation process are included in the

analysis of each of the motivations in order to better understand the influence of this

process on teaching change.

When the data were being collected for this study, the nine participants had either

completed the portfolio creation process in previous years or were in the process of

working on the portfolio creation process. Each of the participants taught some branch of

high school science. The four teachers who had completed the portfolio creation process

prior to this present study included Tim, Pam, Greg, and Henry. Tim and Pam taught in

the same science department, and they supported each other as they participated in the

NB certification process at the same time. Tim taught AP chemistry, Pam taught AP

biology, Greg taught chemistry, and Henry taught physics.

The five teachers who were working on the portfolio creation process during the

data collection period for this present study included Pete, Brenda, Susan, Scott, and Jan.

Pete taught physical science, and Scott taught chemistry. Brenda, Jan, and Susan taught

biology. Pete, Susan, and Brenda taught at the same high school and supported one

another in their efforts to complete the certification process.

Five major categories of motivation emerged relative to the teachers' responses to

the interview questions. These categories were identified as the following: money,

improving teaching, colleague support, challenge, and prestige/recognition/validation.

The researcher will use the research questions included in Tables 1, 2, and 3 to explain

for each of the motivation categories where the data arose relative to the research

questions. The five major categories of motivation are described in Table 4 below.

Table 4

Major Coding of Teacher Motivation

Motivation	Description
Money	the impact of money on teacher's decision to become involved in the NB certification process
Improving teaching	the issues specifically related to improving one's own teaching
Colleague support	the different impacts of colleagues, for instance, in local support groups, on teachers' decisions to begin the NB certification process or having access to support workshops
Challenge	the issues with personal challenges, for example, self-improvement or affirmation
Prestige/Recognition/Validation	a teacher's desire to be recognized and/or validated by colleagues and community and to earn prestige

Money

The data related to the role of money in the teachers' motivation for becoming

involved with the NB certification process arose from some of the interview questions

posed to the participants. In an interview question that was posed to the participants, the

issue of how they first became involved ultimately was a primary source of information

about the role of money in their decision-making. Interestingly, two subcategories of

motivation related to money arose from the teachers' responses. There was a primary

factor related to this motivation of money regarding whether there was an immediate link

between the money and beginning the NB certification process. An example of the

primary factor relating the motivation of money and beginning NB certification was

provided in a statement by Henry, one of the participants in this present study, when he indicated that the money was his main motivation since first considering participation in the NB certification process. Other examples of this primary link to begin the process are included in this section from responses of participants who considered this category as one of their main motivations for beginning the NB certification process. A secondary factor regarding the motivation of money was identified as the upfront monies for application fees for the NB certification process. This secondary factor regarding money as a motivation was described in a statement by Scott, another participant in this present study, identifying the upfront money as essential to his participation in the process.

Interview Questions Related to the Role of Money as a Motivation to Begin the NB Certification Process

The interview questions from which the data arose regarding the role of teachers' motivation to begin the NB certification process are discussed in the following paragraphs. The first interview question asked that the participant describe his/her "relationship with the NB certification process". The response to this question allowed the researcher to investigate whether or not the introduction to the NB certification might have been related to a monetary motivation to participate in the process. In response to this first question, two of the nine participants in this present study stated that money as a motivational factor to become involved in the NB certification process was related to their initial introduction to the process.

In her response to this first interview question, Pam described how she came to learn about the NB certification process and how the monetary factor influenced her decision to participate in the process. Her statement is provided below.

I know that money, the 10%, absolutely, so I would say that probably was the first

hook that Zack, he was the one who sponsored the workshop we went to, that was

the hook. Oh, you want to raise your salary 10%? I mean, really that's what

brought you in…to sit there and look at someone's portfolio. (Pam, Interview 1)

Scott also acknowledged that his introduction to the NB certification process and

the details regarding available state funding for fees served as motivation for his

beginning the NB certification process. He described the motivation of this monetary

factor in the following excerpt.

We've had a number of teachers here at our school to go through the process. I

had talked with a number of the teachers who had been involved with the process,

and this past summer there was an opportunity to take like a staff development

course, Introduction to the National Boards. And I was able to take that course,

and with the understanding that there might be some monies available from the

state, and with those factors in place, I just felt like it was the right time for me to

get involved with it. Initially getting involved in the process, the upfront money

was important. I would probably not have paid $2300.00 out of my pocket to go

through the process. (Scott, Interview 1)

Similar responses regarding the influence of the fee support on the participation in

the NB certification process were also reported by Kelley and Kimball (2001) among the

participants in their study of the financial incentives for NB certification.

In contrast, the seven other participants in the study responded to this interview

question by indicating that their first introduction to the NB certification process was

more about the requirements of the process and the portfolio creation process. Brenda,

Susan and Pete were introduced to the process by NBCTs in their own school; Tim was invited by a teacher in his school to attend a meeting where a NBCT presented her portfolio and explained the requirements of the process. Henry described a discussion with another graduate student who was considering going through the process, and also, he attended an in-service meeting in his school district where information regarding the portfolio process was provided. Greg reported that he read about the NB certification process in magazines and was interested in becoming involved because reports suggested that it was a difficult process.

     The second interview question asked that the participant recall the time when he/she first considered beginning the process and identify their reasons at that time for pursuing NB certification. The researcher learned from the teacher responses to this question whether of not money was a motivation for beginning the NB certification process. Also, additional information was sought in the analysis of the comparisons and contrasts among the participants regarding this motivation. Finally, the responses to this question informed the researcher as to whether or not there were changes in the monetary motivation during the NB certification process regarding the motivation for involvement and why these changes occurred.

     Though only the two participants mentioned above indicated the monetary motivation for beginning the NB certification process came from their initial introduction to the NB certification process, all of the participants in this study considered the monetary motivation to be a reward, as described in Chapter 3 of this document, for earning NB certification. Like these participants, Kelley and Kimball (2001) reported

that the teachers in their study described the promise of a pay raise to be "a tangible

reward and recognition for their ongoing extraordinary efforts to be excellent" (p. 563).

Analysis of Data Related to Money as a Motivation

    The participants in this present study reported different degrees of positive motivation

from the potential of a financial reward for NB certification, but they did not report any

change in their teaching practice as a result of this initial motivation. Though there were

reported differences in importance of the reward, none of the participants identified the

financial reward as a non-factor. Represented in Table 5 below, the impact of the role of

money as a motivation for beginning the NB certification process varied along a nine-

point range from essential for some to nice but not a primary motivation for others.

Table 5

Range of Responses Regarding Money as a Motivation to Begin the NB Certification Process

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Explicit Endpoint[c]	1	Henry
Multiple mentions of the role of Money during the interview and	2	Tim
identification of money as a primary motivation to begin the process	3	Pam
	4	Susan
Money is mentioned as one of three primary motivations for	5	Brenda
pursuing NB certification.	6	Jan
[e]--		
	7	Pete
	8	Greg
Implicit Endpoint[d]	9	Scott

As described earlier in this chapter, Henry was one of the teachers in this present study who completed the portfolio creation process prior to the beginning of this present study. He described his career plans regarding his efforts to accomplish his various goals, including NB certification. His response was placed at position 1, the endpoint representing the most explicit response regarding the motivation by the anticipation of a monetary reward to begin the NB certification process. His comments were assigned this position because he described the monetary reward to be his only motivation for beginning the process. His comments are included below.

> But I decided that I, it would be much more economical to, to finish the Specialist [degree], get certified [NB certified], and then pursue a doctorate than it was to get the Specialist, to get the doctorate, and then to do NB certification. So for me it was purely a monetary decision of how I thought I could make the most amount of money over the five or ten years or however long it was going to take me to finish all three of those things. (Henry, Interview 1)

A different perspective is presented in the following excerpt that provided an example of a more implicit statement regarding money as a motivation for becoming involved in the NB certification process. Scott's response was placed at position 9, the

endpoint representing the most implicit response, because he did not indicate a major

impact of a monetary reward on his participation in the NB certification process. His

response is included below.

> As far as reaping any financial benefit at the end of the process, I suppose that's a
>
> nice result, if it happens, but the process, I do think, is more important than that. I
>
> don't see how a person could just go through the process to do it just to try to get
>
> more money in terms of an increase in their salary. (Scott, Interview 1)

Along the range of responses regarding the monetary motivation defined by the

endpoints included above, five additional teachers considered the motivation of money to

have an important place among their motivations to begin the NB certification process.

The researcher placed of the responses of these five teachers along the range based upon

their description or ranking of the impact of this motivation on their beginning the

process. For some participants, money was clearly a secondary factor in their motivation

to participate in the NB certification process. Responses from two additional participants

who considered the monetary reward as a secondary factor for beginning the NB

certification process were placed farther toward the most implicit endpoint of the range,

and an explanation of the placement of the response on the range is included with the

statement from each of these two participants.

Among those teachers who described the motivation of money as a primary factor

for beginning the NB certification process, Tim's response was placed in the second

position on the range because of the significance of the anticipated monetary reward as a

motivation for him to participate in the NB certification. Tim described in the response

below why the monetary reward was his primary motivation for beginning the process.

Also, of course, the pay, I mean that was huge. I mean I'm in a house now because I got nationally certified. It would have been tight to do it otherwise; now, it's very comfortable. Without that, I waited until I got that pay before I actually bought a house. It was the first house I'd ever owned, you know, so that helped. … I mean, although, you know, number one's got to be the pay. I really doubt that if I had, if they had, didn't have that incentive after I looked at how sort of daunting the whole task was, I doubt if I probably would have done it without some sort of pay incentive. And it's been a great experience. I'm glad I did it. And knowing what I know now, I probably would have done it without the pay. But to initially get me in there, there's no way I would have done it without the pay increase. That's the truth. (Tim, Interview 1)

Continuing along the range from the endpoint for explicit responses that identified the monetary reward as a motivation for beginning the NB certification process, Pam's response was placed at position 3 because she also described the monetary reward as a significant motivation for her participation in the NB certification process. Pam described, in terms of percentage, the impact of money as her primary motivation initially for becoming involved in the NB certification process in the following comment, "I would say the money was probably 50-70% [of the motivation to participate]." (Pam, Interview 1)

Like the teachers who identified the motivation of money as a primary factor for beginning the NB certification process, Susan's response regarding the anticipated monetary reward of the NB certification process was placed at position 4 on the range because she, too, considered this motivation to be among her main reasons for

participating. She explained her personal reason regarding the pay raise in the following statement, "One of the main reasons, and I want to be very honest with you, is the rewards that we get afterwards. Why? Because I have two kids in college and we need the money." (Pam, Interview 1)

Brenda's response regarding the monetary reward as a motivation to begin the NB certification was placed at position 5 on the range. She was one of the teachers who described this motivation as a major motivation for her participating in the NB certification process. Her response was placed at this position because she identified the monetary motivation only after having supplied two other reasons for being involved in the NB certification process. Her statement is included below.

And then honestly, the third reason is, I've always had to have a second job because of income. And, I taught night school when we moved here to Georgia because my husband was still finishing his dissertation. And so we're still trying to, uh, you know, kind of get back out of the hole that we're in financially. And, so, you know, a 10% increase in my salary will allow me to move away from always having to have a second job, or you know, fill up my entire summer doing summer school, that I can get away from the classroom because teachers really need that time away. (Brenda, Interview 1)

Jan's response was placed at position 6 on the range. She, too, was among those participants who considered the monetary motivation to be a major factor in their beginning the NB certification process. Among her motivations, she described the significance of the pay raise with regard to her retirement plans in the following comments, "I will be very candid with you; the 10% increase in pay has become more

significant to me because I am nearing retirement, and when you do the math, it was that

part was also attractive." (Jan, Interview 1)

The remaining three participants did not describe the monetary reward as having

as significant a role in motivation for beginning the NB certification process. Toward the

middle of the range, Pete's response regarding the monetary reward as a motivation for

beginning the process was placed at position 7. His response was placed at this position

because he reported less impact by this motivation on his beginning the process than

participants 1 through 6 on the range. Pete shared the following response.

