DEVELOPMENT AND DETERMINATION OF RELIABILITY AND VALIDITY

OF PROFESSIONAL LEARNING COMMUNITY COLLABORATIVE TEAM

SURVEY (CTS)

A dissertation presented to the
Faculty of the Graduate School
University of Missouri-Columbia

In Partial Fulfillment of
the Requirements for the Degree

Doctor of Education

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by

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July 2013

The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

DEVELOPMENT AND DETERMINATION OF RELIABILITY AND VALIDITY OF PROFESSIONAL LEARNING COMMUNITY COLLABORATIVE TEAM SURVEY (CTS)

Presented by Joshua A. Colvin,

A candidate for degree of Doctor of Education

And hereby certify that, in their opinion, it is worthy of acceptance.

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ACKNOWLEDGEMENTS

I want to thank the University of Missouri–Columbia for requiring doctoral candidates to complete a dissertation. I am grateful for having to go through this process. Although the work was tough at times, I was inspired by this learning opportunity and truly blessed to have the support and guidance of so many people.

First and foremost, I want to acknowledge Dr. Phil Messner. I consider very few folks as a mentor; however, I hold Dr. Messner in such high regard and have enjoyed learning from him. His impact on me as a person and a professional is immeasurable. I regard Dr. Messner as my friend and will miss working with him on this dissertation. In addition, Dr. Messner and Dr. Joyce Piverall did an excellent job of using our course work to challenging our classes to consider new perspectives and to be reflective in our own personal practices. Dr. Piverall is great person and phenomenal leader. I also want to thank Dr. Carole Edmonds for her help with completing this process. Although our time working together was somewhat brief, I sincerely appreciated Dr. Edmonds' professionalism and dedication to her students. Additionally, I want to acknowledge and thank Dr. Kristi Alexander, Dr. Vigil Freeman, and Dr. Bruce Johnson for serving on my dissertation committee.

I would like to thank my family – my mother, Lori, my father, Larry, and my sister, Leah – for their constant love and support throughout my life. I attribute much of my progression as person and professional to growing up in such a wonderful family. Together we share our accomplishments, face our difficulties, and above all – are a foundation for each other. In all of my pursuits, it has and continues to be a fortuitous blessing to have my family's enthusiastic encouragement.

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Lastly, I want to thank all of my friends that have contributed to my personal growth over the years. These are the people that have positively influenced me through their pure kindness and sheer devotion. We have learned from each other, shared so many laughs, and experienced many of life's greatest adventures. To those dedicated individuals that have given me strength and support, I will always be there when you need me.

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DEVELOPMENT AND DETERMINATION OF RELIABILITY AND VALIDITY OF

PROFESSIONAL LEARNING COMMUNITY COLLABORATIVE TEAM SURVEY

(CTS)

Joshua A. Colvin

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ABSTRACT

The study of transformative learning within collaborative teams was conducted to gain new applicable knowledge used to influence overall school improvement and implementation of professional learning communities. To obtain this new knowledge, the Professional Learning Community Collaborative Team Survey (CTS) was developed and psychometrically tested to identify indicators of transformative learning within collaborative teams.   The CTS was sent to a purposive sample of 25 northwest Missouri schools that had undergone at least three years of membership within the Missouri Professional Learning Communities (MPLC) Project. Nineteen of the selected 25 schools chose to administer the CTS to an estimated overall sample of 457 teachers. The Northwest Missouri Region 5 Regional Professional Development Center (RPDC) provided blinded archival data of 234 to 255 responses per CTS item. Conclusions indicated the CTS was a reliable and valid instrument.   Principal component analysis yielded two components confirming transformative learning within collaborative teams: (a) Purposeful Work and (b) Productive Relationships. A data reduction process produced two alternate versions of the CTS, which were also determined to be reliable and valid.

CHAPTER ONE

INTRODUCTION TO THE STUDY

New knowledge was discovered in this study from the original investigation of transformative learning within collaborative teams. Knowledge gained from this study has brought about new perspectives to influence overall school improvement and the implementation of professional learning communities (PLCs). A quantitative survey instrument was developed as a tool used to measure teacher perception of transformative learning within collaborative teams. The rationale for developing a valid and reliable quantitative survey instrument was established by recognizing the importance of collaborative teams within schools.

Professional learning community literature established collaborative teams as a fundamental building block for facilitating continuous school improvement (DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). The PLC design for school improvement was used in this study to define collaborative teams. The collaborative team characteristic is one of six total characteristics embedded within the framework of schools (DuFour & Eaker, 1998; DuFour et al., 2006; Missouri Professional Learning Communities [MPLC], 2009). In this study, the collaborative team characteristic will be described as having both exclusive and interdependent attributes (see Figure 1). The investigation of collaborative teams has provided insight into explaining the phenomenon of transformative learning within collaborative teams.

Clarifying Priorities

Collective Inquiry

Results Orientation

Collaborative Teams

Commitment to Continuous
Improvement

Action
Orientation/Experimentation
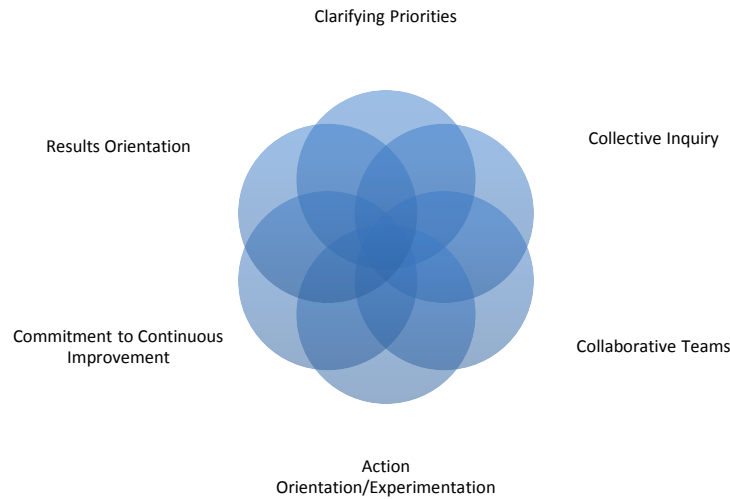
Figure 1. Venn diagram of association among six PLC characteristics.

Chapter One contains background for the position that PLCs evolved from adult learning theory. The collaborative team characteristics were studied through a transformative adult learning theory lens. The conceptual underpinnings of the study were from the positivism research paradigm, with three frameworks of focus: a priori theory, transformative learning theory, and psychometrics. Chapter One contains discussion of the problem and purpose of the study, research questions, and a summary of the study methodology. Chapter One includes the definition of key terms used throughout the study, in addition to discussion of assumptions, limitations, delimitations, and anticipated benefits. A brief summary concludes the chapter.

Background

In this study, the researcher analyzed organizational learning theory as constructed from previously researched adult learning theory. The learning organizations were recognized as composed of individual workers who learn both individually and

collectively. Nonaka and Takeuchi (1995) stated an "organization cannot create knowledge on its own without the initiative of the individual and the interaction that takes place within the group" (p. 13). Learning organizations must then work to transform individual knowledge into collective organizational knowledge. In organizations, the use of the learning organization designation brings focus to certain principles and characteristics that contribute to learning within the organization (Preskill & Torres, 1999).

Argyris and Schon (1978) first introduced organizational learning in management theory literature. Senge (2006) later filtered the agglomerate of learning organization literature to describe learning organizations as "organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together" (p. 3). The ideas taken from learning organization literature soon became applicable to schools as they took on a learning orientation (Senge, 2001). Professional learning communities evolved from a paradigm shift that took place as schools implemented learning organization initiatives (Boyd & Hord, 1994).

Professional learning communities developed from adaptations of the business model and quickly became a promising strategy for sustained and substantive school improvement (Dufour & Eaker, 1998; DuFour et al., 2005), although the literature reviewed did not provide a specific framework for implementing a PLC design within schools (Senge, 2001). The school generally determines PLC design and implementation. In some cases, an outside agency may assist in PLC implementation.

For example, MPLC have developed curriculum to assist schools in implementing a PLC

orientation. The MPLC curriculum expands upon a framework embedding six

characteristics within schools (see Figure 2). The characteristics used within MPLC

curriculum were originally described as essential components embedded in PLC schools

(DuFour & Eaker, 1998). The MPLC curriculum aligned to the study definition and

description of collaborative teams (see Figure 1). The quantitative survey developed

within this study was administered to a sample of teachers who worked within schools

that had participated in the MPLC Project. The quantitative survey was developed for

MPLC Project use as a process evaluation or diagnostic tool assessing transformative

learning within collaborative team learning.
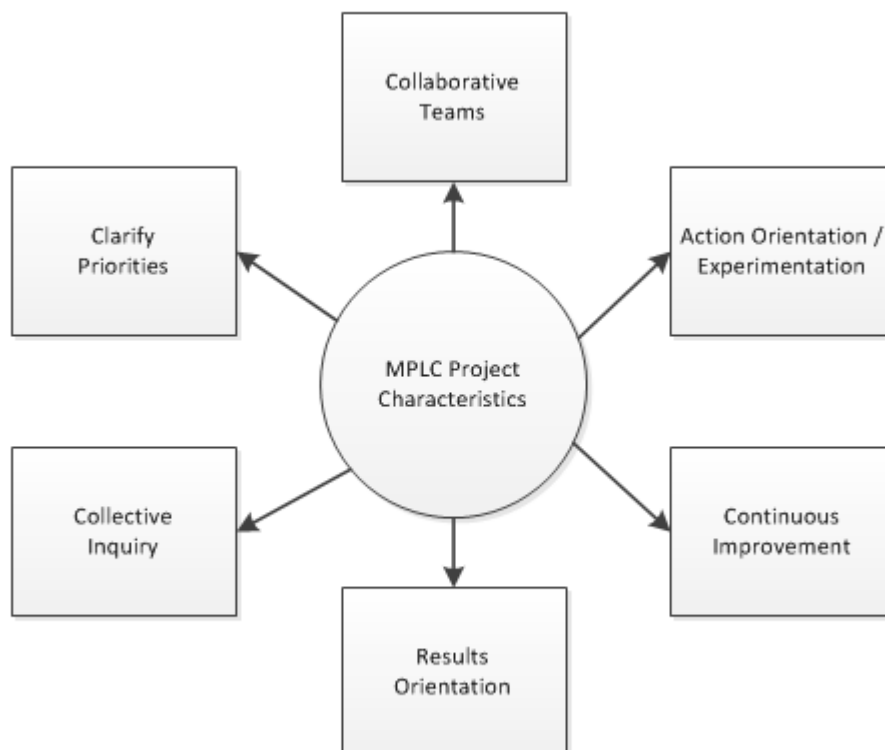
Figure 2. Relationship of six characteristics within the MPLC Project.

Conceptual Underpinnings of the Study

Thomas and Brubaker (2000) suggested a fundamental attribute of human thought was the propensity to arrange individual experiences into unique categories and classes, adding that by arranging personal experiences, people are more able to compare, contrast, and construct a mental map of reality. In the current study, teacher perception was used to form a reality for analyzing transformative learning within collaborative teams. In educational research, a positivist orientation accepts reality as "stable, observable, and measurable" (Merriam, 1998, p. 4). Positivism was the research orientation used to guide this study by providing logical support for the conceptual underpinnings of the study: (a) a priori theory supported interpretations and assumptions involving theoretical constructs, (b) transformative learning theory explained learning within collaborative teams, and (c) psychometrics provided the basis for testing reliability and validity within a survey instrument. All three conceptual underpinnings were used to facilitate the understanding of transformative learning within collaborative teams.

Positivism Orientation

A positivism research orientation is usually linked to quantitative research (Merriam, 1998). In the present study, a quantitative research instrument was developed to measure transformative learning within collaborative teams. The perception of teachers provided empirical measurements used logically to confirm or reject the existence of hypothesized transformative learning constructs within collaborative teams. Coghlan and Brannick (2005) discussed positivism research orientation as aimed at using a methodological approach to create knowledge. All three conceptual underpinnings used within the current study supported a positivism orientation through the development

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of a reliable and valid survey instrument. Knowledge gained of transformative learning within collaborative teams was derived from a detailed methodological approach.

Transformative Learning Theory

Transformative learning theory was used within this study as a conceptual underpinning. When used as a lens for examining learning within collaborative teams, transformative learning assumes that individual and social transformation are inherently linked (Alcantara, Hayes, & Yorks, 2009; Cranton, 2006; Fenwick, 2008; Mezirow, 2000; Yorks & Marsick, 2000). Educators can view learning within schools at the individual, group, and school level through the transformative learning perspective. Six hypothesized constructs of transformative learning were used to investigate collaborative teams (see Figure 3).
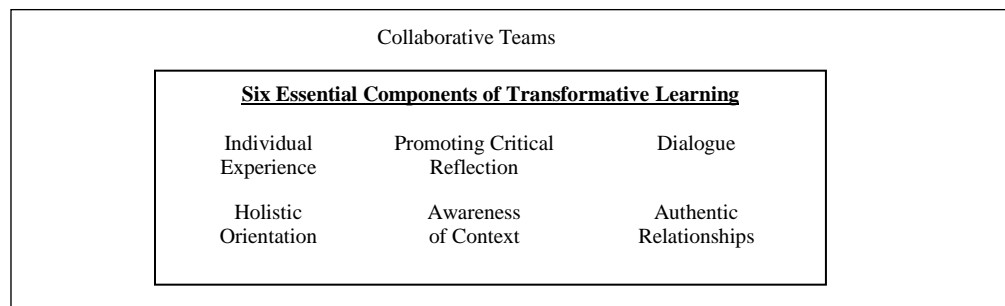
Figure 3. Conceptual framework illustrating collaborative teams framed from six transformative learning theory characteristics.

Taylor (2009) identified six essential components to describe transformative learning within a classroom: individual experience, promoting critical reflection, dialogue, holistic orientation, awareness of context, and authentic relationships. Each

component suggested by Taylor was adapted in the present study and applied as a hypothesized construct used to investigate transformative learning within collaborative teams.

A Priori Theory

A priori theories are logically derived from assumptions made from certain self-evident principles or ideas (Baehr, 2006). The six hypothesized transformative learning constructs identified within this study were assumed to be evident within collaborative teams. The statistical technique of confirmatory factor analysis was used to confirm or reject the six constructs as primary variables of transformative learning within collaborative teams. Currently, no known quantitative instrument has the ability to confirm or reject the existence of transformative learning within collaborative teams.

Psychometrics

Psychometrics is the study of theory and techniques used in educational and psychological measurement and includes the measurement of knowledge, abilities, attitudes, and personal traits (Heppner & Heppner, 2004). A valid and reliable psychometric instrument is developed to interpret these measurements as applied to underlying constructs (Cook & Beckman, 2006). Heppner and Heppner (2004) identified three primary considerations of psychometrics: instrument development, procedures of measurement, and refinement of underlying constructs. Hence, the focus of the current study was the development of a valid and reliable survey instrument. The survey instrument consists of hypothesized transformative learning constructs and items constructed from PLC collaborative team literature.

Summary

The research paradigm of this study provided a conceptual framework to create a focus on studying transformative learning within collaborative teams. Transformative learning theory as a conceptual underpinning was used to better understand learning within collaborative teams. Hypothesized constructs were developed for use in the survey instrument. A priori theory as the second conceptual underpinning assumed that assumptions could be made from the hypothesized constructs by using confirmatory factor analysis; such constructs provided the basis for depicting transformative learning within collaborative teams. Psychometrics as the final conceptual underpinning provided the basis for testing validity and reliability within the survey instrument. The research paradigm of the study brought focus to transformative learning within collaborative teams, which represent an important characteristic within school improvement.

Statement of the Problem

DuFour (2004) suggested that PLC school improvement models had reached a point were initial enthusiasm had given way "to confusion about the fundamental concepts driving the initiative, followed by inevitable implementation problems" (p. 6). Collaborative teams appear in PLC literature as a fundamental concept used to facilitate continuous school improvement (DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). The importance of collaborative teams emphasizes the need to better understand learning within collaborative teams. More specifically, the goal of this study was to discover how teachers working within collaborative teams experienced transformative learning. No known quantitative instrument had measured transformative learning as perceived by teachers working within collaborative teams. School leaders

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and collaborative team members needed an applicable instrument to provide direction on how well collaborative teams experienced transformative learning at the building level. Knowledge of how collaborative teams experience transformative learning could support overall school improvement and performance.

Purpose of the Study

The purpose of this study was to determine whether transformative learning occurred within collaborative teams. To achieve this purpose, the Professional Learning Communities Collaborative Team Survey (CTS) was developed to identify indicators of transformative learning within collaborative teams. The CTS consists of 68 transformative learning items. Each of the 68 items originated from one of six hypothesized transformative learning constructs developed from a meta-analysis of recent literature examining the processes of collaborative teams. The CTS is the first known quantitative instrument used to collect teacher perceptions of transformative learning within collaborative teams. Therefore, this study provides unique insight into transformative learning by determining the psychometric properties associated with CTS validity and reliability. School leaders may use the CTS as a process evaluation or diagnostic tool to better understand transformative learning within collaborative.

DuFour et al. (2005) stated that PLCs are characterized by their collaborative culture; collaborative teams are essential contributors to a PLC collaborative culture. Participants within the study were public school teachers currently working within a school-based PLC. A purposive sampling of PLC schools provided the necessary parameters for studying transformative learning within collaborative teams. The target

audience for findings associated with this study was all school leaders, teachers, and individuals working within a collaborative team.

Chosen Methodology

Several statistical techniques were used in this quantitative study to test and refine the CTS. The CTS collected teacher perceptions in association with six hypothesized constructs. Semantic, differentiated, interval-scaled items were developed for each construct and a Likert-type 4-point rating scale was used to collect participants' responses to each item. The 4-point Likert-type rating scale on the CTS collected teacher perceptions as responses categorized as 1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*. The Likert-type response format is recognized as the most common for measuring attitudes or opinions (McLeod, 2008). The CTS was administered to approximately 457 teachers from 19 different school districts.

The study followed an action plan associated with developing a reliable and valid survey instrument. The action plan was constructed from explanations provided by Trochim and Donnelly (2008) and Heppner and Heppner (2004) in defining steps that contribute to reliability and validity. The action plan involved four steps for developing the survey instrument. The first step was to create content validity within the survey instrument by conducting a meta-analysis of recent academic literature. Step 1 included consulting with a panel of experts to examine constructs and associated items. Step 2 was to secure face validity by conducting a pilot test of the survey. Step 3 was to test construct validity by determining the psychometric properties of the survey instrument through confirmatory factor analysis. Step 4 was to test reliability of individual items and the extracted factors (see Figure 4).

Step 1 – Content Validity
1) Develop theoretical constructs from meta-analysis of recent research literature on transformative learning and professional learning community (PLC) collaborative teams.
2) Support and modification of theoretical constructs by an assembled panel of experts within the field of PLCs.
3) Create survey items by juxtaposing concepts found in both transformative learning and PLC literature.
3) Consult with expert panel to review and modify survey items.

Step 2 – Face Validity
1) Conduct pilot survey to ensure respondents understand informed consent, directions, and survey questions.
2) Collect open-ended feedback from pilot survey participants of how to improve the survey prior to its administration.

Administer survey to study sample.

Step 3 – Construct Validity
1) Use principal component analysis with varimax rotation to determine how many interpretable components exist (eigenvalues > 1.0 or higher).
2) Identify indicators of each component by analyzing factor loadings of each retained by component (factor loading >= 0.5).
3) Construct latent variables by determining underlying relationships by identifying independent subsets formed from interpretable component and associated items.
4) Confirm or reject hypothesized transformative learning constructs.
5) Create alternate forms of survey instrument.

Step 4 – Internal Consistency Reliability Analysis
1) Confirm internal consistency of the survey prior to administering to study sample (Cronbach's alpha value > 0.7).
2) Confirm internal consistency and internal item-total consistency after administered to study sample (Cronbach's alpha value > 0.7).
3) Confirm internal consistency of alternate forms of the survey (Cronbach's alpha value > 0.7).

Figure 4. Action plan for developing a reliable and valid survey instrument.

Research Questions and Null Hypotheses

RQ 1. Is the draft survey a valid and reliable survey instrument?

a. Can a panel of experts establish the presence of content and face validity in the draft survey?

b. Utilizing results of a pilot study, can internal consistency be confirmed in the draft survey?

RQ 2. After confirmation of RQ 1, what are the descriptive summary statistics for teacher perceptions of transformative learning within collaborative teams on each itemized CTS indicator?

RQ 3. Is the Collaborative Team Survey (CTS) a reliable instrument?

    a. Can overall internal consistency be established within the CTS?

    b. Is internal item-total consistency present for each survey item?

Criteria: The statistical technique of Cronbach's Alpha the 0.7 criterion was applied.

RQ 4. How many reliable and interpretable components are present among the developed transformative learning indicators on the CTS?

H4_0: Utilizing the statistical techniques of factor analysis with Varimax rotation, reliable and interpretable components cannot be identified within the transformative learning indicators on the CTS.

RQ 5. Can further application of the statistical techniques of factor analysis be utilized to reduce the number of items to refine and more specifically identify indicators specific to transformative learning within collaborative teams?

H5_0: Further application of factor analysis cannot be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within collaborative teams.

RQ 6. If reliable factors emerge from the factor analysis, is construct validity present in relationship to the hypothesized transformative learning constructs with associated indicators on the CTS?

H6_0: The use of a Varimax rotation does not reveal construct validity in relationship to the hypothesized transformative learning constructs with associated indicators on the CTS.

RQ 7. Can alternate forms of the CTS be created and determined as reliable and valid?

    a. Can alternate forms of the CTS be constructed through the statistical techniques of factor analysis?

    b. Can overall internal consistency be established within alternate forms of the CTS?

Assumptions

The following assumptions were made throughout the study:

1. The implementation of PLC initiatives within a school is the best practice for facilitating school improvement.

2. Transformative learning occurs within collaborative teams with a PLC orientation.

3. Schools participating within the study had a PLC orientation that facilitated teachers working within collaborative teams.

4. The participants within the study were teachers working within a school that had previously participated in three years of MPLC activities.

5. The participants had knowledge of PLCs and recognized strategies associated with PLC initiatives.

6. The participants within the study were teachers who currently worked within a collaborative team.

7. The participants within the study responded to the survey in a straightforward and honest manner.

8.   The participants within the study chose to respond to the survey without any

coercion or undo pressure to participate.

Limitations

The following limitations applied to the current study:

1.   The measure of professional experience each responding participant contributed

to his or her Professional Learning Communities (PLCs) implementation was

unknown. In addressing this limitation, building principals were asked to

distribute the Professional Learning Communities Collaborative Team Survey

(CTS) to teachers who were currently participating within a collaborative team

consisting of teachers only.

2.   Not all teacher participants had the same knowledge concerning working within

PLC collaborative teams. In response to this limitation, a panel of experts and a

pilot test were used to confirm CTS items as meaningful to respondents. In

addition, CTS respondents were purposively selected from schools that had

completed at least three years of membership within the MPLC.

3.   The respondents to the survey instrument were time-bound to complete the

electronically distributed CTS within one week. In response to this limitation, the

CTS was integrated into an Internet-based survey delivered by SurveyMonkey.

The Internet-based format allowed immediate access to the CTS while also

simplifying the survey process.

4.   Results were limited by the degree to which all participants understood and

answered the survey questions within the CTS. In editing the CTS, a panel of

experts addressed this limitation by completing a modified version of the CTS

that included a dichotomous yes-or-no check for understanding of each question and alignment to PLC concepts. The modified CTS allowed members to complete an open-ended response format suggesting question improvement at the conclusion of the survey.

5. Results were limited by the degree to which all participants reported their perceptions. The electronic format of the CTS addressed this limitation with all potential respondents by explanations within a written consent form concerning confidentiality procedures, privacy procedures in desegregating and reporting data, and potential benefits to respondents and society.

6. The hypothesized transformative learning constructs within this study were developed from Taylor's (2000b) identification of six essential components framing a transformative learning approach to teaching. To address this limitation, a meta-analysis of both recent PLC and transformative learning theory literature took place in the study. Collaborative team attributes were aligned to six transformative learning constructs.

7. Results of the study were limited by the reliability and validity of the CTS. The study addressed reliability and validity within the methodology by using a four-step action plan used to bolster reliability as well as content, face, and construct validity.

Delimitations

The following delimitations applied to this study:

1. The participants were public school teachers in Missouri during the 2011-2012 school year.

2.   Purposive sampling was used to seek schools that had completed at least three years of membership with the MPLC Project.

3.   The participants within the study currently worked within a public school that completed at least three years of membership within the MPLC Project.

4.   The CTS was composed of only 68 indicators in compliance with the Region 5 Regional Professional Develop Center (RPDC) request for a concise survey instrument.

5.   The respondents were time-bound to voluntarily complete the CTS within one week its electronic distribution.

6.   The survey was administered only one time to all participants within the identified sample.

7.   CTS items were developed from PLC literature that endorsed the use of collaborative teams.

Definition of Key Terms

The following are definitions of key terms used throughout the study.

Action orientation/experimentation. This is the actual work done by schools that have implemented a PLC design (DuFour & Eaker, 1998; DuFour et al., 2006). Collaborative teams work to answer the four corollary questions and address the 18 critical issues for team consideration (DuFour et al., 2006; MPLC, 2009).

Authentic relationships. These are meaningful, genuine relationships that allow individuals to have questioning discussions, to share information openly, and to achieve greater mutual and consensual understanding (Taylor, 2009).

Awareness of context. This is the understanding of personal and socio-cultural factors as influencing processes found within transformative learning (Taylor, 2009).

Clarifying priorities. Clarifying priorities is a school's development of its mission, vision, values, and goals. The mission, vision, values, and goals foster a sense of commitment with a direction applicable to planning, implementing, and measuring school improvement (DuFour & Eaker, 1998; DuFour et al., 2006; Lunenburg, 2010).

Collaborative teams. Collaborative teams work interdependently toward shared goals and support school improvement by providing a process for learning to occur among teams of teachers. Teams, rather than individuals, work to positively influence student learning through the implementation of curriculum, instruction, and assessment (DuFour & Eaker, 1998; DuFour et al., 2006; MPLC, 2009).

Collective inquiry. Collective inquiry is the process of examining data and finding how to improve by researching best practices of teaching and learning (DuFour & Eaker, 1998; DuFour et al., 2006).

Commitment to continuous improvement. This represents a school's implementation of a learning design that supports the planning, study, development, and assessment of programs that promote student learning (DuFour et al., 2006).

Dialogue. The medium for which learning occurs as individual or groups of individuals reflect upon experience, question assumptions, and beliefs, and transform habits of mind is called dialogue (Cranton, 2006; Mezirow, 2000; Taylor, 2009).

Discriminant analysis. Discriminant analysis is a statistical technique used to determine how dependent variables are best predictors of membership in groups or categories between or among variables (Field, 2005).

Holistic orientation. Holistic orientation recognizes the awareness of feelings and emotion as triggers for learning (Taylor, 2009).

Individual experiences. These are the prior experiences of a learner in terms of knowledge gained from personal and work experiences as well as participation within the social construction of knowledge (Alcantara et al., 2009; Fenwick, 2008; Nonaka & Takeuchi, 1995; Yorks & Marsick, 2000). Individual experience represents the assumptions that underpin a learner's value judgments and normative expectations (Cranton, 2006; Mezirow, 2000; Taylor, 2009).

Professional Learning Communities Collaborative Team Survey (CTS). This survey was developed by the researcher to measure perceived transformative learning within the processes of collaborative teams.

Promoting critical reflection. Here, learners question the integrity of deeply held assumptions and beliefs based upon prior experiences (Cranton, 2006; Mezirow, 2000; Taylor, 2009). Mezirow (2000) stated the critical reflection often emerges from the awareness of conflicting thoughts, feelings, and actions, and at times leads to perspective transformation.

Results orientation. This trait represents commitment within a PLC directed at embedding evidence-based decision-making within everyday practice (Wellman & Lipton, 2004; White, 2007).

Anticipated Benefits

The anticipated benefits of this study arise from the opportunity to better understand transformative learning within collaborative teams. In undertaking this endeavor, the researcher gained professional knowledge within the following areas: (a)

the use of PLCs as a school improvement model, (b) transformative adult learning theory as fostering productive workplace learning, and (c) statistical analysis associated with developing a reliable and valid survey instrument. The amalgamated result of the researcher's gain in professional knowledge is the development of the Professional Learning Communities Collaborative Team Survey (CTS). Schools can gain knowledge of transformative learning within collaborative teams by using the CTS. School leaders and teachers can use CTS results to improve collaborative team performance by fostering transformative learning attributes.

An additional anticipated benefit of this study is its contribution to the research informing transformative learning and collaborative teams. Cranton (2006) discussed a lack of resources and the need for more research pertaining to encouragement of transformative learning within the workplace. The intent of this study was to investigate transformative learning as a workplace phenomenon within collaborative teams of PLC schools. The importance of facilitating productive collaboration in schools is exhaustive (DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). Collaborative teams within PLC schools can now benefit by considering the link between transformative learning and team performance.

The focus of the study on identifying constructs and items associated with transformative learning within collaborative teams represented the most important benefit. No known variables, items, or instruments existed for studying transformative learning within collaborative teams. The present study was the first known attempt to increase understanding of transformative learning within the processes of collaborative

teams. Therefore, this study presented new knowledge informing PLC and transformative learning research.

Summary

This chapter contained background knowledge for implementing PLCs within a school. A research orientation was established to support the development of three conceptual underpinnings, followed by statements of the problem and purpose of the study. A summary of the study methodology included discussion on methods of investigating the problem. Research questions, assumptions, limitations, delimitations, definitions of key terms, and anticipated benefits also appeared in the chapter.

