A MIXED METHODS STUDY OF SHARED EPISTEMIC AGENCY IN TEAM PROJECTS IN AN ONLINE BACCALAUREATE NURSING COURSE

by

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Abstract

This study explores the role of instructional design in the development of shared epistemic agency (SEA) when RN to BSN nursing students collaborate to complete a team project in an online course. Paavola & Hakkarainen's (2005) trialogical model of learning is used to design a learning activity where teams create a shared knowledge object, a co-authored patient interprofessional care plan to support group knowledge creation. The study addresses the following research questions:

1. What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?

2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object?

2b. How did the instructor's online interaction enhance or constrain each team's epistemic and regulative decisions?

2c. How did each team's use of project technology tools affect the development of their shared knowledge object?

3. What contributed to supporting or suppressing SEA in each team?

These questions examine SEA in relationship to research in shared knowledge construction pedagogies and instructional design within nursing education.

This study uses a convergent parallel mixed methods design, in which both quantitative and qualitative data are collected, analyzed separately, and then merged (Creswell & Plano Clark, 2011). Quantitative content analysis is used to examine student discourse for evidence of student epistemic and regulative actions. This is combined with two forms of qualitative analysis. Thematic analysis is used to examine student artifacts and interviews with team members and their instructor to gain deeper insight into the

meanings of their epistemic and regulative experiences within this six week collaborative activity. Case analysis is used to describe and synthesize differences among teams that supported or constrained the development of SEA.

The quantitative strand of research found higher levels of regulative actions compared to epistemic actions in both teams. The qualitative strand of research identified two areas which constrained each team's development of SEA overall. The first related to a series of uncertainties related to apprehensions about working with team members for the first time, concerns about the project and the instructor's expectations, and doubts about using technology for collaboration. The second related to a series of disjunctures associated with students' discordent beliefs about collaboration; contradictory views of conflict; and, discrepent views of leadership.

Synthesis of these results resulted in six factors that contributed to supporting or suppressing SEA in each team: team contracts, the team wiki, propensity for regulative over epistemic actions, narrow views of conflict, misconceptions about collaborative learning, and the instructor's role. In light of these findings, theoretical and practical implications and recommendations are detailed.

Keywords: shared epistemic agency, knowledge construction, learning presence, self-regulation, online learning, collaboration

DEDICATION

To Ken, Caroline, and Evan

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Table of Contents

Abstract..... ii
Dedication..... iv
Acknowledgements v

Chapter One Introduction 1
Growing Need for Nurses with Baccalaureate Degrees 1
Changing Nursing Competencies 3
Twenty First Century Skills 5
Technology-Mediated Group Knowledge Construction 7
Knowledge building 7
Knowledge creation 8
Epistemic Agency in Groups 9
Knowledge Construction and the LMS 10
Statement of Problem 12
Definitions of Terms 13
Knowledge building 13
Knowledge construction 13
Knowledge creation 14
Shared epistemic agency 14
Shared knowledge object 14
Epistemic actions 14
Epistemic decisions 14
Regulative actions 14
Regulative decisions 15
Team contract 15
Trialogical approach to learning 15
Significance of Study 15
Personal Statement 16
Summary 17

Chapter 2 Theoretical Framework and Literature Review 19
Theoretical Framework: Shared Epistemic Agency 19
Theoretical Underpinnings 21
Epistemic and Regulative Dimensions 22
Human Agency 24
Agency in individuals 24
Agency in groups 26
Origins of Epistemic Agency in Educational Research 26
Operationalization of Epistemic Agency 28
Reconciling Individual and Group Level Contributions 30
Self- and Group-Level Regulation 32
Summary 33
Instructional Design to Support SEA 34
Temporal considerations 34

Instructor role 35
Use of wikis for knowledge construction activities 39
Team contracts 41
Summary 42

Chapter 3 Methodology 44
Research Design and Rationale 44
Study Context and Access 46
Sample and Participant Recruitment 48
Study Participants 49
Design of Final Team Project 50
Purpose 50
Project tasks 51
Project instructions and related course documents 53
Timeline of student team and individual project tasks for final project 54
Instructor Role in Final Project 55
Design of the Project Team Work Areas in LMS 55
Researcher Role 58
Data Sources and Data Analysis 59
Research Question 1 62
Data sources 62
Data analysis of student discourse 62
Measures of epistemic actions 62
Measures of regulative actions 70
Research Question 2 76
Data sources 77
Data analysis 80
Research Question 3 86
Data Collection Schedule 86
Alignment of Research Questions, Data Sources and Data Analysis 86
Validity Considerations 87
Ethical Considerations 88
Study Timeline 89
Summary 89

Chapter 4 Quantitative Content Analysis Results 91
Epistemic Actions Coding 92
Inter-rater reliability 93
Results 93
Chi-square test of independence 93
Team Comparison: Epistemic Actions Density 93
Team Comparison: Distribution of Epistemic Actions Indicators Frequencies by Category 94
Team B: Epistemic Actions Indicator Frequency over Duration of Project 97
Team C: Epistemic Actions Indicator Frequency over Duration of Project 101
Within Team Comparisons 103