> Nice. It sure is nice. That was an incentive for some of us, and I, that was a big
>
> incentive for others, more than, not for me, not as much. I mean, definitely it was,
>
> but I looked at it as more of a challenge than as somewhat a way to get more
>
> money. It's just a, a plus, but, honestly, if it wasn't, if it maybe it was only 3%
>
> [salary increase], I might not have, I wouldn't have done it probably. You know?
>
> (Pete, Interview 2)

Finally, Greg's response was placed at position 8 on the range, next to the implicit

endpoint, which represents the least amount of impact by the anticipation of the monetary

reward as a motivation to begin the NB certification process. Greg's response was placed

at this position because he reported less significance of the monetary reward on his

beginning the NB certification process than did those participants in positions 1 through 7

on this range. Greg's comment regarding the percentage of his motivation that he

assigned to the monetary motivation to begin the NB certification process was in

response to a sub-question asked by the researcher. During the semi-structured interview

as a means to further identify the impact of the motivation of money as a factor that

influenced Greg's becoming involved in the NB certification process, the researcher

asked Greg to specify any reasons that motivated him to pursue NB certification. Greg's

remarks are included below.

> To pursue it, uh, I guess, two things. One of them obviously is the pay increase
>
> you're getting, I guess, in Georgia. You can't just ignore that… My wife tells me
>
> that, uh, I used the, the pay increase as, uh, a reason to justify to everybody
>
> around me why I get involved in all these crazy pursuits. (Greg, Interview 1)

And when asked to assign a percentage to these two motivations that he identified,

Greg's response was, " Probably …30% pay". (Greg, Interview 1)

All of the participants, as indicated in the above excerpts, assigned some degree

of positive motivation as a result of the financial reward associated with the

accomplishment of NB certification. There were 18 different times that the motivation of

money, either the salary increase or upfront money for the fee support, was coded among

the interviews of these nine participants. Six of the nine participants in this present study

indicated that the monetary motivation had a major impact on their beginning the NB

certification process. As indicated on the range described above in Table 5, three of the

nine participants indicated less motivation of the monetary reward on their beginning the

process. These findings that the majority of the participants in this present study

considered the monetary reward as a significant motivation for beginning the NB

certification process are similar to the findings of Kelley and Kimball (2001). In the

Kelley and Kimball (2001) study, the participants described the monetary motivation as

the main motivation for beginning the NB certification process.

Variability in the Importance of Monetary Motivation

Though the monetary motivation for beginning the process was reported by all of these teachers, four participants identified a change in how they viewed the monetary motivation during or after the portfolio creation process. Tim reported a change in the strong motivation by money in the beginning of the process, though it remained important, to a motivation focused on the professional development experience of the portfolio process. Susan, who also identified a change in the initial monetary motivation as the portfolio process continued, stated that the monetary motivation to begin the NB certification process changed to a motivation regarding her behavior as a teacher. Susan's statement regarding this change in the initial monetary motivation for participating in the NB certification process was understood by the researcher to mean that she became more motivated with regard to her improving her teaching. Steve identified the importance of the fee support to his beginning the process; however, once he began the process his main motivation was the professional development aspect of the portfolio experience. Pam identified a decrease in the impact of the monetary motivation as she became fully engaged in the portfolio creation process. She described her major motivation to change from the financial aspect of the process and to become the completion of the portfolio process.

These data reporting a change in initial motivation of participants are closely aligned with the findings in the study conducted by Kelly and Kimball (2001). The teachers in the Kelley and Kimball (2001) study were described to have begun the process because of the opportunity for the salary increase but to have continued the process because it was consistent with "their personal philosophy and approach to

teaching" (p.561). Interestingly, three of the four teachers in this present study who reported a change in their main motivation of the monetary reward described their main motivation to become the professional development aspect of the process. This professional development aspect of the NB certification process, which will be discussed in a later section of this chapter, was likewise significant among the participants in the Kelley and Kimball study.

The findings of the study by Kelly and Kimball (2001) also indicated that among those 28 states that had provided financial incentives to NBCTs as of December 2000, the states offering larger financial incentives reported greater numbers of teachers seeking certification. Also, this same study reported strong support for the use of pay to increase interest in the NB certification process even in the states where there were no financial incentives offered. According to this study by Kelly and Kimball (2001) though there are certainly other factors that influence the number of teachers who become NB certified, the financial incentive is seen to be a significant motivation for pursuing NB certification. The findings in the study presented here also support the concept that financial incentives do motivate teachers to become involved in NB certification.

It might be assumed that the monetary incentive would produce a positive effect, but there are those who suggested in the literature (Johnson, 1986) that teachers are only motivated by intrinsic rewards and that the inclusion of monetary rewards for significant work decreases the merit of that work. The data collected in this present study do not support the concept that teachers are negatively influenced by a monetary incentive to participate in NB certification. Though the nine participants in this present study expressed different rankings of the financial incentive as a motivation for participating in

the NB certification process, they all indicated that the increase in salary was or would be

a welcomed reward for completing the process and becoming NB certified.

The monetary motivation for beginning the NB certification process was

addressed first in this chapter among the five main categories of motivation because it

was the only motivation that was identified by all nine of the participants as a factor,

either primary or secondary, in their becoming involved in the process. The strong

influence of this factor of motivation on the initial participation of these teachers in the

NB certification process is supported by the findings in the Kelley and Kimball's study

cited above. Likewise there were changes in the significance of the monetary motivation

for some of the participants in this present study as the process continued, and three of

the four identified changes in motivation were related to the professional development

aspects of the process. This finding regarding a focus on the professional development

aspect of the NB certification process is important because the process was developed for

teachers as a means for their assessment and education. The relationship of the impact of

money as a motivation to the other motivation categories in this study will follow in this

chapter.

<div align="center">Improving Teaching</div>

The participants' views of their own goals of improving teaching served as a

motivation to begin the NB certification process in this present study. The data related to

these views about improving teaching as a motivation for beginning the process emerged

from the responses of the participants to certain of the interview questions listed in Tables

1, 2, and 3. In the future this motivation will be referred to as motivation related to

improving teaching. Three subcategories of this motivation category were identified from the interview responses of the participants; these subcategories were professional development, the reflective process, and upgrading self/skills.

Interview Questions Related to Improving Teaching as a Motivation to Begin the NB Certification Process

The participants were asked in interview question 1 of protocol 1 to describe their "relationship with the NB certification process". The researcher learned from the participant responses whether the motivation for improving teaching might have been related to their first introduction to the NB certification process and to their becoming involved in the process. In interview question 2 of protocol 1, the participants were asked to think back to the time when they first considered going up for NB certification and to identify their reasons for pursuing NB certification. From the responses to this question, the researcher determined whether or not improving teaching was a motivation for beginning the NB certification process. Also, the researcher learned how many of the participants considered or did not consider improving teaching a motivation for beginning the NB certification process. Finally, the researcher discovered if there were any changes over time related to the motivation of improving teaching and, if so, why these changes occurred.

Two sub-questions of interview question 3 in protocol 1 are related to the motivation of improving teaching. In the first of these sub-questions, 3c, participants were asked to be specific about what they considered to be the learning that results from participation in the NB certification process. The researcher learned from the responses to this question the perceptions that were held by the participants regarding what they

learned that served to improve their teaching as a result of the NB certification process. Also, the researcher learned in some cases whether or not there were activities/lessons included in the teacher's portfolio that were already in use in that individual's classroom, indicating use of prior skills. From this interview sub-question, the teachers sometimes indicated whether the NB certification process was more of a professional development activity than a reward-bearing activity. In the second sub-question, 3d, the participants were asked to specifically indicate ways in which the NB certification process is a professional development activity. Responses to this sub-question in some cases provided the researcher with additional detailed information describing how the teacher perceived the professional development aspect of the NB certification process.

In interview question 5 of protocol 1, the participants were asked to compare and contrast the NB certification process with pursuit of a graduate degree. Responses to this sub-question provided the researcher with information regarding any relationship to improving teaching that might be connected to the decision to attempt NB certification rather than pursuing a graduate degree.

From protocol 2, two questions were asked of the participants as a means of gaining a better understanding of any changes in teaching that might have been related to the motivation of improving teaching. In interview question 2 of protocol 2, the participants were asked what parts of the portfolio process impacted teaching change. The researcher determined whether the motivation of improving teaching was identified by the participants as having an impact on their teaching changes. In interview question 4 of protocol 2, the participants were asked to identify any new insights gained as a result of the NB certification process related to how students learn when taught using specific

instructional styles or specific instructional techniques. Along with interview question 4, sub-questions 4a and 4b were included; these additional questions also related to insights gained about learner motivation and ways of making connections between the real world and science teaching, respectively. From the responses to interview questions 4, 4a, and 4b, the researcher learned whether the participants considered the gains in insight resulting from having gone through the NB certification process as rewards or accomplishments. The definitions of rewards and accomplishments regarding these interview questions were the definitions included in Chapter 3 of this document.

The data related to the role of improving teaching as a factor in the motivation to begin the NB certification process emerged from the interview questions detailed above. The data related to the motivation category labeled improving teaching are distributed among three sub-categories, professional development, reflection, and upgrading self/skills, and will be addressed separately and placed on a range representing participant responses related to that particular sub-category.

Analysis of Data Related Professional Development, a Sub-category of Improving Teaching, as a Motivation to Begin the NB Certification Process

The data from participant responses related to professional development as a motivation for beginning the NB certification process will be placed on a nine-point range that extends from an endpoint explicitly describing professional development as the main motivation for beginning the NB certification process to the opposite endpoint implicitly describing professional development only as a result of the NB certification process and not as a motivation to begin the process. This range is represented in Table 6 below.

Table 6

Range of Responses Regarding Professional Development as a Motivation to Begin the NB Certification Process

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Explicit Endpoint[c] Professional development described as the main motivation for beginning the NB certification process	1	Pete
Professional development described to be among the top motivations for beginning the	2	Tim Jan
NB certification process	3	Scott
Implicit Endpoint[d] Professional development described only as a result of the NB certification process	9	Greg Pam Henry

[a] Examples of key words only from descriptions are shown in the table; full descriptions are found in the text.
[b] A ranking of one indicates the highest level of participants' explicitness regarding the role of professional development in motivation to participate in the NB certification process; a ranking of three indicates the least explicit role of professional development in motivation, described only as a result of the NB certification process.
[c] The term explicit refers to the overt use of descriptions of motivation to participate in NB certification that mention professional development.
[d] The term implicit refers to the absence of overt language by participants regarding the role of professional development in their motivations to pursue NB certification.

The response representing the explicit endpoint of the range for professional development as a motivation to begin the NB certification process is provided below in an excerpt from Pete. His comments were in response to a follow-up question and not a question listed in the protocol. Pete's response was placed at position 1 because he explicitly identified professional development as a motivation. His response had clear statements regarding what the professional development was going to do to improve his

teaching. Also, Pete described professional development as his number one motivation for beginning the NB certification process. When Pete was asked to think about the time when he and the two other participants in this present study were talking about beginning the NB certification process and to describe his reasons for beginning the process, he made the following comments, "To keep revived, to stay revived in teaching, uh… Not that we were going stale, but just to keep it going. I guess it's called professional [development]." Also, when asked by the researcher to indicate what kinds of professional development he had expected to result from going through the process, Pete said, "I guess more focus on teaching strategies and less focus on management issues, and just improving our success with the students." (Pete, Interview 2)

At the opposite endpoint of the range, position 9, responses from Greg, Pam, and Henry collectively represented the endpoint for implicit responses related to professional development only as a result of the process and not as a motivation to begin the process. Greg described the professional development aspect of the NB certification process are included below. During his interview, when Greg was asked whether he considered the NB certification process as a professional development process, he responded, "Yes!" Also, he was asked, having completed the NB certification process in the past, to comment as to whether the NB certification process was more of a professional development activity than a reward. Greg provided the following response.