Chapter Two contains the presentation of the context used for writing the review of literature. The chapter includes identification of six hypothesized constructs found within transformative learning theory, discussion of all six characteristics of PLCs, and establishment of the CTS as an instrument used to measure transformative learning within collaborative teams. Chapter Three gives details about the research design of the study, including information about the sample, instrumentation, data collection procedures, and statistical analyses. The results of the statistical analyses appear in Chapter Four. The discussion, implications, and conclusions about the findings appear in Chapter Five.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

A description of the investigation of transformative learning within collaborative teams is the focus of Chapter Two. The researcher in this study has a sincere interest in understanding professional learning communities (PLCs) as a school improvement model. Procedures used in this study were developed specifically to examine transformative learning within collaborative teams. The examination included juxtaposing elements of six developed hypothesized transformative learning constructs with elements of collaborative teams found within the PLC model. The study of transformative learning in collaborative teams provided new insight into research of transformative learning within the public school environment.

The content in Chapter Two assisted in the development of this study. The first focus of this chapter is to provide the context for developing the review of literature for the study. The second focus of the chapter is to provide a review of literature pertaining to both collaborative teams and transformative learning. The analysis of transformative learning helps to explain collaborative team learning within the scope of six hypothesized constructs. The analysis of collaborative teams describes certain structures, processes, and attributes and provides a general description of the five other PLC characteristics as related to collaborative teams. The third focus of the chapter is to explain how the review of literature has contributed to the development of the CTS. A summary concludes the chapter contributions to the study.

Context for the Review of Literature

Missouri state law mandates that all public school districts must participate in the Missouri School Improvement Program. The Missouri School Improvement Program (MSIP) standards and indicators were developed to promote school improvement within each district (Missouri Department of Elementary and Secondary Education [MODESE], 2004). The MSIP also requires each school district to implement a five-year Comprehensive School Improvement Plan (CSIP) to direct overall improvement of educational programs and services. The MSIP and CSIP are two examples of external factors motivating school improvement.

Today's school leaders must work to establish a school environment with the ability to continuously improve. Educational research indicates PLCs represent a school improvement model that promotes continuous improvement within schools (DuFour et al., 2005; Hord, 1997; Hord & Sommers, 2008; Lunenburg, 2010; Preskill & Torres, 1999). As a result, schools have begun integrating PLC characteristics. For example, many Missouri school leaders have facilitated their school's participation in the Missouri Professional Learning Communities (MPLC) Project. The MPLC Project was developed by the MODESE as a program used to assist schools in implementing a school-wide PLC model (Burns, 2009), and research and recognition of the PLC model have influenced the design of school improvement initiatives facilitated within schools.

Collaborative teams are a fundamental building block for facilitating continuous school improvement (DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). Collaborative teams also represent one of six characteristics used in implementing a PLC within a school (DuFour & Eaker, 1998; DuFour et al., 2006; Missouri Professional

Learning Communities Academy, 2009). Literature on PLCs recommends certain

structures, processes, and attributes for utilizing collaborative teams within a school

(DuFour et al., 2006). In this study, organization of these recommendations was in

relation to six hypothesized transformative learning constructs. The developed constructs

were used to determine whether collaborative teams experienced transformative learning.

Review of the problem, purpose, and delimitations of the study provides further context

for the development of this study.

Problem. Does transformative learning occur within collaborative teams?

Answering this question by investigating transformative learning within collaborative

teams was the goal of this study. No known quantitative instrument, variables, or related

indicators existed to understand how collaborative teams experienced transformative

learning. The problem of this study supported the review of transformative learning

literature. The review of transformative learning literature was used to define six

hypothesized transformative learning constructs represented as underlying latent

variables within the CTS. Confirmatory factor analysis (CFA) was used to test the

hypothesized constructs as variables used to understand transformative learning within

collaborative teams.

Purpose of the Study. The purpose of this study was to determine whether

transformative learning occurred within collaborative teams. The objective of the study

was to better understand transformative learning within collaborative teams. Progressive

research directed toward this purpose became even more important, considering the

linking of collaborative teams to overall school improvement (DuFour & Eaker, 1998;

DuFour, 2005; DuFour et al., 2006; Hord, 1997; Hord & Sommers, 2008; Lunenburg,

2010). The purpose of the study supported the review of collaborative team literature.

Specifically, the CTS is composed of 68 items derived from a review of collaborative

team literature. Statistical analysis of the CTS was completed to eliminate or confirm

each item as an indicator of transformative learning within collaborative teams. The

confirmed indicators can be used beyond this study to improve collaborative team

performance by fostering transformative learning.

      Delimitations of the study. In this study, the delimitation of purposive sampling

influenced the literature reviewed. The delimitation of purposive sampling defined a

sample of teacher participants currently working within a school that had completed at

least three years of membership within the MPLC Project. Therefore, PLC literature was

used to synthesize the literature review of collaborative teams. Items found in the CTS

reflect PLC collaborative team literature.

<div align="center">

Overview of Transformative Learning

</div>

      The review of transformative literature in this study is in three sections. The first

section is a definition of transformative learning as used within the study. Secondly,

transformative learning is discussed as one of the conceptual underpinnings of the study.

Finally, a review of transformative learning literature is used to define six hypothesized

constructs.

Transformative Learning Defined

      Transformative learning is defined within this study as a learning process that

uses prior interpretations of human experience to develop new or revised interpretations

to guide future actions (Mezirow, 2000). Mezirow explained the definition as structured

from the suggestion that knowledge is acquired when humans engage in an ill-structured

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problem with no absolute solution. Learning occurs as solutions are constructed from prior frames of reference. A new solution would then imply development of a new frame of reference for future action. Acquiring knowledge by addressing a problematic frame prompts a learning experience that is "more inclusive, discriminating, reflective, open, and emotionally able to change" (Taylor, 2009, p. 22).

Transformative Learning as a Conceptual Underpinning

Transformative learning provides a model for understanding adult learning within various cultural settings (Taylor, 2009). In this study, collaborative teams within PLCs provided the cultural setting for understanding adult transformative learning. The position of the study was that transformative learning occurred within collaborative teams. Support of this position was rationalized by juxtaposing the work of collaborative teams within a PLC with transformative learning through collaborative inquiry within groups. Bray, Lee, Smith, and Yorks (2000) defined collaborative inquiry as small groups addressing compelling questions with a meaningful purpose. The group learns by creating new meaning from repeated cycles of action and reflection (Bray et al., 2000; Cranton, 2006; Taylor, 2009). Similarly, PLC literature described collaborative teams as engaged in collective inquiry, action research, and experimentation (DuFour & Eaker, 1998; DuFour et al., 2006; MPLC, 2009). Such collaborative team activities are used to improve learning within the team.

Transformative Learning Constructs Applied to Collaborative Teams

In this study, six hypothesized constructs were established from transformative learning theory. Taylor (2000b) first identified these constructs as elements to foster transformative learning within school classrooms. The researcher in this study modified

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the elements into hypothesized constructs used as latent variables for understanding

transformative learning within collaborative teams. The following elements were defined

as hypothesized transformative learning constructs: individual experience, promoting

critical reflection, dialogue, holistic orientation, awareness of context, and authentic

relationships.

Individual experience. Taylor (2009) originally defined individual experience as

the prior experiences a learner uses as the starting point for discourse. In collaborative

teams, the individual as a learner has prior life and work experiences that contribute to a

background of tacit and explicit knowledge (Nonaka & Takeuchi, 1995). Careful

attention is needed when grouping individuals for collaborative inquiry (Cranton, 2006;

Mezirow, 2000; Taylor, 2009). Groups of individuals participating in collaborative

inquiry need to invest time in shaping questions, discussing expectations and

commitments, and forming agreements upon how many cycles of action and reflection

are necessary (Taylor, 2009). Meaningful discourse within a group occurs as they engage

in value-laden work and experiential activities (Cranton, 2006; Taylor, 2009). Discourse

within the group is triggered by a disorienting dilemma that questions the group norms

and values.

Promoting critical reflection. Critical reflection occurs when a learner questions

the integrity of deeply held assumptions and beliefs based upon prior experience (Taylor,

2009). Learners experience perspective transformation as a result of critical reflection

(Cranton, 2006; Mezirow, 2000; Taylor, 2009). Mezirow (2000) discussed three forms of

reflection that facilitate perspective transformation: (a) content reflection of what

individuals perceive, think, feel, and act upon; (b) process reflection of how an individual

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functions, given his or her perceptions; and (c) premise reflection as awareness of why individuals perceive and how presuppositions exist within their underlying knowledge.

Dialogue. Dialogue is the medium in which critical reflection is "put into action, where experience is reflected on, assumptions and beliefs are questioned, and habits of mind are ultimately transformed" (Taylor, 2009, p. 9). Dialogue among individuals occurs when beliefs, feelings, and values can be assessed (Cranton, 2006; Mezirow, 2000). Cranton identified ideal conditions for participating in dialogue as follows:

- Accurate and complete information is available,

- The discussion is free of coercion and negative self-perceptions,

- Participants are able to weigh evidence and assess arguments objectively,

- Members are open to alternative perspectives,

- Participants are able to reflect critically on assumptions and their consequences,

- There is equal opportunity to participate, and

- Consensus is accepted as valid.

Taylor (2000a) determined that good reflective dialogue promotes trusting relationships supportive of the process of gaining new insight and understandings. Dialogue provides a forum for participants to speak, listen, and learn collaboratively (Mezirow, 2000).

Holistic orientation. Holistic orientation appeals to the role of feelings or other ways of knowing that are "affective and relational" (Taylor, 2009, p. 10). Brown (2006) suggested holistic orientation involves a see-feel-change sequence instead of a more traditional analyze-think-change sequence. The context of holistic orientation provides

greater recognition of learning as related to emotion and feeling. Holistic orientation may

also include participation in presentational or expressive ways of learning (Yorks & Kasl,

2006). Similarly, Taylor suggested holistic orientation occurs by participating within a

learning environment conducive to whole person learning. For example, Taylor

discussed the *whole person learning* environment as one in which individuals participate

in rituals or create community. Taylor further suggested whole person learning occurs as

learners participate in expressive activities like storytelling and cooperative inquiry.

     Awareness of context. Mezirow (2000) stated that knowledge is not definite, but

rather is due to circumstance and "may best be understood as a continuous effort to

negotiate contested meanings" (p. 3). In negotiating meaning within a group setting,

individuals must have an awareness of the immediate surroundings, understand personal

and professional influences, and have knowledge of background information (Taylor,

2009). Taylor reasoned that awareness of context implies an increased understanding of

personal and socio-cultural factors.

     Scribner and Donaldson (2001) discussed awareness of context in terms of

understanding the dynamics of group learning. Scribner and Donaldson found unequal

distribution of group responsibilities and emphasis on task completion as inhibitors of

reflective dialogue. Taylor (2009) also discussed the awareness of time as a necessary

dynamic of group learning. "Democratic process, inclusiveness of agendas, striving for

consensus, critical reflection, dialogue–create a high demand for time" (p. 11).

     Authentic relationships. Authentic relationships allow "Individuals to have

questioning discussions, share information openly, and achieve greater mutual and

consensual understanding" (Taylor, 2009, p. 13). Relationships provide a medium for

thoughtful discourse and in-depth reflection (Cranton, 2006; Mezirow, 2000; Taylor, 2008). Cranton and Carusetta (2004) suggested five components for authentic teaching and fostering transformative learning. The suggested components provide a context for promoting authentic relationships within a team and have been rewritten for team use:

- Individuals within the team must have self-awareness,

- Team members must be able to consider the needs and interests of others,

- Team members must be genuine and open with each other,

- Team members must develop an awareness of how context shapes practice, and

- Group members should engage in critical group and self-reflection.

Review of Collaborative Team Literature

In this section, the literature reviewed establishes collaborative teams as an important characteristic of school improvement. The literature reviewed has been gleaned from recent PLC research and publications. Collaborative teams are defined as a primary component of establishing a collaborative culture within a PLC (Clay, Sodwedel, & Many, 2011; DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). The literature reviewed in this chapter establishes collaborative teams as associated with five other PLC characteristics. A synthesis of the five other characteristics and their association to collaborative teams is included.

Collaborative Teams Defined

"Creating a collaborative culture is the single most important factor for successful school improvement initiatives and the first order of business for those seeking to enhance the effectiveness of their school" (Eastwood & Louis, 1992). The importance of

establishing a collaborative culture appears in PLC literature as a primary element within

implementation (Clay et al., 2011; DuFour & Eaker, 1998; DuFour et al., 2006). A

collaborative culture is established within a PLC through the alignment of both

systematic and systemic collaborative teams (Clay et al., 2011). Clay et al. defined both

systematic and systemic teams: Systematic teams are horizontal groups of individuals

with similar roles and systemic teams are vertical groups of individuals with different

roles. The primary goal of systematic and systemic teams within a PLC is to improve

student learning (Clay et al., 2011; DuFour & Eaker, 1998; DuFour et al., 2005; DuFour

et al., 2006). Systematic and systemic collaborative teams are the engines of a PLC that

create the momentum to drive school improvement (Clay et al., 2011; Eaker & Keating,

2009).

Systematic Collaborative Teams of Teachers

The literature suggested that collaboration should be embedded within all aspects

of school culture (Clay et al., 2011; DuFour & Eaker, 1998; DuFour et al., 2006; Hord &

Sommers, 2008). Within this section are certain structures, processes, and attributes that

form the basis for understanding how systematic collaborative teams of teachers

influence school culture. Understanding the structures, processes, and attributes of

systematic collaborative teams of teachers aided in developing the CTS.

Structure. In this study, structuring collaborative teams implied organizing

individuals and providing time to promote a collaborative culture. PLC schools had to

first structure a collaborative culture by organizing teachers into collaborative teams.

Organizing collaborative teams of teachers took place by recognizing those who shared

responsibilities and common interest in exploring critical questions about learning (Clay

et al., 2011; DuFour & Eaker, 1998; DuFour et al., 2006). DuFour et al. (2006) suggested organizing collaborative teams of teachers by their mutual interest in exploring five critical questions:

1. What knowledge, skills, and disposition must each student acquire as a result of this course, grade level, and/or unit of instruction?

2. What evidence will we gather to monitor student learning on a timely basis?

3. How will we provide students with additional time and support in a timely, directive, and systematic way when they experience difficulty in their learning?

4. How will we enrich the learning of students who are already proficient?

5. How can we use our SMART goals and evidence of student learning to inform and improve our practice?

PLC schools must recognize time as a structural component of collaborative teams and must establish time for collaborative teams to meet within the contractual day (DuFour et al., 2006). Time as a structural component brings teachers together to collaborate and influences internal operations within the collaborative team. Internal collaborative team structures must also allow for efficient use of allotted time (DuFour & Eaker, 1998; DuFour et al., 2006; Eaker & Keating, 2009). Eaker and Keating (2009) discussed internal collaborative team structures as necessary to promote adherence

> To team norms; clarify and add meaning to essential learning outcomes for each subject or course; develop and utilize formative common assessments; analyze student learning student by student, skill by skill; direct students to specific additional time and support or enrichment; seek out and share best practice; and

lead the team in a process of developing and monitoring the attainment of SMART goals. (Eaker & Keating, 2009, n.p.)

Process. In the present study, collaborative team processes represented the ongoing, interdependent work of teachers that focused on student, team, and school results. DuFour et al. (2006) reiterated this description by emphasizing the importance of educators working collaboratively in ongoing processes of collective inquiry and action research. DuFour et al. (2006) detailed the work done by collaborative teams in the Critical Issues for Team Consideration worksheet. The worksheet brings attention to issues influencing student achievement. For example, team processes should be inclusive of the following: (a) develop and adhere to team norms, (b) clarify and add meaning to essential learning outcomes, (c) develop and use common assessments, (d) analyze student learning, (e) direct students to specific enrichment opportunities, (f) seek out best practice, and (g) constantly develop and monitor SMART goals.

Attributes. In the present study, attributes of a collaborative team were certain behaviors allowing teams to function cohesively. Teams developed norms of behavior that contributed to productive collaborative team output. DuFour et al. (2006) utilized the work of Lencioni (2002) to describe collaborative team behavior. The contraposition of Lencioni's five dysfunctions of a team provided guidelines for describing collaborative team norms. Collaborative team members had to exhibit the following attributes to create a cohesive team that facilitated school improvement: (a) they trusted one another, (b) they engaged in unfiltered conflict around ideas, (c) they committed to decisions and plans of action, (d) they held one another accountable for implementing plans, and (e) they focused on achievement of collective results.

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PLC Characteristics Associated with Collaborative Learning

School leaders endorse the characteristics found within a PLC (Clay et al., 2011; DuFour & Eaker, 1998; DuFour et al., 2006; Hord & Sommers, 2008). DuFour and Eaker (1998) established six characteristics found within a PLC design: (a) shared mission, vision, value, and goals; (b) collaborative teams; (c) collective inquiry; (d) action orientation, and experimentation; (e) commitment to continuous improvement; and (f) results orientation. All six characteristics are interdependent and have attributes embedded within each other. The focus in this study was on the collaborative team characteristic. However, the interdependent relationship between collaborative teams and the other five PLC characteristics was acknowledged. This section contains definitions of the five other characteristics and explanation of their relationship to collaborative teams.

Shared vision, mission, values, and goals. The vision, mission, values, and goals within a PLC provide a shared image of what the school is to look like in the future (DuFour & Eaker, 1998; DuFour et al., 2006; Eaker, DuFour, & DuFour, 2002; Lunenburg, 2010). School improvement initiatives become apparent within the activities of a school by fostering a shared commitment to these four priorities (DuFour & Eaker, 1998; Eaker et al., 2002; Senge, 2006). Following is a brief synopsis of each priority.

The vision statement. The vision statement is a blueprint with certain commonalities that all stakeholders can endorse (Lunenburg, 2010). The blueprint prescribed by the vision statement should clarify a compelling future and align all decision-making (Eaker et al., 2002; Lunenburg, 2010; MPLC, 2009).

The mission statement. The mission statement should communicate a purpose that captures how members within the school will perform their duties (DuFour et al., 2006; Eaker et al., 2002; Lunenburg, 2010) and describe a shift from a generic mission statement to a statement that specifically addresses four corollary questions: (a) What will students learn? (b) How we will know what the students are not learning? (c) How do we respond when students do not learn? and (d) How do we respond when students learn more? Additionally, MPLC (2009) suggested use of a fifth question in writing the mission statement: How do we teach to ensure student learning?

Value statements. Value statements convey stakeholder attitudes, behaviors, and commitments toward moving the school forward (DuFour & Eaker, 1998; Eaker et al., 2002; Lunenburg, 2010). In constructing value statements, opportunities arise for individuals to focus upon themselves (DuFour et al., 2006; Lunenburg, 2010). Value statements define stakeholder behavior and commitment within a school (DuFour et al., 2006).

Goals. Goals are "Desired outcomes, translated into measurable performance standards, monitored continuously, and designed to produce short-term wins and also stretch aspirations" (Eaker et al., 2002, p. 17). School stakeholders have the responsibility to derive goals from the value statements (Eaker et al., 2002; Lunenburg, 2010) and use the goals to set clear standards for school improvement (Lunenburg, 2010).

Lunenburg (2010) stated that within a PLC is "A sense that people understand what is important, what the priorities are, and that they are working together in a collaborative way to advance the school toward those goals and priorities" (p. 1). Collaborative teams are structured to engage in job-embedded work practices that are

reflective of the PLC mission, vision, values, and goals (DuFour & Eaker, 1998; DuFour

et al., 2006). The PLC mission, vision, values, and goals provide an accountability

structure for collaborative teams to align decision-making, while also forming the basis

for review and reflection. Collaborative team

> Members work together to clarify exactly what each student must learn, monitor
> each student's learning on a timely basis, provide systematic interventions that
> ensure students receive additional time and support for learning when they
> struggle, and extend and enrich learning when students have already mastered the
> intended outcomes. (DuFour et al., 2006, p. 3)

Collective inquiry. Collective inquiry promotes continuous improvement for

both schools and individuals (DuFour & Eaker, 1998; Eaker et al., 2002). The collective

inquiry process focuses on making research-based decisions about best practice (Eaker et

al., 2002). This focus gradually contributes to "fundamental shifts in attitudes, beliefs,

and habits, which over time, transform the culture of a school" (DuFour et al., 2006, p.

4). The result of collective inquiry should be the development of new skills related to

teaching students as well as considering how students can better learn.

All PLCs promote social and physical structures that allow teachers to engage in

collective inquiry. In a PLC, the collective inquiry process primarily involves teachers

working within collaborative teams (DuFour et al., 2006) structured to focus on

improving student learning. A three-step inquiry process was used in the present study to

describe collective inquiry (Preskill & Torres, 1999). The steps were (a) define the issue,

identify stakeholders, and create evaluative questions; (b) use a design that includes data

collection, analysis, and reporting; and (c) involve participants by applying knowledge

gained through an implemented action plan to monitor progress. The three steps

discussed by Preskill and Torres provided a description of collective inquiry processes used within collaborative teams.

      Action orientation and experimentation. The PLC philosophy specifically directs people to work together and help each other succeed (Lunenburg, 2010). With this explained, action orientation and experimentation are work done by school stakeholders in coordinating school improvement. Action orientation derives knowledge from praxis and data that is contextually embedded (Coghlan & Bannick, 2005). DuFour et al. (2006) stated, "Learning by doing develops a deeper and more profound knowledge and greater commitment than learning by reading, listening, planning, or thinking" (p. 4).

      The repetitive processes of collaborative teams found within work experience and creating knowledge are what define action orientation and experimentation (DuFour & Eaker, 1998; DuFour et al., 2006). For describing collaborative team processes, DuFour et al. (2006) created the Critical Issues of Team Consideration survey instrument to explicitly define certain processes used within PLC collaborative teams. Further examples of defining action orientation and experimentation can be found with the MPLC implementation rubric (MPLC, 2011). The implementation rubric contains eight strands describing the overall actions found within PLC schools. Strand 3, specific to collaborative teams, describes repetitive practices and protocols used to promote action orientation and experimentation within a collaborative team.

      Commitment to continuous improvement. A commitment to continuous improvement implies creating conditions for perpetual learning (DuFour et al., 2006). DuFour et al. (2006) recommended a systematic learning design that allows PLCs to

continually improve by expanding their awareness and capabilities. The recommended

design involves all PLC members participating in the following cycle:

1. Gathering evidence of current levels of student learning,

2. Developing strategies and ideas to build on strengths and address weaknesses in that learning,

3. Implementing those strategies and ideas,

4. Analyzing the impact of changes to discover what was effective and what was not, and

5. Applying new knowledge in the next cycle of continuous improvement.

Literature addressing PLCs did not identify this recommendation as the definitive

model for promoting perpetual learning. Several different learning designs could be used

to facilitate learning within organizations as well as within groups of individuals

(Morgan, 1997; Nonaka & Takeuchi, 1995; Senge, 2006). The review of literature

revealed that all learning organizations create internal conditions for perpetual learning

and continuous improvement (DuFour et al., 2006; Morgan, 1997; Nonaka & Takeuchi,

1995; Senge, 2006). The PLC model suggests establishing internal collaborative teams

of teachers to facilitate a school's learning capacity (Clay et al., 2011; DuFour & Eaker,

1998; DuFour et al., 2006). Therefore, the use of a learning design by collaborative

teams of teachers provides the conditions necessary to facilitate perpetual learning and

continuous improvement.

Results orientation. "The rationale for any strategy for building a learning

organization revolves around the premise that such organizations will produce

dramatically improved results" (Senge, Kleiner, Roberts, Ross & Smith, 1994, p. 44).

Results orientation within a PLC is fundamental to promoting school improvement (DuFour & Eaker, 1998; DuFour et al., 2006; Reeves, 2007; Wellman & Lipton, 2004). The PLC model is a structure members use to continually organize and analyze evidence of student learning (DuFour & Eaker, 1998; DuFour et al., 2006). A results orientation within a PLC becomes evident as influential decisions emerge from the interpretation of data (Wellman & Lipton, 2004). The use of data then becomes fundamental to the strategic planning of school improvement initiatives (DuFour et al., 2006).

Professional learning communities are composed of collaborative teams of teachers who work to achieve common student performance goals (DuFour & Eaker, 1998, DuFour et al., 2006). A results orientation within collaborative teams becomes evident as members systematically participate in a data-driven dialogue (Wellman & Lipton, 2004) that involves the analysis of data relating to assessment of student performance goals (Guskey, 2007; White, 2007). For example, PLC collaborative teams work to develop common classroom assessments. Data from these assessments are used to facilitate a data-driven dialogue to improve student achievement, focus collective inquiry, and guide action orientation and experimentation (DuFour et al., 2006; MPLC, 2009; Reeves, 2007). Collaborative teams in PLCs also develop specific, measurable, attainable, realistic, and timely (SMART) goals (DuFour & Eaker, 1998; DuFour et al., 2006). SMART goals established by collaborative teams specifically align with district goals (DuFour et al., 2006). Results motivate collaborative teams and contribute to the achievement of SMART goals and other goals directed at improving student performance.

Professional Learning Community Collaborative Team Survey (CTS) Development

The CTS was developed as a quantitative instrument for understanding transformative learning within collaborative teams. Taylor (2009) identified six core elements used to foster transformative learning within the classroom. The researcher modified these six elements and hypothesized them as latent variables used to understand transformative learning within collaborative teams. The latent variables were then used as hypothesized transformative learning constructs. The following hypothesized transformative learning constructs were used to develop the CTS: individual experience, promoting critical reflection, dialogue, holistic orientation, awareness of context, and authentic relationships.

A synthesis of transformative learning and collaborative team literature provided the foundation for the development of CTS items. All CTS items constructed were reflective of transformative learning within Professional Learning Community (PLC) collaborative teams. The CTS items were grouped by hypothesized transformative learning construct in Table 1. Each item in Table 1 focuses upon determining teacher perception as relating to membership within a collaborative team.

The items developed for each hypothesized transformative learning construct were juxtaposed from identified concepts found in both transformative learning and PLC collaborative team literature. Therefore, CTS items are cross-referenced by transformative learning and PLC literature (see Appendix B). The table in Appendix B further substantiated how collaborative teams experienced transformative learning from a theoretical perspective. Appendix C has a list of each CTS item by contributing author, with authors identified in Appendix D.

Table 1

CTS Survey Items by Hypothesized Transformative Learning Construct

Individual Experience
1. I share my professional knowledge.
2. I share my knowledge gained from working in the classroom.
3. I share my classroom data.
4. I have gained new professional knowledge.
5. I have learned from other team members.
6. I have gained knowledge of effective instructional strategies.
7. I believe instruction in my classroom has improved.
8. I believe student learning in my classroom has improved.
9. I believe work done in collaboration aligns with work done in my classroom.
Promoting Critical Reflection
10. I believe we determine what students should learn.
11. I believe we determine whether students have learned.
12. I believe we determine what to do if a student does not learn.
13. I believe we determine what to do if a student does learn.
14. I believe we determine how to teach so all students can learn.
15. I believe we identify best teaching practice.
16. I believe we analyze student achievement data.
17. I believe we implement initiatives to improve student learning.
18. I believe we take action to support student learning.
19. I believe we gather evidence of current levels of student learning.
20. I believe we develop strategies to address weaknesses in student learning.
21. I believe we develop strategies to build upon strengths in student learning.
22. I believe we evaluate the effectiveness of teaching strategies.
23. I believe we establish specific goals.
24. I believe we establish measureable goals.
25. I believe we establish attainable goals.
26. I believe we establish results-oriented goals.
27. I believe we establish time bound goals.
28. I believe our actions are directed at achieving results.
29. I believe we are focused upon student learning.
Dialogue
30. I believe there is openness to alternative points of view.
31. I believe the team is free of negative coercion.
32. I believe we share responsibilities.
33. I believe there is equal participation among members.
34. I believe we address members who are not fulfilling team responsibilities.
35. I believe we freely discuss evidence derived from data.
36. I believe we have access to necessary data.
37. I believe we have established guidelines for communication.
38. I believe we work toward consensus.
Holistic Orientation
39. I believe there is evidence of celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.)
40. I believe we have developed traditions that attribute to team success.
41. I believe we recognize the accomplishment of personal goals.
42. I believe we recognize accomplishment of classroom success.
43. I believe we are respectful of each other.
44. I believe we use conflict as a catalyst for dialogue.

Table 1 (continued)

CTS Survey Items by Hypothesized Transformative Learning Construct

45. I believe our work is guided by an agenda.
46. I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).
47. I believe we have established norms for behavior.
48. I believe there is an appreciation for all members.
Awareness of Context
49. I believe each member contributes.
50. I believe there is a shared sense of responsibility.
51. I believe there is time to promote individual reflection.
52. I believe there is time for team reflection.
53. I believe our work aligns to our school's mission statement.
54. I believe our work aligns to our school's vision statement.
55. I believe our work aligns to values that exist within our school.
56. I believe our work aligns to goals established within my school.
57. I believe there is time to address critical issues.
Authentic Relationships
58. I have confidence when participating in my team's decision-making processes.
59. I feel comfortable in taking risks during team discussions.
60. I believe we encourage positive relationships.
61. I believe our relationships contribute to effective listening.
62. I believe our relationships contribute to open sharing of ideas.
63. I believe there is shared accountability among team members.
64. I believe our relationships promote problem solving.
65. I believe there is trust among members.
66. I believe my relationship with other members has been positive.
67. I believe the environment promotes positive relationships.
68. I value the contributions of team members.

Summary

Chapter Two contained an introduction to the context used for developing the

review of literature. The chapter included a review of the literature of both

transformative learning and collaborative teams. A synthesis of transformative learning

literature contributed to identifying six hypothesized constructs used to understand

transformative learning within collaborative teams. A synthesis of collaborative team

literature contributed to identifying items related understanding transformative learning

within collaborative teams. The hypothesized transformative learning constructs and

items were used to create the CTS. The CTS was created to provide new insight into

understanding transformative learning within collaborative teams.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

Introduction

Chapter Three contains the steps and actions taken in response to the presented

research questions. The first section is a restatement of the problem, purpose, and

research questions guiding the study. The second section contains details of the study

research design. The third section has definitions of the study sample. The fourth section

is a discussion of the instrumentation used in developing a reliable and valid survey. The

fifth section details step-by-step procedures used to collect data. Finally, the sixth section

of the chapter contains a list of the procedures used to analyze data found within the

Professional Learning Community Collaborative Teams Survey (CTS). The chapter

concludes with a summary reiterating the processes involved in the study methodology.