Team B Students: Epistemic actions indicators 103
Team C Students: Epistemic actions indicators 103
Epistemic Actions Summary and Discussion 105
Learning Presence Coding 108
Inter-rater reliability 108
Results 109
Chi-Square Test of independence 109
Team Comparison: Learning Presence Density 109
Team Comparison: Distribution of Learning Presence Indicator Frequencies by Category 109
Team Comparison: Forethought and planning 111
Team Comparison: Monitoring 112
Team Comparison: Strategy use 114
Team Comparison: Reflection 115
Team B: Learning Presence Indicator Frequency over Duration of Project 116
Team C: Learning Presence Indicator Frequency over Duration of Project 117
Within Team Comparisons 117
Team B Students: Learning presence indicators 117
Team C Students: Learning presence indicator 118
Learning Presence Summary and Discussion 120
Considering the Relationship of Epistemic Actions to Learning Presence 122

Chapter 5 Qualitative Analysis Findings 124
Primary Themes 125
Uncertainties 126
Apprehensions about team members 127
Anxieties about project and instructor expectations 129
Doubts about using technology for online collaboration 129
Disjunctures 130
Discordant beliefs about collaborative learning 131
Contradictory view of conflict 131
Discrepant views of leadership 132
Summary of Primary Themes 132
Secondary Thematic Analysis: Values Coding Findings 133
Online Team Project Required Students to Work through Their Mixed Feelings about Group Work 133
Concerns about the Team Were Eased When Members Demonstrated Commitment 134
Good Communications was Essential to Team Success Due to Lack of Face-To-Face Communication 137
Conflict is Undesirable 138
Project Instructions and Using Wiki Were a Source of Confusion 138
Summary of Secondary Thematic Analysis 140
Instructor Interaction with Teams B and C 140
Background 140
Instructor and her role 141

Team B: Resistance to epistemic prompts 142
Team C: Limited response to epistemic prompts 145
Case Analysis 149
Team B: Highly organized, but misdirected 150
Team C: Slow, steady and on target 174
Conclusions 193
Chapter summary 199

Chapter 6 Synthesis, Implications and Recommendations 201
Shared Epistemic Agency 203
What Contributed to Supporting or Suppressing SEA in Each Team? 205
Team Contracts Addressed Concerns About Shared Risk and Responsibility 205
LMS Wiki Was a Viable Authoring Tool for Developing Shared Knowledge 208
Students' Propensity for Regulative Action 207
Students' Views of Perceived Conflict Constrained Deeper Epistemic Engagement 210
Misconceptions about Collaborative Learning Inhibit Knowledge Creation 210
Understanding the Optimal Instructor Role in Team Project 210
Implications 212
Theoretical and practical implications 213
Instructional design recommendations 216
Study Limitations 219
Closing 221

Tables

Table 1. Epistemic and Regulative Dimensions of Shared Epistemic Agency 23
Table 2. American Association of Nursing Colleges Nine Essentials of Baccalaureate Education for Nursing Practice (2008) 47
Table 3. Team Project Tasks 52
Table 4. Roles and Responsibilities of Researcher and Nursing Program Faculty and Staff 59
Table 5. NUR302 Learning Outcomes Mapped to Evidence 65
Table 6. Comparison of IRR using Cohen's *kappa* and Holsti's Coefficient of Reliability 68
Table 7. Frequencies by Week of Team Epistemic Actions by Category 69
Table 8. Epistemic Action Frequencies by Combined Weeks in Teams B and C 69
Table 9. Epistemic Action Frequencies by Student in Teams B and C 70
Table 10. Comparison of Regulative Actions and Learning Presence Indicators 72
Table 11. Modifications to Original Learning Presence Coding Scheme 73
Table 12. Inter-rater Reliability for Learning Presence Practice Coding 75
Table 13. Weekly Counts of Team Learning Presence Indicators by category 75
Table 14. Learning Presence Frequencies by Combined Weeks in Teams B and C 75
Table 15. Learning Presence Frequencies by Student in Teams B and C 75
Table 16. Open Coding Examples 81
Table 17. Data Sources and Collection Points for Team Projects 86

Table 18. Alignment of Research Questions, Data Sources and Data Analysis 87
Table 19. Study Timeline and Milestones 89
Table 20. Team B and C Concepts Identified in Student Discourse 92
Table 21. Initial and Negotiated Inter-Rater Reliability for Epistemic Actions 93
Table 22. Initial and Negotiated Inter-Rater Reliability for Learning Presence 108
Table 23. Themes and Subthemes from Thematic Analysis of Student Interviews 128
Table 24. Themes from Values Coding 135
Table 25. Classification of Instructor Interactions with Team B 145
Table 26. Classification of Instructor Interactions with Team C 146
Table 27. Team B's Ten Topics for Research 156
Table 28. Analysis of Team B's Contract Based on Epistemic and Regulative Dimensions of SEA 157
Table 29. Analysis of Team C's Contract Based on Epistemic and Regulative Dimensions of SEA 178
Table 30. Contributors to Supporting or Suppressing SEA by Team 206