> I think it's more of a professional development activity because of, uh, you're
> asked to basically think outside of the box of your everyday teaching. You're
> asked to look at your teaching… As I was going through it, I could see that it was
> a professional development activity, and I still feel that way. (Greg, Interview 1)

Pam's response was also placed at the position 9, representing the implicit endpoint on this range for professional development as a motivation for beginning the NB certification process, because like Greg she did not indicate that the professional development aspect of the NB certification process was a motivation to begin the process. Instead, she described it as an important result of the experience of going through the process.

> Well, I think it is [a professional development activity], and … that is really evaluating what you do in the classroom… also sitting there and just watching videos of what you do in the classroom also helps to point out some weaknesses or strengths that you have in the classroom. I think that was a big help as well. (Pam, Interview 1)

Additionally, at position 9, the implicit endpoint on the range of responses for professional development as a motivation to begin the NB certification process, Henry's response was included. He indicated that the professional development aspect of the NB certification process did not serve as a motivation for him to begin the process. He did state, however, that he considered staff [professional] development to be a result of having gone through the NB certification instead of a motivation to begin the process. Henry's comments are included below.

> If you do successfully complete this [portfolio process] and you look back on what you've done, I think you can see that it did serve as a staff development opportunity. But I really don't think that you can see that going in because you don't know what you're about to do. You don't know how to do what you're about to do, and a lot of the procedures that you are required to go through to

fulfill the objectives or checklists or whatever… you get from NB, are things that no, that you have not done before… So it ends up having the potential to be a really good staff development tool, but you can't see that until you've done the process. And, the way that it's a staff development tool, I think, is different for every individual because you learn as much about yourself and your role as a teacher and your philosophy on things, and sometimes that may even change during the process itself. And so, I don't think it's a "standardizable" staff development tool; I think it can be, and then upon reflection is an individual staff development. (Henry, Interview 1)

Along the range defined by the endpoints included above, there were three participants, Scott, Tim, and Jan, who considered the motivation of professional development to be among their top motivations for beginning the NB certification process. Their responses, along with an explanation for the position of their response on the range, are provided below.

Tim's response was located at position 2 on the range for professional development. His response was placed at this position because he referred to the professional development aspect of the process as his second most important motivation for becoming involved in the NB certification process. Tim remarked, "I think that I would say that probably this [interest in improving as a teacher] would be next in line [indicating second position] because that's pretty important to me, and I always think about that." (Tim, Interview 1)

In addition, Jan's response was placed on the range at position 2 because she ranked the professional development aspect, identifying strengths and weaknesses, of the

process to be one of her two reasons for beginning the NB certification process. She explained this motivation in the following excerpt.

> I think that this process certainly encourages you to look at yourself, look at your practice and to see where you need to improve, where weaknesses are, where strengths are. So it can be an affirming process, at the same time it is a stretching process. (Jan, Interview 1)

Because Scott did not identify the professional development aspect of the NB certification process as his number one motivation for becoming a participant, he was placed at position 3. He did describe professional development as one of the main motivations in his decision to begin the process. Also, he recognized that the NB certification process could change his teaching [professional development]. His response is included below.

> I knew that this would be about me and about my teaching and that was a motivation for me because I wanted to be able to have a challenge of being forced to do things that would make me become a better teacher. (Scott, Interview 1)

The data from the study presented here showed that four of the seven participants who commented about the professional development associated with the process described this sub-category of improving teaching as a motivation for beginning the NB certification process. These four teachers ranked professional development as the number one or number two motivations to begin the NB certification process. At the opposite end of the range, the three teachers, Greg, Pam, and Henry, who were placed together at the implicit end of the range because each acknowledged the impact of

professional development as a result of the going through the process, but they did not identify professional development as a motivation to begin the NB certification process.

As indicated in the teachers' responses above, the motivation due to the perception that NB certification as a professional development, a subcategory of improving teaching, was a factor that influenced teachers to begin the NB certification process. These data in the present study are consistent with other studies indicating that the NB certification process is an outstanding professional development experience (Bohn, 2001; Kelley & Kimball, 2001; Rotberg et al., 1998). The accomplishment of professional development resulting from completing the portfolio process was an individual experience depending upon how the participants designed their own approaches to the portfolio entries. Though oftentimes the participants in this study initially viewed professional development in general terms as an anticipated accomplishment, they described the realized accomplishment of professional development in specific terms related to changes in teaching practices, such as improved class discussions and better use of inquiry. Regarding the teaching changes involving class discussion, four of the participant teachers reported that the class discussions became more student-centered, with the teacher serving as a facilitator. All of the participants in this present study had used class discussions as a teaching method prior to their preparation of the portfolio; however, Tim, Jan, Brenda, and Scott described changes in the way that the class discussions were conducted after their portfolio experience. Instead of occurring only in impromptu situations, class discussions were planned ahead so that particular issues were certain to be addressed. The class discussions where the students experienced a central role were reported by Jan, one of the

teachers in this present study, to promote student enthusiasm. Also, Jan reported that special class discussions involving student debates resulted in detailed preparation and involvement by the students. The extensive preparation by the students and their exuberant involvement in the debates were convincing evidence for Jan that including more student-centered class discussions in the future would produce beneficial learning experiences for her students.

The change in teaching practice that resulted from the professional development aspect of the portfolio process also included the use of inquiry. Three of the four teachers participating in the study presented here who had completed the portfolio creation in past years described the incorporation of more inquiry into their practice as a result of having gone through the portfolio creation process. Their comments are included below.

Tim described the use of inquiry in his classes since completing the NB certification process in the following excerpt.

> Probably the biggest impact on my teaching style [from having gone through the NB certification process] is the amount of open-ended activities I do and trying to make sure that I instigate or bring in as much investigation and open-ended, you know, the inquiry approach. That's probably the biggest impact it's had on how I teach. And I do a lot more of the Socratic stuff than I used to. I was, before I started this whole process of getting my Master's, gifted certification and nationally certified, I was very much a lecturer, you know, and the book type of, this is the lab, these are the steps, do the steps. (Tim, Interview 1)

Greg made the following comments regarding his use of inquiry in his classroom after completing the requirements of the inquiry entry and submitting his portfolio.

I've used it a little bit more than I used to. Obviously, I didn't used to do it very

much. But, I still don't use it as much as I'd like to, and I think it's for a couple

of reasons. It takes a lot of time to prepare for those types of activities. So we

don't always have all that time available, and, I think, sometimes it's the type of

students that you have that if they're not very involved in science, they, a lot of

times, they don't want you to make 'um think. They just want you to tell 'um

how to do it, and I think that those are two reasons, just lack of student response

sometimes and just lack of time on my part. (Greg, Interview 1)

During her interview responses, Pam described how she had used inquiry labs in

her teaching prior to her NB certification experience, and when asked to describe what

evidence could be seen by a visitor to her classroom that she was a NBCT, she identified

the use of inquiry as part of that evidence. Her comments are included below.

You'd definitely see inquiry in my classroom. I probably don't use it, quite

honestly I don't use it as much as I did when I was working on National Boards,

but that has nothing to do with it being an important skill. It's got, simply got to

do with time management and being able to get through all the activities,

knowledge, and skills they're asking us to cover. (Pam, Interview 1)

Two of participants who completed the portfolio creation process during this

study expressed an intention to use inquiry in their classrooms as a result of having

completed the process. When asked how she perceived that her teaching practices would

change as a result of having just gone through the NB certification process, Brenda made

the following comments.

One thing is that the inquiry-based lab, because I've always been moving in that direction anyway, but it's like how, something that's open-ended takes a whole lot of time. And so you're, as a teacher, you're constantly trying to decide between do I take something that takes more time and is more valuable to the student and I sacrifice other material? I didn't have time this summer, but I really wanted to be able to think about how I could really use, streamline inquiry-based learning so that it's kind of like, it's not too open-ended, but you're actually kind of like streamlining it and sending the students in a certain direction. Like they can go and explore, but yet you streamline it, in a short time period and then move through and basically run the class off of generating it, you know, everything we look at, look at it from that perspective. (Brenda, Interview 2)

In her discussion of the professional development aspect of the portfolio process, Jan commented on the influence of time requirements on her use of some classroom activities prior to becoming involved with the NB certification process. Her comments are included below.

I was, because of the process, I did things that I had always had in the back of my mind. 'This is a good idea; I should do this.' But I hadn't necessarily taken time to do it. For example, inquiry labs, I think are wonderful, and certainly that's the nature of science for students to learn to ask questions and to answer those questions and follow the scientific process in doing that. I think that's valuable; I think that's good. The reason that I had not done more of that in my own teaching is simply a matter of time, particularly on block, every moment, particularly, is

precious. But these experiences were good, and so I plan to continue to try to do

them. (Jan, Interview 1)

The positive teaching changes reported in the previous paragraphs by participants

in the present study provide additional evidence that the NB certification process is a

professional development activity that does improve teaching. As was described above,

some participants in this present were motivated to begin the NB certification process

because of its potential for providing professional development while other participants

looked back on their participation in the NB certification process and saw the

professional development aspect as a result of having gone through the process. In either

case the descriptions in the data from this present study of professional development as a

motivation to begin the process, as well as a result of having gone through the process,

served to strengthen the position that the NB certification process is a professional

development activity.

Analysis of Data Related to Reflective Thinking, a Sub-category of Improving Teaching,

as a Motivation for Beginning the NB Certification Process

The requirement for reflective thinking was identified as a subcategory of

improving teaching as a motivation for beginning the NB certification process. The

teacher responses related to reflective thinking as a motivation for beginning the NB

certification process were limited to one participant in this present study. The remaining

teacher responses that referred to reflection did not include descriptions of this factor as a

motivation to begin the process, but they did describe the reflective thinking required

during the process to be a positive result of the portfolio process.

During her interview, Susan described the motivation for improving teaching to be one of her two most important reasons for beginning NB certification. In particular, she focused on the reflection aspect of improving teaching as a motivation for her participation. She provided the following response.

> And, another one [motivation for beginning], and I think is more important for me as a teacher, is like thinking what I do in my classroom, how I do it, and have some chance to make it that way and think about my teaching. (Susan, Interview 1)

The researcher interpreted Susan's remarks included above to refer to her motivation to improve her teaching by reflecting upon her teaching techniques in the classroom in an effort to improve how she teaches.

The remaining seven teachers who provided a response regarding reflection described their reflection during and/or after the process. Their comments regarding the reflection that took place during and/or after the process are included below.

Tim's comments, which indicated a significant increase in the amount of reflection resulting from going through the NB certification process, are provided in the following excerpt:

> I think a lot more about how I approach teaching and how I go through things. So I think that's very definite. I'm always thinking about, 'How did I do that? What could I do? What could I do next year? How could I approach it differently? What could I trim?' You know, 'How could I make it more, you know, how could I make it more so the students try to figure it out?' (Tim, Interview 1)

In contrast to Tim's comments, Pam discussed the reflection that occurred during her participation in the NB certification process. Her comments are included below.

> I think that they [NBPTS] had some leading questions that made you reflect on student prior knowledge, before you start an activity, or that, you know, they'd ask a question about students' comfort, or you know, or well, they probably just put prior knowledge on there, now that I think about it. So I think they had some leading questions that make you think about [connecting the real world] with what they already know or real life. (Pam, Interview 1)

In her interview, Jan, who described the positive impact of reflection during the portfolio creation process, explained that she had reflected upon the success of the inquiry activity that she did with her class. Her comments follow.