Problem, Purpose, and Research Question Overview

In this study, the problem, purpose, and research questions were directed at

understanding transformative learning within collaborative teams. In response to the

study problem and purpose, the Professional Learning Community Collaborative Team

Survey (CTS) was developed. The review of literature in Chapter Two provided

synthesis needed to develop the CTS by amalgamating transformative learning and

collaborative team literature. The CTS was administered and tested to improve

understanding of the phenomenon of transformative learning within collaborative teams.

In testing the CTS, research questions were aligned with the study problem and purpose

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statements. The statistical analysis involved with each research question appears in Table 2.

Statement of the Problem

Although many authors discussed the importance of transformative learning (Mezirow, 2000; Mezirow & Taylor, 2009; Merriam, 2008), they presented is little or no evidence about transformative learning occurrence within collaborative teams. The problem investigated was the lack of evidence of transformative learning occurring within collaborative teams. No published information or applicable instrument was available for determining whether transformative learning occurred within collaborative teams. No known variables had been used to describe transformative learning within collaborative teams and no known quantitative instrument existed to understand transformative learning as perceived by teachers working within collaborative teams.

The PLC literature broadly defines learning as an essential component of facilitating sustained and substantive school improvement (DuFour & Eaker, 1998; DuFour et al., 2005). Learning occurs in a PLC as individuals work within collaborative teams, participate in collegial inquiry and dialogue, and are motivated to reflect upon important inquiry questions (Hord & Sommers, 2008; Alcantara et al., 2009). In this study, the CTS was developed as both a diagnostic instrument and a process evaluation. Reliability and validity testing of the CTS contributed to defining variables of transformative learning within collaborative teams. Identified variables contributed to revised forms of the CTS instrument.

Purpose of the Study

The purpose of this study was to determine whether transformative learning occurred within collaborative teams. To achieve this purpose, the CTS was developed and tested to define variables used to describe transformative learning within collaborative teams. The CTS was created as a quantitative instrument offering the opportunity to derive new information concerning transformative learning within collaborative teams of public school teachers.

The reason for creating the CTS was to measure transformative learning as perceived by teachers working within collaborative teams. Teachers responding to the CTS were asked to rate their perceptions related to membership within a collaborative team. Items found within the CTS were constructed for each of six hypothesized transformative learning constructs. The CTS was tested for internal consistency, reliability, and validity. A specific action plan (see Figure 4) was followed to test for variables used to describe transformative learning within collaborative teams. In testing the CTS, a unique contribution to research was made to transformative learning, collaborative teams, and professional learning communities.

Research Questions and Null Hypotheses

Does transformative learning occur within collaborative teams? This question guided the overall investigation in this study. To answer this question, teacher perceptions of collaborative team members were examined. The research questions listed below were developed explicitly to guide the study. Table 2 contains further description of the statistical techniques applied to each research question.

RQ 1. Is the draft survey a valid and reliable survey instrument?

a. Can a panel of experts establish the presence of content and face validity in the draft survey?

b. Utilizing results of a pilot study, can internal consistency be confirmed in the draft survey?

RQ 2. After confirmation of RQ 1, what are the descriptive summary statistics for teacher perceptions of transformative learning within collaborative teams on each itemized CTS indicator?

RQ 3. Is the Collaborative Team Survey (CTS) a reliable instrument?

a. Can overall internal consistency be established within the CTS?

b. Is internal item-total consistency present for each survey item?

Criteria: The statistical technique of Cronbach's Alpha the 0.7 criterion was applied.

RQ 4. How many reliable and interpretable components are present among the developed transformative learning indicators on the CTS?

H4$_0$: Utilizing the statistical techniques of factor analysis with Varimax rotation, reliable and interpretable components cannot be identified within the transformative learning indicators on the CTS.

RQ 5. Can further application of the statistical techniques of factor analysis be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within collaborative teams?

H5$_0$: Further application of factor analysis cannot be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within collaborative teams.

RQ 6. If reliable factors emerge from the factor analysis, is construct validity

present in relationship to the hypothesized transformative learning constructs with

associated indicators on the CTS?

H6$_0$: The use of a Varimax rotation does not reveal construct validity in

relationship to the hypothesized transformative learning constructs with associated

indicators on the CTS.

RQ 7. Can alternate forms of the CTS be created and determined as reliable and

valid?

    a. Can alternate forms of the CTS be constructed through the statistical

        techniques of factor analysis?

    b. Can overall internal consistency be established within alternate forms of

        the CTS?

Table 2

Statistical Techniques Applied to Research Questions

Research Question	Purpose Point	Statistical Technique	Anticipated Outcome
RQ 1a: Can a panel of experts establish the presence of content and face validity in the CTS?	To determine whether CTS items are understandably to participants and accurately reflect PLC concepts in alignment to hypothesized transformative learning constructs.	Survey items were evaluated a by panel of experts. After the evaluation revisions were made before sending a pilot survey to a sample of 25 teachers.	The panel will establish content and face validity by item confirmation or by suggesting opportunity for modification and/or refinement.
RQ 1b: Utilizing results of a pilot study, can internal consistency be confirmed in the draft survey?	To check for reliability of the CTS as a consistent measure of one underlying construct administered to pilot study sample.	Calculate Cronbach's alpha to measure overall internal consistency.	Internal consistency will be measured and reliability will be established with a Cronbach's alpha level of 0.7 or higher before collecting data from the sample.

Table 2 (continued)

Statistical Techniques Applied to Research Questions

RQ 2: After confirmation of RQ 1, what are the descriptive summary statistics for teacher perceptions of transformative learning within collaborative teams on each itemized CTS indicator?	To establish initial data, indicating teacher perceptions regarding the learning within their collaborative team as associated by item and identified components.	Descriptive statistics per each CTS item: frequency percentage rates, mean rank, median, standard deviation, skewness, and kurtosis	Report of all items.
RQ 3a: Can overall internal consistency be established within the CTS?	To check for reliability of the survey instrument as a measurement of one underlying construct administered to the sample.	Calculate Cronbach's alpha to measure overall internal consistency.	Internal consistency will be measured and reliability will be established with a Cronbach's alpha level of 0.7 or higher.
RQ 3b: Is there internal item-total consistency for each survey item?	To check the reliability of individual items as internally correlated with overall survey score.	Calculate inter-item correlations to measure internal item-total consistency for each item.	Individual items will be considered reliable if inter-item correlation is 0.7 or higher. Inter-item correlation will be reported for each item in consideration to overall Cronbach's alpha.
RQ 4: How many reliable and interpretable components are there among the developed collaborative team indicators on the CTS?	To utilize confirmatory factor analysis techniques for testing construct validity.	Use principal component analysis with Varimax rotation to identify interpretable components. Evaluate eigenvalues based upon Kaiser's criterion and corresponding scree plot.	Identify interpretable components by collaborative team indicators with generated factor loadings.
RQ 5: Can further application of the statistical techniques of factor analysis be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within a collaborative team?	To reduce the number of items through principal component analysis with Varimax rotation.	Principal component analysis given an alpha level of .05 and with Varimax rotation. (eigenvalue 1.0 or higher).	Factor loadings of 0.5 or higher will be identified as strong items within their designated component. Weak items with a factor loading below 0.5 will be rejected.

Table 2 (continued)

Statistical Techniques Applied to Research Questions

RQ 6: If reliable factors are found from the factor analysis, is construct validity present in relationship to the hypothesized transformative learning constructs with associated to indicators on the CTS?	Compare developed factors to hypothesized transformative learning constructs to secure construct validity.	Use principal component analysis to construct a table factors and indicators.	Use table for cross comparison identified factors and hypothesized constructs. Use table to assess construct validity and confirm or disconfirm transformative learning constructs.
RQ 7a: Can alternate forms of the CTS be constructed through the statistical techniques of factor analysis?	To construct and test refined forms for the CTS.	Use factor loading to build refined forms of the CTS.	Refined forms of the survey will be created by reduction of items with factor loading less than 0.5.
RQ 7b: Can overall internal consistency and reliability be established within alternate forms of the CTS?	To determine overall internal consistency and reliability of refined forms of the CTS.	Calculate Cronbach's alpha to measure overall internal consistency.	Internal consistency will be measured and reliability will be established with a Cronbach's alpha level of 0.8 or higher.

In this study, the research questions explicitly focused on establishing the CTS as a valid and reliable survey instrument. The research questions were aligned to the study problem and purpose to address two areas of need. First, the research questions supported testing the CTS to confirm or reject connections established in Chapter Two used to define transformative learning within collaborative teams. Second, refined versions of the CTS provided an applicable tool used to inform school leaders of transformative learning within collaborative teams. Investigating the research questions provided further understanding of transformative learning within collaborative teams. The remaining sections of this chapter provide the exact steps taken to answer the seven research questions developed from the study problem and purpose statements.

Research Design

Following the advice of Trochim and Donnelly (2008) and Fink (2006), a non-experimental, cross-sectional research design was applied to the study. Trochim and Donnelly (2008) suggested collecting data from a non-experimental study population composed of multiple non-random groups. The researcher identified a non-experimental sample of teachers working within collaborative teams. The researcher then administered the CTS to the sample group (Fink, 2006). Fink (2006) suggested when conducting non-experimental research, a cross-sectional survey design could provide a one-time "snapshot of a group of people or organizations" (p. 60). A one-time collection of data was taken from teachers working within collaborative teams of identified schools. The data collected was used to test and refine the CTS as a process evaluation and diagnostic tool.

Process Evaluation

Fink (1995) suggested using a process evaluation to verify implementation of a program and to determine whether expected outputs were actually produced. Following the advice of Fink, the CTS was written as a process evaluation used by school leaders. The CTS measures teachers' perceptions of those working within a collaborative team, and then determined whether transformative learning occurred as an expected outcome. The data collected from administering the CTS was used to confirm, reject, and revise transformative learning items and variables. The CTS and alternate forms of the CTS were developed for school leaders to evaluate the implementation of school-based collaborative teams and determine whether transformative learning occurs as an expected outcome.

Diagnostic Instrument

Preskill and Torres (1999) recommended the use of a diagnostic instrument to further a team's learning capacity. As advised by this recommendation, school leaders and collaborative team members could make use of the CTS as a diagnostic instrument. The CTS was developed to determine whether transformative learning occurs within collaborative teams and items within the CTS were developed as indicators of transformative learning within collaborative teams. Data from the CTS became diagnostic as collaborative team members and school leaders analyzed individual items and overall measurements of transformative learning using established variables. Improving transformative learning within a collaborative team became prescriptive as participants took actions to address items and areas of concern.

Variable Identification

Heppner and Heppner (2004) recommended establishing a cogent rationale when defining and using variables within a study. The rationale for defined variables in the present study emerged from the researcher's interest in understanding learning within schools that had organized themselves into a PLC. The researcher completed an exhaustive review of PLC literature and established learning within collaborative teams as key to promoting overall school improvement (DuFour & Eaker, 1998; DuFour et al., 2006) and then established transformative learning theory as a conceptual underpinning for understanding learning within teams. Six hypothesized transformative learning constructs identified in recent literature were utilized as initial variables in this study.

The researcher constructed the CTS by identifying certain indicators to define and describe each hypothesized transformative learning construct. The researcher then

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established a relationship between transformative learning identifiers and similar

concepts of collaborative teams found in PLC literature (see Appendix B). The

relationship allowed construction of the CTS using 68 items (see Appendix A). Items

were constructed by juxtaposing transformative learning indicators with PLC

collaborative team concepts (see Appendix B). The testing of hypothesized constructs

and individual items took place through statistical analysis.

Table 3

Variables and Items within the CTS.

Dependent Variables	Items on CTS
Individual Experience	1-9
Promoting Critical Reflection	10-29
Dialogue	30-38
Holistic Orientation	39-48
Awareness of Context	49-57
Authentic Relationships	58-68

Important Study Contributions

The researcher's relationship with the staff at the Region 5, Northwest Missouri

Regional Professional Development Center (RPDC), should be noted as an important

contribution to the study. The RPCD first assisted the researcher by volunteering five

members as advisors by participating on an expert panel. The RPDC members were able

to provide valuable insight in aligning indicators of transformative learning with concepts

found within collaborative teams and were instrumental in reviewing the CTS and

providing suggestions on how to improve content and face validity.

The RPDC agreed to sponsor and administer the CTS to schools that had

completed at least three years of membership in the MPLC Project. The researcher's

relationship with the RPDC allowed identification of PLC schools based upon their membership in the MPLC Project. The RPDC provided blinded archival data after administering the CTS. The RPDC was able to administer the CTS to a purposive sample, control extraneous factors, and carry out a non-experimental, cross-sectional research design.

The RPDC's use of technology provided a third contribution to the study. The RPDC used SurveyMonkey, a web-based survey administration, to survey multiple schools and generated a large number of respondents in a short amount of time. SurveyMonkey made data immediately accessible to RPDC staff members. The researcher petitioned the RPDC (see Appendix E) and received written permission from the RPDC Director (See Appendix F). The researcher received a Microsoft Excel file of blinded archival CTS survey data after the University of Missouri-Columbia Institutional Review Board (IRB) evaluated the study. The IRB determined the study did not require review because the CTS did not qualify as human subject research (see Appendix G).

Study Sample

Missouri has 67,362 public school teachers working in 2,288 schools located in 522 school districts (MODESE, 2012). Over 400 of the 2,288 schools in Missouri currently participated in the MPLC Project. Trochim and Donnelly (2008) suggested use of a purposive sampling when seeking information from predefined groups. Following Trochim and Donnelly's suggestion, a purposive sample of 25 schools received invitations from the RPDC to participate in the study. All of the schools invited to participate were located in northwest Missouri. The RPDC confirmed each school

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invited to participate had previously undergone at least three years of membership within the MPLC Project.

Sample Size

The RPDC confirmed the selected sample consisted of approximately 457 teachers who were currently working within schools that had completed three years of MPLC project membership. Raosoft (2004) provided the calculation for sample size needed to make inferences about the target population. The calculation used the target population of 457 teachers, a 95% confidence level, a 5% margin of error, and a 50% response rate. Given these inputs, Raosoft determined 209 teacher responses would be necessary to maintain a 95% confidence level with 5% confidence interval. Raosoft determined 171 survey responses would provide a 90% confidence level, and 271 responses would equate to a 99% confidence level. The greater number of survey responses, which comprised the sample, corresponded to the increased external validity and the ability to make generalizations and inferences from the sample (Trochim & Donnelly, 2008). Field (2005) suggested the reliability of the correlation coefficients used in the factor analysis was also dependent upon sample size.

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Instrumentation

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The CTS was developed to collect data on perceptions of teachers working in a collaborative team. The CTS consists of 68 items (see Appendix A) created from six hypothesized transformative learning constructs. Each item within the CTS was formatted for semantic differential responses with a 4-point interval-level response format. The 4-point scale used to gather teacher perception was based upon the following scale: 4 = *strongly agree,* 3 = *agree,* 2 = *disagree*, and 1 = *strongly disagree*.

"Reliable and valid surveys are obtained by making sure the definitions and models you use to select questions are grounded in theory or experience" (Fink, 2006, p. 7). A defined action plan (see Figure 4) was implemented in this study to bolster development of a reliable and valid survey instrument. The action plan included four unique steps in association with instrumentation of the CTS: content validity, face validity, construct validity, and internal consistency reliability analysis.

Step 1: Content validity

A survey has content validity when items or questions accurately represent the characteristics or attitudes they intend to measure (Fink, 2006). In this study, CTS items were developed to measure transformative learning within collaborative teams. The CTS is composed of 68 items applicable to teachers working within collaborative teams of professional learning communities and characteristic of six hypothesized transformative learning constructs. Content validity was facilitated by creating CTS items from a meta-analysis of recent literature (Fink, 2006). A panel of experts reviewed content of the items.

Meta-analysis of literature. The researcher conducted a meta-analysis of recent literature to identify six hypothesized constructs and 68 associated items (Thomas & Brubaker, 2000). The meta-analysis consisted of an exhaustive review of transformative learning, collaborative teams, and PLC literature. Six hypothesized constructs were established to describe transformative learning within collaborative teams. The content of the literature review was used to interrelate specific structures, processes, and attributes of PLC collaborative teams to the six hypothesized transformative learning constructs. All CTS items were cross-referenced by PLC collaborative team and

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transformative learning concepts (see Appendix B). In addition, CTS items are listed in

Appendix C, with the notable author or researcher in Appendix D.

Panel of experts. A panel of experts was established to further secure CTS

content validity (Fink, 2006). Members of the panel all worked in positions assisting

with the implementation, monitoring, and training of collaborative teams as well as with

training individuals within those collaborative teams. The initial intent of assembling the

panel of experts was to introduce the hypothesized constructs and associated items. The

panel of experts provided feedback and offered suggestions for improvement and

revision. After the meeting, a revised draft of hypothesized constructs and associated

items were sent electronically to each member of the panel for review. Each member

provided comments detailing suggestions for improvement and modification.

After receiving feedback, the CTS items were converted into survey questions for

administration as a pilot survey. The panel members were asked to complete a third

review of all CTS items written in a survey format. Each panel member detailed an item-

by-item check to secure understandability and alignment to PLC collaborative team

concepts.

Step2: Face Validity

Face validity of the survey instrument relates to the ability of respondents to

understand the survey questions as represented by the hypothesized constructs (Fink,

2006; Trochim & Donnelly, 2008). The CTS was formatted as a pilot survey and

administered to check for reliability and bolster validity (Fink, 2006). The pilot survey

was created as an Internet-based survey and was administered through SurveyMonkey, a

private web-based survey provider. The response format required participants to first

complete an informed consent question. Participants who chose to complete the pilot

survey were then asked to respond to CTS survey items (see Appendix A). At the

conclusion of the pilot survey were four open-ended questions used to collect suggestions

on how to improve the CTS prior to its initial administration.

Twenty-five teachers were selected to participate in the pilot survey. All 25

teachers worked in the same school, which had completed over three years of PLC

orientation. Each teacher chosen worked in one of five curriculum-based collaborative

teams. All 25 selected teachers received an e-mail invitation to participate in the survey.

Nineteen of the selected 25 teachers responded to the pilot survey within one week of

receiving the e-mail invitation. The 19 participant responses provided the data needed to

establish face validity for the CTS. The instrumentation of face validity in this study

aligned with Research Question 1b (RQ 1b) criterion. The criterion required the

establishment of face validity before the CTS could be administered officially.

Step 3: Construct Validity

Construct validity refers to the degree of experimental proof in which legitimate

inferences can be made from the hypothesized constructs used within a study (Fink,

2006; Heppner & Heppner, 2004; Trochim & Donnelly, 2008). Construct validity in this

study was associated with inferences made from six hypothesized transformative learning

constructs used as latent variables for creating CTS items. Statistical methods were used

to strengthen construct validity within the study by confirming or rejecting the

hypothesized constructs, while concurrently maintaining, reclassifying, or removing CTS

items. Principal component analysis (PCA) was the primary statistical method used to

strengthen construct validity, to extract components, and identify associated items.

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PCA is a technique used to conduct confirmatory factor analysis (Field, 2005; Heppner & Heppner, 2004). Principal component analysis is a statistical technique used to test research hypotheses developed to understand structures of latent variables and their relationship with each other (Field, 2005). PCA was used to determine whether the six hypothesized transformative learning constructs exist as latent variables in this study (Field, 2005; Heppner & Heppner, 2004). The analysis completed after PCA was used to confirm or reject the hypothesized transformative learning constructs, determine underlying relationships between components and associated items, and form independent subsets associated with related items.

Principal component analysis was the primary statistical technique applied to analyze construct validity and test hypotheses presented within the research questions. Field (2005) suggested applying three statistical options to make PCA inferences more meaningful. First, Field suggested the use of Kaiser's criterion for retaining components with eigenvalues of 1.0 or higher. Second, Field suggested the use of a Varimax rotation to improve the identification of interpretable components during item loading. Third, Field suggested using factor loadings of 0.5 or higher to identify strong items in relation to designated components. All three suggested options were applied as PCA was used to identify interpretable components from the data. The interpretable components were used to establish latent variables with associated items. The latent variables allowed confirmation or rejection of the hypothesized transformative learning constructs.

Step 4: Internal Consistency Reliability Analysis

Internal consistency analysis implies testing the instrument to determine whether it consistently assesses the construct it is intended to measure (Field, 2005). In this study,

internal consistency reliability analysis was used in determining overall reliability of the CTS as an assessment of transformative learning. After determining overall reliability, a second use of internal consistency reliability analysis was to determine the reliability of each individual CTS item in relationship to all other items. The interpretations of internal reliability found in this study involved multiple calculations of Cronbach's alpha.

Cronbach's alpha is a statistical coefficient widely used to indicate the degree to which a set of measured items is a reliable assessment of a single variable (Field, 2005; Heppner & Heppner, 2004). Cronbach's alpha values greater than 0.7 indicate reliability by conveying the existence of a strong underlying factor (Field, 2005). In this study, Cronbach's alpha was first calculated to measure overall internal consistency of data collected from the pilot study. Second, Cronbach's alpha was used to calculate overall internal consistency of the CTS after administration to the sample. Third, Cronbach's alpha was used to measure reliability of each individual item as compared to all other CTS items. Fourth, Cronbach's alpha was used to calculate overall internal consistency of alternate forms of the CTS developed. Therefore, Cronbach's alpha values calculated have contributed to overall reliability of the CTS as a measure of transformative learning, with reliable components identified as super variables.

Data Collection

Data collection involved establishing a sponsorship agreement (see Appendix E) with the Northwest Missouri Region 5 Regional Professional Development Center (RPDC). The Region 5 RPDC agreed to survey schools that had completed at least three years of participation in the MPLC Project (see Appendix F). The RPDC reported a sample size consisting of approximately 457 Missouri public school teachers. The RPDC

agreed to administer the CTS and maintain all data collected from participating schools.

The researcher petitioned and was granted access to blind archival data with no

identifying information associated to individual responses or participating school

identification. The researcher worked closely with the University of Missouri–Columbia

Institutional Review Board to protect the participating schools, teachers, and the

researcher against potential legal implications and the neglect of important ethical issues.

RPDC Contact of Participants

The researcher had no contact with participating schools or individual

respondents, but instead worked with the RPDC members in drafting e-mail invitations

and electronic informed consent forms for both principals and teachers. RPDC staff

members contacted building principals of selected schools by phone and then forwarded

an e-mail invitation (see Appendix H) to the principals. The principals choosing to have

their school participate in the study had to first complete an electronic consent document

(see Appendix I) by linking to a, Internet-based SurveyMonkey survey application. The

electronic consent acknowledged survey development and sponsorship. The electronic

consent form made principals aware of when school data would be available. The

electronic invitation included notification that data collected from the survey would be

provided to the doctoral candidate as blinded archival data. The Internet-based

SurveyMonkey survey application included additional instructions (see Appendix J) to

help principals distribute the survey to selected collaborative teams.

RPDC members e-mailed consenting school principals after they had completed

the Internet-based SurveyMonkey survey application. The e-mail included a teacher

invitation (see Appendix K) that was forwarded to teachers currently working within a

collaborative team. The teacher invitation allowed each participant to link directly to the SurveyMonkey application of the CTS. All responses were collected by the RPDC and school principals had no access to any individual response.

Teacher participants had to first complete a consent form (see Appendix L) acknowledging their willingness to participation. Teachers who agreed to participate were allowed to complete the CTS survey items. The RPDC reported that individual identifying information was not collected from the teacher respondents. Teacher responses, participation, and non-participation within this study were free of penalty. Individuals could skip items or choose to withdraw from CTS administration at any time.

RPDC Internet-Based Data Collection

The CTS was developed as an Internet-based survey. The RPDC reported participant responses were sent electronically to SurveyMonkey, a private web-based survey company. Participant responses were collected and exported into a Microsoft Excel file for analysis. The Microsoft Excel file was released to the researcher following completion of a petition process (see Appendix E and Appendix F). The RPDC retained all property rights on all information collected. The researcher received blind archival data from the RPDC; therefore, no individual was identified. All schools and individuals participating in this study were assigned a designated code within the exported data.

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Data Analysis

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In this study, data analysis was conducted sequentially by presented research question. The sequential order of the research questions coincided with the development of the Professional Learning Community Collaborative Team Survey as a tool used to describe transformative learning within collaborative teams. The first research question

was established to facilitate the development of content and face validity and reliability before collecting data from the study sample. After addressing RQ 1, the researcher received a blinded Microsoft Excel file of archival data consisting of participant responses from the administration of the CTS. RQ 2 allowed the researcher to screen data and make general observations about transformative learning within collaborative teams (Field, 2005; Heppner & Heppner, 2004). The purpose of RQs 3-7 was to analyze construct validity within the CTS. The analyses of construct validity allowed making observations to establish findings and results.

Statistical Analyses Applied to Research Questions

The analysis of the research questions aligns with the study problem and purpose statement as well as the parallel actions needed to complete the instrumentation of the CTS. The blinded data received from the RPDC was imported into the Statistical Package for Social Sciences (SPSS) version 19 software loaded on the researcher's computer. The data analysis applied to each specific research question.

RQ 1a. A panel of five experts was established to address RQ 1a. The panel of experts reviewed the CTS for content validity on three separate occasions. The expert panel helped secure content validity by (a) affirming the importance of the hypothesized transformative learning constructs in relation to PLC collaborative teams; (b) making suggestions for CTS item revision and modification; (c) confirming the understandability of CTS items as presented as question in an Internet-based survey; and (d) confirming CTS items aligned with PLC collaborative team concepts.

RQ 1b. Data collected from a pilot survey was used to analyze RQ 1b with the purpose of securing face validity. The pilot survey provided the data used to statistically

test for both internal consistency and construct validity. Two statistical techniques were applied: (a) a Cronbach's alpha value of greater than 0.7 was calculated to confirm internal consistency, and (b) PCA confirmed the existence of interpretable components with eigenvalues of 1.0 or higher. RQ 1b allowed the establishment of face validity prior to collecting data from the study participants.

RQ 2. Descriptive summary statistics of collected interval data were calculated for each item in the CTS. SPSS performed the following calculations: mean rank, standard deviation, skewness, kurtosis, number of responses, frequency, and percent.

RQ 3a. SPSS software was used to calculate a Cronbach's alpha value to determine overall internal consistency. The Cronbach's alpha value allowed making inferences about the extent to which the CTS measured one underlying construct. The measurement was used to assess reliability of the CTS in measuring transformative learning within collaborative teams.

RQ 3b. SPSS software allowed the calculation of inter-item correlations. The inter-item correlations provided a measure of how individual items correlated to all CTS items as a total. SPSS also provided a calculation of Cronbach's alpha based upon removal of the individual item. Inferences were made about the influence of individual items on overall reliability of the CTS. The findings provided a base for discussion about CTS item confirmation versus item reduction.

RQ 4. Principal component analysis (PCA) was used to perform a confirmatory factor analysis (CFA) by determining the interpretable component existing within collaborative team indicators. The PCA identified components with eigenvalues of 1.0 or higher and utilized Varimax rotation to improve interpretability of extracted components

(Field, 2005). A scree plot was used with the PCA to determine component eigenvalues greater than 1.00. Components derived from the PCA and the scree plot appear in a table by component, eigenvalue, and percentage of variance. A cross-comparison of extracted components took place to test construct validity to confirm or reject hypothesized transformative learning constructs.

RQ 5. Principal component analysis was used to reduce items and identify indicators as specific to interpretable components. The PCA included a Varimax rotation and the extracted components had eigenvalues of 1.0 or higher. Items with factor loadings of 0.5 or higher were identified as strong items in relation to their designated component. The weaker items with factor loadings below 0.5 were rejected.

RQ 6. Principal component analysis was used to construct a component matrix and component correlation matrix. The component matrix allowed identification of indicators with factor loadings of 0.5 or higher by factor after rotation. The component correlation matrix was used to test for independence and to reveal relationships between factors.

RQ 7a. Alternate forms of the CTS were created from the findings and RQ 5. Alternate CTS forms were constructed with items that had factor loadings of 0.5 and higher. Principal component analysis was used to create a component correlation matrix to identify factor loadings of 0.5 or higher and to construct alternate forms for the CTS though item identification and reduction.

RQ 7b. A Cronbach's alpha value was calculated to determine overall internal consistency and reliability of the refined CTS forms. Items with factor loadings of 0.5 or higher found in RQ 6a were organized by interpretable component. A Cronbach's alpha

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value of 0.8 was used to establish overall internal consistency and reliability (Field, 2005). Cronbach's alpha values were used to calculate internal consistency and reliability of individual components by assigned items. The SPSS software created a corrected item-total matrix indicating Cronbach's alpha value if items were deleted. The item-total matrix allowed improvement of the internal consistency of the alternate forms.

Summary

Chapter Three contained a discussion of the methodology used in this study. The chapter began with a summary of information presented in Chapter One and Chapter Two. Following the introduction, Chapter Three was divided into six sections: Research Design, Study Sample, Instrumentation, Data Collection, and Data Analysis. The research design was a non-experimental, quantitative, cross-sectional survey research design. The study sample consisted of teachers currently working in a purposive sample of schools located in northwest Missouri. The instrumentation involved development of the CTS and implementation of a prescribed action plan to bolster reliability and validity.

Data collection methods used in this study included a sponsorship agreement with the Northwest Missouri Region 5 Regional Professional Development Center (RPDC). The RPDC reported using SurveyMonkey as an Internet-based survey administration program. The researcher received a Microsoft Excel file of blinded archival survey data from the RPDC. Data analysis was conducted using SPSS software, and the various statistical procedures used for each unique research question appear in Table 2.

The objective of this study was to investigate the phenomenon of transformative learning within collaborative teams. This chapter contained an explanation of the processes used to determine whether transformative learning occurs within collaborative

teams. The results of detailed statistical analyses conducted for this study are in Chapter

Four and the CTS used to collect data for this study appears in its entirety in Appendix G.