Figures

Figure 1. Timeline of Student Team and Individual Final Project Tasks 54
Figure 2. Project Team Work Areas 56
Figure 3. Research Questions Flow Chart 61
Figure 4. Epistemic Actions Coding Process 67
Figure 5. Example of Clustering Using Theme "Adapting to Unfamiliar Expectations" 82
Figure 6. Team Comparison: Distribution of Epistemic Actions Frequencies by Category 94
Figure 7. Team Comparison: Epistemic Actions Frequency Count by Category 95
Figure 8. Team B: Comparison of Epistemic Actions Indicators by Project Weeks 98
Figure 9. Team Comparison: Creating Awareness (CA) Indicators by Project Weeks 99
Figure 10. Team Comparison: Alleviating Lack of Knowledge (ALK) Indicators by Project Weeks 99
Figure 11. Team Comparison: Creating Shared Understanding (CSU) Indicators by Project Weeks 100
Figure 12. Team Comparison: Generative Collaborative Actions (GCA) Indicators by Project Weeks 101
Figure 13. Team C: Comparison of Epistemic Actions Indicators by Project Weeks 102
Figure 14. Team B Students: Comparison of Epistemic Actions and Learning Presence 103
Figure 15. Team C Students: Comparison of Epistemic Actions and Learning Presence 104
Figure 16. Team B Students: Distribution of Epistemic Actions Indicators 104
Figure 17. Team C Students: Distribution of Epistemic Actions Indicators 105
Figure 18. Team Comparison: Learning Presence Frequency Count by Category 110

Figure 19. Team Comparison: Distribution of Learning Presence Frequencies by Category 111
Figure 20. Team Comparison: Forethought and Planning (FP) Indicators by Project Weeks 112
Figure 21. Team Comparison: Monitoring (MO) Indicators by Project Week 113
Figure 22. Team Comparison: Strategy Use (SU) Indicators by Project Weeks 114
Figure 23. Team Comparison: Reflection (RE) Indicators by Project Weeks 116
Figure 24. Team B: Comparison of Learning Presence Indicators by Project Weeks 117
Figure 25. Team C: Comparison of Learning Presence Indicators by Project Weeks 118
Figure 26. Team B Students: Distribution of Learning Presence Indicators 119
Figure 27. Team C Students: Distribution of Learning Presence Indicators 119
Figure 28. Thematic Mapping of Student Uncertainties and Disjunctures as They Affect SEA within the Context of Team Final Projects 133
Figure 29. Instructor's Epistemic Prompt to Teams B and C 143
Figure 30. Instructor's Second Epistemic Prompt to Team C 148
Figure 31. Representation of Team B's Failed Shared Knowledge Object 173
Figure 32. Representation of Team C's Shared Knowledge Object 192
Figure 33. Synthesis of Combined Quantitative and Qualitative Results 203

References 223

Appendices
Appendix A. Student Recruitment Letter 235
Appendix B. Student Participant Informed Consent 236
Appendix C. Instructor Participant Informed Consent 239
Appendix D. Student Interview Protocol 241
Appendix E. Instructor Interview Protocol 244
Appendix F. Team Contract Instructions 246
Appendix G. How to Work Effectively as a Team 247
Appendix H. Module 7: Interprofessional Collaboration in Health Care 248
Appendix I. Appendix J. Case Study Instructions - Weeks 10-15 249
Appendix J. Background for Instructor on Shared Epistemic Agency 250
Appendix K. Epistemic Actions Coding Scheme 252
Appendix L. Coding Scheme for Learning Presence 254
Appendix M. Coding Protocol for Student Interviews 257
Appendix N. Coding Protocol for Student Self- and Team Assessments 261
Appendix O. Analytical Protocol for Team Contracts 264
Appendix P. Analytical Protocol for Instructor Interaction 265
Appendix Q. Analytical Protocol for Shared Knowledge Objects 266
Appendix R. Team B Chronology 267
Appendix S. Team C Chronology 269

Chapter One Introduction

In this chapter, I present and develop the rationale for my proposed research study by examining the changes affecting the U.S. nursing profession, nursing competencies, and nursing education and how these can be addressed through technology-mediated pedagogies that support knowledge construction and shared epistemic agency (SEA). This is followed by the statement of my research problem and questions, a discussion of their significance to the scholarship of online learning and nursing education, and closes with my personal statement describing how I arrived at this research topic.

Growing Need for Nurses with Baccalaureate Degrees

According to the Institutes of Medicine (IOM), the nursing profession accounts for the largest sector of the nation's health care workforce, with more than 3 million registered nurses in the United States, and has a significant role to play in meeting the needs of 32 million more Americans who will gain access to health care coverage as a result of the national health care reforms enacted in March of 2010 that went into effect in 2013 (2011). As patient care within hospital and community settings becomes more complex as a result of new technologies, extended lifespans for those with chronic illness, and requirements to coordinate care with other specialists and professionals, the baccalaureate degree in nursing has become the recommended standard for entry into the profession (Benner, Sutphen, Leonard & Day, 2010).

One implication of this shift is that that those with RN degrees will need to progress to the BSN degree early in their careers. At a national level, the 2011 IOM study calls for increasing the number of BSN prepared nurses to 80% by 2020. This falls far short of current levels; only 50% of registered nurses have baccalaureate or advanced

degrees. Furthermore, to staff these programs, there must be a pipeline of qualified nurses to advance to the master's and doctoral levels. The IOM study calls for "doubling the number of nurses with doctoral degrees by 2020 with 10% of all baccalaureate graduates matriculate into a master's or doctoral program within five years of graduation" (p. S-10).