> I will say that as my students look back on this course, I'm certain that is one part [the inquiry lab] they won't forget because it was successful. I felt good about it as I did it, and I felt good about it as I looked back on it and reflected on what we had done. (Jan, Interview 1)

In the following excerpt Pete included a comment about his reflection during the NB certification process as he described how his motivations changed during the process.

> I think it [the motivation for participating in the NB certification process] definitely changed more to focus on really, truly teaching better and reflecting on how, on our lessons. It definitely made us reflect, and, I guess, that's the biggest thing. Forcing the reflection is good, and it did force us. I mean, I reflect by talking with Brenda and usually, but really processing it is a different story. But having to write it down and all really makes you think. (Pete, Interview 2)

Rather than a motivation to begin the NB certification process, Brenda described the positive aspects of the reflective thinking that resulted from her participation in the process. Her comments, regarding how the reflection required by the portfolio creation process impacted change in her teaching, are included below.

I think what they [NBPTS] make you go through, the questions that they ask make you really think about what you, why did you do what you did. And, you know, you don't get to do that on a daily basis in your classroom. And, sometimes, you know, having to stop and think, yeah, it takes a lot of time. But… it helps you become intentional about what you do. (Brenda, Interview 2)

Though the reflective aspect of the NB certification process did not serve as a motivation for Greg to begin the process, he did describe his reflection during the process. As he discussed the portfolio creation process, he said, "You're asked to look at your teaching, and there is a lot of reflection involved, which we don't normally do because of lack of time." (Greg, Interview 1)

Finally, among these seven teachers who referred to the reflective aspect during and/or after the NB certification process, Scott also described the positive impact of the reflective thinking that was required during the portfolio creation process. In his comparison of his graduate courses to his NB certification experience, he described the relationship between the research data presented in his graduate courses and his observations of much of that data enacted in his classroom. His recognition of the research data that were evidenced in his classroom prompted his increased reflection regarding how students learn science. Scott's statements about his reflection on how students learn science are included below.

As I discuss with the kids science concepts, as I interact with them and I've

watched the tapes [for the portfolio entries] and I look at how they are gaining

understanding, I have seen a lot of what the research says born out in the tapes

and things I've looked at. And it's caused me to again reassess and examine the

way kids learn science. (Scott, Interview 1)

Reflection on and self-evaluation of teaching practices and students' learning

during the portfolio process allowed the teachers in this present study to align their work

with the goals of the NBPTS in the effort to move toward more student-centered learning

and positive student outcomes. Though the teachers in the study presented here

expressed during their interviews a confidence in their teaching practices prior to the NB

certification process, most of the teachers in this study, as described in the responses

above, indicated that there had been a positive impact by the reflection and self-

evaluation of the process on how they thought about and justified their teaching practices.

Similarly, a case study involving teachers who were candidates for NB certification

(Bohen, 2001) reported that the candidates described the reflective and analytical

requirements of the process as having an impact on improving their skills and their

professional decisions. Also, research has included reflection among the ways for

professional learning to take place on the individual level because it is considered

essential for the recognition and change in established behavior (Kwakman, 2003; Schon,

1983).

Analysis of Data Related to Upgrading Self/Skills, a Sub-category of Improving

Teaching, as a Motivation to Begin the NB Certification Process

A third subcategory that fell under the general heading of "participating in NB certification in order to improve one's teaching" was labeled as upgrading self/skills. Two of the teachers in this present study, Scott and Jan, identified this subcategory as a positive motivation to begin the NB certification process. This subcategory differed from the other two subcategories of improving teaching, professional development and reflection, in that they spoke of a self-directed improvement. Scott described his participation in the process as enabling him to identify his deficiencies and therefore upgrade his skills.

During discussion of his motivations to become involved with the NB certification process, Scott explained that his motivation to begin the process was a self-motivation that centered on his interest in becoming a better teacher. His comments regarding this motivation are included below.

> I knew that it would be an intense process from talking to the other teachers. And I felt like at this point in my career it would be an opportunity to affirm some things that I was doing and improving some other things that I was doing. And it pretty much has been what I thought it would be. … I'd see this as more as something that I've done for myself in the sense of just trying to do a better job. … I can tell you it has been a self-motivating thing for me, and it has been a sense of something that I wanted to do. (Scott, Interview 1)

Also, during his interview, Scott described what he considered as an improvement in his teaching skill, related to class discussions, as his went through the process.

I feel like I'm more skilled now at having students to conduct a meaningful class discussion. Looking at some strategies that can be used to elicit higher order thinking among the students, you learn some of these things on your own as you go through and do the process. (Scott, Interview 1)

Like Scott, Jan was the other participant in this present study who described the desire for upgrading self as a strong positive motivation for beginning the NB certification process. She discussed her self-motivation to excel in her teaching and her view of the NB certification process as a way to upgrade the skills of her teaching practice. Her comments are included below.

I have always wanted to be the best teacher I think I could be. And I think this process certainly encouraged you, encourages you to look at yourself, look at your practice and to see where you need to improve, where weaknesses are, where strengths are. So it can be an affirming process; at the same time it is a stretching process. (Jan, Interview 1)

These two participants identified upgrading self/skills as a specific type of teaching improvement. They looked at the portfolio process as means of identifying areas of strength in their teaching, in order to affirm what they did well, and they also looked at the portfolio process as a means of identifying the areas in which they needed to improve their teaching practice, in order to do a better job in the classroom.

The impact of the motivation of improving teaching on becoming involved in the NB certification was examined in this section. For seven of the participants in this present study, the motivation to improve their teaching ranked highly among the reported motivations for beginning the NB certification process. Also, as they worked through the

portfolio creation process, three of these seven participants described how their ranking

of the motivation of improving teaching changed to become their main motivation. The

teaching changes resulting from this category of motivation, improving teaching, were

unique to each participant, depending upon the individual's teaching strengths and

weaknesses. Also, the three subcategories of the motivation related to improving

teaching, professional development, reflection, and upgrading self/skills, served to

illustrate just how large the impact of improving teaching was on this group of teachers,

not only on their beginning the process but also on their continuing and completing the

process. The impact of improving teaching as a category of motivation to participate in

the NB certification process described in this present study supports the findings of other

studies documented in this section regarding motivation to participate in the NB

certification process.

<div style="text-align:center">Colleague Support</div>

In this section the role of colleague support is examined in relationship to the

motivation to become involved in the NB certification process. The use of the term

colleagues refers to NBCTs and other peer teachers, sometimes in the same subject area

and sometimes not. On the surface, the participants in the study presented here tended to

report a range of impact of those colleagues from large to, in some cases, practically no

impact at all.

Interview Questions Related to Colleague Support as a Motivation to Begin the NB

Certification Process

The data regarding the role of colleague support as a category of motivation to participate in NB certification emerged from the responses of the participants to certain of the interview questions listed in Tables 1, 2, and 3 of this document. The participants were asked in interview question 1 of protocol 1 to describe their relationship with the NB certification process. The researcher examined the participant responses for some indication of whether or not the motivation of colleague support was related to their first introduction to the NB certification process and to their becoming involved in the process. In interview question 2 of protocol 1, the participants were asked to think back to the time when they first considered going up for NB certification and to identify their reasons for pursuing NB certification. From the responses to this question, the researcher learned whether or not the impact of colleague support was a motivation for beginning the NB certification process. Also, the researcher determined how many of the participants considered or did not consider colleague support as a motivation for beginning the NB certification process. Finally, the researcher learned whether or not there were any changes over time related to the motivation of colleague support and, if so, why these changes occurred. In interview question 3e of protocol 1, participants were asked to describe how the group of people with whom they worked made a difference in their pursuit of NB certification. From the responses to this question, the researcher learned about the impact of colleague support in the workplace on participants regarding their participation in the NB certification process.

In protocol 2 all of the interview questions related to aspects of change in teaching resulting from participation in the NB certification process. In interview question 2 of protocol 2, the participants were asked what parts of the portfolio process impacted teaching change. The researcher reviewed participants' responses to this interview question in order to determine whether or not the motivation of colleague support was identified as having an impact on their teaching changes.

Analysis of Data Related to Colleague Support as a Motivation to Begin the NB Certification Process

The data related to the colleague support as a motivation to begin the NB certification process emerged from the interview questions detailed above. They are placed on a nine-point range extending from colleague support as the main motivation for participating in the NB certification process to the lack of motivation by colleague support as a reason for beginning the process. The data emerging from the teacher responses regarding colleague support are represented below in Table 7.

Table 7

Range of Responses Regarding the Motivation of Colleague Support to Begin the NB Certification Process

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Explicit Endpoint[c] Multiple aspects of the role of colleague support were described by participants.	1	Jan Brenda
A few descriptions of colleague support as a motivation to begin the NB certification were offered.	3	Pete Tim Pam

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Less description of colleague support as a motivation to begin the NB certification process was offered.	4	Scott Susan
Description of colleague support as a motivation to begin the NB certification process was limited to that associated with the NB-related workshops.	5	Greg
Implicit Endpoint[d]	9	Henry

[a] Only examples of key words from descriptions are shown in the table; full descriptions are found in the text.

[b] A ranking of one indicates the highest level of participants' explicitness regarding the role of colleague support in motivation to participate in the NB certification process; a ranking of five indicates the absence of the role of colleague support in motivation to begin the NB certification process.

[c] The term explicit refers to the overt use of descriptions of motivation to participate in the NB certification process that mention colleague support.

[d] The term implicit refers to the description by participants of the absence of role of colleague support as a motivation to participate in the NB certification process.

Responses from Jan and Brenda were placed at position 1 on the range represented in Table 7 because they described various aspects of colleague support as motivation to begin the process. They also described the colleague support to continue the NB certification process from teachers within their schools. Colleague support from facilitators of the NB-related workshops was also described by Jan and Brenda as a motivation during the NB certification process. Their responses are included below.

Jan explained how she was motivated to begin the NB certification process by the support of a colleague who taught a course in which she was enrolled.

And then a course that I was taking … to receive certification to teach gifted

students, and the teacher of that class took me aside one night and said, '… I think

you should do this. The things that you turn in [for] my class are, I think, the

kinds of things that they are looking for, and I think that you will be able to be

successful.' So this caused me to think about it again. So I guess that's why I got

into it. (Jan, Interview 1)

Jan went on to explain the motivation provided from colleague support during the

process by people at her school, as well as facilitators in the NB certification workshops.

I think it's very helpful to have someone in your subject area doing it [the NB

certification process] at the same time. Scott and I obviously went through this

together this year, and so we had each other to talk to. And, I think that support's

important. Other people in the building who are NB certified were also

supportive. Now they didn't necessarily understand the nuances of the science

portfolios, but they understood stress. They understood the technical difficulties

with videos and things like that. And I do think a support group is very important.

The workshops that I went to, if you run into teachers who did not have someone

that was going through this process, they seemed more adrift than people who had

support and touchstones to stay on track and to encourage one another. I mean, I

think Scott and I both had our ups and our downs. And, if he was down, I could

bring him up; if I was down, he could bring me up. That helps, you know. (Jan,

Interview 1)

The motivation from the colleague support provided at the NB-related workshops

was described by Jan in the following comments:

Our mentor was very willing to read things we had written and certainly we had

discussions. I think there were maybe five or six of us that were assigned to this

mentor. And, so when we had these workshops, there was a time when we met

together as a group, and there were things that we discussed, you know, practical

advice on how to approach certain portfolio entries and that type of thing. But,

anything that we wrote, she was willing to read. After we had done videos, we

carried our videos, and the group looked at the videos and critiqued them and that

sort of thing. My mentor was willing to receive things by mail. I sent quite a few

things. I mean, as I did my entries, I sent them to her by mail, and I just put a

stamped self-addressed envelope in. And, so after she had read and made

comments, she could just mail it back to me. And, she was willing to do that,

which I appreciated. (Jan, Interview 1)

Along with Jan at position 1 on the range of responses representing the motivation

of colleague support to begin the NB certification process, Brenda provided a description

of the colleague support that served as her motivation to begin the NB certification

process. Also, Brenda described the motivation during the process from colleagues who

were going through the process with her and from facilitators in the NB-related

workshops. A NBCT in Brenda's school was the source of the initial colleague support

that motivated her to begin the process. A description of that motivation is provided

below.