CHAPTER FOUR

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to determine whether transformative learning

occurred within collaborative teams. To achieve this purpose, the Professional Learning

Community Collaborative Team Survey (CTS) was implemented with a research design

used to create knowledge about transformative learning within collaborative teams of

Professional Learning Communities (PLCs). The research design implemented in this

study provided a blueprint for evaluating the research questions. The CTS was further

developed, administered, and tested as the research questions were evaluated. Data

collected to evaluate the research questions were from a non-experimental, cross-

sectional sample of study participants. The research questions were aligned to an action

plan (see Figure 4) to impose an amalgamated methodological approach used to create

knowledge about transformative learning within collaborative teams of PLCS.

In this chapter, the first section contains a description of the study participants

from whom data were collected. The second section is a presentation of the findings and

an interpretation of the results for each research question. The final section of this

chapter has a summary and conclusion.

Description of Study Participants

The Northwest Missouri Regional Professional Development Center (RPDC) used

the CTS as an instrument for measuring transformative learning within collaborative

teams of Missouri Professional Learning Communities (MPLC) schools. The researcher

received blinded archival data from the RPDC through an established sponsorship

agreement (see Appendix E and Appendix F). The blinded archival data confirmed the

RPDC administered the CTS as presented in previous chapters. The study sample

defined by the RPDC consisted of schools that had completed at least three years within

the MPLC project (see Appendix F).

Study Sample

The RPDC identified 25 schools in northwestern Missouri that had participated in

at least three years of membership within the Missouri Professional Learning

Communities (MPLC) Project. Building principals of all 25 schools were contacted and

provided access to administer the CTS. Nineteen of the selected 25 schools chose to

administer the CTS during the 2011-2012 school year. The RPDC provided the

researcher with blinded archival data collected from 19 total schools consisting of an

overall estimated sample of 457 teachers.

Sample Size

The blinded archival data provided by the RPDC contributed an aggregated total

of participant responses ranging from 234 to 255 per CTS item. As shown in Table 4, the

sample size of participants represented on all 68 CTS items reflected over 50% of the

total estimated population. Raosoft (2004) was the software tool used to calculate a

desired sample size of 209 teacher participants. The response rate range for each CTS

item exceeded the calculation found in Chapter Three. Given the range of total

responses, Raosoft was used to calculate confidence level and the corresponding

confidence interval based upon a total of 234 and 255 participant responses.

A sample size of 255 responses implied a confidence level of 98.35% with a

corresponding confidence interval of 4.08%. A sample size of 234 responses implied a

confidence level of 97.10% with a corresponding confidence interval of 4.48%. The

aggregated total of participant responses found in this study implied the presence of external validity and the ability to make applicable generalizations about the entire population. The aggregated total of participant responses also implied increased reliability in estimating relationships between variables found when utilizing factor analysis.

Table 4

CTS Participant Sample Size and Significance Testing

Responses	Response Rate	Confidence Level	Confidence Interval
234	51.20%	97.10%	4.48%
255	55.79%	98.35%	4.08%

Total Response and Frequency

The table in Appendix M was constructed to display frequency data collected from the RPDC administration of the CTS (Heppner & Heppner, 2004; Trochim & Donnelly, 2008). Construction of Appendix M allowed the researcher to make observations prior to analyzing the research questions. Identified in Appendix M are total responses, missing responses, and frequency rates per question on CTS items. The calculated frequency rates are based upon the percentage of responses collect in regards teacher perception: 4 = *strongly agree*, 3 = *agree*, 2 = *disagree*, and 1 = *strongly disagree*.

A total of 255 teacher participants responded to at least one CTS question. The number of missing responses due to participants choosing to either skip a question or not complete the CTS was, at most, 21. As shown in Appendix M, the number of missing responses increased as the participants responded to a sequential order of questions.

Respondent fatigue typically contributes to missing questions (Heppner & Heppner, 2004).

The frequency data revealed evidence of respondent fatigue based upon the systematic frequency of response patterns observed in Appendix M. Missing responses became more numerous as teacher participants sequentially answered presented items. The researcher did not delete or use imputation data methods when presented with missing responses. The researcher maintained all collected data, given the dense sample space and the achieved confidence interval (Trochim & Donnelly, 2008).

Five CTS items in Appendix M had more than two missing responses as compared to the items presented sequentially before the listed item. Item 12, 38, 43, 42, 47 are identified in Table 5 with a corresponding delta value. Delta, as shown in Table 5, indicates the change in value of missing responses as compared to the CTS item presented immediately prior to the listed indicator.

Table 5

CTS Items with Greater than Two Missing Responses as Compared to Item Presented Immediately Before

Item	Indicator	Missing Responses	Δ
12	I believe our relationships promote problem solving.	9	9
38	I believe there is time to promote individual reflection.	19	6
43	I believe our work is guided by an agenda.	16	5
42	I believe we use conflict as a catalyst for dialogue.	21	4
47	I believe we establish results-oriented goals.	19	3

As shown in Table 5, the delta indicates items that did not follow a response pattern, indicating respondent fatigue. Items that are sensitive or uncomfortable for participants to answer might contribute to missing responses (Heppner & Heppner, 2004;

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Trochim & Donnelly, 2008). Heppner and Heppner discussed missing responses as sometimes due to vagueness of an item and the participants' inability to understand the presented question. The researcher in this study interpreted the missing responses associated with items 38, 43, and 47 as due to vagueness. CTS participants might have not understood concepts of individual reflection or results-oriented goals, or how to utilize an agenda to guide work done within a collaborative team. The researcher identified items 12 and 42 as sensitive to CTS participants. CTS items 12 and 42 addressed relationships and conflict within collaborative teams that might have been uncomfortable for members.

Presentation of Findings by Research Question

The presentation of the findings in this study is by research question. The research questions were ordered to facilitate testing of the CTS as a psychometric instrument. A review of the analysis methods applied to each research question was established prior to presenting the findings. The findings were then presented and ameliorated though the presentation of data calculations, tables, and figures. An interpretation of the results for each research question is provided. Inferences made from the investigation of each research question contributed to new informative knowledge about transformative learning within collaborative teams.

Research Question 1

Development of the CTS was initiated through a defined action plan (see Figure 4) used to bolster validity and reliability within the instrument. In alignment to the action plan, RQ 1 provided an evaluation of validity and reliability of the CTS as a drafted instrument. The findings of RQ 1 allowed further construction of the CTS as a valid and

reliable instrument. RQ 1 was evaluated prior to the Northwest RPDC administering the CTS to the study sample.

      RQ 1a. Can a panel of experts establish the presence of content and face validity in the draft survey?

      RQ 1a analysis methods. A panel of experts provided systematic feedback to the researcher on the content of developed CTS items. The researcher created a draft of the CTS (see Appendix O) consisting of 72 indicators of transformative learning within collaborative teams. The drafted CTS was given to panel members for review of content and face validity. Panel members were asked specifically to identify indicators not clearly stated or not aligned to PLC collaborative team concepts. Each member of the panel of experts provided individual feedback to the researcher.

      *RQ 1a findings***.** Five members of the panel of experts provided individual feedback to the researcher on all 72 drafted CTS items. The expert panel confirmed content and face validity of 68 items within the draft survey. Items in Table 6 were deleted from the draft CTS survey, based upon feedback from the expert panel. Multiple members of the expert panel indicated items 32, 36, 53, and 64 as not clearly stated or not aligned to PLC collaborative team concepts.

Table 6

Item Deleted From CTS Draft After Panel of Expert Review

Item	Indicator
32	I believe we can be characterized as being cooperative.
36	I believe we have all relevant information.
53	I believe there is equitable participation among members.
64	I collaborate with colleagues that have complementary skills.

The expert panel provided feedback used to revise items 3, 6, 28, 34, 38, 45, and 51. Items shown in Table 7 are CTS drafted items the panel of experts identified for revision. The revised items are in Table 7 and in the final CTS draft in Appendix A. The expert panel confirmed the presence of content and face validity in the 68 CTS items after suggested revisions.

Table 7

Draft Survey Items Identified for Revision as Used on Collaborative Team Survey

Drafted Survey Item	Collaborative Team Survey Items
3. I share data obtained from my students.	3. I share my classroom data.
6. I have gained positive teaching skills.	6. I have gained knowledge of effective instructional strategies.
28. I believe our actions are directed at achieving positive results.	28. I believe our actions are directed at achieving results.
34. I believe there is equal opportunity to participate among members.	33. I believe there is equal participation among members.
38. I believe we have free access to necessary data.	36. I believe we have access to necessary data.
45. I believe we are respectful of each other's feelings.	43. I believe we are respectful of each other.
51. I believe each member contributions personally.	49. I believe each member contributes.

Interpretation of RQ 1a Results. The researcher applied the findings of RQ 1a and constructed a revised draft of the CTS. The revised CTS draft consisted of 4 less items and 7 new revised items. Results of RQ 1a confirmed 68 CTS items as relevant and clear indicators of transformative learning within collaborative teams. The panel of

experts confirmed the presence of content and face validity in the CTS. The revised draft of the CTS completed after evaluating RQ 1a was used throughout the study.

RQ 1b. Utilizing results of a pilot study, can internal consistency be established within the CTS?

RQ 1b analysis methods. The researcher used the survey drafted at the conclusion of RQ 1a to conduct a pilot study. The pilot study consisted of 19 teacher participants working in collaborative teams of a PLC school. The Statistical Package for the Social Sciences (SPSS) 19 was used to calculate a Cronbach's alpha value. A Cronbach's alpha value of greater than 0.7 was the criterion used to confirm internal consistency (Field, 2005).

RQ 1b findings. SPSS 19 was used to calculate a Cronbach's alpha value of 0.989 as related to data from all 68 items of the drafted CTS. The pilot study established the CTS as having internal consistency. The Cronbach's alpha of 0.989 confirmed the 68 items located on the CTS were reliable measures of transformative learning. The 68 items presented in the pilot study were finalized as indicators of transformative learning used in all subsequent versions of the CTS.

Interpretation of RQ 1b Results. RQ 1b confirmed the CTS as a reliable, overall internally consistent survey instrument. The Cronbach's alpha value of 0.989 indicated all 68 items were highly analytic measures of one underlying construct. Responses taken from the 19 teacher participants on the drafted CTS were used to determine the CTS as a reliable survey instrument. As a result of the RQ 1b, the researcher forwarded the CTS to Northwest RPDC as an instrument used to collect perceptions of transformative learning within collaborative teams.

Research Question 2

The researcher utilized RQ 2 to provide descriptive summary statistics for all 68 CTS items. The purpose of RQ 2 was to provide descriptive analyses of teacher perceptions to depict how participants responded as a group to each CTS indicator. Descriptive summary statistics generated to address RQ 2 are in Appendix M and Appendix N.

RQ 2. After confirmation of RQ 1, what are the descriptive summary statistics for teacher perceptions of transformative learning within collaborative teams on each itemized CTS indicator?

RQ 2 analysis methods. Descriptive summary statistics were generated from blinded data received from the Northwest Missouri Regional Professional Development Center (RPDC). Frequency percentage rates, mean rank, median, standard deviation, skewness, and kurtosis were reported for all 68 CTS item. The amalgamated generated data provided initial inferences about teacher perceptions in regards to transformative learning within collaborative teams.

RQ 2 Findings. Appendix M and Appendix N contain descriptive summary statistics for all 68 CTS items. Teacher perceptions of each indicator ranged from scores of 1 = *strongly disagree* to 4 = *-strongly agree*. As shown in Appendix M, 3 = *agree* had the highest percentage of responses for 64 of the 68 items. Four items in Appendix M— 9, 10, 49, and 66—had 4 = *strongly agree* as the most frequent response. Table 8 shows four items had over 95% of the responses as either 4 = *strongly agree* or 3 = *agree*.

Table 8

Identified CTS Items with 95% of Participant Responses as Agree and Strongly Agree

Item	Indicator	Strongly Agree (%)	Agree (%)	Cumulative (%)
66	I value the contributions of team members.	54.20	44.96	99.16
64	I share my knowledge gained from working in the classroom.	43.70	53.36	97.06
16	I believe instruction in my classroom has improved.	45.53	50.81	96.34
49	I have learned from other team members.	51.26	44.54	95.80

Mean rank, median, standard deviation, skewness, and kurtosis further explain the

dispersion of data for all 68 items. The median value of 3 was generated as the 50th

percentile of all participant response for all 68 items. The standard deviation revealed

very little difference in variance as reported for all 68 items. The use of standard

deviation in consideration to mean rank and skewness reinforced the findings that all 68

items deviate from a normal distribution. The positive and negative kurtosis values

reported by CTS item indicate differences in how data in dispersed. Negative kurtosis

values implied a platykurtic dispersion of data with more item scores distributed between

1 = *strongly disagree* to 4 = *strongly agree*. CTS items with positive kurtosis values

indicated a leptokurtic dispersion of data with a greater distribution of participant

responses of 3 = *agree* and 4 = *strongly agree*. The central tendency for all 68 CTS items

indicates a shift centered between 2.66 and 3.53. Descriptive statistics from Appendix N

were used to construct Table 9 and Table 10.

As shown in Table 9, items 61, 60, 36, 38, and 42 had the lowest calculated

means of the 68 CTS items. The negative kurtosis value of all five CTS items listed in

Table 9 described the response data as more dispersed among 1 = *strongly disagree* to 4

= *strongly agree* as compared to other items. Table 9 items had higher standard deviation

values as compared to most other items in Appendix N.

Table 9

Five CTS Items with Lowest Calculated Mean Values

Item	CTS Item	*M*	*Mdn*	*SD*	Skewness	Kurtosis
61	I believe we address members who are not fulfilling team responsibilities.	2.66	3	0.825	-0.123	-0.515
60	I believe the team is free of negative coercion.	2.85	3	0.826	-0.256	-0.541
36	I believe there is equal participation among members.	2.88	3	0.882	-0.385	-0.589
38	I believe there is time to promote individual reflection.	2.94	3	0.727	-0.238	-0.272
42	I believe we use conflict as a catalyst for dialogue.	2.94	3	0.747	-0.332	-0.16

As shown in Table 10, items 66, 9, 49, 10, and 16 were identified as having the highest calculated mean of all 68 CTS items. All five items identified in Table 10 are skewed, with a high percentage of responses as 3 = *agree* or 4 = *strongly agree*. The standard deviation of all five items was lower in value as compared to most other items in Appendix N. The standard deviation values of the items identified in Table 10 provided further indication that participant responses for these items were primarily 3 = *agree* or 4 = *strongly agree*. The kurtosis value of items 66 and 16 is noted in the items listed in Table 10. Items 66 and 16 have similar distribution responses between 3 = *agree* and 4 = *strongly agree*, with little to no participant responses of 2 = *disagree* or 1 = *strongly disagree*. The positive kurtosis value for 66 and 16 indicated a platykurtic relationship to scores only distributed between 3 = *agree* and 4 = *strongly agree*.

Table 10

Five CTS item with highest calculated mean values

Item	CTS Item	*M*	*Mdn*	*SD*	Skewness	Kurtosis
66	I value the contributions of team members.	3.53	4	0.517	-0.321	-1.467
9	I believe our actions are directed at achieving results.	3.47	4	0.619	-0.824	0.187
49	I have learned from other team members.	3.47	4	0.593	-0.728	0.243
10	I believe we are focused upon student learning.	3.45	4	0.650	-0.941	0.571
16	I believe instruction in my classroom has improved.	3.42	3	0.564	-0.296	-0.839

Interpretation of RQ 2 results. The descriptive summary statistics provided a general insight into how the overall study group of teacher participants responded to CTS items. The overall distribution of participant responses for all 68 items indicated a non-normal distribution. The distributed sample of participant responses for all 68 CTS items were negatively skewed, with frequency distributions indicating a high percentage of responses as 3 = *agree* and 4 = *strongly agree*. The homogeneity of variance with little variation among CTS items is reflective of the delimitation of the study to a purposive sample of survey respondents. The CTS was administered only to teachers working within schools that had completed three years of membership in the MPLC Project. These teachers responded to CTS items that were written as indicators of transformative learning, but are also reflective of best practices found with PLC literature. The consistency of variation among CTS items is attributed to teacher respondents already having advanced knowledge of the indicators of transformative learning as implemented within a school organized to facilitate PLC best practices.

The descriptive summary statistics provided additional support of reliability calculations and component analyses completed in subsequent research questions. The descriptive summary statistics indicated no univariate or multivariate outliers within the data set. With no outliers present and similar distributions and dispersions of data for all 68 CTS items, the researcher was able to assume calculations of internal consistency would be relatively high and the existence of a strong underlying variable. The similar distributions and dispersion of data for all 68 CTS items allowed the researcher to determine the results of the study would not be generalizable beyond the sample collected.

Research Question 3

The purpose of RQ 3 was to establish the CTS as a reliable instrument used to measure transformative learning within collaborative teams. A Cronbach's alpha value of 0.7 was established as the criteria for RQ 3a and RQ 3b. Cronbach's alpha values of 0.7 or higher within this study were considered to be measures of implied reliability. A Cronbach's alpha value was statistically calculated for RQ 3a to determine overall internal consistency of the CTS as an instrument. For RQ 3b, multiple values of Cronbach's alpha were calculated to determine whether internal items of the CTS were reliable measures as compared to all other items.

RQ 3a. Can overall internal consistency be established within the CTS?

RQ 3a analysis methods. Calculating a Cronbach's alpha value took place for data collected on all 68 CTS items. The criterion of Cronbach's alpha value of 0.7 or higher was used to determine whether the CTS was overall internally consistent.

RQ 3a findings. A Cronbach's alpha value of 0.989 was calculated by conducting a reliability analysis on all 68 CTS items. The Cronbach's alpha value revealed items on the CTS had overall internal consistency and reliability.

Interpretation of RQ 3a results. The findings of RQ 3a confirmed the CTS as a reliable and internally consistent survey instrument. The Cronbach's alpha value was used to measure the extent to which the scale measures one underlying factor or construct. The CTS was developed to measure transformative learning within collaborative teams. The Cronbach's alpha value of 0.989 provided further evidence the CTS is a reliable overall measure of transformative learning within collaborative teams as defined in this research.

RQ 3b. Is there internal item-total consistency for each survey item?

RQ 3b analysis methods. Determining the reliability of each CTS item as internally consistent with all other items was necessary. The first statistic calculated was a corrected-item total correlation score for each CTS item. The corrected-item total correlation score provided a reliability scale of how each item correlated to an overall internal consistency score taken from all other items. The second statistic was a score to determine whether reliability of the instrument, Cronbach's alpha, would improve if the item were deleted. Items with item-total correlation values less than 0.3 have a low correlation and may need to be dropped (Field, 2005).

RQ 3b findings. The item-total statistics revealed all 68 CTS items had internal item-total consistency (see Appendix P). Total correlation scores ranged from 0.62 to 0.862, with all items above 0.3. There were no cases of improved overall internal

consistency based upon removal of a selected item. All items were maintained within the

data set and determined to contribute positively to overall reliability.

Interpretation of RQ 3b results. Results of RQ 3b provided further confirmation

of the CTS as a reliable measure of its intended target. The calculated internal item-total

consistency determined all CTS items as internally consistent with each other and

positively contributing to the overall CTS reliability. A high degree of internal

consistency was found in the sampled population. Readers of this study can be confident

the findings derived from the use of the CTS in this study are valid and reliable.

Research Question 4

The purpose of RQ 4 was to determine whether reliable and interpretable

components could be derived from the data. Conducting a principal component analysis

(PCA) with Varimax rotation on all 68 CTS items took place. The number of

interpretable components to extract from the data set was calculated. The interpretable

components extracted were designated as latent variables used to describe transformative

learning within collaborative teams. The latent variables were further analyzed by

structuring associated CTS item into independent subsets. Inferences made about the

latent variables were compared to hypothesized transformative learning constructs.

RQ 4. How many reliable and interpretable components are there among the

developed transformative learning indicators on the CTS?

RQ 4 analysis methods. Calculating a PCA took place for data collected on all 68

CTS items. Four primary statistical options provided the rationale for examining whether

interpretable components existed. First was the use of a Varimax rotation to improve

identification of the interpretable components. Second was the use of Kaiser's criterion

for retaining components with eigenvalues of 1.0 or higher. Third was using factor

loadings of 0.5 or higher to designate certain items to component to which they strongly

related.

When data exists for over 200 participants, a scree plot with an identified point of

inflection may be used to determine how many components exist (Field, 2005). The

statistical option combined with identified component eigenvalues and associated

percentages of variance provided the methodology needed to extract interpretable

components from the data. RQ 4 provided the analyses needed to name the two

components, based upon existing patterns identified from the factor loadings.

RQ 4 findings. Utilizing the statistical techniques of principal component analysis

with Varimax rotation, the null hypothesis for RQ 4 was rejected. Seven different

components were identified using Kaiser's criterion for extracting components with

eigenvalues greater than 1.0. The seven components with their associated percentages of

variance are in Table 11. Communalities explaining how each CTS items related to the

remaining seven components with eigenvalues greater than 1.0 are in Appendix Q.

Table 11

Initial Eigenvalues and Percentage of Variance

Component	Initial Eigenvalues	% of Variance
1	39.215	57.670
2	3.555	5.229
3	2.086	3.068
4	1.678	2.467
5	1.274	1.874
6	1.233	1.813
7	1.048	1.541

Kaiser's criterion is accurate under only two circumstances: (a) when the number

of components after extraction are less than 30 and the resulting communalities are

greater than 0.7, or (b) when the sample size exceeds 250 and the average communality is

greater than or equal to 0.6 (Field, 2005). The PCA yielded several communalities less

than 0.7 (see Appendix Q) and the participant sample did not exceed 250 responses on all

CTS items (see Appendix M). The percentage of variance of each component indicated

the first component accounted for the greatest majority. Therefore, the scree plot

generated from the PCA was used to better examine the number of existing components,

given the possibility of Kaiser's criterion as inaccurate, based upon generated PCA data.
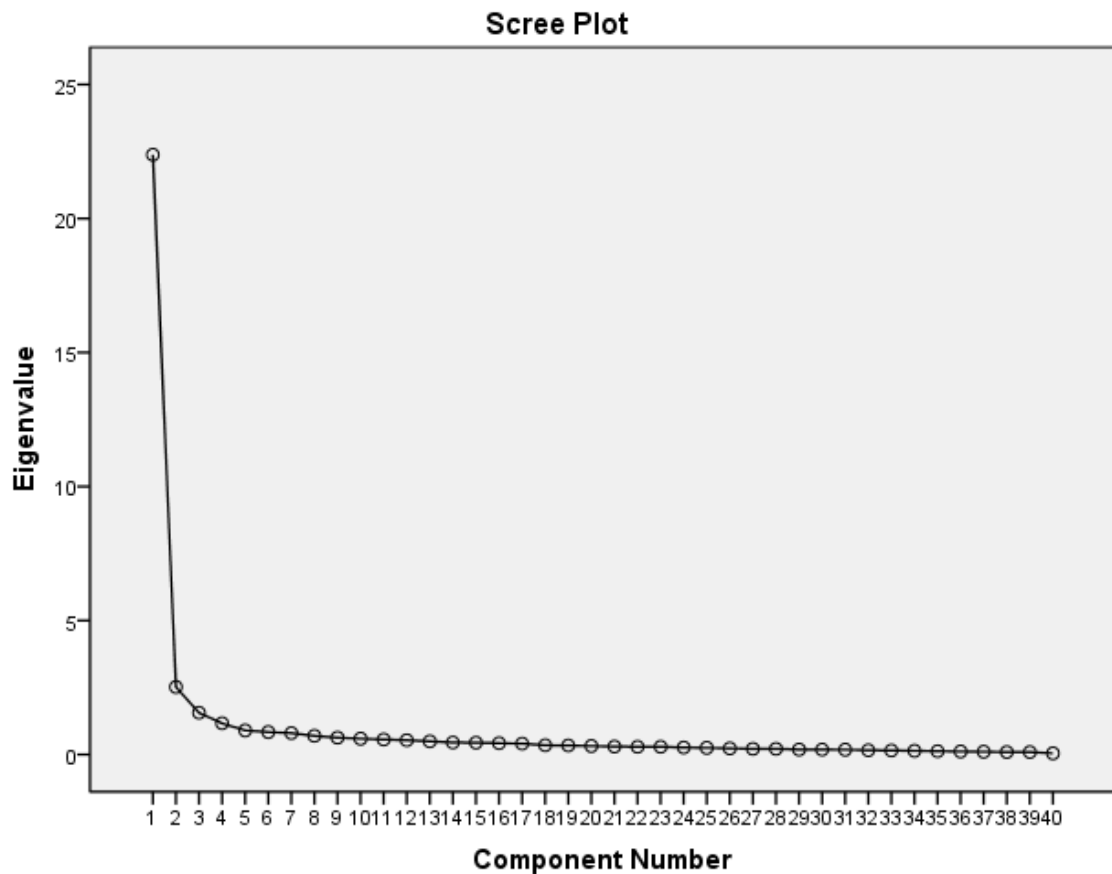
Figure 5. Scree plot of eigenvalues generated from principal component analysis of all 68 CTS items.

The scree plot generated from the PCA (see Figure 5) suggested the existence of two interpretable components based upon the exhibited point of inflection. The scree plot indication of interpretable components differed from the seven components identified using Kaiser's criteria. Therefore, the researcher utilized additional PCA applications with Varimax rotation on all 68 items to distinguish how many interpretable components existed. Identified component were structured by CTS item and their designated factor loading to distinguish the existence of conceptual differences. CTS items were used to structure a component based upon meeting only three criteria: (a) retained items had to have a factor loading of 0.5 or greater, (b) the extracted component had to have at least three designated items, and (c) items with loadings greater than 0.4 and loading on more than one component were not used.

A second application of PCA with Varimax rotation was used to extract three components with eigenvalues greater than 2.0. The three components accounted for 65.96% of the variance with 39 retained CTS items (see Appendix R). The first extracted component accounted for 57.67% of the variance and was structured from 23 CTS items. The second extracted component accounted for 5.22% of the variance and was structured from 13 CTS items. The third component accounted for 3.07% of the variance and was structured from only 3 CTS items. The three-component model contained a component with three non-distinguishable items.

A third application of principal component analysis was used to extract two components with eigenvalues greater than 3.0. The three components accounted for 62.89% of the variance with 42 retained CTS items (see Appendix S). The first extracted component accounted for 57.67% of the variance and was structured from 27 CTS items.

The second extracted component accounted for 5.22% of the variance and was structured

from 15 CTS items.

Table 12

Items, Identified Component, and Factor Loading

CTS Item	Component	Factor Loading
I believe we implement initiatives to improve student learning.	1	0.798
I believe we gather evidence of current levels of student learning.	1	0.793
I believe we take action to support student learning.	1	0.78
I believe our work aligns to our school's vision statement.	1	0.762
I believe we establish measureable goals.	1	0.754
I believe we develop strategies to address weaknesses in student learning.	1	0.745
I believe we establish attainable goals.	1	0.739
I believe we analyze student achievement data.	1	0.737
I believe we develop strategies to build upon strengths in student learning.	1	0.734
I believe instruction in my classroom has improved.	1	0.726
I believe our actions are directed at achieving results.	1	0.717
I believe our work is guided by an agenda.	1	0.714
I believe student learning in my classroom has improved.	1	0.708
I share my classroom data.	1	0.706
I believe work done in collaboration aligns with work done in my classroom.	1	0.69
I believe we identify best teaching practice.	1	0.684
I believe we have access to necessary data.	1	0.677
I believe we are focused upon student learning.	1	0.67
I share my professional knowledge.	1	0.665
I share my knowledge gained from working in the classroom.	1	0.659
I believe we determine if students have learned.	1	0.654
I have gained knowledge of effective instructional strategies.	1	0.65
I believe we determine how to teach so all students can learn.	1	0.615
I believe we establish time bound goals.	1	0.585
I value the contributions of team members.	1	0.543
I believe there is time to promote individual reflection.	1	0.533
I believe we determine what students should learn.	1	0.529
I believe there is an appreciation for all members.	2	0.844
I believe there is trust among members.	2	0.823
I believe our relationships contribute to open sharing of ideas.	2	0.806

Table 12 (continued)

Items, Identified Component, and Factor Loading

I believe the team is free of negative coercion.	2	0.802
I believe we are respectful of each other.	2	0.799
I believe there is a shared sense of responsibility.	2	0.779
I believe the environment promotes positive relationships.	2	0.77
I believe there is equal participation among members.	2	0.768
I believe each member contributes.	2	0.766
I believe there is shared accountability among team members.	2	0.751
I believe we share responsibilities.	2	0.735
I believe my relationship with other members has been positive.	2	0.711
I believe there is openness to alternative points of view.	2	0.657
I believe we address members who are not fulfilling team responsibilities.	2	0.633
I feel comfortable in taking risks during team discussions.	2	0.61

Both two- and three-component solutions were examined using PCA on all 68 items. The two-component model in Table 12 provided a structure in which items represented two distinctive conceptual concepts. In terms of interpretability, the two-component model made the most sense concerning collaborative teams experiencing transformative learning. Retention of two components based upon the scree plot provided the most conceptual and statistically appropriate model to determine the existence of two reliable and interpretable components.

Interpretation of RQ 4 results. The findings of RQ 4 identified two interpretable components within the data. The two-component model reduced the set of 68 CTS items to a set of 42 items. The 42 items formed two specific subsets by component and provided a statistical structure for two newly identified latent variables. Each latent variable represented a concept based upon its relationship to specific CTS items. As shown in Table 12, Component 1 is composed of several items related to work done within a collaborative team. The focus of these work indicators is both the collaborative

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team and the individual within the collaborative team achieving a predetermined vision or a specific goal. Based upon related CTS items, Component 1 was "Purposeful Work."