Separate from the number of nurses available to meet the demands of the health care system, at least 900,000 nurses over the age of 50 will leave the workforce as the Baby Boom generation ages into retirement (Bureau of Labor Statistics, 2009). As a result, demand for nursing education will continue to outstrip supply. Further exacerbating this crisis is the fact that thousands of qualified nursing degree candidates are turned away due to insufficient seats in existing programs (Kovner and Djukic, 2009).

At the same time, online nursing education has grown dramatically over the past decade. Although there are no online enrollment figures reported for this segment, the 2014 Nursing Factsheet, the American Association of Colleges of Nursing (AACN) estimated there were nearly 692 RN to BSN programs operating in the United States. Of that number, more than 400, or almost two-thirds of these programs, offered degrees involving some online study.

These numbers parallel the overall expansion in online learning in U.S. higher education. For example, between 2002 and 2011, the total number of students taking at least one online course increased from 1.6 million to over 7.1 million, a 16.1% compound annual growth rate. Furthermore, the proportion of students enrolled in an online course section expanded from slightly less than 10% in 2002 to nearly 33.5% ten years later (Allen & Seaman, 2014, p. 15-16).

Changing Nursing Competencies

Health care is a knowledge-driven field. Whether a nurse provides direct patient care by communicating with patients and their families or ensures the delivery of a prescribed course of treatment and the desired outcomes, nurses are also expected to participate in problem solving connected with the reform of the U.S. health care system. Increasingly, nurses will be called to develop, supervise, implement, and monitor plans for improvement and make the necessary adjustments to achieve these goals while balancing the needs of patient-centered care (Institutes of Medicine, 2011). To operate effectively under complex conditions related to changes in science, technology, population demographics, and heath care policy, nurses must develop new competencies in systems thinking, quality improvement, and care management.

To address these concerns, baccalaureate level nursing education must also provide practitioners with a better understanding of the cultural, political, economic, and social issues that affect patients and influence the delivery of care (AACN, 2008). Additionally, nursing education programs must also move to more progressive forms of learning to: a) better integrate the classroom and clinical teaching; b) shift from decontextualized learning to helping students cultivate knowledge that is grounded in situated cognition; c) focus on mastering techniques for exercising flexible judgment; and d) expand beyond the use of critical thinking skills to clinical reasoning and multiple modes of thinking (Benner et al., 2010).

The 2008 baccalaureate curriculum standards of the AACN acknowledged that professional nursing competencies related to collaboration are essential for nurses to

function effectively amid complex environments that require trans-disciplinary cooperation. These standards call for students to demonstrate skills and knowledge related to team work and group problem solving (2008). When considered in combination, these recent curriculum changes present an unprecedented opportunity to engage nursing students in collaborative group knowledge processes.

Research has shown that collaboration and coordination among those responsible for caregiving is an important contributor to high quality patient care (Barnsteiner, Disch, Hall, Myers & Moore, 2007). Moreover, these competencies apply not only to intraprofessional interactions involving those who share responsibilities for nursing care, but also to interprofessional relations and communications among diverse specialists that make up health care teams in which "each profession knows and uses the others' expertise and capabilities" to enhance the quality of patient care (Institutes of Medicine, 2011; Interprofessional Educational Cooperative Expert Panel, 2011). To develop these competencies, nursing educators must begin to make widespread use of active and collaborative instructional methods that emphasize key processes of communication, cooperation, collaboration, and teamwork.

It is increasingly imperative that nurses graduating with bachelor's degrees are adequately prepared for a knowledge-based society. Their academic preparation must result in the skills and dispositions required to participate in knowledge processes that are "created through the mobilization of expertise" to effectively address health care problems such as medical treatments, process improvement, and delivery of care. To meet this need, baccalaureate nursing education must expand beyond simply having students apply their clinical knowledge, instead engaging in formative experiences that

allow them to explore, test, validate, and create new knowledge (Jensen, Lahn & Nerland, 2012).

Twenty First Century Skills

The National Research Council (NRC) in its 2012 study, "Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century," identified similar core competencies that were consistent with those described above within the nursing profession. Although the NRC's study described broader social and economic challenges beyond health care, the agency argued that the U.S. economy has already begun a shift towards a knowledge-based society in which the creation and implementation of ideas and related services are just as important as the production of material goods.

The NRC's 2012 study also identified three domains of competence: cognitive, interpersonal, and intrapersonal. The cognitive encompasses processes and strategies related to knowledge building and innovation. The interpersonal domain addresses competencies such as collaboration, communication skills, and shared responsibility. The intrapersonal domain relates to learner flexibility, initiative, and the ability of students to reflect on their learning and make adjustments as necessary, which aligns closely with concepts of self-regulation.

This last domain is particularly important because flexibility, initiative, and reflection are important dimensions of self-regulated learning. For example, individuals who are self-regulated learners are those who are metacognitively, motivationally, and behaviorally active participants in their own learning processes; they demonstrate forethought and planning, monitor their performances, implement strategies, and reflect

on their effectiveness in meeting their goals (Zimmerman, 1989, 2000). Educational researchers have identified that comparable skills do emerge and can be developed at the group level, such as co-regulation and socially-shared regulation (Chan, 2012; Grau & Whitebread, 2012; Hadwin & Oshige, 2011; Järvenoja, 2010; Rogat & Linnenbrink-Garcia, 2011; Saab, 2012; Salonen, Vauras, & Efklides, 2005; Vauras, Iiskala, Kajamies, Kinnunen, & Lehtinen, 2003). Among students taking online courses, this constellation of self and co-regulative skills has been defined as "learning presence" by Shea and colleagues (2012, 2013, 2014).