Actually, I [was] pushed by another staff member because she felt I had the

requirements, and she's an English teacher… And she just came down to my

room two years ago and said, "You, you [have to] do this." I think she'd just

finished, and I think she was like, "You, you have to do this because I'm seeing

you do this and this and this, and that's why you need to do it"… So I had to plan

a year where I could give up my part time job to be able to do this… She was,

she, she was like an advertisement for them and really motivated us to do this.

(Brenda, Interview 1)

In addition to the motivation resulting from colleague support to begin the NB

certification process, Brenda discussed, in the following excerpt, the colleague support

provided during the process by the two other teachers in her science department with

whom she went through the process.

If I hadn't had support of the other two people in my building, I couldn't have

made it through the end of the year because it was just like, oh, everything I could

do, you know, I was just really exhausted. (Brenda, Interview 2)

Another aspect of motivation resulting from colleague support was described by Brenda

as the colleague support provided in the NB-related workshops during the portfolio

creation process. Her comments are included below.

Our mentor-kind-of person was absolutely incredible. She was wonderful. She

gave us so many suggestions and just how to stay on task. And she kept

motivating us, and I mean, if it hadn't been for her and just going through it like

that, those weekends were a big help. Just, even though you went and did your

own thing, being pulled back together and hearing people's kind of war stories, it

just helped the process a whole lot. (Brenda, Interview 2)

At the opposite endpoint of the range of teachers' responses regarding colleague

support as a motivation to begin the NB certification, Henry's comments were placed at

position 9 because he described his inability to locate a colleague with whom to go

through the NB certification process and scheduling problems that eliminated his

attending some supportive seminars. Henry's lack of colleague support as a motivational factor for beginning the NB certification process is presented below.

> I tried to find out if anybody else in my school was going through it [the NB certification process] because the prior year two friends of mine went through it together, and they talked about how beneficial it was to be able to have each other to lean on and to brainstorm and things like that. And so I actively tried to find out if there was anybody at my school in the same situation… So I was the only one in my school that year that was going through it. I did have access to be able to go to one-day seminars throughout the procedure. And I didn't go to them. And the main reason I didn't go to any of them they were offered in a sequential way so that you went in the fall along the chronology that you supposedly would do the portfolio. By the time I got the school year started, got my graduate class …under control, and had everything at home …going good, I was already behind the chronology that these one day seminars had laid out for everybody. And I didn't feel comfortable being behind. So I decided not to go to any of those. (Henry, Interview 1)

Only a few teachers in Henry's school knew that he was involved in the NB certification process, and he described their offer to brainstorm with him or to proofread his portfolio entries and their willingness to supply any physical materials for video activities, etc. However, he essentially went through the portfolio process with minimal support of colleagues. In his interview, Henry expressed regret that he had not better planned his schedule for participating in the NB certification process so that it might have enjoyed the support of colleagues. This record of his portfolio experience shows that the

portfolio can be created without input from colleagues; however, all of the other participants in this present study reported a positive experience from some aspect of colleague support.

Between the two endpoints of the range for colleague support as a motivation to begin the NB certification process that are described above, five other participants in this present study indicated that colleague support was a motivation for beginning the process. One participant indicated that colleague support, though helpful, was not a motivation to begin the process. Responses of each of these six teachers are included below, along with an explanation of their position on the range.

Responses from three participants in this present study, Pete, Tim, and Pam, were placed at position 2 on the range shown in Table 7. They were placed collectively at this position because each described some type of colleague support as an initial motivation to begin the NB certification process, and each indicated that colleague support was, also, a motivation to continue in the process.

In the excerpt below, Pete described how the potential for colleague support motivated him to begin the NB certification process.

> A couple of teachers at the school had gone through it and passed. And several
> science teachers got together and decided that we might want to do it. So with
> knowing that we had support, we did it together, three of us. (Pete, Interview 2)

In his discussion of how the colleague support enabled him to go through the process, Pete made the following comments:

> Well, just moral support. Just to bounce ideas off each other, which we did before
> we started the process, but it helped. And, it helped focus; when we were

answering questions in the portfolio, we were focusing. It helped us. Like if it, we'd proofread each other's, and if we weren't reading the question right, then somebody would say something. And, just to kind of get ideas on maybe how to write it differently. All of us definitely had our own writing style, so that didn't change much, but it made us look at it a little differently. (Pete, Interview 2)

Also, at position 2, Tim referred to colleague support as a motivation for beginning the NB certification process. He also described how colleague support during the process was very beneficial to him as he worked through the process.

Actually one of the other teachers here… his sister-in-law got nationally certified in elementary education. So he got all fired up about doing the national certification; so he got some of us together… There were five of us in this department… We got together at his house, and she explained the whole process… So we decided to work together on it and try to help each other out. And, uh, when push came to shove [the two of us] saw it through to the end…. And it was good that the two of us worked together. It was a major benefit. It's tremendously helpful. Well, [we] have always been pretty good friends so it was sort of natural that we'd sort of work together anyway. So we really worked off of each other, a lot of synergism; uh, when one was down, the other one picked 'um up and, uh, bouncing ideas, 'How did you do this? What do you think this means? What do you think of this? Should I try this?' (Tim, Interview 1)

Pam, the third teacher among the participants placed at position 2, indicated that colleague support was a positive motivation to begin the NB certification process. She worked on the portfolio process with another science teacher in her school and described

potential of having a partner with whom to go through the NB certification process as an important motivation to begin the NB certification process. Pam commented, "Finally, it ended up with just the two of us [going through the process]. But, absolutely, working with somebody else who's going through the process was a major reason, I think, that I took it on at the time." (Pam, Interview 1)

Additionally, Pam discussed the positive motivation during the process that came from the colleague support.

> As far as Tim and I working together, I could tell you [that] it was about a daily thing. And, I guess that's, you know, the convenience. We teach so close, and we've worked for a long time. It was support when you're feeling frustrated, you know, when you have a video and no sound on the video and you just want to scream. And you know you can go back there and say, 'I didn't get any sound!' You know, and he would certainly understand the problem… Whatever it was, just to have that support was wonderful, and it made it a lot easier to get through, I think, than trying to do it on your own. (Pam, Interview 1)

Susan and Scott were both placed at position 3 on the range in Table 7 regarding colleague support as a motivation to begin the NB certification process. They were placed at this position because even though they indicated that this was a motivation for their beginning the process they did not go into as much detail about this particular category of motivation as did the participants whose responses were placed at positions 1 and 2. Comments from Susan and Scott are included below.

Susan identified the motivation of colleague support as a positive motivation to begin the process, and specifically she explained that having other teachers in her science

department who were simultaneously working on the portfolio served as an initial

motivation for participating in the process. Her response follows.

> Well, another one [a motivation for beginning the process] is that two other
>
> teachers in my school are doing it, and I think that way, we are going to learn a lot
>
> from each other. So collaboration among the three of us is going to be great….
>
> And it is going to make it, uh, we're going to be able to exchange ideas, interact,
>
> and get some feedback from each other. So I think that is very important. (Susan,
>
> Interview 1)

Also at position 3, Scott identified the colleague support within his school to be a

positive motivation to begin the NB certification process. An excerpt from his interview

in included below.

> Here in this school, I can't speak for other schools… I think the teachers exert a
>
> lot of peer influence and pressure on each other. And it has been a sense of, it's
>
> been something that I wanted to do to, uh, I have viewed it more in terms of the
>
> motivation behind my colleagues and the way they view me and the way I view
>
> them…. (Scott, Interview 1)

Unlike the teacher responses listed so far, Greg's response was placed at position

4 because he did not consider colleague support as a motivation to begin the NB

certification process. He worked independently on the portfolio process with regard to

teachers within his school. When asked by the researcher how the group of people with

whom he worked at his school made a difference in his going through the process, Greg

responded, "They didn't. They were not involved." (Greg, Interview 1)

Though he worked independently on the portfolio process at his school, Greg did describe how he participated in the NB-related workshops throughout the portfolio creation process and how he received colleague support at these workshops.

> I went to some [workshops] during the week sort of things after school that the county school system sponsored. I went to a couple of those and got some good information there, more general information about approach and things like that…. And I went to several of these that the [state professional educators' organization] sponsors. They, I think, do a fantastic job of helping people, and the way they, I think the reason they can do such a good job is because they have people who are already certified who are willing to take the time to go and read entries. Like I said, you try to be modest, and the people there look at what you're doing and say, 'Now, this is really good, but I don't read it on your paper.' … So it was really good in looking back. (Greg, Interview 1)

As described in the comments above from participants in this present study, the motivation resulting from colleague support occurred in different situations before and during the portfolio creation process. The affects of the motivation included encouragement to become involved, continue and complete the process, as well as feedback regarding the portfolio entries and input regarding teaching practices. The motivation resulting from colleague support reported by the participants in the study presented here was highly ranked among the five motivation categories for beginning the NB certification process by seven of the nine participants. Those teachers who placed an importance on the potential of working with one or more colleagues within their own

school during the portfolio creation process did not change their perception of this motivation.

The support of colleagues during the portfolio experience was described as motivational and helpful to eight of the nine participants in completing the process. One of these eight participants, Brenda, described the collegiality with the two other science teachers in her school who were also going through the portfolio creation process as having an impact on change in her teaching practice. Her view of the potential for collegiality to impact teaching change was expressed as her hope for the continuation and expansion of the support of colleagues to include the rest of the members of her science department. Brenda described colleague support as an important means by which to encourage change in teaching practice and to enable each teacher to better address student academic needs. This description of the impact of collegiality during the portfolio creation process parallels those in other studies that have shown that learning communities provide opportunities for teachers to grow professionally and together with their peers address student learning (DuFour, R., 2004; Feldman, 1996; Little, J.W., 1993).

The impact of colleague support on completion of the portfolio process went beyond the daily contacts with other science teachers in their own schools with whom they were creating the portfolio entries. Five of the six teachers in this present study, who commented about their participation during the portfolio creation process in NB-related workshops provided by universities, professional teacher organizations, or local school systems, described a beneficial experience from attending the workshops. Especially helpful to these five of the participants were the NBCTs who served as

resource personnel and provided valuable feedback for the drafts of the portfolio entries and critiques of the videotapes, as well as moral support. The descriptions by these five participants regarding the positive impact of the support workshops on their motivation to continue and complete the portfolio creation process are very similar to the descriptions recorded by the teachers in the study conducted by Kelley and Kimball (2001). The responses of the teachers in this present study regarding the benefits of the support workshops are supported by the strong evidence attributed by Pershey (2001) to the positive impact of support workshops on the success of candidates for NB certification. She reported that since the beginning of the national support initiative to mentor teachers during the NB certification process began in 1997, the number of NBCTs rose from 912 to 4,801 in 1999.

Not only was the factor of colleague support a significant motivation for beginning the NB certification process for the majority of participants in this present study, but also, it was acknowledged as having a significant impact on the participants throughout the portfolio creation process. The motivation of colleague support for the participants in this present study to begin, continue, and complete the NB certification process came from teacher contacts in various situations, those in the same school, those in the same content area and in different content areas, NBCTs who served as mentors in workshops, and teachers within their network of communication. The findings of this present study regarding the motivation of colleague support during the portfolio creation process were similar to descriptions of one of the school districts in the study by Kelley and Kimball (2001) where a group of teachers in one school pursued certification at the same time, and they helped each other with interpreting the standards and the portfolio

directions. Also, a significant finding in this present study was the impact of the NB-related workshops on five of the teachers; this finding supported the data presented by Pershey (2001) regarding the positive impact of a successful mentor program set up for NB certification candidates.