Component 2 was "Productive Relationships" because the majority of its related items addressed relationships that promoted productivity within a team. Component 2 identified the need for trust, respectfulness, and openness of the team to alternative points of view within a collaborative team. Component 2 further addressed productive team behaviors, such as sharing, equal participation, and risk taking. Many of the items loaded into Component 2 were profoundly high and identified distinct indicators of productive relationships.

As shown in Appendix T, PCA revealed elimination of 26 items due to multicollinearity, with a factor loading of at least 0.4 apportioned to both components. Hypothesized constructs developed with associated items for this study were created by juxtaposing collaborative team characteristics with transformative learning concepts. PLC collaborative team characteristics were identified as both mutually exclusive and interdependent. The existence of interrelated items was likely, given the interdependence of the PLC characteristics used to develop survey items.

Research Question 5

The purpose of RQ 5 was to determine the most plausible model of the CTS. The statistical analysis applied to RQ 4 revealed two underlying latent variables within collected CTS data. RQ 5 further examined the two latent variables. Further applications of factor analysis, PCA, were used to determine how each CTS item influenced the identified latent variable. Greater identification of CTS items as indicators of each latent variable allowed greater description and understanding of transformative learning within

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collaborative teams. RQ 5 allowed reduction of the items that contributed to construction of refined forms of the CTS.

RQ 5. Can further application of the statistical techniques of factor analysis be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within collaborative teams?

H5$_0$: Further application of factor analysis cannot be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within collaborative teams.

RQ 5 analysis methods. The factor loadings unique to an identified variable were used to determine how strong the indicator influenced a variable. Loadings greater in value were stronger indicators of the variable. Applications of PCA were used to reduce items and identify indicators as specific to established latent variables. Each application of PCA included a Varimax rotation, and extracted components had eigenvalues of 3.0 or higher. Items with factor loadings of 0.5 or higher were identified as stronger items in relationship to their designated variable. Weaker items with factor loadings below 0.5 were rejected. Items with loadings greater than 0.4 and loading on more than one component were eliminated from consideration. The researcher utilized factor loadings to determine standards of acceptance. The researcher used further applications of PCA and categorized CTS items as specific indicators of Purposeful Work or Productive Relationships, based upon each item's factor loading. Factor loadings greater in value were used to establish refined forms of the CTS (see Appendix V and Appendix W).

RQ 5 findings. Using the statistical technique of PCA, the null hypothesis was rejected. As shown in Table 12, the researcher retained 42 items based upon criteria used

to evaluate RQ 4. Twenty-seven of the 42 items were identified as indicators of the first

component, Purposeful Work. Fifteen items were identified as indicators of the second

component, Productive Relationships. The researcher used further applications of PCA

to identify four items with factor loading less than 0.6. As shown in Table 13, the second

application of PCA allowed the reduction of four CTS items. All four items were

rejected as indicators of the latent variable Purposeful Work. The reduction of these

items contributed to creation of CTS Form B (see Appendix V), a refined version of the

CTS. All items on Form B are composed of CTS items with factors loadings greater than

or equal to 0.6.

Table 13

CTS Item Reduction with Factor Loadings Greater than 0.5 and Less than 0.6

CTS Item	Component	Factor Loading
I believe we determine what students should learn.	Purposeful Work	0.529
I believe there is time to promote individual reflection.	Purposeful Work	0.533
I value the contributions of team members.	Purposeful Work	0.543
I believe we establish time bound goals.	Purposeful Work	0.585

As shown in Table 14, using a third application of PCA identified CTS items with

factor loadings greater than 0.5 and less than 0.7. Implementing this standard allowed the

reduction of the original 42 items to 26 indicators of transformative learning within

collaborative teams. Items shown in Table 14 were reduced from the original set of 42

CTS items. CTS Form C (see Appendix W) a refined form of the CTS was created and

composed of 14 Purposeful work indicators and 12 Productive Relationships indicators.

Table 14

CTS Item Reduction with Factor Loadings Greater than 0.5 and Less than 0.7

CTS Item	Component	Factor Loading
I believe we determine what students should learn.	Purposeful Work	0.529
I believe there is time to promote individual reflection.	Purposeful Work	0.533
I value the contributions of team members.	Purposeful Work	0.543
I believe we establish time bound goals.	Purposeful Work	0.585
I feel comfortable in taking risks during team discussions.	Productive Relationships	0.610
I believe we determine how to teach so all students can learn.	Purposeful Work	0.615
I believe we address members who are not fulfilling team responsibilities.	Productive Relationships	0.633
I have gained knowledge of effective instructional strategies.	Purposeful Work	0.650
I believe we determine whether students have learned.	Purposeful Work	0.654
I believe there is openness to alternative points of view.	Productive Relationships	0.657
I share my knowledge gained from working in the classroom.	Purposeful Work	0.659
I share my professional knowledge.	Purposeful Work	0.665
I believe we are focused upon student learning.	Purposeful Work	0.670
I believe we have access to necessary data.	Purposeful Work	0.677
I believe we identify best teaching practice.	Purposeful Work	0.684
I believe work done in collaboration aligns with work done in my classroom.	Purposeful Work	0.690

Interpretation of RQ 5 results. The main findings of RQ 5 determined PCA could be used to better identify indicators specific to transformative learning within collaborative teams. The null hypothesis was firmly rejected because factor loadings were used to create two refined versions of the CTS. The refined forms of the CTS are composed of items considered more specific indicators of the latent variables, Purposeful Work and Productive Relationships. The results of RQ 5 clearly provided the construction of alternate versions of the CTS with fewer items. Alternate versions of the CTS composed of few items could address issues of respondent fatigue present within the data set. In addition, the reduction of items identified in Table 13 and Table 14 confirmed all categorized indicators maintained their relationship to related variables. Although these items were eliminated for alternate versions of the CTS, the researcher

determined these items were still reflective of the variable in which they were originally found to represent. Results indicated all alternate versions of the CTS found within this study are composed of indicators of either Purposeful Work or Productive Relationships.

Research Question 6

The purpose of RQ 6 was to determine whether underlying components found within the data were related to the six hypothesized constructs posed in the study. The main findings of RQ 4 formed the bases for comparing interpretable components to the six hypothesized constructs introduced in this study. In evaluating RQ 4, two interpretable components were found and categorized by 42 CTS items as indicators of transformative learning. A cross comparison between items as designated by hypothesized construct and designated by latent variable took place to evaluate RQ 6.

RQ 6. If reliable factors are found from the factor analysis, is construct validity present in relationship to the hypothesized transformative learning constructs with associated indicators on the CTS?

H6_0: The use of a factor analysis with Varimax rotation will not reveal construct validity in relationship to the hypothesized transformative learning constructs with associated indicators on the CTS.

RQ 6 analysis methods. PCA with Varimax rotation was used to construct a component matrix (see Appendix T) based upon two extracted components with eigenvalues greater than 3.0. The component matrix allowed identification of all 68 CTS items as indicators of extracted components. CTS items loading into both factors were suppressed from further analysis. CTS items loading into a unique factor with a value greater than 0.5 were retained as indictors of a designated component. Forty-two items

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were retained for further analysis. Data in Appendix U was used to determine whether

construct validity existed. Interpretable components extracted with related indicators

were analyzed in relationship to hypothesized transformative learning constructs.

  RQ 6 findings. The findings established from RQ 6 supported accepting the null

hypothesis. PCA with Varimax rotation applied to all 68 CTS items revealed the

existence of two interpretable components. The number of interpretable components

derived from PCA in this study disagreed with hypothesized existence of six constructs.

Further analysis using PCA allowed structuring of 42 CTS items into two component

subsets based upon factor loading value (see Appendix S). The 42 CTS items identified

as indicators of the two components were not specifically written in alignment to a

predetermined hypothesized construct. As shown in Table 15, Component 1, identified

as the latent variable Purposeful Work, is composed of 26 indicators originally written for

all six of the hypothesized constructs. Component 2, identified as the latent variable

Productive Relationships, is composed of items written for four of the six hypothesized

constructs.

Table 15

Number of CTS Items by Hypothesized Construct Aligned to Named Component

Hypothesized Construct	Purposeful Work	Productive Relationships
Individual Experience	6	0
Promoting Critical Reflection	15	0
Dialogue	1	4
Holistic Orientation	1	2
Awareness of Context	2	2
Authentic Relationships	1	6

  Construct validity relating the two-component model in relationship to six

hypothesized construct structure was not confirmed within the data. As shown in

Appendix U, components identified as latent variables had no specific pattern in regards to the hypothesized constructs posed in this study. Although reliable factors were found, construct validity in relationship to the hypothesized transformative learning constructs was unsupported.

Interpretation of RQ 6 results. The hypothesized structure for constructs was not confirmed through factor analysis. The researcher did confirm the existence of two interpretable components with 42 CTS items designated as indicators. The first component, Purposeful Work, was composed primarily of indicators originally written for constructs of individual experience and promoting critical reflection. Indicators of Purposeful Work represented work done within a collaborative team that allowed the occurrence of group and individual learning.

In transformative learning theory, a group's work or actions are based upon challenging and testing assumptions (Alcantara et al., 2009). When assumptions are challenged or tested, transformative learning occurs when participants engage in collaborative inquiry, look for patterns of relational wholeness, and adopt validity practices (Alcantara et al., 2009). Similarly, PLC literature described collaborative team action as engaging in work through the development and testing of hypotheses (DuFour & Eaker, 1998). PLCs have a systematic learning designed used to continually improve by expanding awareness and capabilities. As cross-referenced in transformative learning theory and PLC literature (see Appendix B), Purposeful Work indicators represent work done by a collaborative team that empowers perpetual learning within a group of individuals.

Component 2, identified as latent variable Productive Relationships, is composed of 14 indicators originally written for hypothesized constructs dialogue, holistic orientation, awareness of context, and authentic reflection. Divergent from Component 1, Productive Relationships is not composed of indicators originally written for the hypothesized constructs of individual experience and promoting critical reflection. Indicators of Productive Relationships categorized the dynamics of how relationships within a collaborative team are used to foster learning. The dynamics of collaborative team relationships create the conditions for an effective level of learning (Mezirow, 2000; Taylor, 2009).

In PLC literature, Hord and Sommers (2008) suggested these conditions are met when a collaborative team can think more creatively, take more risk, and share information more readily. Productive relationships within a collaborative team are relationships that facilitate transformative learning. Productive relationships are present when collaborative team members are productive and engaged as well as when emotional aspects of member relationships are positive.

Research Question 7

RQ 7 was used to determine whether alternate forms of the CTS could be created and determined as reliable and valid. RQ 7 was reorganized into two subquestions to provide the basis for creating the forms. RQ 7a determined whether alternate forms of the CTS could first be constructed through statistical analysis. RQ 7b followed RQ 7a to assess reliability of the alternate forms by testing for internal consistency. The intent of creating alternate forms was to shorten the CTS while maintaining as much of the original information as possible.

RQ 7a. Can alternate forms of the CTS be constructed through the statistical

techniques of factor analysis?

RQ 7a analysis methods. Two alternate forms of the CTS were constructed in

this study. PCA with Varimax rotation was used to calculate the factor loadings for all

42 items associated as either indicators of Purposeful Work or Productive Work.

Alternate forms of the CTS were created based upon the strength of factor loadings. CTS

Form B (see Appendix V) was created from indicators with factor loading values greater

than 0.6. CTS Form B (see Appendix W) was created from indicators with factor loading

values greater than 0.7.

RQ 7a findings. Alternate forms of the CTS were constructed in this study

through factor analysis. Form B had 39 indicators of transformative learning in

collaborative teams. Twenty-two indicators of Form B consisted of CTS items aligned to

the latent variable Purposeful Work and 17 items aligned to the latent variable Productive

Relationships. Form C consisted of 26 total CTS item represented as indicators of

transformative learning within collaborative teams. Fourteen CTS items of Form C

aligned to Purposeful Work and 12 CTS items aligned to Productive Relationships.

Interpretation of RQ 7a results. Two alternate forms of the CTS were

constructed with specific indicators of the latent variables Purposeful Work and

Productive Relationships. Alternate Form B and Form C are shortened versions of the

CTS composed of specific measures of transformative learning within collaborative

teams.

RQ 7b. Can overall internal consistency be established within alternate forms of

the CTS?

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RQ 7b analysis methods. Calculating Cronbach's alpha value took place for data collected on all 39 CTS items of Form B and all 26 CTS items of Form C. The criterion of Cronbach's alpha value of 0.7 or higher was used to determine whether Form B and Form C were overall internally consistent.

RQ 7b findings. CTS Form B and Form C were created as alternate forms of the CTS and were determined reliable. Cronbach's alpha was 0.989. Based upon the Cronbach's alpha values, Form B and Form C are considered overall internally consistent and reliable.

Interpretation of 7b results. Two alternate reliable forms were developed. The two versions had items that were specific indicators of variables Purposeful Work and Positive Relationships. The use of alternate CTS Form B and Form C will provide reliable and specific assessment of transformative learning within collaborative teams.

Summary

In this study, the research questions were written with the purpose of determining whether transformative learning occurred within collaborative teams. The Collaborative Team Survey (CTS) was developed and used as an instrument to determine whether transformative learning occurred within collaborative teams. The focus of the research questions was on testing the CTS to further understand transformative learning within collaborative teams. In evaluating the research questions, the findings and interpretation of results presented in Chapter Four provided new information, insight, and understanding of transformative learning within collaborative teams.

The findings and interpretation of results established from evaluating the research questions in Chapter Four contributed to (a) confirmation of the presence of content and

face validity and reliability in the CTS, (b) identification of underlying variables to determine construct validity, and (c) development of alternate, refined forms of the CTS through statistical techniques. The findings for RQ 1a were confirmed by a panel of experts who reviewed the CTS and determined the instrument had both content and face validity. RQ 1b and RQ 3 were evaluated to provide estimates of internal consistency and reliability for the study. Data collected for RQ 1b and RQ 3 produced Cronbach's alpha values of 0.989. The interpreted results of RQ 1b and RQ 3 confirmed the CTS as a reliable and internally consistent instrument.

The findings of RQ 2 provided general insight into how the overall study group responded to all 68 CTS items. RQ 2 allowed a preliminary analysis of the data prior to utilizing applications of factor analysis to evaluate subsequent research questions. For RQ 4, the null hypothesis was rejected because interpretable components were identified within the transformative learning indicators on the CTS. Two new components were identified as (a) Component 1: Purposeful Work, and (b) Component 2: Productive Relationships.

For RQ 5, the null hypothesis was rejected because further applications of factor analysis were used to reduce the number of items and identify specific indicators of transformative learning within collaborative teams. Forty-two items on the CTS were specific indicators of transformative learning within the collaborative teams (see Appendix S). Given the identification of two interpretable components, the null hypothesis for RQ 6 was accepted. Statistical analyses of the data did not reveal a relationship between the developed hypothesized transformative learning constructs and the interpretable components found within the data. As shown in Table 15, the two

identified components, Purposeful Work and Productive Relationships, did not consist of CTS indicators related to one specific hypothesized transformative learning construct.

For RQ 7, statistical techniques of factor analysis were used to construct two alternate forms of the CTS. CTS Form B (see Appendix V) and CTS Form C (see Appendix W) were constructed and determined to have overall internal consistency. CTS Form B consisted of 39 indicators and maintained internal consistency and reliability with a Cronbach's alpha value of 0.989. CTS Form C consisted of 26 indicators and maintained internal consistency and reliability with a Cronbach's alpha value of 0.989. Chapter Five contains conclusions and recommendations as a result of the study.

CHAPTER FIVE

DISCUSSION WITH CONCLUSIONS AND RECOMMENDATIONS

This study was an investigation of the phenomena of transformative learning occurring within collaborative teams of teachers. New knowledge of how teachers experience transformative learning when working within collaborative teams was discovered. Although many authors had discussed the importance of transformative learning (Mezirow, 2000; Mezirow & Taylor, 2009; Merriam, 2008), they presented little or no evidence of transformative learning occurring within collaborative teams. This study addressed this issue by structuring a problem and purpose to examine transformative learning within collaborative teams. The development, use, and revision of the Professional Learning Community Collaborative Team Survey (CTS) provided the data needed to formalize the discussion, conclusions, and recommendations presented in this chapter. Chapter Five is organized to provide an overview of the study, a discussion of findings, limitations of the research, and the researcher's conclusions and recommendations for the future research.

Overview of the Study

Collaborative teams are recognized as a fundamental building block for facilitating continuous school improvement within a PLC (DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). The significance of facilitating continuous school improvement and the prevalent use of collaborative teams provided the impetus for investigating transformative learning within collaborative teams. Prior to this study, an identified lack of theoretical evidence was available to describe the occurrence of

transformative learning within collaborative teams. The researcher found no published

information or applicable instrument available for determining whether transformative

learning occurred within collaborative teams. No known variables had been used to

describe transformative learning within collaborative teams and no known quantitative

instrument existed to understand transformative learning as perceived by teachers

working within collaborative teams.

The Professional Learning Community Collaborative Team Survey (CTS) was

developed as a quantitative instrument used to determine whether transformative learning

occurs within collaborative teams. The researcher determined the psychometric

properties of the CTS and extracted two independent variables, purposeful work and

productive relationships, by implementing a non-experimental, cross-sectional research

design. The research design implemented followed a four-step action plan used to test

and revise the CTS as a reliable and valid survey instrument. Two alternate forms of the

CTS were developed from the research design (see Appendix V & Appendix W). The

alternate forms were created with two independent variables by revising the CTS from 68

original items into two alternate forms consisting of 39 and 26 items (see Appendix V &

Appendix W). All alternate forms were developed from the research design used to

propagate the CTS as a quantitative process evaluation or diagnostic instrument.

The CTS was administered by establishing a sponsorship agreement (see

Appendix E) with the Northwest Missouri Region 5 Professional Development Center

(RPDC). The RPDC reported administering the CTS in April 2012 to approximately 457

teachers working within northwest Missouri schools who had completed at least three

years of participation within the Missouri Professional Learning Communities (MPLC)

Project. The findings, conclusions, and recommendations made within this chapter are

based upon data collected from 255 teachers who voluntarily chose respond to CTS

questions. New knowledge discovered from this study will facilitate continuous

improvement by informing the workplace phenomenon of transformative learning within

collaborative teams of PLC schools.

<p align="center">**Discussion of Findings**</p>

The discussion of findings is used to provide further explanation of the results

composed from data analyses presented in Chapter Four. The discussion of findings is

organized by the seven research questions that guided the study. The research question is

restated and then discussed in reference to convergence or divergence from posed

criteria, hypotheses, and reviewed literature.

Research Question 1

To bolster validity and reliability of the CTS prior to administering the tool to the

study group, Research Question 1 was separated into two questions: 1a and 1b. First, a

panel of experts reviewed the CTS to improve both content and face validity of the

instrument. After the panel's review, the CTS was revised and administered as a pilot

study. A calculated Cronbach alpha value was used to determine reliability.

RQ 1a. Can a panel of experts establish the draft survey as having content and

face validity? As advised by Fink (2006), a panel of experts was used to secure CTS

content validity (Fink, 2006). The panel established the CTS as having content and face

validity. Items for the CTS were developed by mapping concepts of transformative

learning onto corresponding concepts of best practice found within PLC collaborative

teams (see Appendix B). The panels of experts directly confirmed CTS items were

<p align="center">101</p>

aligned to PLC collaborative team concepts. Given the development of CTS items, the

panel indirectly acknowledged concepts of transformative learning present in PLC

collaborative teams. The findings of RQ 1a allowed the researcher to revise and further

test the CTS as an instrument used for determining whether transformative learning

occurs within collaborative teams.

RQ 1b. Utilizing results of a pilot study, can internal consistency be established

within the CTS? Following the advice of Fink (2006) and Trochim and Donnelly (2008),

the pilot study allowed for an acceptable statistical calculation of Cronbach's alpha that

met criteria established prior to evaluating RQ 1. The pilot study conducted by the

researcher further secured face validity and confirmed the CTS as having internal

consistency. Beyond testing for internal consistency, the pilot study allowed the

researcher to anticipate actual circumstances for administering the CTS to a study

sample. The pilot study participants completed the drafted CTS online with directions

similar to the RPDC's administration of the CTS. RQ 1b finalized the CTS as a reliable

instrument ready for administration by the RPDC.

Research Question 2

After confirmation of RQ 1, what are the descriptive summary statistics for

teacher perceptions of transformative learning within collaborative teams on each

itemized CTS indicator? Descriptive summary statistics were reported for all 68 CTS

items. An overall pattern of distribution was identified in the descriptive summary

statistics. All items were negatively skewed, with a high percentage of responses as 3,

agree and 4, *strongly agree*. The descriptive summary data further revealed CTS items

with over 95% of the response data as *agree* or *strongly agree*. These items were deemed

as important indicators found in most PLC collaborative teams.

The consistent skewness and similar distribution and dispersion found within the

descriptive summary statistics for each item revealed little to no discrimination between

CTS items. The homogeneity of variance existing within the data set indicated

subsequent calculations of internal consistency would be relatively high. Prior to factor

analysis, the researcher recognized the existence of a strong underlying variable and the

likelihood of identifying fewer latent variables, as compared to the six hypothesized

constructs. The overall finding of RQ 2 revealed teachers within the study sample shared

many of the same perceptions.

Research Question 3

Is the CTS a reliable instrument? RQ 3 was used to establish the CTS as a

reliable instrument used to measure transformative learning within collaborative teams.

RQ 3a and RQ 3b were used as separate research questions to derive the primary finding

of RQ 3. First, RQ 3a was used to determine overall internal consistency of the CTS as

an instrument. Second, RQ 3b was used to determine internal item-total consistency. The

results of RQ 3a and RQ 3b revealed the CTS was a strongly reliable instrument when

administered to the study sample.

RQ 3a. Can overall internal consistency be established within the CTS? Results

of RQ 3a established the CTS as an internally consistent instrument.   Items on the CTS

consistently measured one underlying variable. In the study, CTS items were constructed

to measure transformative learning within collaborative teams. The results of RQ 3a

provided evidence the CTS is a reliable measure of transformative learning in

collaborative teams. RQ 3a also served as a precursor for subsequent dimensionality and construct validity testing.

RQ 3b. Is there internal item-total consistency for each survey item? The results of RQ 3b revealed all CTS items as having internal item-total consistency. The reliability of the CTS could not be improved by removing any specific item. RQ 3b confirmed the reliability of each specific CTS item as internally consistent to all other items.

Research Question 4

How many reliable and interpretable components are present among the developed transformative learning indicators on the CTS? The results of RQ 4 revealed a two-component model present within the data. Interpretable components, purposeful work and productive relationships, were identified as relatively independent of each other. The two-component model provided a structure for explaining how collaborative teams experienced transformative learning. The findings did not support the framework defined in this study for understanding transformative learning within collaborative teams that consisted of six hypothesized constructs. Forty-two items formed two specific subsets by component and provided the statistical structure for two interpretable components. Table 16 shows the 27 CTS items used to structure the latent variable purposeful work. Table 17 shows the 15 CTS items used to structure the latent variable productive relationships.

Table 16

Indicators of Latent Variable Purposeful Work

Purposeful Work
I believe we implement initiatives to improve student learning.
I believe we gather evidence of current levels of student learning.
I believe we take action to support student learning.
I believe our work aligns to our school's vision statement.
I believe we establish measureable goals.
I believe we develop strategies to address weaknesses in student learning.
I believe we establish attainable goals.
I believe we analyze student achievement data.
I believe we develop strategies to build upon strengths in student learning.
I believe instruction in my classroom has improved.
I believe our actions are directed at achieving results.
I believe our work is guided by an agenda.
I believe student learning in my classroom has improved.
I share my classroom data.
I believe work done in collaboration aligns with work done in my classroom.
I believe we identify best teaching practice.
I believe we have access to necessary data.
I believe we are focused upon student learning.
I share my professional knowledge.
I share my knowledge gained from working in the classroom.
I believe we determine if students have learned.
I have gained knowledge of effective instructional strategies.
I believe we determine how to teach so all students can learn.

Table 16 (continued)

Indicators of Latent Variable Purposeful Work

I believe we establish time bound goals.
I value the contributions of team members.
I believe there is time to promote individual reflection.
I believe we determine what students should learn.

Table 17

Indicators of Latent Variable Productive Relationships

Productive Relationships
I believe there is an appreciation for all members.
I believe there is trust among members.
I believe our relationships contribute to open sharing of ideas.
I believe the team is free of negative coercion.
I believe we are respectful of each other.
I believe there is a shared sense of responsibility.
I believe the environment promotes positive relationships.
I believe there is equal participation among members.
I believe each member contributes.
I believe there is shared accountability among team members.
I believe we share responsibilities.
I believe my relationship with other members has been positive.
I believe there is openness to alternative points of view.
I believe we address members who are not fulfilling team responsibilities.
I feel comfortable in taking risks during team discussions.

Research Question 5

Can further application of the statistical techniques of factor analysis be utilized to reduce the number of items in order to refine and more specifically identify indicators specific to transformative learning within collaborative teams? The main findings of RQ 5 determined factor analysis, specifically principal component analysis (PCA), could be used to better identify indicators specific to transformative learning in collaborative teams. The set of 68 CTS items were reduced to a set of 42 items as indicators of purposeful work or productive relationships. In alignment with RQ 7, additional applications of factor analysis were used to construct two alternate versions of the CTS. CTS Form B (see Appendix V) consists of 38 items and CTS Form C (see Appendix W) consists of 26 items.

Research Question 6

If reliable factors are found from the factor analysis, is construct validity present in relationship to the hypothesized transformative learning constructs with associated indicators on the CTS? The findings of RQ 6 did not support construct validity and disagreed with the hypothesized existence of six constructs. This finding is inconsistent with literature used to develop the CTS from a framework consisting of the hypothesized constructs.

Research Question 7

Can alternate forms of the CTS be created and determined as reliable and valid? In the study, two alternate forms of the CTS were created and determined as reliable and valid. RQ 7a was used to facilitate item selection for the alternate forms through factor

analysis. RQ 7b was used to confirm reliability of the alternate forms by measuring overall internal consistency.

RQ 7a. Can alternate forms of the CTS be constructed through the statistical techniques of factor analysis? Alternate forms of the CTS were constructed in this study through factor analysis. Form B had 39 indicators of transformative learning in collaborative teams. Twenty-two indicators of Form B consisted of CTS items aligned to the latent variable purposeful work and 17 items aligned to the latent variable productive relationships. Form C consisted of 26 total CTS item represented as indicators of transformative learning within collaborative teams. Fourteen CTS items of Form C aligned to purposeful work and 12 cts items aligned to productive relationships.

RQ 7b. Can overall internal consistency be established within alternate forms of the CTS? CTS Form B and Form C were created as alternate forms of the CTS and were determined reliable. Cronbach's alpha was 0.989. Based upon the Cronbach's alpha values, Form B and Form C are considered overall internally consistent and reliable.

Limitations

As the case with any research, the contexts of presented results are influenced by limitations existing in the analysis of data. It is important to note the researcher's relationship with the staff at the Region 5, Northwest Missouri Regional Professional Development Center (RPDC). This relationship allowed for obtaining useable data from a purposive study sample that enhanced the validity of study results. The RPDC was able to successfully collect 255 CTS responses in one week of distribution by utilizing the SurveyMonkey online website. However, the received sample of teacher participants was not a random representation of teachers working in schools across the United States.

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The research conducted was with a sample size of data collected from teachers teaching in selected schools in northwest Missouri. The teachers who volunteered to participate in the CTS worked in schools that had completed three years of Missouri Professional Learning Community (MPLC) Project membership. Generalizing the results of this study should be considered a limitation, given the data were gathered from a closed population.

Another limitation in the study was the cross-sectional nature of the study. The teachers surveyed had varying professional work experiences and knowledge about PLC collaborative teams. The degree to which respondents understood the questions when answering is unknown. These limitations were initially addressed by utilizing a panel of experts to secure an item-by-item check to secure understandability and alignment to PLC collaborative team concepts. Additional measures were taken by providing specific directions for distributing the CTS and by collecting responses from a purposive sample. The primary objective of this study was met by identifying characteristics of transformative learning within collaborative teams. Future research may address this limitation by collecting correlation data between schools or by surveying the staff of one school.

Yet another limitation in the study was the use of self-reported data based upon teachers' perceptions of working within a collaborative team. A written consent was used to help facilitate accurate reporting by providing notification of confidentiality procedures, privacy procedures in desegregating the reporting data, and disclosure of potential benefits to respondent and society. Data used in this study were composed of a high percentage of responses as 3 or 4, *agree* or *strongly agree*. The homogeneity of variance in the study was attributed to a purposive sample size of teachers surveyed.

However, two additional considerations might have contributed to the high percentage of self-reported data as 3 or 4, *agree* or *strongly agree*. First, the researcher utilized a panel of experts to construct items that were understandable and aligned to PLC collaborative team concepts. Second, the CTS responses were collected from schools that were working as members of the MPLC project. This membership could have contributed to survey participants exaggerating their collaborative team accomplishments.

The final limitation of this study related to determining whether the CTS measured what it claimed to measure. The results of the study were limited by the reliability and validity of the CTS as a measure of transformative learning within collaborative teams. To facilitate a reliable and valid instrument, the researcher utilized a four-step action plan that established the CTS as a reliable and valid instrument. Purposeful work and productive relationships were identified as independent variables used to describe the phenomenon of transformative learning in collaborative teams. Because the study initially posed six hypothesized transformative learning constructs, a strong need exists for further replication of the results through confirmatory factor analysis with other populations.

Overall Conclusions

The presented results and findings indicated this study achieved its primary goal of determining whether transformative learning occurs within collaborative teams. Findings indicated the two latent variables, purposeful work and productive relationships, were underlying descriptors of behaviors experienced by teachers when transformative learning occurs within a collaborative team. These behaviors were revealed as applied

psychometric techniques and established the CTS as a valid and reliable instrument. Although extracting the latent variables from collected CTS data was somewhat exploratory in nature, based upon the strength of reliability and validity evidence presented, this study provided new knowledge to confirm and extend current literature and implied practice.