Although initiative and reflection have been addressed in the literature of baccalaureate nursing standards and competencies, there is little or no mention of self- or group level regulation. As more nursing programs move to incorporate online curricula and instruction, competencies related to self-regulation are particularly relevant. This arises because many courses are predominantly asynchronous and online learners are not obliged to attend regular weekly onsite classes. Because of this, students have considerable latitude to determine when and how often they will engage with their courses' instructors, peers, and content. As a consequence, these students also need to develop the necessary skills to assume ownership of their personal learning and participate effectively in computer-mediated communications, group collaboration, knowledge construction, and reflective practices in order to succeed in online study.

Thus, there is a parallel need for students in both their nursing studies and in their professional capacities to develop group level knowledge construction, collaboration, and socially shared regulation skills to become active engaged learners and effective team

members who deliver responsible high quality health care. With these concerns in mind, technology-mediated learning offers the potential to cultivate these competencies.

Technology-Mediated Group Knowledge Construction

Educators' interest in knowledge construction arises from a form of social-constructivist epistemology in which all learning arises from social interaction, and meaning is constructed through communication, activity, and interactions with others (Vygotsky, 1978). Vygotsky's developmental psychology posited that external tools and signs are first shared among individuals in a society or culture, and through exposure, are then internalized by the child. This process of cultural mediation is demonstrated by the use of language as a tool through which humans come to perceive, experience, and act on shared reality. Just as language serves as a tool for developing understanding through social means, so too can technology be used as a tool to mediate learning by supporting both individual cognition as well as shared understanding through social interaction and negotiation of meaning.

The harnessing of technology-mediated learning in the service of developing collaborative knowledge construction skills, which are essential to the preparation of BSN students and graduates, can be found in the knowledge building approach of Scardamalia and Bereiter (2002, 2006) and in Paavola & Hakkarainen's (2005) knowledge creation metaphor.

Knowledge building. To understand how group knowledge construction can best be adapted to online learning, it is first necessary to understand the contributions of Scardamalia and Bereiter's knowledge building approach. Through their research, they successfully demonstrated that young elementary students could effectively collaborate in

discourse communities, which parallel the work of scientists, by creating shared knowledge artifacts and advancing and improving their ideas as a collective enterprise. This was accomplished through the development of the Computer Supported Intentional Learning Environment (CSILE) system, later enhanced and renamed Knowledge Forum, which concretized students' thinking as visible representations and documented their incremental progress to present, connect, refine, and improve their ideas (Scardamalia, & Bereiter, 1991, 2006; Scardamalia, Bereiter, McLean, Swallow, & Woodruff, 1989). Both systems served to structure and guide students' collaborative efforts to demonstrate deeper thinking and explore more complex questions as they participated in the scientific inquiry process. Nevertheless, Hakkarainen, (2009), in his critique of knowledge building, asserted that Scardamalia and Bereiter's reliance upon using a system to promote "ideas interacting with ideas to generate ideas" failed to adequately contextualize the collaborative inquiry process by excluding other types of epistemic artifacts such as traditional notes, expert opinions, and field study results, and neglected to support the design of alternative collaborative concrete artifacts (2009, p. 222.)

Knowledge creation. In contrast, Paavola & Hakkarainen have proposed an alternative approach to Scardamalia & Bereiter's knowledge building model called the knowledge creation metaphor, in which students participate in collaborative inquiry with the objective of creating new knowledge through their sustained work on shared epistemic objects (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004; Paavola & Hakkarainen, 2005; Paavola, Lipponen & Hakkarainen, 2004). The knowledge-creation view represents a trialogical approach. This means that neither the individual, as the locus of learning acquisition (i.e., a monological model), nor the community, where learning

results from interaction and participation among members (i.e., a dialogical model), provides an adequate explanation of the knowledge creation process. In the trialogical model, learning takes place as a result of the way individuals work collaboratively to develop mediating shared artifacts through interaction (Paavola & Hakkarainen, 2005, p. 545). Thus, technology-based learning environments offer considerable potential to support the development of shared epistemic objects that direct, focus, and organize the learning community's activities around artifacts that represent the efforts of joint inquiry.

An important point of contrast between the knowledge building and knowledge creation approaches lies in the focus of each group's activities. In Scardamalia's and Bereiter's pedagogy, learners focus on the improvement of ideas. In Paavola and Hakkarainen's trialogical approach, the collaborative efforts of the group not only create shared knowledge objects, but also result in knowledge practices. These are "epistemic practices of working with knowledge, channeling the participants' efforts in ways that elicit knowledge advancement, in which the development of ideas is one component" (Hakkarainen, 2009, p. 224). Perhaps more significant than these differences, however, is the fact that both of these models of learning share a common underlying concept that is central to students' productive engagement in knowledge building and knowledge construction communities: the cultivation of epistemic agency.

Epistemic Agency in Groups

Within the context of knowledge construction approaches to learning, epistemic agency is grounded in the intentional progressive pursuit to attain knowledge construction goals. In simplest terms, students demonstrate epistemic agency through productive engagement with their peers. They further assume responsibility for their own

learning as a result of the intentional efforts to advance their own inquiry and develop shared knowledge (Scardamalia, 2002).