<div align="center">Challenge</div>

A motivation for becoming involved in the NB certification process was also identified by some of the participants in this present study as the personal challenge associated with the process. In this section the category will be simply labeled as *challenge*. Among the seven teachers in this present study who responded in some way regarding the motivation associated with the challenge of the NB certification process, their responses ranged from a positive motivation to begin the process resulting from the challenge to only a consideration of the challenge before or during the process. These various responses will be included in this section.

Interview Questions Related to Challenge as a Motivation to Begin the NB Certification Process

The data regarding the factor of challenge as a motivation to begin the NB certification process arose from the responses of the participants to certain of the research questions listed in Tables 1, 2, and 3. The participants were asked in interview question 1 of protocol to describe their relationship with the NB certification process. The researcher learned from the participant responses whether the motivation of challenge might have been related to their first introduction to the NB certification process and to their becoming involved in the process. In interview question 2 of protocol 1, the participants were asked to think back to the time when they first considered going up for

NB certification and to identify their reasons for pursuing NB certification. From the responses to this question, the researcher determined whether or not the challenge of the NB certification process was a motivation for beginning the NB certification process. Also, the researcher found out how many of the participants considered or did not consider the challenge a motivation for beginning the NB certification process. Finally, the researcher learned whether or not there were any changes over time related to the motivation of challenge and, if so, why these changes occurred.

In interview question 3b, the teachers were asked whether or not they felt that they deserved the NB certification due to their prior accomplishments as a teacher. The researcher reviewed the participants' responses in order to learn what were the perspectives of the teacher regarding achievement of NB certification and how these perspectives might have been related to any motivation by the challenge to participate in the process.

In interview question 5 of protocol 1, the participants were asked to compare and contrast the NB certification process with pursuit of a graduate degree. The researcher studied the participants' responses in order to learn of any relationship to the challenge of the NB certification process that might be connected to the decision of a participant to attempt NB certification rather than pursuing a graduate degree.

From protocol 2, two questions were asked of the participants in hopes of gaining a better understanding of any changes in teaching that might have been related to the motivation of the challenge of the process. In interview question 2 of protocol 2, the participants were asked what parts of the portfolio process impacted teaching change. The researcher examined the responses in order to learn whether or not the challenge of

the process that was identified by the participants was a motivational factor related to any teaching changes.

In interview question 4 of protocol 2, the participants were asked to identify any new insights gained as a result of the NB certification process related to how students learn when taught using specific instructional styles or specific instructional techniques. Sub-questions 4a and 4b were included with interview question 4; these additional questions also related to insights gained about learner motivation and ways of making connections between the real world and science teaching, respectively. Using the definitions of rewards and accomplishments that were included in Chapter 3 of this document, the researcher examined the responses to interview questions 4, 4a, and 4b in order to learn whether the participants considered the gains in insight resulting from having gone through the NB certification process as rewards or accomplishments.

Analysis of Data Related to Challenge as a Motivation to Begin the NB Certification Process

The data related to challenge as a motivation to begin the NB certification process emerged from the participant responses to the interview questions detailed above. The data were placed on a nine-point range that extended from a strong motivation by the challenge to begin the process to the lack of influence by the challenge as a motivational factor to begin the process. As represented below in Table 8, seven of the participants in this present study responded in some way regarding the challenge of the NB certification process as a motivation to participate. The responses ranged from a positive motivation to begin the process resulting from the challenge to lack of motivation by the challenge to begin the process.

Table 8

Range of Responses Regarding Challenge as a Motivation to Begin the NB Certification Process

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Explicit Endpoint[c]	1	Greg
Challenge was noted as the second most important motivation to begin NB certification.	2	Pete
Challenge was noted as the third most important motivation to begin NB certification.	3	Scott Pam
Challenge was noted as an important motivation for beginning the NB certification process; however, no rank was mentioned.	4	Tim
Challenge was not noted as a motivation to begin the NB certification process, but it was credited as having an impact on participation.	5	Susan
Implicit Endpoint[d]	9	Henry

[a] Only examples of key words from descriptions are shown in the table; full descriptions are found in the text.
[b] A ranking of one indicates the highest level of participants' explicitness regarding the role of challenge in motivation to participate in the NB certification process; a ranking of six indicates the least level of explicitness regarding the role of challenge in motivation to participate in the NB certification process.
[c] The term explicit refers to the overt use of descriptions of motivation to participate in the NB certification process that mention challenge.
[d] The term implicit refers to the description by a participant indicating no role of challenge as a motivation to participate in the NB certification process.

Five of the participants identified challenge as a positive motivation for beginning

the NB certification process; two of the participants identified challenge as a

consideration or an influence on their participation, though not a motivation to begin the process. The explicit endpoint of the range regarding the motivation of challenge to begin the NB certification process was identified by a response from Greg. His response was placed at this endpoint position because, more explicitly than any of the other participants in this present study, he described the challenge of successfully meeting the requirements of the process to be his primary motivation. While describing his motivations for beginning the process, Greg said, "The other one [motivation] was a challenge basically, you know, like I said, reading how it can't be done and not if it could be done and yeah, it can. So mostly, it was just a challenge." (Greg, Interview 1)

At the implicit endpoint of this range Henry's response was located at position 9 because he did not identify the challenge of the process as a motivation to begin the process. However, he did comment that the challenge had been a consideration prior to his decision to begin the process. His comments related to the challenge of the process are included below.

> I was initially interested in the NB process because everybody talked about how challenging it was, and I'm always up for a challenge. And so I looked at it and investigated what it was about because it had this reputation of being a difficult, but worthwhile, endeavor. But in terms of me actually mentally deciding I want to do this, that was a total money decision. (Henry, Interview 1)

The responses of the teachers who indicated some type of motivation by the challenge of the process will follow according to how much of an impact they described this motivation to have on their beginning the process. Following the response from Greg, who indicated a strong motivation by the challenge of the NB certification, Pete's

response was placed at position 2 because he also included the challenge to be among his highest ranked motivations to become involved with the NB certification process. With regard to the challenge of the process, Pete said, "I mean, definitely it [the pay raise] was [an incentive], but I looked at it more of a challenge than as somewhat a way to get more money." (Pete, Interview 2)

Scott's response regarding the challenge of the NB certification process as a motivation to begin the process was placed at position 3 because he also indicated that the challenge was among his main motivations for becoming involved in the process. Related closely to his comments about the professional development aspect of the process, he mentioned the challenge on the process when he said, "…I wanted to be able to have a challenge of being forced to do things that would make me look at my teaching." (Scott, Interview 1)

Along with Scott's response, Pam's response was included at position 3 on the range. Pam described the challenge of the process as her third most important motivation. Her comments are included below in response to some follow-up questions regarding the ranking of her motivations to begin the process and the percentages that she would assign to these motivations.

> I think that would be the second reason, the challenge behind it. That I think it was following my Master's degree. I thought it was a good challenge to take at the time. Actually, I think I would give working with somebody a higher percentage than the challenge. I'd give 20% for working with somebody and then 10% for the challenge [indicating challenge as her third ranking motivation]. (Pam, Interview 1)

Because Tim did not offer a particular ranking for challenge as a motivation for beginning the NB certification process, his response was placed at position 4 on this range among those teachers who described some type of motivation by the challenge of the process. Tim's response did indicate that for him the challenge of the process was a high-ranking motivation because he wanted the chance to confirm that he was a teacher of excellence as measured by a national assessment. He explained his motivation to begin the process that resulted from the challenge of the process when he said, "Also, it was a challenge. And that is something that I sort of wanted to do, a little bit of proving to myself I could fit in that upper echelon." (Tim, Interview 1)

Susan's response was placed on the range in Table 8 at position 5. Though Susan did not identify the challenge of the process as a motivation to begin the process, she did describe, in the following excerpt, how the challenge of the process did impact her participation because she was originally from another country and spoke English as a second language. Her account of this motivation is included below.

> Also, for me it was a challenge because, as you can notice, I have as accent so I'm not originally from here. I have been in this country for a long time, since' 78 when I came to graduate school, but it's also to prove myself, that you know, coming from a different background, from a different language, and I still can do the job here. (Susan, interview 1)

The findings of this present study regarding the motivation of challenge as a factor in beginning the NB certification process were similar in tone to those reported by Hoag et al. (2004). Like those teachers in the study by Hoag et al. (2004) there were teachers in this present study who were strongly motivated to begin the NB certification

process because of the challenge to confirm their professional competency. However, unlike the teacher responses in the study by Hoag et al. (2004), the greatest number of responses for beginning the NB certification process was not reported by the teachers in this present study to be the challenge of establishing their professional competencies.

Those participants in this present study who described the challenge of the NB certification process as a motivation for becoming involved in the process perceived their meeting the challenge and experiencing the self-affirmation of completing the NB certification process as the reward of this particular motivation, and their perception of this motivation did not change over time. Their commitment to complete the NB certification process speaks volumes about their motivation to meet the challenge, and in their meeting the challenge of the NB certification process, participants described the resulting changes in their teaching practices that were discussed in the previous section regarding improving teaching.

<div align="center">Prestige/Recognition/Validation</div>

In this section, the factor of prestige/recognition/validation is discussed as it relates to the motivation of participants in this present study to become involved in the NB certification process. As described in Table 4, this category of motivation includes the teacher's desire to be recognized and/or validated by colleagues and community and to earn prestige. The teachers in this present study described this motivation from an individual perspective, as a measure of credibility and a means of recognition from colleagues and the community. Also, two of the teachers described this motivation from a professional perspective as it related to their promoting the credibility of the teaching profession.

Interview Questions Related to Prestige/Recognition/Validation as a Motivation to Begin

the NB Certification Process

The data regarding the impact of prestige/recognition/validation as a motivation to begin the NB certification process arose from the responses of the participants to certain of the research questions listed in Tables 1, 2, and 3. The participants were asked in interview question 1 of protocol 1 to describe their relationship with the NB certification process. The researcher examined participants' responses in order to learn whether the motivation of prestige/recognition/validation might have been related to their first introduction to the NB certification process and to their becoming involved in the process. In interview question 2 of protocol 1, the participants were asked to think back to the time when they first considered going up for NB certification and to identify their reasons for pursuing NB certification. The responses to this question allowed the researcher to examine whether or not the prestige/recognition/validation associated with achieving NB certification was a motivation for beginning the NB certification process. Also, the researcher reviewed the participants' responses to this question in order determine if there were any indicated changes over time related to the motivation of prestige/recognition/validation and, if so, why these changes occurred.

In interview question 3a of protocol 1, participants were asked to talk about the potential of the process to change other people's opinion of them as a professional. The researcher examined the responses of the teachers in order to learn what was their perception regarding the validation from various sources (such as from other persons) as a reward or accomplishment for achieving NB certification. In interview question 3b, the teachers were asked whether or not they felt that they deserved the NB certification due

to their prior accomplishments as a teacher. Responses to this question were reviewed in order to learn what were the perspectives of the teachers regarding their views of how the NB certification was achieved and regarding the relationship of these views to the prestige/recognition/validation associated with achieving the NB certification.

In interview question 1 of protocol 2, the teachers were asked to explain how they perceived that their teaching practices had changed or would change as a result of participating in the NB certification process. The researcher studied the teachers' responses in order to learn what was the change in teaching practice that relates the whole NB certification process to the prestige/recognition/validation of achieving NB certification.

Analysis of Data Related to Prestige/Recognition/Validation as a Motivation to Begin the NB Certification Process

The data regarding the prestige/recognition/validation of achieving NB certification as a motivation for beginning the process arose from the interview questions included above. These data were placed on a nine-point range that extended from a strong motivation to begin the process to the lack of motivation to begin the process. This range is represented in Table 9 that follows.