Contrary to the conceptual framework consisting of six hypothesized constructs initially introduced, the study provided empirical support for using two variables to describe transformative learning within a collaborative team. Purposeful work and productive relationships were identified and structured from CTS indicators. Because the indicators were originally created by juxtaposing transformative learning collaborative team concepts, the applied psychometric techniques confirmed transformative learning concepts were relevant to the structures, processes, and attributes of collaborative teams.

Concerning the transformative learning literature, the indicators of purposeful work were similar to concepts of meaningful work found within the discussion of collaborative inquiry (Bray et al., 2000; Cranton, 2006; Taylor, 2009). Discussions of productive relationships were not directly referenced in the review of literature beyond constructing the indicators from the hypothesized constructs. Several authors discussed relationships (Bray et al., 2000; Cranton, 2006; Taylor, 200b, 2009) in way that was not inclusive of how productive relationships were defined in this study. Productive relationships address what should exist (e.g., trust, respect, free of coercion) within a team as well as what must happen (e.g., equal participation, open sharing). Identifying purposeful work was confirmed as referenced in transformative learning literature, while

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productive relationships extended the literature reviewed and provided new knowledge of how to describe productive relationships within collaborative teams.

An additional conclusion indicated the research-based knowledge generated from this study provided school personnel with new insight of how collaborative teams of teachers experienced transformative learning. The study confirmed purposeful work and productive relationships as underlying variables of collaborative team structures, processes, and attributes. Given this condition, one can conclude the focus for collaborative teams should be based upon engaging in purposeful work and productive relationships.

Through the review of collaborative team literature, the indicators associated with purposeful work were present within the six interdependent characteristics found within PLC design (DuFour & Eaker, 1998). Indicators of productive relationships were not specifically acknowledged in the literature concerning PLC design. However, productive relationships were acknowledged as a behavioral attribute of collaborative teams. The current study provided support for acknowledging productive relationships as a primary concern of collaborative teams.

This study provided research-based support that the CTS is a reliable and valid instrument used to assess transformative learning within collaborative teams. Alternate CTS Form B (see Appendix V) and CTS Form C (see Appendix W) can be used by school leaders as either a process assessment or a diagnostic tool. Utilizing the CTS as a process evaluation would allow school leaders to collect quantitative data to determine whether collaborative teams experienced transformative learning as an expected outcome. The CTS becomes a diagnostic tool when school leaders and collaborative team members

analyze individual items and overall measurements of purposeful work and productive relationships. Collaborative teams can better achieve expected outcomes by prescribing actions to address overall concerns as well as by addressing individual CTS items.

Recommendations

As stated in Chapter Two, collaborative teams are a fundamental building block for facilitating continuous school improvement (DuFour & Eaker, 1998; DuFour et al., 2005; DuFour et al., 2006). In this study, the emergence of two latent variables provided new perspectives that influence continuous school improvement through the implementation of collaborative teams. Based upon the findings, teams should focus on purposeful work and productive relationships to better promote transformative learning in collaborative teams. This recommendation stemmed from the review of literature, which indicated learning organizations improve as individual knowledge is transformed into collective organizational knowledge (Nonaka & Takeuchi, 1995; Senge, 2006).

An important contribution of this study was the development of the survey instrument. The CTS was developed and tested for reliability and validity based upon implementation of a methodical four-step action plan. The results strongly supported the alternate forms of the CTS as reliable and valid instruments. School leaders, trainers, and future researchers could use the alternate CTS forms and know with high confidence the instruments are reliable and valid. The findings provided evidence of the successful implementation of the four-step action plan in this study. Researchers should consider using a process similar to the four-step action plan when developing and testing a survey instrument for reliability and validity.

Future studies could research transformative learning in collaborative teams of school that have not received PLC training. Data from such studies could further validate the results of this study and allow the generalization of new insights to all school that make use of collaborative teams. Future studies could also consider testing purposeful work and productive relationships separately. Further knowledge and validation of these two variables would be valuable to structuring and training of collaborative teams in schools.

Summary

The goal of this study was achieved by discovering new knowledge concerning how teachers working within collaborative teams experienced transformative learning. Findings determined that two latent variables, purposeful work and productive relationships, were underlying descriptors of behaviors experienced by teachers when transformative learning occurs within collaborative teams. Purposeful work and productive relationships were identified as a result of psychometric techniques applied to the CTS as an instrument used to measure teacher perception.

The CTS was refined and two alternate forms of the CTS were developed as reliable and valid instruments. The two alternate forms of the CTS were constructed as the first known quantitative instruments used to measure transformative learning in collaborative teams. This study may provide new perspectives that influence the practice, training, evaluation, and study of collaborative teams. Such influence could be impactful and provide positive support to overall school improvement and performance.

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APPENDIX A

ITEMS WITH HYPOTHESIZED CONSTRUCTS FOR THE COLLABORATIVE
TEAM SURVEY

Individual Experience
1.   I share my professional knowledge.
2.   I share my knowledge gained from working in the classroom.
3.   I share my classroom data.
4.   I have gained new professional knowledge.
5.   I have learned from other team members.
6.   I have gained knowledge of effective instructional strategies.
7.   I believe instruction in my classroom has improved.
8.   I believe student learning in my classroom has improved.
9.   I believe work done in collaboration aligns with work done in my classroom.

Promoting Critical Reflection
10.   I believe we determine what students should learn.
11.   I believe we determine whether students have learned.
12.   I believe we determine what to do if a student does not learn.
13.   I believe we determine what to do if a student does learn.
14.   I believe we determine how to teach so all students can learn.
15.   I believe we identify best teaching practice.
16.   I believe we analyze student achievement data.
17.   I believe we implement initiatives to improve student learning.
18.   I believe we take action to support student learning.
19.   I believe we gather evidence of current levels of student learning.
20.   I believe we develop strategies to address weaknesses in student learning.
21.   I believe we develop strategies to build upon strengths in student learning.
22.   I believe we evaluate the effectiveness of teaching strategies.
23.   I believe we establish specific goals.
24.   I believe we establish measureable goals.
25.   I believe we establish attainable goals.
26.   I believe we establish results-oriented goals.
27.   I believe we establish time bound goals.
28.   I believe our actions are directed at achieving results.
29.   I believe we are focused upon student learning.

Dialogue
30.   I believe there is openness to alternative points of view.
31.   I believe the team is free of negative coercion.
32.   I believe we share responsibilities.
33.   I believe there is equal participation among members.
34.   I believe we address members who are not fulfilling team responsibilities.
35.   I believe we freely discuss evidence derived from data.
36.   I believe we have access to necessary data.
37.   I believe we have established guidelines for communication.
38.   I believe we work toward consensus.

Holistic Orientation
39.   I believe there is evidence of celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.)
40.   I believe we have developed traditions that attribute to team success.
41.   I believe we recognize the accomplishment of personal goals.
42.   I believe we recognize accomplishment of classroom success.
43.   I believe we are respectful of each other.
44.   I believe we use conflict as a catalyst for dialogue.
45.   I believe our work is guided by an agenda.
46.   I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).
47.   I believe we have established norms for behavior.
48.   I believe there is an appreciation for all members.

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Awareness of Context
49. I believe each member contributes.
50. I believe there is a shared sense of responsibility.
51. I believe there is time to promote individual reflection.
52. I believe there is time for team reflection.
53. I believe our work aligns to our school's mission statement.
54. I believe our work aligns to our school's vision statement.
55. I believe our work aligns to values that exist within our school.
56. I believe our work aligns to goals established within my school.
57. I believe there is time to address critical issues.
Authentic Relationships
58. I have confidence when participating in my team's decision-making processes.
59. I feel comfortable in taking risks during team discussions.
60. I believe we encourage positive relationships.
61. I believe our relationships contribute to effective listening.
62. I believe our relationships contribute to open sharing of ideas.
63. I believe there is shared accountability among team members.
64. I believe our relationships promote problem solving.
65. I believe there is trust among members.
66. I believe my relationship with other members has been positive.
67. I believe the environment promotes positive relationships.
68. I value the contributions of team members.

APPENDIX B

COLLABORATIVE TEAM SURVEY ITEMS BY CORRESPONDING
TRANSFORMATIVE LEARNING AND PROFESSIONAL LEARNING
COMMUNITY REFERENCE

The following items appear on the Collaborative Team Survey. Authors found in transformative learning theory and PLC literature have referenced the items listed.

Individual Experience	Transformative Learning Reference	PLC Reference
1. I share my professional knowledge.	A learner's prior experiences provide a primary medium for transformative learning (Taylor, 2009). Organizational knowledge creation is a continuous and dynamic interaction between tacit and explicit knowledge (Nonaka & Takeuchi, 1995).	A fundamental task when creating a collaborative culture is to bring together those whose responsibilities create a mutual interest in exploring critical questions (DuFour et al., 2006, DuFour & Eaker, 1998). In constructing collaborative teams there need be knowledge available to make collaboration more effective (DuFour et al., 2006, DuFour & Eaker, 1998) A core learning capability for teams includes personal mastery (Senge, 2006).
2. I share my knowledge gained from working in the classroom.		Collaboration is "…a systematic process in which educators work together interdependently to analyze and impact their professional practice in order to achieve better results for their students, team, and their school" (DuFour et al., 2006). Hord and Sommers (2008) discussed that reflection that occurs while teaching is called situational awareness.
3. I share my classroom data.	A catalyst for reflection and dialogue are those experiences related to content found in text, activities, and relationships (Taylor, 2009).	Ainsworth (2007) suggested the following instruction and assessment practices: (a) identify grade and course specific outcomes; (b) identifying key concepts and skills related to the outcomes; (c) the use of data teams. A results orientation leads each collaborative team to "…develop and pursue measurable improvement goals that are aligned to school and district goals for learning" (DuFour et al., 2006, p. 5).

4. I have gained new professional knowledge.	Individual experience is the starting point when examining a learner's assumptions, judgments and expectations (Mezirow, 2000).	Teacher should return from collaboration possessing an "… expanded repertoire of skills, strategies, materials, and ideas in order to impact student achievement in a positive way" (DuFour et al., 2006).
5. I have gained knowledge of effective instructional strategies.	Knowledge is converted from tacit to explicit by induced triggers related to experiences, such as life, social, etc. (Nonaka & Takeuchi, 1995; Taylor, 2009).	Hord (1997) suggested a goal of professional learning communities is to increase understanding of instruction and learning.
6. I have learned from other team members.	Cranton (2006) found that transformative learning leads to "…more inclusive, discriminating, and integrating of experience" (p.19).	"People who engage in collaborative team learning are able to learn from one another, thus creating momentum to fuel continued improvement" (DuFour & Eaker, 1998, p. 27).
7. I believe instruction in my classroom has improved.	Knowledge is converted from tacit to explicit by induced triggers related to experiences, such as life, social, etc. (Nonaka & Takeuchi, 1995; Taylor, 2009).	"… the very reason that teachers work together in teams and engage in collective inquiry is to serve as catalysts for action" (DuFour et. al, 2006, p. 4).
8. I believe student learning in my classroom has improved.		
9. I believe work done in collaboration aligns with work done in my classroom.	Transformative learners become take action to promote cultural chance after gaining insight on unexplained cultural norms (Mezirow, 2000).	Educators reflect upon their actions by using the results of their work and identify patterns in their teaching practice
Promoting Critical Reflection		
10. I believe we determine what students should learn.	Critical reflection occurs when one questions the integrity of deeply held assumptions and beliefs based upon prior experiences (Mezirow, 2000).	"Successful professional learning communities believe that all students can learn. That statement will only become meaningful, if faculty are willing to engage in some deeper questions" (Lunenburg, 2010, p. 2).
11. I believe we determine whether students have learned.		
12. I believe we determine what to do if a student does not learn.	Cranton (2006) discussed three types of reflection when creating meaning perspective: (a) content - what we perceive, think, feel, and act upon; (b) process–how we perform the function of perceiving; (c) premise–awareness of why we perceive.	In clarifying priorities MPLC (2009) suggest five corollary questions be discussed: (a) What do all students need to know and be able to do? (b) How will we know if they have learned? (c) What will we do if they do not learn? (d) What will we do when they learn? (e) How do we teach so that all students will learn?
13. I believe we determine what to do if a student does learn.		
14. I believe we determine how to teach so all students can learn.		
15. I believe we identify best teaching practice.		Collective inquiry encourages a process focused upon making research-based decisions about best practice (Eaker et al., 2002).
16. I believe we analyze student achievement data.		Collaborative teams assess current levels of achievement when engaged in collective inquiry (DuFour et. al., 2006).

17. I believe we evaluate the effectiveness of teaching strategies.		"The teams in a PLC engage in collective inquiry into both best practices in teaching and best practices of learning" (DuFour et al., 2006, p. 4).
18. I believe we are focused upon student learning.		Hord and Sommers (2008) professional learning communities must focus on student learning as a core characteristic of their functioning.
19. I believe our actions are directed at achieving results.	Collaborative inquiry engages participants in a transformative learning process of creating new meaning (Alcantara, Hayes, & Yorks, 2009).	"Members of such organizations turn aspirations into action and visions into reality…they believe engagement and experience are the most effective teachers" (DuFour & Eaker, 1998, p. 27).
20. I believe we take action to support student learning.	Collaborative inquiry fosters critical reflectivity on personally embedded assumptions and premises by sharing power equally, challenging and testing assumptions, and following group-adopted validity practices (Alcantara et al., 2009).	"An important corollary of the action orientation is a willingness to experiment-to develop and test hypotheses" (DuFour & Eaker, 1998, p. 27).
21. I believe we gather evidence of current levels of student learning.	"Discernment begins with receptivity and appreciation and moves to seeing patterns of relational wholeness" (Cranton, 2006, p. 48).	A commitment to continuous improvement implies creating conditions for perpetual learning (DuFour et al., 2006).
22. I believe we develop strategies to address weaknesses in student learning.		DuFour et al. (2006) recommended a systematic learning design to continually improve by expanding awareness and capabilities. The recommended design involves all PLC members participating in the following cycle: (a) gathering evidence of current levels of student learning, (b) developing strategies and ideas to build on strengths and address weaknesses in that learning, (c) implementing those strategies and ideas, (d) analyzing the impact of changes to discover what was effective and what was not, and (e) applying new knowledge in the next cycle of continuous improvement.
23. I believe we implement initiatives to improve student learning.		
24. I believe we develop strategies to build upon strengths in student learning.		Several different learning designs can be used to facilitate learning within organizations as well as within groups of individuals (Morgan, 1997; Nonaka & Takeuchi, 1995; Senge, 2006).
25. I believe we establish specific goals.	Experts will develop indicators to assess reflection. Such as, coding	Data from these assessments are used to facilitate a data-driven

26. I believe we establish measureable goals. 27. I believe we establish attainable goals. 28. I believe we establish results-oriented goals. 29. I believe we establish time bound goals.	schemas, repertory grids, instructional aids, and reflective journals (Taylor, 2009). Taylor (2009) recognized the creation of artifacts as a way for learners to externalize their reflective experience.	dialogue to improve student achievement, focus collective inquiry, and guide action orientation and experimentation (DuFour et al., 2006; MPLC, 2009; Reeves, 2007). PLC collaborative teams develop specific, measurable, attainable, realistic, and timely (SMART) goals (DuFour & Eaker, 1998; DuFour et al., 2006).
Dialogue		
30. I believe there is openness to alternative points of view.	Taylor (2009) and Mezirow (2000) suggest the ideal conditions for participants to engage in reflective dialogue must include the following: 1. The most accurate and complete information.	Hord and Sommers (2008) discussed a major challenge is set aside judgment in order to stay open to different points of view and new ideas.
31. I believe the team is free of negative coercion.	2. Ensure freedom from coercion and distorting self-deception. 3. Encourage openness to alternative points of view. 4. Demonstrate empathy and concern about how others think and feel.	DuFour et al. (2006) suggested there be two standards met in order to move forward when a decision is made by consensus: (1) all points of view have been heard; (2) The will of the group is evident even to those who most oppose it (i.e. voice is heard).
32. I believe we share responsibilities.	5. Develop an ability to weigh evidence and assess arguments objectively. 6. Develop greater awareness of the context of ideas and more critically reflective of assumptions. 7. Ensure an equal opportunity to participate in various roles of the discourse. 8. Encourage a willingness to seek understanding and agreement to accept a resulting best judgment as a test of validity until new perspectives, evidence, or arguments are encountered and validated through discourse as yielding a better judgment.	Conzemius and O'Neill (2001) discussed a framework for shared responsibility involve three elements: 1. Focus-creates shared clarity of though, direction, and purpose 2. Reflection helps people learn from what they've done in the past and identify better ways of accomplishing the goals 3. Collaboration brings people together to share ideas and knowledge.
33. I believe there is equal participation among members.		"Collaboration is the process of developing interdependent relationships where all are focused on a common purpose and set of goals and where people rely on each other to achieve these goals" (Conzemius & O'Neil, 2001, pp. 15-16).
34. I believe we address members who are not fulfilling team responsibilities.	9. Be able to accept informed objective consensus as valid.	"In order for teammates to call each other on their behaviors and actions, they must have a clear sense of what is expected" (Lencioni, 2002).
35. I believe we freely discuss evidence derived from data.	Cranton (2006) discussed the need	Teams that focus on results are more effective than those that

	for supportive groups to solve problems involving conflict, coping with constraints, and management issues.	center their work on activities and tasks (Katzenbach & Smith, 1993). The measure of a great team is based upon the results it achieves (Lencioni, 2002).
36. I believe we have access to necessary data.		"In a professional learning community, educators are hungry for evidence of student learning. Relevant, timely information is the essential fuel of their continuous improvement process" (DuFour et al., 2006, p. 145). "The challenge for schools is to provide each teacher with powerful and authentic information in a timely manner in order to impact his or her professional practice in ways that enhance student learning" (DuFour et al., 2006, p.147).
37. I believe we have established guidelines for communication.		Communication competencies are used to improve interpersonal exchanges, build rapport, networks, and include presentation, writing, and reading (Gilley et al., 2010). Communication skills involve proper use of active listening, questioning, encouraging, and silence (Gilley et al., 2010). "Effective communication is an essential component of the change process" (DuFour & Eaker, 1998, p. 106).
38. I believe we work toward consensus.		"Great teams understand the danger of seeking consensus, and find ways to achieve buy-in even when complete agreement is impossible. Great teams ensure that everyone's ideas are genuinely considered, which then creates a willingness to rally around whatever decision is ultimately made by the group" (Lencioni, 2002).
Holistic Orientation		
39. I believe there is evidence of celebrating accomplishments (e.g., photos, flyers, minutes, agenda, etc.).	Holistic orientation encourages learning through engagement or other ways of knowing that are affective and relational (Taylor, 2009). Awareness of feelings and emotions	DuFour et al. (2006) recommended using celebration to support "collaborative efforts, accomplished tasks, achieved goals, team learning, continuous improvement, and support for student learning" (p. 28).

	during the reflective process develops affective knowing (Taylor, 2009). Holistic approaches include the importance of relationships with others as fostering transformative learning (Taylor, 2008).	"celebrations continually remind people of the purpose and priorities of their organization, members are more likely to embrace the purpose and work toward agreed-upon priorities" (DuFour et al., 2006, p. 28).
40. I believe there is an appreciation for all members. 41. I believe we recognize the accomplishment of personal goals. 42. I believe we recognize accomplishment of classroom success. 43. I believe we are respectful of each other.		Hord (1997) identified mutual respect and understanding as fundamental requirements promoted within a PLC culture. PLC members must feel comfortable sharing their successes and failures (Hord, 1997). PLC members should praise and recognize one another's triumphs and offer empathy and support when needed (Hord, 1997).
44. I believe we use conflict as a catalyst for dialogue.		Hord and Sommers (2008) recognized that teachers should tolerate and even encourage debate, discussion, and disagreement.
45. I believe we have developed traditions that attribute to team success.	Taylor (2009) discusses examples of other ways of knowing as presentational or expressive (e.g., music, modeling, storytelling, cooperative inquiry, and rituals) Alcantara et al. (2009) discussed the influence of agendas in structuring transformative learning through the collaborative inquiry process. Cranton (2006) recognized the use of group norms in supporting a cohesive group structure.	Lunenburg (2010) recognized teacher isolation as a traditional PLC obstacle. Lunenburg (2010) suggested that day-to-day activities be designed in order to connect teachers and administrators. In reference to teacher isolation, Lunenburg (2010) stated "Faculty need to address these structural and cultural traditions in schools that present obstacles and barriers to substantive improvements" (p.3).
46. I believe our work is guided by an agenda.		DuFour et al. (2006) suggested teams be given autonomy to determine their own agenda once principals and team leaders had agreed upon the work to be done, timeline for completion, and what evidence will be used to demonstrate completion.
47. I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).		Protocols move teams into meaningful dialogue and help support a culture where team members are committed to fulfilling responsibilities (DuFour et al., 2006).

48. I believe we have established norms for behavior.		Norms for dialogue distinguish a time for decision-making by balancing input, advocacy, inquiry, and reflection (Hord & Sommers, 2008). DuFour et al. (2006) distinguished that teams increase their performance levels when expectations, procedures, responsibilities, and relationships are clarified between members.
Awareness of Context		
49. I believe each member contributes.	Taylor (2009) discussed barriers that are in place or inhibit what is necessary for transformative learning can explain resistance to change (e.g., unequal distribution of responsibilities, rules and sanctions, role assignments, times, resistance to technology, etc.).	"Collaboration doesn't just mean staff members feel good about each other or liking each other. It is about creating an environment-through structures, systems, processes, and polices-where everyone contributes skills, knowledge, and experience to continuously improve student learning" (Conzemius & O'Neill, 2001, p. 16).
50. I believe there is a shared sense of responsibility.		DuFour et al. (2006) recognized interdependence as a common goal that promotes productivity, performance, and innovation.
51. I believe there is time to promote individual reflection.		Hord and Sommers (2008) discussed the need for collaborative teams to balance timely decisions with time needed to ensure a reflective process.
52. I believe there is time to address critical issues.		"It is imperative that teachers be provided with time to meet during their contractual day" (DuFour et al., 2006, p. 95).
53. I believe there is time for team reflection.		"One of the ways in which organizations demonstrate their priorities is allocation of resources, and in schools, one of the most precious resources is time" (DuFour et. al., 2006, p. 95).
54. I believe our work aligns to our school's mission statement.	Mezirow (2000) discussed six habits of mind that shape how learners derive meaning based upon our background, experience, culture, and personality.	Lunenburg (2010) discussed the mission statement used to identify a school's purpose and engaging the faculty in deeper questions.
55. I believe our work aligns to our school's vision statement.		The vision statement should be the faculty agreed upon endorsement of what they want their school to become (Lunenburg, 2010). "In an exemplary school,

		students (a) accept responsibility for their learning, decisions, and actions; (b) develop skills to become more self-directed learners as they progress through grades; and (c) actively engage in and give effort to academic and extracurricular pursuits" (Lunenburg, 2010, p. 2).
56. I believe our work aligns to values that exist within our school.		Shared values represent those attitudes, behaviors, and commitments that all teachers would pledge to demonstrate as they work toward their school's shared vision (Lunenburg, 2010).
57. I believe our work aligns to goals established within my school.		Goals are based upon the school value statements (Lunenburg, 2010). Lunenburg (2010) discussed three relationships between goals and school leaders: 1. Goals are the guidepost for defining standards when implementing school improvement efforts. 2. Goals influence the aspirations of a school district's key administrators (i.e. professional development, allocation of resources, etc.) 3. Goals reflect a desired end result of actions. It is measurable. Goals motivate and foster commitment to performance standards and targets (Lunenburg, 2010).
Authentic Relationships		
58. I feel comfortable in taking risks during team discussions.	"Authentic relationships also allow individuals to have questioning discussions, share information openly, and achieve greater mutual and consensual understanding" (Taylor, 2009, p.13).	"… relationship skills allow team members to enhance their relationships with others so that they can build a positive, comfortable, and nonthreatening communication climate with others–one that encourages other people to discuss organizational issues, problems, and other ideas openly and honestly, without fear of reprisal" (Gilley, Morris,

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		Wait, Coates, &Veliquette, 2010).
59. I believe our relationships contribute to open sharing of ideas.	Taylor (2009) discussed fostering the ability to be genuine and open with others as a facet to establishing authentic relationships in the classroom.	DuFour et al. (2006) suggested two standards be met before moving forward when a decision is made by consensus: (1) all points of view have been heard; (2) the will of the group is evident even to those who most oppose it (i.e. voice is heard).
60. I have confidence when participating in my team's decision-making processes.	Alcantara et al. (2009) discussed how collaborative inquiry should motivate participation bused upon the individual's interest in presented questions.	DuFour et al. (2006) discussed members being proactive and resolving issues standing in the way of accomplishing team goals.
61. I believe our relationships contribute to effective listening.	Cranton (2006) stated, "We need to engage in conversation with others in order to better consider alternative perspectives and determine their validity" (p. 36).	Hord and Sommers (2008) recognized that successful dialogue within a team is contingent upon its members actively listen to others, suspending judgment, and resistance to premature closure. "Teamwork represents a set of values that encourage listening and responding constructively to views expressed by others, giving others the benefit of the doubt, providing support, and recognizing the interests and achievements of others (Katzenbach & Smith, 1993, p. 112).
62. I believe there is shared accountability among team members.	In a supportive group, there is acceptance of responsibility within the group (Cranton, 2006).	Accountability occurs when team members are willing to call their peers on performance or behaviors that might hurt the team (Lencioni, 2002). Team goals motivate a social contract among members that is based upon purpose and obligates participation (Katzenbach & Smith, 1993). Teams must have clear sense of what is expected is expect in order for teammates to call each other on their behavior (Lencioni, 2002).
63. I value the contributions of team members.	Cranton (2006) distinguished mutuality and appreciation as attributes that supportive and cohesive learning groups.	Lencioni (2002) discussed effective teams composed of individual that have learned to acknowledge mistakes, weaknesses, failures, and the need for help. Lencioni (2002) discussed

		teammates must to recognize and value the strengths of other members of the team and be willing to learn from one other (Lencioni, 2002).
64. I believe our relationships promote problem solving.	Transformative learning within a learning organization occurs as individuals work to meet organizational goals (York & Marsick, 2000).	Gilley et al. (2010) identified synergistic relationships as those composed of interdependent individuals working toward a common goal that incorporates opportunities for growth, development, and participation. Gilley et al. (2010) suggested problem solving is a competency utilized by effective teams. An effective team is able to properly define the problem, identify the desired future state, identify and analyze forces acting on the problem, develop a strategy to resolve the problem, and evaluate the result of the decision (Gilley et al, 2010).
65. I believe there is trust among members.	"It is through building trusting relationships that learners develop the confidence to deal with learning on an affective level, where transformation can be perceived as threatening and an emotionally charged experience" (Taylor, 2009, p. 13).	"When trust exists, organizations tend to think more creatively, take more risks, and share information more readily. There is a feeling of being supported" (Hord & Sommers, 2008, p. 104).
66. I believe we encourage positive relationships.	"Previous research established positive and productive relationships with others is one of the essential factors in a transformative experience (Taylor, 2009, p. 13).	"The ultimate outcome of positive (synergistic) relationship between individuals is known as rapport, which is the unconditional positive regard for one another and is further defined as a deep concern for the well-being of others" (Whichard & Kees, 2006 in Gilley et al., 2010). Building external relationships – the team establishes relationships with others who can support their efforts to achieve their goals (DuFour et al., 2006, p. 104).
67. I believe my relationship with other members has been positive.		Caring orientation–members communicate positive regard, appreciation, and respect. A close personal relationship is not a prerequisite of an effective team, but mutual respect and validation are critical (DuFour et al., 2006, p. 104).

68. I believe the environment promotes positive relationships.		Positive environment–the group focuses on staying positive: positive affect, positive behavior, and the pursuit of positive outcomes. Members cultivate positive images of the group's past, present, and future (DuFour et al, 2006, p. 104).

COLLABORATIVE TEAM SURVEY ITEMS WITH CORRESPONDING
REFERENCE

The following items appear on the Collaborative Team Survey. The numbers after each
item correspond to the list of authors found on the reference list supporting that item.