SEA, as advanced by Damşa, Kirschner, Andriessen, Erkens, and Sin (2010), describes a theoretical construct that is demonstrated by small groups of learners working together who assume joint responsibility for developing and advancing shared conceptual artifacts, as active and productive contributors in a sustained process of knowledge creation. It is through this process that small groups collaborate to systematically organize their efforts to achieve collective epistemic goals in which they advance their own knowledge and deepen their understanding.

Knowledge Construction and the Learning Management System

To ensure that nursing students acquire the necessary knowledge construction skills, dispositions, and practices, educators must ascertain whether the learning activities and the learning environments that host them can support meaningful collaboration and group knowledge work. Instructional design to support the cultivation of SEA among nursing students who study online may provide a promising approach to scaffold technology-supported forms of knowledge construction. Designing for SEA has the potential to shape online learning environments that support learners to: develop intentional actions that incrementally deepen shared understanding within a group; progressively engage with solving problems over time; establish long and short term shared plans and goals; monitor and evaluate group progress; and develop productive group epistemic and regulative processes. As such, these designs hold considerable promise to address the well-documented curricular reform challenges facing baccalaureate nursing educators.

Learning management systems (LMSs), such as BlackBoard, ANGEL, Moodle, Canvas, and others offer at minimum, the capacity to host and deliver content to students in the forms of readings, lecture notes, multimedia, and links to web sites. Furthermore, as a result of discussion forums' affordances that support student-to-student and student-to-instructor interaction, they have assumed a prominent place as the primary locus of collaborative knowledge construction activities in online college courses. When used effectively, instructors and students have the potential to participate in discourse-based activities to arrive at shared negotiation of meaning and co-construction of understanding (Anderson & Kanuka, 1997; Garrison, Anderson & Archer, 1999, 2001; Kanuka & Anderson, 1998; Zhu, 1998).

However, in their critique of the LMS, Lakkala, Paavola, Kari, Muukkonen, Bauters and Hannu (2009) asserted that these environments offer only limited support for collaborative knowledge creation because the learning activities housed there are isolated, making it difficult for students to draw connections between them or build upon them over time. Moreover, the interactions in online discussions are often focused on critical thinking and argumentation as a way to arrive at shared understanding but fall short in supporting the development of a shared conceptual artifact that is representative of group knowledge creation. Similarly, tools such as blogs may be used to support individual cognition and reflection or student dialog when commenting features are used. Wikis and discussion areas have also been used to host group level projects, although even when integrated into an LMS, similar constraints prevail.

Given the limitations of the LMS described above, nursing educators confronting the rapidly expanding world of online education are faced with the following questions.

First, how can online learning be used to assist students in BSN programs to develop the collaborative knowledge construction skills needed to function effectively in teams for their academic and professional work? Second, how can instructional design be used to overcome the limitations of the LMS to help online learners assume greater responsibility for their learning and group processes through the cultivation of epistemic agency?

Statement of Problem

In this study, I will explore the development of SEA when nursing students work in teams to complete a six week long online collaborative learning project. This project uses a trialogical model of learning in which student teams develop a shared knowledge object: a group authored patient interprofessional plan of care for a fictional case study in support of knowledge creation. My study will use mixed methods: quantitative content analysis, thematic analysis, and case studies to identify differences among teams that result in the development of this construct. I will address the following research questions:

1. What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?

2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object?

2b. How did the instructor's online interactions enhance or constrain each team's epistemic and regulative decisions?

2c. How did each team's use of project technology tools affect the development of their shared knowledge object?

3. What contributed to supporting or suppressing SEA in each team?

To answer my first research question, I will use quantitative content analysis to examine each team's discourse connected with the development of the interprofessional

plan of care for their assigned case; I will map indicators and patterns of SEA that measure the extent of student knowledge creation and group regulatory processes within each team. To address the second, I will conduct a qualitative inquiry by analyzing student and instructor interviews and examining student artifacts such as team generated contracts, shared knowledge objects, individual reflections, and team assessments to develop case analyses examining each team's participation in a six week long collaborative team project. The third will be addressed in my synthesis of both strands of research in Chapter Five. It is argued that this analysis is essential to understanding and improving the learning processes through which BSN students develop the necessary knowledge construction and group regulative skills to support effective teamwork in their academic and professional work.

Definitions of Terms

Below are definitions of certain key terms which are used through this study. They serve a dual purpose to clarify the meaning of these concepts and to establish shared understanding with the reader.

Knowledge building is a specific type of knowledge construction pedagogy focused on learning as a process of inquiry, developed by Scardamalia and Bereiter (2006), in which students collaborate in small groups to continuously produce, revise, and improve their ideas using the CSILE and Knowledge Forum computer systems to document their progress and draw connections between concepts.

Knowledge construction is a general category of pedagogy based on learning, in which learners collaborate to negotiate meaning and arrive at shared understanding.

Knowledge creation refers to a specific type of collaborative learning, related to knowledge construction, advanced by Paavola and Hakkarainen (2005) and Damşa et al. (2010) in which students generate new knowledge through communal activities which are directed at the development of shared conceptual artifacts or knowledge objects.

Shared epistemic agency, as conceptualized by Damşa et al. (2010), refers to the ability of groups to intentionally engage in and perform sustained collaboration that results in the creation of new knowledge which is embodied in shared knowledge objects.