Table 9

Range of Responses Regarding the Motivation of Prestige/Recognition/Validation to Begin the NB Certification Process

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Explicit Endpoint[c] Multiple descriptions of motivation by prestige/recognition/validation to begin the NB certification process	1	Brenda Pete

Descriptive labels for categories within the range of rankings[a]	Rank[b]	Participants
Though not a main motivation for beginning the NB certification process, this category was described as a motivation associated with the status gained by accomplishing NB certification.	3	Tim
Motivation for beginning the NB certification process was described regarding this category only as self-validation and the validation of colleagues.	5	Pam Scott
Implicit Endpoint[d]	9	Susan

[a] Only examples of key words from descriptions are shown in the table; full descriptions are found in the text.

[b] A ranking of one indicates the highest level of participants' explicitness regarding the role of prestige/recognition/validation in motivation to participate in the NB certification process; a ranking of four indicates the least level of explicitness regarding the role of prestige/recognition/validation in motivation to participate in the NB certification process.

[c] The term explicit refers to the overt use of descriptions of motivation to participate in the NB certification process that mention prestige/recognition/validation.

[d] The term implicit refers to the description by a participant indicating no role of prestige/recognition/validation as a motivation to participate in the NB certification process.

Analysis of Data Related to Prestige/Recognition/Validation as a Motivation to Begin NB

Certification

At the explicit endpoint of the range representing a strong motivation to begin the

process resulting from the prestige/recognition/validation of achieving NB certification,

the responses from Brenda and Pete were represented at position 1. They were placed at

the same position because they expressed motivation to begin the process that resulted

from the prestige/recognition/validation of achieving NB certification. They expressed

this motivation not only in terms of the self-validation and the validation from

professional peers but also the motivation to raise the credibility of the teaching profession. Brenda offered the following responses regarding the impact of this category of motivation on her beginning the process.

> So I think the National Board is a way for us to regain credibility. I think as more people do it and we publish and we talk about what we're doing in the classroom and it becomes something that can be put in and advertised about our public school teachers, especially, this is something, I think, can raise people's awareness about what we're trying to do as professionals to make ourselves more professional. (Brenda, Interview 1)

Brenda also commented about the validation from others as a motivation for beginning the NB certification process. Her comments follow below.

> I think that [validation] plays into it [the motivation to begin the NB certification process] because when I said the next step [in my career], there [are] already things that I've done professionally as a teacher. So it does sort of put a stamp of approval on saying that there's other people out there who have read what you've done, who've seen what you've done… So it's a way to kind of validate your experience from your professional peers and that does make a difference to have somebody else say, 'Yeah, this is, you're in the right direction; keep going.' (Brenda, Interview 2)

Also at position 1 on the nine-point range in Table 9 representing responses regarding prestige/recognition/validation as a motivation to begin the NB certification process, Pete's response was similar to Brenda's response. Not only did he describe a positive motivation to begin the NB certification process due to the self-validation aspect

of achieving NB certification, but he also commented on the motivation to begin the process as a way to raise the credibility of the teaching profession. Regarding the motivation to begin the process from the aspect of self-validation, he remarked, "having only taught three years before that [beginning the NB certification process], I thought it would validate for myself, as well as other people, validate my skills." (Pete, Interview 2)

With regard to his motivations for beginning the NB certification process, Pete made the following comment related to the category labeled prestige/recognition/validation.

> I guess… to make it [teaching] more of a profession by getting the certification, starting as more of an impetus for more people to get it, too, and improve their teaching. As well as non-teachers, having a national certificate those people might view teaching as a little more of a profession. (Pete, Interview 2)

At position 9, Susan's response was represented at the implicit endpoint of the range that represented the lack of motivation to begin the NB certification process as a result of the prestige/recognition/validation associated with becoming NB certified. Her response was placed at this position because among her reasons for beginning the NB certification process she described no motivation from the prestige/recognition/validation for achieving NB certification. When asked if others' opinions of her as a professional had been a motivation to begin the NB certification process, she made the following comments:

> No, not really, not really… I think I'm doing a good job, and it's not trying to prove to anybody else that I can teach or I can do a good job teaching. It's more something for myself, you know. (Susan, Interview 1)

Tim's response was placed at position 3 on the range and represented a positive motivation to begin the NB certification process resulting from the prestige/recognition/ validation associated with achieving NB certification. His response was placed at this position because, though not one of his major motivations to begin the process, he did include among his list of motivations for beginning the NB certification process the status associated with achieving NB certification. Tim remarked, "There is some status to it [accomplishing NB certification]. And that certainly, I'm not a real status person, but there is some of that." (Tim, Interview 1)

Two teachers, Pam's and Scott's, were placed at position 5 because they limited their description of motivation for beginning the NB certification process regarding the prestige/recognition/validation to their self-validation and the validation from their professional peers. Unlike Brenda and Pete, Pam did not mention motivation of improving the credibility of the entire teaching profession. Her comments are included below.

> I think validation is important. I do, and I think National Boards does give you that validation. I do think that it is true, so much from others, I don't know. I think it was more for myself than just others. I think my colleagues would understand it more than parents. Even administration, I don't think understand it, what's involved in that process as much as another teacher or colleague. (Pam, Interview 1)

Also at position 5, Scott's response was indicated limited motivation to begin the process resulting from the prestige/recognition/validation associated with achieving NB certification. He did not describe the prestige/recognition/validation received from others

outside of the teaching profession as motivation for beginning the process. Instead, he described this category of motivation as associated with his self-validation and how his colleagues viewed him and how he viewed them. In Scott's response to the question regarding other peoples' opinion of him as a reason to begin the NB certification, he made the following comments:

> I haven't really considered that [the impact of achieving NB certification on the relationship with the parents of your students]. I suppose that it will, but it's definitely not a motivating factor. I'd see this as more something that I've done for myself in the sense of just trying to do a better job…I have viewed it [the NB certification process] more in terms of the motivation behind my colleagues and the way they view me and the way I view them. (Scott, Interview 1)

As described in the excerpts above, five of the six the participants who responded regarding this category of motivation did perceive prestige/recognition/validation to have some impact on their becoming involved in the NB certification process, and this perception did not change over time. The motivation of prestige/recognition/validation was seen as a reward for going through the process, and though it did not change their teaching practice, some aspects of this motivation, such as portfolio entries judged acceptable by teachers at the NBPTS, were described as increasing confidence in the use of effective educational reform practices in the classroom. The findings of this present study regarding the motivation of prestige/recognition/validation to begin the NB certification process indicated that this category of motivation does impact the decision of teachers to participate in the process. Approximately 14% of the participants in a study

by Hoag et al. also indicated that the increased status associated with the certification was a motivational factor in their decision to begin the NB certification process.

Summary

Presented in this chapter was the analysis of the data from this present study that identified five main categories of teachers' motivation to begin the NB certification process, money, improving teaching, colleague support, challenge, and prestige/recognition/validation. The category labeled money was related to motivation to begin the NB certification process in two ways, the expected salary increase and the upfront funds available for application fees. Also, participants in this present study described their motivation to begin the process to be related to the category, improving teaching, which was divided into three sub-categories: professional development, reflection, and upgrading self/skills. The motivation sub-category labeled professional development was described as having a significant impact on the decision to participate in the NB certification process by four of seven of the participants who responded in their interviews regarding this motivation. The reflection associated with the NB certification process was described by only one participant as a motivation to begin the process, though seven other participants commented about the impact of reflection on their teaching during and/or after the process. Two of the teachers described a motivation to begin the process as a result of the desire for upgrading self/skills. Collectively, the sub-categories included responses regarding improving teaching from five of the nine participants in this present study. Colleague support was described as a motivation to begin the NB certification process by seven of the nine participants in this present study. The source of motivation resulting from colleague support was identified in several ways.

One source of colleague support was described as colleagues within the same school and with whom a participant was going through the process. Another source of colleague support was described as the NBCTs within a participant's school or in their community who provided encouragement to begin the process. Also, facilitators in NB-related workshops who initially explained the requirements of the process were described as sources of motivation for beginning the process. In addition to the motivation to begin the process that was provided by the colleague support from NBCTs who served as facilitators in the NB-related workshops, participants in this present study also reported a positive motivation from the colleague support of these individuals during the portfolio creation process. The challenge of the process was related to motivation to begin the process by participants who expressed their desire to establish that they could successfully meet the requirements of the NBPTS and achieve NB certification. The category labeled prestige/recognition/validation was related to motivation to begin the process in the following ways. The prestige associated with achieving NB certification was viewed by two participants as a means of raising the credibility of the teaching profession. Also, participant responses explained the impact of this motivation category on their beginning the process as it related to the potential validation from those professional peers who assessed the submitted portfolio entries, the validation from colleagues within the respective school of the participants, and the self-validation of achieving NB certification.

There were interrelationships between some of the five categories of motivation, and because they were not always mutually exclusive, at times it was impossible to completely separate them. For example, in one description of the motivation by

professional development to begin the NB certification process, the requirement to examine one's teaching was described as an anticipated challenge presented by the process. Therefore, both the challenge of the process and the anticipated professional growth of the process were connected.

Another example of the interrelatedness of these categories of motivation was found in the responses regarding colleague support and reflection. The motivation by the exchanges between colleagues who went through the NB certification process together was related to the descriptions of participants who described those exchanges as impacting how they looked at (reflected upon) their individual teaching practice. Also, a relationship was found between the prestige/recognition/validation of the process and the motivation of improving teaching. The validation from others served as a motivation for some participants to begin the NB certification process and was described by a participant as being related to his striving to do a better job of teaching. A close relationship was found to exist for one participant between the motivation from colleagues (colleague support) and the validation from these colleagues upon completion of the process. Though data related to each of the five categories of motivation were examined, the interrelationships among the five categories must be acknowledged when describing teachers' motivations to begin the NB certification.

Analysis of the data in this present study revealed findings that were compared to data from other studies regarding teacher motivations to become involved in the NB certification process. Like the teachers in the study conducted by Kelley and Kimball (2001), the teachers in this present study, except for Henry, who described his motivation to be solely financial, reported a combination of motivations to influence their beginning

the NB certification process. The findings of this present study revealed that the

motivations reported by the greatest number of participants for beginning the NB

certification process were money and improving teaching. The implications of these

findings will be described in the Chapter 5.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

The study presented in this document focused on the motivations to become involved in the NB certification process, along with perceptions of the rewards and accomplishments associated with the process, reported in interviews of nine high school science teachers. Additionally, the research examined how retrospective reports of changes in the participant teacher's motivations during or upon completion of the NB certification occurred. Any change in teaching that these participants described as a result of participation in the NB certification was also examined. As a science teacher, the researcher chose this study because of an interest in why science teachers become involved in the NB certification process and what changes in science teaching result from participation in the NB certification process. Also, as part of the larger study described earlier in this document, the researcher had the opportunity to consult with the other researchers involved in that study.

This study was designed as part of a larger research project that was established to look at the influence on teaching practices of the participants and on student learning that results from the NB certification process. A basic assumption of the larger project was that the NB certification process is a professional development activity that rewards the participating teachers and elevates student learning. Related to the professional development and reward aspects of the NB certification process described by the larger

project, this present study involved the analysis of data taken from the interview responses of participating teachers regarding their motivations for beginning the NB certification process. In addition, teacher interview responses were analyzed regarding the changes in teaching practice resulting from participation in the process.

Overview of the Findings

The analysis of the findings revealed five major categories of teacher motivation for beginning the NB certification process. These five major categories of teacher motivation were coded as money, improving teaching, colleagues, challenge, and prestige/recognition/validation.