Individual Experience	
1. I share my professional knowledge.	5, 6, 15, 16,17
2. I share my knowledge gained from working in the classroom.	5, 6, 7, 15, 17x
3. I share my classroom data.	1, 5, 11, 17, 18
4. I have gained new professional knowledge.	5, 6, 7, 8, 14
5. I have learned from other team members.	2, 5, 6, 7, 8, 14
6. I have gained knowledge of effective instructional strategies.	5, 6, 7, 8, 14
7. I believe instruction in my classroom has improved.	5, 6, 18
8. I believe student learning in my classroom has improved.	5, 6, 7, 8, 14
9. I believe work done in collaboration aligns with work done in my classroom.	5, 6, 7, 8, 14
Promoting Critical Reflection	
10. I believe we determine what students should learn.	5, 6, 7, 14
11. I believe we determine whether students have learned.	5, 6, 7, 14
12. I believe we determine what to do if a student does not learn.	5, 6, 7, 14
13. I believe we determine what to do if a student does learn.	5, 6, 7, 14
14. I believe we determine how to teach so all students can learn.	5, 6, 7, 14
15. I believe we identify best teaching practice.	1, 5, 6, 14
16. I believe we analyze student achievement data.	1, 5, 6, 11, 13, 18, 19
17. I believe we implement initiatives to improve student learning.	1, 2, 5, 6
18. I believe we take action to support student learning.	5, 6
19. I believe we gather evidence of current levels of student learning.	5, 6
20. I believe we develop strategies to address weaknesses in student learning.	5, 6
21. I believe we develop strategies to build upon strengths in student learning.	5, 6
22. I believe we evaluate the effectiveness of teaching strategies.	1, 5, 6
23. I believe we establish specific goals.	3, 5, 6, 7
24. I believe we establish measureable goals.	
25. I believe we establish attainable goals.	
26. I believe we establish results-oriented goals.	
27. I believe we establish time bound goals.	
28. I believe our actions are directed at achieving results.	3, 5, 6, 7
29. I believe we are focused upon student learning.	5, 6, 7
Dialogue	
30. I believe there is openness to alternative points of view.	2, 4, 5, 6, 10, 11
31. I believe the team is free of negative coercion.	2, 4, 5, 6, 10, 11
32. I believe we share responsibilities.	2, 4, 5, 6, 10, 11
33. I believe there is equal participation among members.	2, 4, 5, 6, 10, 11
34. I believe we address members who are not fulfilling team responsibilities.	2, 4, 5, 6, 9, 10, 11
35. I believe we freely discuss evidence derived from data.	1, 5, 6, 11, 18, 19
36. I believe we have access to necessary data.	1, 5, 6, 11, 18, 19
37. I believe we have established guidelines for communication.	2, 6, 10, 11, 13, 14
38. I believe we work toward consensus.	2, 4, 5, 6, 10, 11
Holistic Orientation	
39. I believe there is evidence celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.)	5, 6, 14
40. I believe we have developed traditions that attribute to team success.	4, 5, 6, 14, 16
41. I believe we recognize the accomplishment of personal goals.	5, 6, 14
42. I believe we recognize accomplishment of classroom success.	5, 6, 14
43. I believe we are respectful of each other.	4, 5, 6, 11, 14, 16
44. I believe we use conflict as a catalyst for dialogue.	4, 5, 6, 9, 11, 14, 16
45. I believe our work is guided by an agenda.	2, 6, 13, 14

46. I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).	2, 6, 13, 14
47. I believe we have established norms for behavior.	2, 6, 13, 14
48. I believe there is an appreciation for all members.	4, 16
Awareness of Context	
49. I believe each member contributes.	4, 16
50. I believe there is a shared sense of responsibility.	4, 16
51. I believe there is time to promote individual reflection.	4, 16
52. I believe there is time for team reflection.	4, 16
53. I believe our work aligns to our school's mission statement.	3, 5, 6, 7, 12, 14
54. I believe our work aligns to our school's vision statement.	3, 5, 6, 7, 12, 14
55. I believe our work aligns to values that exist within our school.	3, 5, 6, 7, 12, 14
56. I believe our work aligns to goals established within my school.	3, 5, 6, 7, 12, 14
57. I believe there is time to address critical issues.	4, 5, 6, 16
Authentic Relationships	
58. I have confidence when participating in my team's decision-making processes.	5, 6, 10, 11
59. I feel comfortable in taking risks during team discussions.	5, 6, 10, 11
60. I believe we encourage positive relationships.	2, 5, 6, 10, 11
61. I believe our relationships contribute to effective listening.	5, 6, 10, 11
62. I believe our relationships contribute to open sharing of ideas.	4, 5, 6, 10, 11, 16
63. I believe there is shared accountability among team members.	5, 6, 10, 11
64. I believe our relationships promote problem solving.	2, 5, 6, 10, 11
65. I believe there is trust among members.	2, 5, 6, 9, 11
66. I believe my relationship with other members has been positive.	2, 5, 6, 7, 8, 10, 11, 14
67. I believe the environment promotes positive relationships.	4, 5, 6, 10, 11, 14, 16
68. I value the contributions of team members.	4, 16

APPENDIX D

REFERENCE LIST FOR ITEM RESEARCH DETAILED IN APPENDIX C

1.   Ainsworth, L. (2007). Common formative assessments: The centerpiece of an integrated standards-based assessment system. In D. Reeves (Ed.), *Ahead of the curve* (pp. 79-101). Bloomington, IN: Solution Tree Press.

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4.   Cranton, P. (2006). *Understanding and promoting transformative learning: A guide for educators of adults* (2nd ed.). San Francisco, CA: Jossey-Bass.

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15.   Missouri Professional Learning Communities Project. (2011). *Missouri professional learning community: Implementation rubric*. Kansas City: Missouri Professional Learning Communities Project.

16.   Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York, NY: Oxford University Press.

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17. Senge, P. M. (2006). *The fifth discipline: The art & practice of the learning organization* (Revised and updated). New York, NY: Doubleday.

18. Taylor, E. W. (2000). Fostering Mezirow's transformative learning theory in the adult education classroom: A critical review. *Canadian Journal of the Study of Adult Education*, 1-28.

19. Wellman, B., & Lipton, L. (2004). *Data-driven dialogue: A facilitator's guide to collaboration inquiry.* Sherman, CT: Mira Via.

20. White, S. (2007). Data on purpose: Due diligence to increase student achievement. In D. Reeves (Ed.), *Ahead of the curve* (pp. 207-225). Bloomington, IN: Solution Tree Press.

APPENDIX E

SPONSORSHIP AGREEMENT

Dear Ms. Baldwin,

I want to begin by thanking you and the staff at the Northwest Region 5 Regional Professional Development Center (RPDC) for your contribution to my study. Our work together has aided my investigation of transformative learning within collaborative teams. The RPDC staff has provided significant input in developing the Collaborative Team Survey (CTS) over the course of this school year. Furthermore, I am very grateful of the RPDC's role in sponsoring the CTS.

It is my understanding the RPDC will be utilizing the CTS to obtain feedback from schools that have completed three years of Missouri Professional Learning Communities process. Your staff has communicated that data derived from the CTS will be used to further support these schools in their professional learning. My hope is the RPDC will continue to use the CTS as a valued instrument.

I am pleased to hear the RPDC has already distributed the CTS and collected data in preparing for next school year. I recognize all respondent data is property of the region 5 RPDC. Therefore, I am petitioning to receive raw data in a blinded form with no references to participating schools. The data received will be used to complete my dissertation by performing validity and reliability tests on the CTS. After completing data analysis, I would like to collaborate with your staff and discuss my findings.

Please reply to this e-mail acknowledging that the RPDC is willing to provide me with raw blinded data collected from their administration of the CTS. If you have questions or concerns, you may also contact me by responding to this e-mail or by phone at 816.294.0179 (h). You may also contact my advisor, Dr. Philip Messner, at Northwest Missouri State University at 660.562.1478 or at pemday@nwmissouri.edu.

Sincerely,

Josh Colvin

APPENDIX F

CONFIRMATION OF SPONSORSHIP AGREEMENT

From: Baldwin,Rebecca [mailto:BALDWIN@nwmissouri.edu]
Sent: Tuesday, May 15, 2012 8:50 AM
To: Colvin, Joshua
Subject: Petition for Data

Dear Mr. Colvin,

The RPDC is currently administering the CTS to schools that have completed three years of the MPLC process. We will be using feedback from this survey to support these schools in their professional learning. You have permission to use the data collected from our recent administration of the CTS. We will provide you with raw data containing no references to participating schools (blinded data). I look forward to discussing your analysis of the data.

Best Regards,

Beccy Baldwin

Beccy Baldwin

Director, Northwest Regional Professional Development Center
660-562-1995
Baldwin@nwmissouri.edu

APPENDIX G

INSTITUTIONAL REVIEW BOARD (IRB) APPROVAL

Janelle Greening of the University of Missouri-Columbia Institutional Review Board sent the e-mail provided below on behalf of the Campus Institutional Review Board (IRB). The message below confirmed the researcher did not need IRB approval and blinded archival data from the Northwest Missouri Regional Professional Center (RPDC) could be used in the study.

From: Greening, Janelle Marie [greeningjm@missouri.edu]
Sent: Tuesday, August 07, 2012 4:07 PM
To: Colvin, Joshua Aaron (MU-Student); pemday@nwmissouri.edu
Subject: Campus IRB: Project #1203335; Review #105479

Good Morning,
Josh, thank you for calling me. Since you are only using the data collected to validate an instrument, this activity does not require IRB review since instrument validation does not qualify as human subject research. Please let me know if you have any questions. I will withdraw this application on your behalf.   THE CAMPUS INSTITUTIONAL REVIEW BOARD

APPENDIX H

INVITATION E-MAIL TO PRINCIPALS

The following letter was used by Northwest Missouri Regional Professional Development Center (RPDC) members when contact building level principals. RPDC members e-mailed the letter below.

Dear <<Insert_Principal_Name>>

Steve or I recently contacted you about having your staff participate in an online survey. The survey titled, Collaborative Team Survey (CTS), has been developed as a diagnostic instrument used to inform teachers and school leaders on how to improve a collaborative team's learning capacity. More specifically, the CTS measures teacher perception of learning within their collaborative teams as aligned to essential concepts found within Professional Learning Communities. Reported CTS data will address team-learning dynamics and shed light on your school's continued progress as a Professional Learning Community (PLC).

The RPDC considers learning within collaborative teams as an extremely important component of school improvement. After analyzing the data from the survey, results will be provided to you to support your continued improvement in the PLC process. If you are willing to administer this survey to your staff, please go to the following link to find out more information:
https://www.surveymonkey.com/s/Principal_Invite

Thank you for your willingness to participate. Please do not hesitate to contact Steve (stevej@nwmissouri.edu) or myself if you have any questions.

Sincerely,

Lori Colvin
NW Regional Professional Development Center
800 University Drive
Maryville, MO 64068
660.562.1995

APPENDIX I

SURVEY INFORMATION AND INFORMED CONSENT PROVIDED TO
PRINCIPALS

The Northwest Missouri Regional Professional Development Center (RPDC) used the information presented to inform school principals of the Collaborative Team Survey (CTS) and to collect an electronic informed consent.

The Northwest Regional Professional Development Center (RPDC) has agreed to sponsor a doctoral candidate's research of collaborative teams within Professional Learning Communities. In sponsoring this research, we have acquired access to the Collaborative Team Survey (CTS). The CTS has been developed to measure teacher perception of collaborative team performance, and then determine the degree in which learning has occurred as an expected outcome. Our center has worked with the doctoral student in aligning survey questions to fundamental Professional Learning Community (PLC) concepts. Therefore, CTS data should directly report how well collaborative teams are experiencing learning. In addition, we believe the CTS will acknowledge how well PLC concepts continue to resonate within collaborative teams of schools that have completed three years of MPLC membership.

Our center will share results of this survey with each participating school in preparation for the 2012-2013 school year. Results will be provided to support your continued improvement in the PLC process. In addition, we intend to use this survey to measure our effectiveness in helping schools continue a culture of learning. Our goal is to maintain supportive relationships will all schools in the Northwest RPDC.

Please note the RPDC will provide the doctoral candidate with blinded archival data collected from the administration of this survey. The doctoral candidate intends to complete his research by further testing and making possible revisions to the CTS. All data collected from the CTS will be maintained and stored by the RPDC on the Northwest Missouri State University campus. Your school will be assigned a number code to maintain confidentiality. Neither your teachers' responses nor school data will be identified in any of the doctoral candidate's reports or recommendations. All information is confidential and anonymous.

Yes–I would like my staff to take the Collaborative Team Survey (continue).
No–I would rather my staff not participate (stop).

APPENDIX J

ADDITIONAL PRINCIPAL INSTRUCTIONS

These addition instructions were provided to school principals before the Collaborative Team Survey (CTS) was made available to their teachers.

Anticipate receiving an e-mail titled CTS Teacher Invite with 24 hours. Please forward this e-mail to your teachers encouraging them to complete the survey by May 1st.

Important: The CTS is completely confidential and anonymous. You will need to designate which collaborative teams should take the survey. Although in most cases collaborative teams are organized by curriculum or grade-level, please instruct your teachers to complete the survey by reflecting upon their experiences within the collaborative team you designate.

If you have questions about the survey, please contact Lori Colvin or Steve Johnson by phone, 660.562.1995, or by e-mail. Thank you in advance for your participation. We look forward to sharing the results of this survey with you in preparation for next year.

Lori Colvin
lcolvin@nwmissour.edu

Steve Johnson
stevej@nwmissouri.edu

APPENDIX K

INVITATION E-MAIL TO TEACHERS

The following letter invites teachers to participate in the Collaborative Team Survey. Building principals forwarded this letter by e-mail to their teachers currently working within a collaborative team.

Dear Teachers:

The Northwest Regional Professional Development Center (RPDC) has agreed to sponsor a doctoral candidate's research of collaborative teams within Professional Learning Communities. We have agreed to sponsor this study in order to better understand the occurrence of learning within your collaborative teams. This study stems from your school's work as a Professional Learning Community (PLC). PLC research suggests that schools improve when individuals or groups of individuals learn and apply their new knowledge.

Steve Johnson and I would like you to complete an internet-based survey to detail your perception of working within a collaborative team. The survey titled, Collaborative Team Survey (CTS), will take approximately 5-10 minute to complete. You can access the CTS by going to the following link: <<insert_web_link>>.

Please note there is no risk in taking this survey. The CTS does not ask for any personal identification. No individual responses will be reported. All responses will be grouped together and reported as school data. All information is confidential and anonymous.

We want to thank you for your willingness to participate in this study. Your expertise, feedback, and time are greatly appreciated.

Respectfully,

Lori Colvin   Steve Johnson
lcolvin@nwmissour.edu   stevej@nwmissouri.edu

COLLABORATIVE TEAM SURVEY (CTS) INFORMATION AND TEACHER
CONSENT FORM

The information given below was provided as the first question on the CTS. Teachers
had to complete this question before moving forward and answer the first CTS question.

The accompanying e-mail invites you to participate in a study sponsored by the
Northwest Regional Professional Development Center (RPDC). The purpose of this
study is to investigate teacher perception of learning within building-level collaborative
teams.

Request of participation: You are invited to participate in research concerning the
measurement of learning within collaborative teams. Your participation in this study is
by individual choice and voluntary. In responding to this survey you may skip items or
choose to withdraw from the study at any time. Your responses will be confidential and
will only be reported as summarized aggregated group data. No individual responses will
be reported.

Exclusions: You must currently be a Missouri public school teacher who is working
within a building-level collaborative team.

Survey Instrument: You will be asked to rate your perception about each item on a
scale from strongly agree to strongly disagree. The survey typically takes 5-10 minutes
to complete. Results of the survey will be shared with your school.

Privacy: All information you provide through this research is confidential and
anonymous. Findings will be reported as summarized aggregate group data. No
individual responses will be reported. Your personal responses will not be identified in
any findings or recommendations derived from this study. Your personal identification
will be protected at all times.

Risks: There are no anticipated risks or discomforts in your participating in this study
beyond the risks of daily life.

Benefits: Results of this study will be shared with your school to support your continued
improvement in the PLC process.

Please complete the first question of this survey confirming you have read the above
statements and agree to continue or discontinue your participation in the Collaborative
Team Survey (CTS).

Yes–I willingly choose to participate (continue).
No–I would rather not participate in this study (stop).

APPENDIX M

COLLABORATIVE TEAM SURVEY TOTAL RESPONSES AND FREQUENCY RATES

Item	Indicator	Total Responses	Missing Responses	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I have gained knowledge of effective instructional strategies.	254	1	43.70%	45.67%	9.45%	1.18%
2	I believe we determine what students should learn.	254	1	42.52%	46.06%	10.24%	1.18%
3	I believe we determine whether students have learned.	254	1	41.34%	49.61%	8.66%	0.39%
4	I believe we determine how to teach so all students can learn.	255	0	32.55%	51.37%	15.29%	0.78%
5	I believe we identify best teaching practice.	254	1	35.43%	53.54%	10.63%	0.39%
6	I believe we develop strategies to address weaknesses in student learning.	255	0	36.86%	49.41%	13.33%	0.39%
7	I believe we develop strategies to build upon strengths in student learning.	254	1	38.19%	49.21%	11.81%	0.79%
8	I believe we establish time bound goals.	255	0	35.69%	51.76%	11.76%	0.78%
9	I believe our actions are directed at achieving results.	255	0	52.94%	41.18%	5.49%	0.39%
10	I believe we are focused upon student learning.	254	1	52.76%	40.16%	6.30%	0.79%
11	I believe there is openness to alternative points of view.	255	0	30.98%	48.24%	17.25%	3.53%
12	I believe our relationships promote problem solving.	246	9	41.06%	43.09%	13.82%	2.03%
13	I believe there is trust among members.	246	9	33.33%	42.68%	19.51%	4.47%
14	I believe my relationship with other members has been positive.	247	8	44.13%	47.77%	6.48%	1.62%
15	I believe the environment promotes positive relationships.	247	8	40.08%	43.32%	12.15%	4.45%
16	I believe instruction in my classroom has improved.	246	9	45.53%	50.81%	3.66%	0.00%
17	I believe student learning in my classroom has improved.	245	10	46.94%	47.35%	5.31%	0.41%
18	I believe work done in collaboration aligns with work done in my classroom.	246	9	39.84%	48.78%	8.13%	3.25%
19	I believe we freely discuss evidence derived from data.	244	11	40.16%	42.62%	15.16%	2.05%
20	I believe we have access to necessary data.	246	9	41.87%	51.63%	6.10%	0.41%
21	I believe we have established guidelines for communication.	246	9	36.59%	47.97%	13.82%	1.63%
22	I believe we recognize the accomplishment of personal goals.	246	9	30.49%	46.75%	21.95%	0.81%
23	I believe we recognize accomplishment of classroom success.	247	8	35.63%	48.99%	14.57%	0.81%
24	I believe we are respectful of each other.	245	10	40.41%	43.27%	13.47%	2.86%
25	I believe there is time to address critical issues.	243	12	24.69%	48.56%	23.87%	2.88%
26	I believe we encourage positive relationships.	243	12	39.92%	49.79%	8.23%	2.06%
27	I believe our relationships contribute to effective listening.	243	12	34.57%	52.67%	10.29%	2.47%
28	I believe our relationships contribute to open sharing of ideas.	241	14	34.85%	48.55%	12.45%	4.15%
29	I believe there is shared accountability among team members.	242	13	29.34%	47.11%	20.25%	3.31%
30	I believe we evaluate the effectiveness of teaching strategies.	241	14	26.14%	51.87%	21.16%	0.83%
31	I believe we establish specific goals.	242	13	38.02%	49.59%	10.74%	1.65%
32	I believe we establish measureable goals.	243	12	37.45%	52.67%	8.23%	1.65%

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33	I believe we determine what to do if a student does not learn.	243	12	30.86%	46.91%	20.99%	1.23%
34	I believe we determine what to do if a student does learn.	241	14	31.54%	52.28%	15.35%	0.83%
35	I believe we share responsibilities.	243	12	34.57%	47.33%	15.23%	2.88%
36	I believe there is equal participation among members.	242	13	26.45%	42.15%	24.38%	7.02%
37	I believe our work aligns to our school's mission statement.	242	13	43.39%	49.17%	6.61%	0.83%
38	I believe there is time to promote individual reflection.	236	19	21.19%	53.39%	23.31%	2.12%
39	I believe there is time for team reflection.	238	17	25.21%	51.68%	18.91%	4.20%
40	I believe our work aligns to our school's vision statement.	237	18	41.35%	51.90%	5.49%	1.27%
41	I believe our work aligns to values that exist within our school.	238	17	42.44%	52.10%	4.20%	1.26%
42	I believe we use conflict as a catalyst for dialogue.	234	21	21.79%	52.99%	22.22%	2.99%
43	I believe our work is guided by an agenda.	239	16	35.15%	52.30%	12.13%	0.42%
44	I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).	237	18	32.07%	50.63%	15.19%	2.11%
45	I believe our work aligns to goals established within my school.	239	16	41.00%	52.72%	5.02%	1.26%
46	I believe we establish attainable goals.	239	16	36.40%	56.49%	6.28%	0.84%
47	I believe we establish results-oriented goals.	236	19	38.14%	52.12%	8.90%	0.85%
48	I have gained new professional knowledge.	237	18	43.46%	48.95%	6.75%	0.84%
49	I have learned from other team members.	238	17	51.26%	44.54%	3.78%	0.42%
50	I believe there is evidence celebrating accomplishments (e.g., photos, flyers, minutes, agenda, etc.).	236	19	27.12%	50.00%	21.61%	1.27%
51	I believe we have developed traditions that attribute to team success.	237	18	32.49%	52.74%	13.08%	1.69%
52	I believe we have established norms for behavior.	236	19	36.86%	49.58%	11.02%	2.54%
53	I believe there is an appreciation for all members.	237	18	30.80%	44.73%	20.25%	4.22%
54	I believe each member contributes.	236	19	32.20%	42.80%	22.03%	2.97%
55	I believe there is a shared sense of responsibility.	238	17	31.09%	48.32%	18.07%	2.52%
56	I believe we analyze student achievement data.	237	18	37.55%	52.74%	7.59%	2.11%
57	I believe we implement initiatives to improve student learning.	236	19	38.98%	54.24%	6.36%	0.42%
58	I believe we take action to support student learning.	237	18	43.88%	51.05%	4.22%	0.84%
59	I believe we gather evidence of current levels of student learning.	236	19	40.68%	50.85%	7.63%	0.85%
60	I believe the team is free of negative coercion.	236	19	22.46%	44.92%	27.54%	5.08%
61	I believe we address members who are not fulfilling team responsibilities.	234	21	14.96%	43.59%	33.76%	7.69%
62	I believe we work toward consensus.	236	19	35.59%	50.42%	12.71%	1.27%
63	I share my professional knowledge.	238	17	44.12%	50.84%	4.62%	0.42%
64	I share my knowledge gained from working in the classroom.	238	17	43.70%	53.36%	2.52%	0.42%
65	I share my classroom data.	237	18	40.51%	50.63%	8.44%	0.42%
66	I value the contributions of team members.	238	17	54.20%	44.96%	0.84%	0.00%
67	I have confidence when participating in my teams decision-making processes.	238	17	43.70%	47.06%	8.40%	0.84%
68	I feel comfortable in taking risks during team discussions.	238	17	36.55%	44.54%	17.23%	1.68%

COLLABORATIVE TEAM SURVEY DESCRIPTIVE SUMMARY STATISTICS

Item	CTS Item	*M*	*Mdn*	*SD*	Skewness	Kurtosis
1	I have gained knowledge of effective instructional strategies.	3.32	3	0.692	-0.735	0.219
2	I believe we determine what students should learn.	3.30	3	0.698	-0.696	0.117
3	I believe we determine whether students have learned.	3.32	3	0.645	-0.503	-0.240
4	I believe we determine how to teach so all students can learn.	3.16	3	0.698	-0.364	-0.400
5	I believe we identify best teaching practice.	3.24	3	0.648	-0.368	-0.299
6	I believe we develop strategies to address weaknesses in student learning.	3.23	3	0.684	-0.398	-0.537
7	I believe we develop strategies to build upon strengths in student learning.	3.25	3	0.687	-0.513	-0.212
8	I believe we establish time bound goals.	3.22	3	0.677	-0.459	-0.159
9	I believe our actions are directed at achieving results.	3.47	4	0.619	-0.824	0.187
10	I believe we are focused upon student learning.	3.45	4	0.650	-0.941	0.571
11	I believe there is openness to alternative points of view.	3.07	3	0.788	-0.556	-0.102
12	I believe our relationships promote problem solving.	3.23	3	0.761	-0.697	-0.068
13	I believe there is trust among members.	3.05	3	0.841	-0.549	-0.374
14	I believe my relationship with other members has been positive.	3.34	3	0.674	-0.862	0.896
15	I believe the environment promotes positive relationships.	3.19	3	0.817	-0.861	0.298
16	I believe instruction in my classroom has improved.	3.42	3	0.564	-0.296	-0.839
17	I believe student learning in my classroom has improved.	3.41	3	0.611	-0.621	0.033
18	I believe work done in collaboration aligns with work done in my classroom.	3.25	3	0.741	-0.927	0.941
19	I believe we freely discuss evidence derived from data.	3.21	3	0.771	-0.650	-0.208
20	I believe we have access to necessary data.	3.35	3	0.613	-0.482	-0.050
21	I believe we have established guidelines for communication.	3.20	3	0.703	-0.574	-0.092
22	I believe we recognize the accomplishment of personal goals.	3.07	3	0.745	-0.232	-0.812
23	I believe we recognize accomplishment of classroom success.	3.19	3	0.706	-0.434	-0.409
24	I believe we are respectful of each other.	3.21	3	0.781	-0.755	0.087
25	I believe there is time to address critical issues.	2.95	3	0.775	-0.290	-0.439
26	I believe we encourage positive relationships.	3.28	3	0.700	-0.804	0.750
27	I believe our relationships contribute to effective listening.	3.19	3	0.716	-0.713	0.603
28	I believe our relationships contribute to open sharing of ideas.	3.14	3	0.788	-0.770	0.353
29	I believe there is shared accountability among team members.	3.02	3	0.794	-0.446	-0.330
30	I believe we evaluate the effectiveness of teaching strategies.	3.03	3	0.712	-0.188	-0.591
31	I believe we establish specific goals.	3.24	3	0.706	-0.662	0.272
32	I believe we establish measureable goals.	3.26	3	0.676	-0.691	0.659
33	I believe we determine what to do if a student does not learn.	3.07	3	0.751	-0.299	-0.666
34	I believe we determine what to do if a student does learn.	3.15	3	0.695	-0.354	-0.353
35	I believe we share responsibilities.	3.14	3	0.773	-0.618	-0.019
36	I believe there is equal participation among members.	2.88	3	0.882	-0.385	-0.589
37	I believe our work aligns to our school's mission statement.	3.35	3	0.641	-0.665	0.352
38	I believe there is time to promote individual reflection.	2.94	3	0.727	-0.238	-0.272
39	I believe there is time for team reflection.	2.98	3	0.782	-0.497	-0.029
40	I believe our work aligns to our school's vision statement.	3.33	3	0.640	-0.725	0.870
41	I believe our work aligns to values that exist within our school.	3.36	3	0.625	-0.750	1.091
42	I believe we use conflict as a catalyst for dialogue.	2.94	3	0.747	-0.332	-0.160
43	I believe our work is guided by an agenda.	3.22	3	0.665	-0.369	-0.392

44	I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).	3.13	3	0.737	-0.525	-0.026
45	I believe our work aligns to goals established within my school.	3.33	3	0.633	-0.713	0.946
46	I believe we establish attainable goals.	3.28	3	0.617	-0.485	0.496
47	I believe we establish results-oriented goals.	3.28	3	0.656	-0.539	0.138
48	I have gained new professional knowledge.	3.35	3	0.644	-0.673	0.351
49	I have learned from other team members.	3.47	4	0.593	-0.728	0.243
50	I believe there is evidence of celebrating accomplishments (e.g., photos, flyers, minutes, agenda, etc.).	3.03	3	0.735	-0.241	-0.565
51	I believe we have developed traditions that attribute to team success.	3.16	3	0.707	-0.529	0.125
52	I believe we have established norms for behavior.	3.21	3	0.735	-0.737	0.443
53	I believe there is an appreciation for all members.	3.02	3	0.826	-0.495	-0.363
54	I believe each member contributes.	3.04	3	0.814	-0.413	-0.577
55	I believe there is a shared sense of responsibility.	3.08	3	0.767	-0.476	-0.242
56	I believe we analyze student achievement data.	3.26	3	0.687	-0.778	0.918
57	I believe we implement initiatives to improve student learning.	3.32	3	0.609	-0.412	-0.014
58	I believe we take action to support student learning.	3.38	3	0.610	-0.659	0.674
59	I believe we gather evidence of current levels of student learning.	3.31	3	0.648	-0.602	0.255
60	I believe the team is free of negative coercion.	2.85	3	0.826	-0.256	-0.541
61	I believe we address members who are not fulfilling team responsibilities.	2.66	3	0.825	-0.123	-0.515
62	I believe we work toward consensus.	3.2	3	0.703	-0.529	-0.047
63	I share my professional knowledge.	3.39	3	0.597	-0.514	0.053
64	I share my knowledge gained from working in the classroom.	3.4	3	0.564	-0.397	0.101
65	I share my classroom data.	3.31	3	0.641	-0.487	-0.189
66	I value the contributions of team members.	3.53	4	0.517	-0.321	-1.467
67	I have confidence when participating in my team's decision-making processes.	3.34	3	0.666	-0.678	0.151
68	I feel comfortable in taking risks during team discussions.	3.16	3	0.763	-0.508	-0.424

ITEMS PRESENTED TO EXPERT PANEL ON DRAFT OF COLLABORATIVE
TEAM SURVEY BY CORRESPONDING HYPOTHESIZED CONSTRUCT

The following items appeared on a draft survey used to secure face and content validity.
Each item was presented to the Expert Panel in the same sequential order by
hypothesized construct. Expert Panel members read and only marked a check box when
a) survey participants may NOT understand this question, or b) Item does NOT align to
PLC collaborative team principles.

Individual Experience

1. I share my professional knowledge.
2. I share my knowledge gained from working in the classroom.
3. I share data obtained from my students.
4. I have gained new professional knowledge.
5. I have learned from other team members.
6. I have gained positive teaching skills.
7. I believe instruction in my classroom has improved.
8. I believe student learning in my classroom has improved.
9. I believe work done in collaboration aligns with work done in my classroom.

Promoting Critical Reflection

10. I believe we determine what students should learn.
11. I believe we determine whether students have learned.
12. I believe we determine what to do if a student does not learn.
13. I believe we determine what to do if a student does learn.
14. I believe we determine how to teach so all students can learn.
15. I believe we identify best teaching practice.
16. I believe we analyze student achievement data.
17. I believe we implement initiatives to improve student learning.
18. I believe we take action to support student learning.
19. I believe we gather evidence of current levels of student learning.
20. I believe we develop strategies to address weaknesses in student learning.
21. I believe we develop strategies to build upon strengths in student learning.
22. I believe we evaluate the effectiveness of teaching strategies.
23. I believe we establish strategic goals.
24. I believe we establish measureable goals.
25. I believe we establish attainable goals.
26. I believe we establish results-oriented goals.
27. I believe we establish time bound goals.
28. I believe our actions are directed at achieving positive results.
29. I believe we are focused upon student learning.

Dialogue

30. I believe there is openness to alternative points of view.
31. I believe the team is free of negative coercion.
32. I believe we can be characterized as being cooperative.
33. I believe we share responsibilities.
34. I believe there is equal opportunity to participate among members.
35. I believe we address members who are not fulfilling team responsibilities.