Shared knowledge objects are physical artifacts that are the result of a collaborative process in which learners negotiate, share, and refine their thinking. They can take the form of a report, essay, model, or other concrete embodiments of knowledge, or intermediate objects, i.e., transitional artifacts that contribute to final group products. They make explicit both individual and communal knowledge (Damşa et al., 2010).

Epistemic actions are intentional learner actions, which are knowledge-related, that support group collaboration in the production of shared knowledge objects. They include identifying problems or lack of information and finding solutions, creating shared understanding, and undertaking generative collaborative actions to establish new ideas or intermediary products. This term is used within the context of the quantitative content analysis segment of this study.

Epistemic decisions refer to knowledge-related choices, intentional or unintentional, made by teams during their final project. This term is used within the context of the qualitative analysis segment of this study.

Regulative actions refer to intentional collaborative process actions in which learners demonstrate forethought and planning, monitoring and reflection on their

progress, and making adjustments in strategy in connection with the production of shared knowledge objects. It also includes managing conflict, redirecting critical feedback, and recognizing the contributions of others. This term is used within the context of the quantitative content analysis segment of this study.

Regulative decisions refer to collaborative process-related choices, intentional or unintentional, made by teams during their final project. This term is used within the context of the qualitative segment of this study.

Team contract, also known as a team charter, refers to the practice of requiring students working in groups or teams to put into writing their mutually agreed upon expectations for interacting with each other during the duration of a collaborative project.

Trialogical approach to learning builds upon Paavola and Hakkarainen's (2005) knowledge creation metaphor in which the central focus is understanding how students develop and modify conceptual artifacts collaboratively, and how technology can support these processes. This approach also provides tools and methods to strengthen group knowledge creation.

Significance of Study

This study will address the following unmet research needs. This will be the first to examine the development of SEA as it relates to trialogical learning in support of knowledge creation among nursing baccalaureate students in an online course. Second, it will investigate the adaption of knowledge construction pedagogies, based on Scardamalia and Bereiter's knowledge building and Paavola and Hakkarainen's knowledge creation metaphor, to a collaborative learning activity delivered in a fully online course designed in an LMS. It will also examine the use of two important

pedagogical elements within an online nursing course: shared knowledge objects and team contracts. Finally, this study will adapt the trialogical model of knowledge creation to an LMS-delivered online course and examine the contributions of instructor facilitation to enhance and sustain SEA.

Personal Statement

The focus of my dissertation is the result of my interest in online learning and my related academic, research, and work experience in this area. During my studies of online pedagogy, theory, and practice, I became aware that a predominance of research studies on LMS-based online learning focused solely on threaded discussions, relative to other types of online learning activities. As a result, I believe that there is a need to further encourage and investigate the creative use of other types of learning activities as alternative approaches to enrich knowledge-construction activities and outcomes among online learners.

As a doctoral student, I have participated in several research studies with my advisor, Dr. Peter Shea, examining knowledge construction in online courses using Garrison, Anderson, and Archer's community of inquiry model (1999). During these projects, I spent many hours coding and negotiating social, teaching, cognitive, and learning presence indicators in student discourse found in online discussions, and training others in the use of these coding schemes. As a result, I have observed that it was particularly difficult for new coders to differentiate between the process of learning and the products of learning when analyzing student discourse for cognitive presence and learning presence. The combination of shared knowledge objects from Paavola and

Hakkarainen's trialogical model of learning and Damşa et al.'s regulative and epistemic dimensions of SEA offers a promising solution to unravel process from product.

Also instrumental in shaping my choice of dissertation topic were my studies with Dr. Jianwei Zhang, in which knowledge building principles were widely discussed and referenced. In my reading, I found myself confronting the limitations of trying to adopt knowledge building principles to learning activities using an LMS, relative to the specialized features of Knowledge Forum. Over time, this challenge became a formative experience for me, as I began to consider different instructional design solutions that might bridge the gap between specific technology-mediated knowledge construction pedagogies and the ubiquitous LMS found on most college campuses.

Summary

This chapter describes the growing need for registered nurses with baccalaureate degrees to meet new competencies related to interdisciplinary collaboration and group knowledge construction processes in the workplace. As more nursing programs move to online and blended delivery, these same students will need to develop shared knowledge construction and social regulation skills to become active and engaged learners and effective professionals who will ultimately be responsible for delivering high quality health care services.

Within the context of technology-mediated group knowledge construction, I reviewed two prominent pedagogical approaches called knowledge building and knowledge creation and discussed how each contributes to SEA in groups, and how these approaches might be adapted to online courses delivered through the LMS. This provided the foundation for the articulation of my research problem and research

questions that provide the impetus for this study, as well as their contribution to the scholarship of online learning and nursing education. Lastly, my personal statement described how my doctoral coursework and research experiences shaped the research topic guiding my dissertation inquiry.

Chapter 2 Theoretical Framework and Literature Review

This mixed methods study explores the role of instructional design in the development of shared epistemic agency (SEA) when RN to BSN students work in teams to complete a six week long collaborative project in an online course. One strand of research uses quantitative content analysis to examine each team's discourse to map indicators of epistemic agency that measure the extent of student knowledge creation and group regulatory processes within each team. The second examines interviews conducted with project teams and their instructor as well as student artifacts — such as team generated contracts, shared knowledge objects, and individual and team assessments — to develop case and cross-case analyses to describe differences among teams that supported or constrained the development of SEA. It is argued that this analysis is essential to understanding and improving the learning processes through which BSN students develop the necessary knowledge construction and group regulative skills to support effective teamwork in their academic and professional work.