The category of money as a motivation for beginning NB certification was found to be a factor for each of the nine participants in the study presented here. The degree to which money was a motivational factor for beginning the process varied from a primary motivation for those teachers who identified money among their top three motivations to a secondary motivation for those teachers who were not motivated by the monetary factor to a great extent. Though the degree to which money was a motivation varied among the nine participants, none of them reported the monetary motivation as a non-factor in their beginning the process.

The acknowledgement by all of the participants that the monetary motivation was related to their beginning the NB certification process emphasized the impact of this factor upon their participation. However, once they became involved in or completed the portfolio creation process, four of the participants changed their feelings regarding the importance of money as the primary motivation for becoming involved in NB certification. The changes in motivation for three of these four participants shifted from

the primary motivation of money to the primary motivation of some aspect of improving teaching. The fourth participant, whose monetary motivation to begin the process changed, described her primary motivation to change to the task of completing the process, once she began to invest her time and effort toward that end. Also, regarding change in instructional practices, participants did not indicate any teaching changes as a result of the monetary motivation to begin the NB certification process.

The category labeled *improving teaching* was described as a motivation for beginning the NB certification process by five of the nine participants in this present study. The responses describing the aspects of improving teaching as a strong motivation for beginning NB certification and a result of going through the process are similar to such accounts in other research studies (CFTL, 2002; Hoag et al., 2002; Kelly & Kimball, 2001) regarding teacher motivations for participating in this process. The motivation category, *improving teaching*, was divided into three sub-categories according to the interview responses of the nine participants. These sub-categories of improving teaching were labeled as *professional development*, *reflective process*, and *upgrading self/skills*. Each of these sub-categories is discussed below.

Professional development was described by four of the nine participants as a significant motivation for becoming involved in the NB certification process. Additionally, findings revealed that three other teachers among the nine participants felt that *professional development* was a definite result of completing the process. The sub-category, *professional development*, was identified as a primary motivation for beginning the NB certification process by more participants than either of the other two sub-categories for improving teaching. Four of the nine participants described a motivation to

begin the NB certification process because of the professional development experience, and two additional teachers in this present study reported that professional development was a result of going through the process. Those teachers who described professional development as a primary motivation for beginning the process did not indicate any change in this motivation during the process, which suggests that professional development is a strong component of the NB certification process.

The findings showed that those aspects of motivation to participate in NB certification labeled as *professional development* were related to changes that these teachers made in their instructional practices. The changes related to professional development that were identified by participants in this present study included the use of more inquiry-based methods and student-centered class discussions. These reported changes are among those supported by current educational reform.

The *reflective process*, another sub-category of motivation that was labeled as improving teaching, was identified by one of the participants, Susan, as a primary motivation for beginning the NB certification process. Though only this teacher identified the reflective process as a primary motivation to begin the process, other participants did describe the significance of the reflection that occurred during and after completing the NB certification process. The significance of the reflective process did not change for, Susan, who indicated its impact on her becoming involved in the process. All of the participants who reported any impact by the reflective process while going through or upon completing the NB certification process indicated that this reflection promoted thoughtful teaching change as a result of examining the effectiveness of their classroom practices. The participants in this study who described teaching changes

resulting from the reflective process included in their descriptions the use of more detailed student feedback, diversity in teaching methods, and student-centered teaching. The sub-category of improving teaching labeled *upgrading self/skills* was found to describe aspects of the analysis through which participants were primarily motivated to participate in NB certification as a result of their desire for the improvement of their personal and professional skills. Though *upgrading self/skills* is closely related to professional development, the analysis of the interview data found that two particular teachers identified their own personal desire to upgrade their teaching skills and/or to become better educators as primary reasons for participation in the NB certification process. In this sense, personal desire to improve is distinguished from professional related motivations to improve and indicates a motivation more related to personality characteristics than to characteristics the teachers felt they had as professionals. Their motivation to upgrade their skills was not described to change during their account of the process. Teaching changes related to this particular motivation included improving the skill of listening to what students were really saying and improving the choice of topics and approaches that actively engaged students in their own learning.

The findings in this present study showed a relationship between the subcategory of motivation that was labeled *colleague support* and the motivation to initiate participation in the NB certification process. For six of the nine participants in this study, the motivation to begin the process resulted from their looking forward to working with a colleague or colleagues in the same school during the NB certification process. For these teachers, "working with" included actions such as collaboration, support, editing assistance, and video assistance.

The significance of the *colleague support* as a motivation for beginning the NB certification process was found to remain unchanged across the period from beginning to completing the NB certification process for those teachers who identified this motivation. The motivation received from *colleague support* to begin the NB certification process was not reported by these participants to change their teaching practices.

The category labeled *challenge* was found to be a motivation for five of the participants in this present study to begin the NB certification process. The reports of the percentage of teachers who successfully complete the NB certification process served as a motivation for these teachers. They considered themselves to be good teachers prior to their participation in the process, but they were motivated by the challenge to establish through the NB certification process that they were accomplished teachers according to a set of national standards. Those teachers who identified the challenge of the process as a motivation to begin the process did not indicate a change in this motivation. Neither did these same teachers describe any change in their teaching as a result of their motivation to meet the challenge of this process.

Another category of teacher motivation to begin the NB certification process that arose from the analysis of the data collected during participant interviews was labeled *prestige/recognition/validation*. This motivation to begin the process was described by five of the participants in this present study to include the validation of self, validation from colleagues, and validation, or increased credibility, for the entire teaching profession. Though undeniably some recognition is associated with accomplishing NB certification, these participants most often responded to questions regarding this motivation from the perspective of not trying to impress others or to gain personal

recognition. Data analysis showed that the validation, expected or realized, was most often related to the participants' self-validation or the validation of colleagues who understood the NB certification process. In those cases where a participant expected to be validated (either by self or by others) upon completion of the NBC, this expectation served as a motivation. For those participants who only saw this validation in retrospect, it is not clear how it might have served as a motivating factor. There were two participants who expressed a motivation to begin the process that related to raising the credibility of the entire teaching profession. Among these five participants, these motivations were not found to change during the process. Also, though most of the participants who addressed this category of motivation did not indicate a change in teaching as a result of the prestige/recognition/validation, one of the participants did indicate that because of the recognition that resulted from becoming a NBCT he was motivated to try to do a better job because of what the certification represented.

Implications for Teachers at the Time of the Interviews

The implications of the findings in this present study follow. At the beginning of this study and after reading the goals and standards of the NBPTS, the researcher believed that the NB certification process provided an effective means for improving teaching and promoting educational reform. The findings of this study have strengthened these beliefs that the NB certification process is a dynamic professional development activity that enriches teaching and identifies accomplished teachers who can effectively carry out educational reform in our nation's schools and improve student learning. As in the study by Kelley and Kimball (2001), this study describes the significant role of the financial support and salary increase for those teachers who successfully complete the

NB certification process. The unanimous response from the participants in this study that

the monetary motivation was in some way a factor influencing their becoming involved

in the NB certification process implies that such support is needed in order to motivate a

continued increase in teacher enrollment in the process. The positive responses from four

of the five teachers who commented regarding their participation in the NB-related

workshops indicated that these workshops were most beneficial in their completion of the

portfolio creation process. The NB-related workshops suggest that they are a vital part of

the NB certification process. The data also showed that the desire for improving teaching

was a motivation for participants in this study to begin the NB certification process, and

participants described changes in their teaching that resulted from going through the

process. Analysis of these data implies that the improvement of teaching is a

documented result of this process, and therefore, the process is a strong instrument for

improving teaching and carrying out educational reform.

Implications for Teachers Regarding a Revised Reward Structure

Because the reward structure in the State of Georgia was revised by the House of

Representatives and the Senate and the senate bill was signed by the governor, as of May

3, 2005, some of the provisions regarding salary increases for persons receiving NB

certification have changed. According to these revisions, any teachers receiving NB

certification after July 1, 2006, and renewing their certification anytime after that date

must teach in a "needs improvement" school as classified No Child Left Behind in order

to receive the 10 percent salary increase awarded to NBCTs in this state. A high-needs

public school is defined by the state as one that has failed to meet Annual Yearly

Progress and has thus received an unacceptable rating for a period of two or more

consecutive years. High needs schools are also labeled as "needs improvement" schools by the Federal legislation titled No Child Left Behind. The terms "needs improvement" and "high needs" are frequently used interchangeably in Georgia. The implications for teachers who become certified after July 1, 2006, are that they will have limited options regarding locations and will need to decide before going through the NB certification process whether or not they are willing to move to a high-needs school in order to receive their salary increase. The implication for the continued growth in the number of NBCTs in the state is that the new restrictions may cause a decrease in the number of teachers who apply for participation in the NB certification process.

<div align="center">Future Research</div>

Because the reward structure for NBCTs has changed in the State of Georgia, future research needs to include interviews of the teachers who participated in this present study regarding their opinions of the revised reward structure. Since the completion of the data collection for this present study, all participating teachers who were not yet NB certified have become NBCTs. The perspectives of the teachers regarding the new reward structure as compared to the reward structure that was in effect when they went through the process will contribute valuable information to research related to NB certification. Future research regarding these teachers' perspectives of the value of successfully going through the NB certification process and of whether or not the benefits of the process outweigh any changes in the reward structure for becoming NB certified will inform the data regarding the motivation of teachers to beginning the process.

Summary

In this chapter, I have discussed the findings, the implications of the findings, and the implications for future research related to this present study. This study was designed with the goal of gaining a better understanding of science teacher motivations for beginning and/or participating in the NB certification process. In addition, the research was conducted in an attempt to understand how changes in teaching identified by science teachers during participation in the process occurred. Then, an understanding was sought regarding the relationship between the motivation to participate and the reported changes in teaching resulting from the science teachers going through the process. The study contributed additional data for explicating why teachers become involved in the NB certification process. The data in this present study were collected with the intention of providing research-based implications for the NBPTS as it continues to promote the NB certification process. It is through a better understanding of why teachers become involved in NB certification that better methods of recruitment of and support for participants can be addressed.

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Appendix A

Interview Questions – Protocol 1

1. Would you describe your relationship to the NB certification process?

2. Think back to the beginning of the time when you first considered going up for
   NB certification, what were your reasons at that time for pursuing NB
   certification?

   2a. Can you add to your list of reasons for pursuing NB certification?

   2b. Can you rank-order this list of reasons that you have just given?

   2c. Can you give a percentage to each of the reasons you listed?

3. [Depending on the reasons given, different questions will be used with different
   people. Examples are provided below.]

   3a. You mentioned the validation that arises from receiving NB certification, can
   you talk about the potential this process has to change other people's opinion of
   you? (For example: parents, teachers, persons in the community, persons in the
   administration, or persons at the state level)

   3b. Do you feel that you deserved the certification due to your own prior
   accomplishments as a teacher?

   3c. Earlier you talked about learning that results from participation in the NB
   certification process could you be more specific about this?

   3d. Can you be more specific regarding the ways in which the NB certification
   process is a professional development activity?

3e. How did the group of people with whom you worked make a difference in the pursuit of this certification?

4. How did your reasons for pursuing NB certification change over time from beginning the process until now?

5. How is the NB certification process similar to and different from pursuit of a graduate degree?

6. Are there any negative outcomes that result from pursuit of NB certification?

7. Are there things in your life as a teacher or as an individual that are not getting done now due to the activities related to the certification process that are added to your schedule?

Appendix B

Interview Questions – Protocol 2

1. How do you perceive that your teaching practices will change as a result of your participating in the NB certification portfolio process?

2. What parts of the portfolio process impact teaching change?

3. How does your learning, as you put together the portfolio, impact teaching change?

4. What new insights did you gain related to how students learn when taught using specific instructional styles or specific instructional techniques?

5. What insights did you gain related to how learners are motivated?

6. What insights did you gain related to ways of making connections between the real world and science teaching?

7. If I came into your classroom, what evidence would I see that would indicate how your teaching has changed as a result of participating in the portfolio creation process?