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36. I believe we have all relevant information.

37. I believe we freely discuss evidence derived from data.

38. I believe we have free access to necessary data.

39. I believe we have established guidelines for communication.

40. I believe we work toward consensus.

Holistic Orientation

41. I believe there is evidence of celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.)

42. I believe we have developed traditions that attribute to team success.

43. I believe we recognize the accomplishment of personal goals.

44. I believe we recognize accomplishment of classroom success.

45. I believe we are respectful of each other's feelings.

46. I believe we use conflict as a catalyst for dialogue.

47. I believe our work is guided by an agenda.

48. I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).

49. I believe we have established norms for behavior.

50. I believe there is an appreciation for all members.

Awareness of Context

51. I believe each member contributes personally.

52. I believe there is a shared sense of responsibility.

53. I believe there is equitable participation among members.

54. I believe there is time to promote individual reflection.

55. I believe there is time for team reflection.

56. I believe our work is reflective of our school's mission statement.

57. I believe our work is reflective of our school's vision statement.

58. I believe our work is reflective of values that exist within our school.

59. I believe our work is reflective of goals established within my school.

60. I believe there is time to address critical issues.

Authentic Relationships

61. I value the contributions of team members.

62. I have confidence when participating in my team's decision-making processes.

63. I feel comfortable in taking risks during team discussions.

64. I collaborate with colleagues that have complementary skills.

65. I believe we encourage positive relationships.

66. I believe our relationships contribute to effective listening.

67. I believe our relationships contribute to open sharing of ideas.

68. I believe there is shared accountability among team members.

69. I believe our relationships promote problem solving.

70. I believe there is trust among members.

71. I believe my relationship with other members has been positive.

72. I believe the environment promotes positive relationships.

APPENDIX P

ITEM-TOTAL STATISTICS FOR RELIABILITY ANALYSIS

The following items appeared as administered on the Collaborative Team Survey (CTS). The calculation of corrected item-total correlation is provided to determine how well the score of one item is internally consistent with composite scores from all other remaining items. The Cronbach's Alpha if Item Deleted column indicates overall reliability of the survey if the item were removed.

Calculations for Research Question 3

Item	Indicator	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	I have gained knowledge of effective instructional strategies.	0.669	0.989
2	I believe we determine what students should learn.	0.635	0.989
3	I believe we determine whether students have learned.	0.718	0.988
4	I believe we determine how to teach so all students can learn.	0.668	0.989
5	I believe we identify best teaching practice.	0.724	0.988
6	I believe we develop strategies to address weaknesses in student learning.	0.693	0.988
7	I believe we develop strategies to build upon strengths in student learning.	0.693	0.988
8	I believe we establish time bound goals.	0.691	0.988
9	I believe our actions are directed at achieving results.	0.751	0.988
10	I believe we are focused upon student learning.	0.719	0.988
11	I believe there is openness to alternative points of view.	0.7	0.988
12	I believe our relationships promote problem solving.	0.825	0.988
13	I believe there is trust among members.	0.781	0.988
14	I believe my relationship with other members has been positive.	0.747	0.988
15	I believe the environment promotes positive relationships.	0.793	0.988
16	I believe instruction in my classroom has improved.	0.729	0.988
17	I believe student learning in my classroom has improved.	0.752	0.988
18	I believe work done in collaboration aligns with work done in my classroom.	0.754	0.988
19	I believe we freely discuss evidence derived from data.	0.783	0.988
20	I believe we have access to necessary data.	0.719	0.988
21	I believe we have established guidelines for communication.	0.783	0.988
22	I believe we recognize the accomplishment of personal goals.	0.749	0.988
23	I believe we recognize accomplishment of classroom success.	0.771	0.988
24	I believe we are respectful of each other.	0.749	0.988
25	I believe there is time to address critical issues.	0.688	0.988
26	I believe we encourage positive relationships.	0.806	0.988

27	I believe our relationships contribute to effective listening.	0.801	0.988
28	I believe our relationships contribute to open sharing of ideas.	0.807	0.988
29	I believe there is shared accountability among team members.	0.785	0.988
30	I believe we evaluate the effectiveness of teaching strategies.	0.769	0.988
31	I believe we establish specific goals.	0.800	0.988
32	I believe we establish measureable goals.	0.772	0.988
33	I believe we determine what to do if a student does not learn.	0.77	0.988
34	I believe we determine what to do if a student does learn.	0.772	0.988
35	I believe we share responsibilities.	0.764	0.988
36	I believe there is equal participation among members.	0.734	0.988
37	I believe our work aligns to our school's mission statement.	0.826	0.988
38	I believe there is time to promote individual reflection.	0.652	0.989
39	I believe there is time for team reflection.	0.687	0.989
40	I believe our work aligns to our school's vision statement.	0.819	0.988
41	I believe our work aligns to values that exist within our school.	0.840	0.988
42	I believe we use conflict as a catalyst for dialogue.	0.697	0.988
43	I believe our work is guided by an agenda.	0.763	0.988
44	I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).	0.728	0.988
45	I believe our work aligns to goals established within my school.	0.836	0.988
46	I believe we establish attainable goals.	0.778	0.988
47	I believe we establish results-oriented goals.	0.822	0.988
48	I have gained new professional knowledge.	0.776	0.988
49	I have learned from other team members.	0.761	0.988
50	I believe there is evidence of celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.	0.671	0.989
51	I believe we have developed traditions that attribute to team success.	0.848	0.988
52	I believe we have established norms for behavior.	0.749	0.988
53	I believe there is an appreciation for all members.	0.805	0.988
54	I believe each member contributes.	0.748	0.988
55	I believe there is a shared sense of responsibility.	0.794	0.988
56	I believe we analyze student achievement data.	0.732	0.988
57	I believe we implement initiatives to improve student learning.	0.82	0.988
58	I believe we take action to support student learning.	0.819	0.988
59	I believe we gather evidence of current levels of student learning.	0.792	0.988
60	I believe the team is free of negative coercion.	0.712	0.988
61	I believe we address members who are not fulfilling team responsibilities.	0.678	0.989
62	I believe we work toward consensus.	0.862	0.988
63	I share my professional knowledge.	0.675	0.989
64	I share my knowledge gained from working in the classroom.	0.665	0.989
65	I share my classroom data.	0.701	0.988
66	I value the contributions of team members.	0.620	0.989

| 67 | I have confidence when participating in my team's decision-making processes. | 0.716 | 0.988 |
| 68 | I feel comfortable in taking risks during team discussions. | 0.652 | 0.989 |

APPENDIX Q

COLLABORATIVE TEAM SURVEY ITEMS WITH CORRESPONDING
COMMUNALITIES

The following items appeared as administered on the Collaborative Team Survey (CTS).
Statistical Package for the Social Sciences (SPSS) was used to complete a principal
component analysis to extract identified components. The proportion of variance
remaining for each item after the extraction of identified components is listed below. The
proportion of variance estimates explain how each item related to the remaining
underlying components.

Item	CTS Item	Variance
1	I have gained knowledge of effective instructional strategies.	0.693
2	I believe we determine what students should learn.	0.579
3	I believe we determine whether students have learned.	0.705
4	I believe we determine how to teach so all students can learn.	0.694
5	I believe we identify best teaching practice.	0.670
6	I believe we develop strategies to address weaknesses in student learning.	0.771
7	I believe we develop strategies to build upon strengths in student learning.	0.682
8	I believe we establish time bound goals.	0.572
9	I believe our actions are directed at achieving results.	0.722
10	I believe we are focused upon student learning.	0.668
11	I believe there is openness to alternative points of view.	0.692
12	I believe our relationships promote problem solving.	0.729
13	I believe there is trust among members.	0.832
14	I believe my relationship with other members has been positive.	0.738
15	I believe the environment promotes positive relationships.	0.762
16	I believe instruction in my classroom has improved.	0.747
17	I believe student learning in my classroom has improved.	0.713
18	I believe work done in collaboration aligns with work done in my classroom.	0.656
19	I believe we freely discuss evidence derived from data.	0.691
20	I believe we have access to necessary data.	0.624
21	I believe we have established guidelines for communication.	0.712
22	I believe we recognize the accomplishment of personal goals.	0.655
23	I believe we recognize accomplishment of classroom success.	0.647
24	I believe we are respectful of each other.	0.835
25	I believe there is time to address critical issues.	0.657
26	I believe we encourage positive relationships.	0.814
27	I believe our relationships contribute to effective listening.	0.763
28	I believe our relationships contribute to open sharing of ideas.	0.835
29	I believe there is shared accountability among team members.	0.820
30	I believe we evaluate the effectiveness of teaching strategies.	0.660
31	I believe we establish specific goals.	0.724

32	I believe we establish measureable goals.	0.713
33	I believe we determine what to do if a student does not learn.	0.676
34	I believe we determine what to do if a student does learn.	0.742
35	I believe we share responsibilities.	0.819
36	I believe there is equal participation among members.	0.811
37	I believe our work aligns to our school's mission statement.	0.760
38	I believe there is time to promote individual reflection.	0.735
39	I believe there is time for team reflection.	0.718
40	I believe our work aligns to our school's vision statement.	0.797
41	I believe our work aligns to values that exist within our school.	0.839
42	I believe we use conflict as a catalyst for dialogue.	0.604
43	I believe our work is guided by an agenda.	0.738
44	I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).	0.745
45	I believe our work aligns to goals established within my school.	0.807
46	I believe we establish attainable goals.	0.736
47	I believe we establish results-oriented goals.	0.798
48	I have gained new professional knowledge.	0.676
49	I have learned from other team members.	0.712
50	I believe there is evidence celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.	0.622
51	I believe we have developed traditions that attribute to team success.	0.780
52	I believe we have established norms for behavior.	0.739
53	I believe there is an appreciation for all members.	0.823
54	I believe each member contributes.	0.819
55	I believe there is a shared sense of responsibility.	0.829
56	I believe we analyze student achievement data.	0.682
57	I believe we implement initiatives to improve student learning.	0.772
58	I believe we take action to support student learning.	0.795
59	I believe we gather evidence of current levels of student learning.	0.745
60	I believe the team is free of negative coercion.	0.802
61	I believe we address members who are not fulfilling team responsibilities.	0.695
62	I believe we work toward consensus.	0.808
63	I share my professional knowledge.	0.826
64	I share my knowledge gained from working in the classroom.	0.811
65	I share my classroom data.	0.748
66	I value the contributions of team members.	0.792
67	I have confidence when participating in my team's decision-making processes.	0.723
68	I feel comfortable in taking risks during team discussions.	0.796

COLLABORATIVE TEAM SURVEY ITEMS WITH EXTRACTION OF THREE
COMPONENTS

The following Collaborative Team Survey (CTS) items appeared have been extracted
through principal component analysis. Components have an eigenvalue greater 2.0. All
factors loadings less than 0.5 have been suppressed. All items having multicollinearity
have been eliminated. Items are organized by assigned component and descending factor
loading values.

CTS Item	1	2	3
I believe we determine what to do if a student does learn.	0.742		
I believe we develop strategies to build upon strengths in student learning.	0.742		
I believe we develop strategies to address weaknesses in student learning.	0.735		
I believe we establish measureable goals.	0.722		
I believe we gather evidence of current levels of student learning.	0.718		
I believe we implement initiatives to improve student learning.	0.717		
I believe we establish results-oriented goals.	0.714		
I believe we establish attainable goals.	0.691		
I believe our work aligns to our school's vision statement.	0.688		
I believe we analyze student achievement data.	0.678		
I believe our work is guided by an agenda.	0.674		
I believe our actions are directed at achieving results.	0.662		
I believe we determine what to do if a student does not learn.	0.657		
I believe we determine whether students have learned.	0.649		
I believe we identify best teaching practice.	0.648		
I believe we determine how to teach so all students can learn.	0.641		
I believe we are focused upon student learning.	0.632		
I believe work done in collaboration aligns with work done in my classroom.	0.617		
I believe we have access to necessary data.	0.606		
I believe we establish time bound goals.	0.597		
I believe there is time to address critical issues.	0.594		
I believe there is time to promote individual reflection.	0.572		
I believe we determine what students should learn.	0.560		
I believe there is an appreciation for all members.		0.814	
I believe there is trust among members.		0.791	
I believe the team is free of negative coercion.		0.779	
I believe our relationships contribute to open sharing of ideas.		0.776	
I believe there is equal participation among members.		0.764	
I believe we are respectful of each other.		0.762	
I believe each member contributes.		0.748	
I believe the environment promotes positive relationships.		0.735	
I believe we encourage positive relationships.		0.723	

I believe our relationships contribute to effective listening.	0.710	
I believe my relationship with other members has been positive.	0.673	
I believe there is openness to alternative points of view.	0.619	
I believe we use conflict as a catalyst for dialogue.	0.535	
I value the contributions of team members.		0.769
I share my knowledge gained from working in the classroom.		0.755
I share my professional knowledge.		0.743

APPENDIX S

COLLABORATIVE TEAM SURVEY ITEMS WITH EXTRACTION OF TWO
COMPONENTS

The following Collaborative Team Survey (CTS) items appeared have been extracted through principal component analysis. Components have an eigenvalue greater 3.0. All factors loadings less than 0.5 have been suppressed. All items having multicollinearity have been eliminated. Items are organized by assigned component and descending factor loading values.

CTS Item	1	2
I believe we implement initiatives to improve student learning.	0.798	
I believe we gather evidence of current levels of student learning.	0.793	
I believe we take action to support student learning.	0.780	
I believe our work aligns to our school's vision statement.	0.762	
I believe we establish measureable goals.	0.754	
I believe we develop strategies to address weaknesses in student learning.	0.745	
I believe we establish attainable goals.	0.739	
I believe we analyze student achievement data.	0.737	
I believe we develop strategies to build upon strengths in student learning.	0.734	
I believe instruction in my classroom has improved.	0.726	
I believe our actions are directed at achieving results.	0.717	
I believe our work is guided by an agenda.	0.714	
I believe student learning in my classroom has improved.	0.708	
I share my classroom data.	0.706	
I believe work done in collaboration aligns with work done in my classroom.	0.690	
I believe we identify best teaching practice.	0.684	
I believe we have access to necessary data.	0.677	
I believe we are focused upon student learning.	0.670	
I share my professional knowledge.	0.665	
I share my knowledge gained from working in the classroom.	0.659	
I believe we determine whether students have learned.	0.654	
I have gained knowledge of effective instructional strategies.	0.65	
I believe we determine how to teach so all students can learn.	0.615	
I believe we establish time bound goals.	0.585	
I value the contributions of team members.	0.543	
I believe there is time to promote individual reflection.	0.533	
I believe we determine what students should learn.	0.529	
I believe there is an appreciation for all members.		0.844
I believe there is trust among members.		0.823
I believe our relationships contribute to open sharing of ideas.		0.806
I believe the team is free of negative coercion.		0.802
I believe we are respectful of each other.		0.799
I believe there is a shared sense of responsibility.		0.779
I believe the environment promotes positive relationships.		0.770
I believe there is equal participation among members.		0.768
I believe each member contributes.		0.766

I believe there is shared accountability among team members.	0.751
I believe we share responsibilities.	0.735
I believe my relationship with other members has been positive.	0.711
I believe there is openness to alternative points of view.	0.657
I believe we address members who are not fulfilling team responsibilities.	0.633
I feel comfortable in taking risks during team discussions.	0.610

COLLABORATIVE TEAM SURVEY ITEMS ORGANIZED BY EXTRACTION OF
TWO COMPONENTS WITH CORRESPONDING FACTOR LOADINGS

The following Collaborative Team Survey (CTS) items appeared by extracted component after principal component analysis with Varimax rotation. The two extracted components have eigenvalues greater than 3.0. CTS items are organized by component and by corresponding factor loadings. All factor loading less than 0.4 have been suppressed.

All CTS Items Organized by Component with Corresponding Factor Loading

Collaborative Team Item	Component 1	Component 2
I believe we implement initiatives to improve student learning.	0.798	
I believe we gather evidence of current levels of student learning.	0.793	
I believe we take action to support student learning.	0.780	
I believe our work aligns to our school's vision statement.	0.762	
I believe we establish measureable goals.	0.754	
I believe our work aligns to goals established within my school.	0.750	0.435
I believe we develop strategies to address weaknesses in student learning.	0.745	
I believe we establish attainable goals.	0.739	
I believe we analyze student achievement data.	0.737	
I believe we establish results-oriented goals.	0.737	0.427
I believe we develop strategies to build upon strengths in student learning.	0.734	
I believe instruction in my classroom has improved.	0.726	
I believe our actions are directed at achieving results.	0.717	
I believe our work aligns to values that exist within our school.	0.714	0.481
I believe our work is guided by an agenda.	0.714	
I believe student learning in my classroom has improved.	0.708	
I share my classroom data.	0.706	
I believe our work aligns to our school's mission statement.	0.697	0.477
I believe work done in collaboration aligns with work done in my classroom.	0.690	
I believe we identify best teaching practice.	0.684	
I believe we determine what to do if a student does learn.	0.680	0.412
I believe we have access to necessary data.	0.677	
I have gained new professional knowledge.	0.676	0.427
I believe we determine what to do if a student does not learn.	0.673	0.419
I believe we are focused upon student learning.	0.670	
I share my professional knowledge.	0.665	
I believe we establish specific goals.	0.659	0.475
I share my knowledge gained from working in the classroom.	0.659	
I believe we determine whether students have learned.	0.654	
I have gained knowledge of effective instructional strategies.	0.650	
I believe we evaluate the effectiveness of teaching strategies.	0.649	0.442
I have learned from other team members.	0.616	0.471

I believe we determine how to teach so all students can learn.	0.615	
I believe we freely discuss evidence derived from data.	0.613	0.501
I believe we establish time bound goals.	0.585	
I believe we have established norms for behavior.	0.559	0.514
I believe there is time to address critical issues.	0.559	0.420
I value the contributions of team members.	0.543	
I believe there is time to promote individual reflection.	0.533	
I believe there is time for team reflection.	0.530	0.449
I believe we determine what students should learn.	0.529	
I believe there is an appreciation for all members.		0.844
I believe there is trust among members.		0.823
I believe our relationships contribute to open sharing of ideas.		0.806
I believe the team is free of negative coercion.		0.802
I believe we are respectful of each other.		0.799
I believe there is a shared sense of responsibility.		0.779
I believe the environment promotes positive relationships.		0.77
I believe there is equal participation among members.		0.768
I believe each member contributes.		0.766
I believe we encourage positive relationships.	0.403	0.762
I believe there is shared accountability among team members.		0.751
I believe our relationships contribute to effective listening.	0.412	0.745
I believe we share responsibilities.		0.735
I believe my relationship with other members has been positive.		0.711
I believe we work toward consensus.	0.530	0.707
I believe our relationships promote problem solving.	0.484	0.701
I believe we have established guidelines for communication.	0.466	0.661
I believe there is openness to alternative points of view.		0.657
I believe we have developed traditions that attribute to team success.	0.557	0.656
I believe we address members who are not fulfilling team responsibilities.		0.633
I believe we recognize the accomplishment of personal goals.	0.444	0.632
I feel comfortable in taking risks during team discussions.		0.610
I believe we recognize accomplishment of classroom success.	0.533	0.571
I believe we use conflict as a catalyst for dialogue.	0.435	0.567
I have confidence when participating in my team's decision-making processes.	0.481	0.55
I believe there is evidence of celebrating accomplishments. (e.g., photos, flyers, minutes, agenda, etc.	0.431	0.533
I believe we have established protocols for participation (e.g., agenda, minutes, decision-making tools, conflict resolution).	0.518	0.522

APPENDIX U

COLLABORATIVE TEAM SURVEY ITEMS IDENTIFIED AS SPECIFIC
INDICATORS BY DESIGNATED COMPONENT

The following Collaborative Team Survey (CTS) items appeared by extracted component after principal component analysis with Varimax rotation. The two extracted components have eigenvalues greater than 3.0. CTS items are organized by component and by corresponding factor loadings.

All CTS Items Organized by Component with Corresponding Factor Loading.

Collaborative Team Item	Hypothesized Construct	Component 1	Component 2
I believe we implement initiatives to improve student learning.	Promote Critical Reflection	0.798	
I believe we gather evidence of current levels of student learning.	Promote Critical Reflection	0.793	
I believe we take action to support student learning.	Promote Critical Reflection	0.78	
I believe our work aligns to our school's vision statement.	Awareness of Context	0.762	
I believe we establish measureable goals.	Promote Critical Reflection	0.754	
I believe we develop strategies to address weaknesses in student learning.	Promote Critical Reflection	0.745	
I believe we establish attainable goals.	Promote Critical Reflection	0.739	
I believe we analyze student achievement data.	Promote Critical Reflection	0.737	
I believe we develop strategies to build upon strengths in student learning.	Promote Critical Reflection	0.734	
I believe instruction in my classroom has improved.	Individual Experience	0.726	
I believe our actions are directed at achieving results.	Promote Critical Reflection	0.717	
I believe our work is guided by an agenda.	Holistic Orientation	0.714	
I believe student learning in my classroom has improved.	Individual Experience	0.708	
I share my classroom data.	Individual Experience	0.706	
I believe work done in collaboration aligns with work done in my classroom.	Individual Experience	0.69	
I believe we identify best teaching practice.	Promote Critical Reflection	0.684	
I believe we have access to necessary data.	Dialogue	0.677	
I believe we are focused upon student learning.	Promote Critical Reflection	0.67	

I share my professional knowledge.	Individual Experience	0.665	
I share my knowledge gained from working in the classroom.	Individual Experience	0.659	
I believe we determine whether students have learned.	Promote Critical Reflection	0.654	
I have gained knowledge of effective instructional strategies.	Individual Experience	0.65	
I believe we determine how to teach so all students can learn.	Promote Critical Reflection	0.615	
I believe we establish time bound goals.	Promote Critical Reflection	0.585	
I value the contributions of team members.	Authentic Reflection	0.543	
I believe there is time to promote individual reflection.	Awareness of Context	0.533	
I believe we determine what students should learn.	Promote Critical Reflection	0.529	
I believe there is an appreciation for all members.	Holistic Orientation		0.844
I believe there is trust among members.	Authentic Reflection		0.823
I believe our relationships contribute to open sharing of ideas.	Authentic Reflection		0.806
I believe the team is free of negative coercion.	Dialogue		0.802
I believe we are respectful of each other.	Holistic Orientation		0.799
I believe there is a shared sense of responsibility.	Awareness of Context		0.779
I believe the environment promotes positive relationships.	Authentic Reflection		0.77
I believe there is equal participation among members.	Dialogue		0.768
I believe each member contributes.	Awareness of Context		0.766
I believe there is shared accountability among team members.	Authentic Reflection		0.751
I believe we share responsibilities.	Awareness of Context		0.735
I believe my relationship with other members has been positive.	Authentic Reflection		0.711
I believe there is openness to alternative points of view.	Dialogue		0.657
I believe we address members who are not fulfilling team responsibilities.	Dialogue		0.633
I feel comfortable in taking risks during team discussions.	Authentic Reflection		0.61

COLLABORATIVE TEAM SURVEY: (CTS FORM B)

The presented 39 items were retained from the Collaborative Team Survey (CTS) to construct an alternative Form B. All 39 items were loaded into a two-component model established within the student. All 39 items had factor loadings greater than 0.6.

CTS Item	1	2
1. I believe we implement initiatives to improve student learning.	0.798	
2. I believe we gather evidence of current levels of student learning.	0.793	
3. I believe we take action to support student learning.	0.780	
4. I believe our work aligns to our school's vision statement.	0.762	
5. I believe we establish measureable goals.	0.754	
6. I believe we develop strategies to address weaknesses in student learning.	0.745	
7. I believe we establish attainable goals.	0.739	
8. I believe we analyze student achievement data.	0.737	
9. I believe we develop strategies to build upon strengths in student learning.	0.734	
10. I believe instruction in my classroom has improved.	0.726	
11. I believe our actions are directed at achieving results.	0.717	
12. I believe our work is guided by an agenda.	0.714	
13. I believe student learning in my classroom has improved.	0.708	
14. I share my classroom data.	0.706	
15. I believe work done in collaboration aligns with work done in my classroom.	0.690	
16. I believe we identify best teaching practice.	0.684	
17. I believe we have access to necessary data.	0.677	
18. I believe we are focused upon student learning.	0.670	
19. I share my professional knowledge.	0.665	
20. I share my knowledge gained from working in the classroom.	0.659	
21. I believe we determine whether students have learned.	0.654	
22. I have gained knowledge of effective instructional strategies.	0.650	
23. I believe we determine how to teach so all students can learn.	0.615	
24. I believe there is an appreciation for all members.		0.844
25. I believe there is trust among members.		0.823
26. I believe our relationships contribute to open sharing of ideas.		0.806
27. I believe the team is free of negative coercion.		0.802
28. I believe we are respectful of each other.		0.799
29. I believe there is a shared sense of responsibility.		0.779
30. I believe the environment promotes positive relationships.		0.770
31. I believe there is equal participation among members.		0.768
32. I believe each member contributes.		0.766
33. I believe there is shared accountability among team members.		0.751
34. I believe we share responsibilities.		0.735
35. I believe my relationship with other members has been positive.		0.711
36. I believe there is openness to alternative points of view.		0.657
38. I believe we address members who are not fulfilling team responsibilities.		0.633
39. I feel comfortable in taking risks during team discussions.		0.61

APPENDIX W

COLLABORATIVE TEAM SURVEY: (CTS FORM C)

The presented 26 items were retained from the Collaborative Team Survey (CTS) to construct an alternative Form B. All 26 items were loaded into a two-component model established within the student. All 26 items had factor loading greater than 0.7.

CTS Item	1	2
1. I believe we implement initiatives to improve student learning.	0.798	
2. I believe we gather evidence of current levels of student learning.	0.793	
3. I believe we take action to support student learning.	0.780	
4. I believe our work aligns to our school's vision statement.	0.762	
5. I believe we establish measureable goals.	0.754	
6. I believe we develop strategies to address weaknesses in student learning.	0.745	
7. I believe we establish attainable goals.	0.739	
8. I believe we analyze student achievement data.	0.737	
9. I believe we develop strategies to build upon strengths in student learning.	0.734	
10. I believe instruction in my classroom has improved.	0.726	
11. I believe our actions are directed at achieving results.	0.717	
12. I believe our work is guided by an agenda.	0.714	
13. I believe student learning in my classroom has improved.	0.708	
14. I share my classroom data.	0.706	
15. I believe there is an appreciation for all members.		0.844
16. I believe there is trust among members.		0.823
17. I believe our relationships contribute to open sharing of ideas.		0.806
18. I believe the team is free of negative coercion.		0.802
19. I believe we are respectful of each other.		0.799
20. I believe there is a shared sense of responsibility.		0.779
21. I believe the environment promotes positive relationships.		0.770
22. I believe there is equal participation among members.		0.768
23. I believe each member contributes.		0.766
24. I believe there is shared accountability among team members.		0.751
25. I believe we share responsibilities.		0.735
26. I believe my relationship with other members has been positive.		0.711

APPENDIX X

DEFINITION OF KEY TERMS

The following are definitions of key terms used throughout the study.

A priori theory. An assumed reality unconfirmed in actual experience. A priori theory exists tacitly or in the mind prior to study or examination (Baehr, 2006).

Baseline data. These are composed of descriptive statistics measured from variations of the Professional Learning Communities Collaborative Team Survey (CTS) and provided for dependent variables by item, subscale, and total. Scores from the CTS are derived from a 4-point Likert-type scale ranging from 1 = *strongly disagree* to 4 = *strongly agree*. The CTS is the survey instrument used in this study; therefore, data found therein is considered baseline data.

Confirmatory factor analysis (CFA). Confirmatory factor analysis is a multivariate statistical procedure in which a priori factors seek to optimally match the observed and hypothesized factors (Heppner & Heppner, 2004; Stapleton, 1997). The data set is structured to determine goodness of fit of a predetermined factor model (Stapleton, 1997). In this study, CFA was used to confirm or reject the suggested hypothesized constructs.

Cronbach's alpha. Cronbach's alpha is the most common measure of internal consistency or reliability of psychometric test scores. Cronbach's alpha scores around .8 or above imply reliability (Field, 2005).

Construct validity. This is "The degree to which the scores reflect the construct you are trying to measure" (Heppner & Heppner, 2004, p. 118). In this study, CFA was used to determine and manage construct validity.

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Descriptive statistics. Heppner and Heppner (2004) defined descriptive statistics as used to describe the main tendencies of a variable. Mean, median, mode, frequency, standard deviation, and percentages are examples of descriptive statistics.

Factor analysis. A statistical technique used in constructing a scale or inventory that attempts to measure an abstract construct (Heppner & Heppner, 2004). Heppner and Heppner found that a factor analysis will "examine the underlying relationships (i.e., latent structure) among variables of interest by discovering coherent subsets that are assumed relatively independent of one another" (p. 277). Factor analysis is used as technique for data reduction to make the data set more manageable in size (Field, 2005).

Positivism. Thomas and Brubaker (2000) suggested a fundamental principle of positivism is that the real world can be known and described beyond one's mind. Positivism research focuses on collecting empirical evidence of the physical and social world and interpreting how it functions (Coghlan & Brannick, 2005).

Psychometrics. Psychometrics is the field of study concerned with psychological measurement, which includes the measurement of knowledge, abilities, attitudes, and personality traits, as well as educational measurement (Cook & Beckman, 2006; Heppner & Heppner, 2004). A psychometric study also involves the process of determining the reliability and validity of a survey instrument (Heppner & Heppner, 2004).

Reliability. Reliability refers to an instrument's ability to produce consistent results between measurements at different times while measured under the same conditions (Field, 2005; Heppner & Heppner, 2004). Heppner and Heppner (2004) provide a technical definition: "Reliability is the variance in scores due to true differences among individuals" (p. 118).

Validity. Validity refers to the ability of an instrument to accurately assess the construct it claims to measure (Heppner & Heppner, 2004).

VITA

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