This chapter serves dual purposes. The first section details a theoretical framing for the concept of SEA and examines its origins and varied conceptualizations in prior research. The second section is a literature review examining the following instructional design considerations that are relevant to my study: temporal dimensions, instructor role, using wikis for knowledge construction activities, and use of team contracts for project work.

Theoretical Framework: Shared Epistemic Agency

SEA, as advanced by Damşa et al. (2010), describes a theoretical concept that is demonstrated by small groups of learners working together, who assume joint

responsibility for developing and advancing shared conceptual artifacts, and indicate that they are active and productive contributors in a sustained process focused on knowledge creation. It is through this collaborative process that small groups systematically organize their efforts to achieve collective epistemic goals in which they advance their own knowledge.

SEA is an emergent process in which students generate new knowledge, rather than demonstrate the acquisition of facts or rely upon procedural approaches. Instead, learners participate in the creation of new knowledge[1] by going beyond the content originally provided to them by their instructors or found in assigned resources and texts. This new knowledge is the result of a collaborative process in which all learners participate through the negotiation, sharing, and refinement of their thinking. The object of these activities is materialized as a jointly created shared knowledge object, which can take the form of artifacts such as reports, essays, models or other concrete embodiments of knowledge, or intermediate objects (i.e., transitional artifacts that contribute to final group products). These artifacts, as shared knowledge objects, also serve to make explicit the contributions of both "individual expertise" and "communal knowledge" to these cognitive processes (Damşa et al., 2010, p. 154). Within this socio-cognitive frame, inter-subjectivity is explicitly expressed in collaborative actions as well as in the negotiation of ideas and knowledge.

[1] New knowledge is not defined as new to the discipline, but rather new to students.

Theoretical Underpinnings

The significance of these objects or artifacts is grounded in Vygotsky's cultural-historical view of learning, which is accomplished through social interaction, where learners use shared tools (material tools as well as signs and symbols) to mediate both their individual and inter-subjective thinking (1978). What Vygotsky proposed was a highly integrated triadic relationship of mediated activity composed of a subject (an individual or group who demonstrate agency), the object of that agency and cognition, and the mediating tools through which the subjects communicate, interact, and direct their actions. By doing so, Vygotsky identified the locus of cognition beyond the mind of the individual to a broader social context that acknowledged the contributions of others' shared actions and understandings.

Leont'ev continued Vygotsky's work by examining how contexts and actions contribute to larger patterns of activity. Engeström (1987, 1999) further argued for expanding the focus of mediation beyond Vygotsky's triad of subject, object, and tools to encompass a broader activity system that examined interactions at the level of the community, its rules, and division of labor. He furthered refined Vygotsky's concept of the object to advocate for the study of artifacts as "integral and inseparable components of human functioning" (1999, p. 29). At the heart of these conceptions of human activity is a more encompassing view of a unified social context that takes into account "notions of intentionality, history, mediation, collaboration and development in constructing consciousness" of both individuals and those with whom they interact (Nardi, 1996, p. 7). Thus, Paavola and Hakkarainen's (2005) trialogical approach to learning, in which

conceptual artifacts are the physical manifestation of the knowledge creation process, is grounded in the work of Vygotsky, Leont'ev, and Engeström.

Epistemic and Regulative Dimensions

With the goal of documenting SEA in practice, Damşa et al. (2010) used an inductive phenomenological approach, by first examining prior research, to posit two distinct dimensions of the construct: epistemic and regulative. They next analyzed empirically the activities and discourse found in two teams of college undergraduates charged with developing and presenting an authentic instructional design project.

Damşa et al. (2010) reported two distinct dimensions of SEA. The first pertains to epistemic actions that are specific knowledge-related activities that support student collaboration in the production of the shared knowledge object and make visible the "concretized choices made for a particular trajectory of action that give knowledge a concrete shape" (p. 154). Within this category are three areas of purposeful agentive actions.[2] The first aims to identify problems or alleviate a lack of knowledge. For example, learners can demonstrate awareness of these situations, make efforts to locate and examine sources, and collect additional sources of information. The second is creating shared understanding. This is accomplished by sharing information, exploring meaning, and discussing misunderstandings. In the third, learners undertake generative collaborative actions such as proposing, generating, and negotiating new ideas, constructing intermediate knowledge objects, revising their thinking, and using feedback constructively. See Table 1.

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[2] There is no agreement on the adjectival form of the noun, agency. Some use agentic; others use agentive or agentival (Ahern, 2001). For the purpose of consistency, I use agentive.

Regulative actions comprise the second dimension. Three intentional process-related activities contribute to the shared management of the collaborative process. Projective activities relate to forethought and anticipation, and are evident when learners plan, establish goals, or engage in proactive conduct. Regulative activities also involve monitoring advancement of the knowledge object, reflecting on actions, ideas and problems, and making adjustments to the group's current strategy. A third relational category addresses transcending social conflict, redirecting critical feedback, and creating space for others' contributions. See Table 1.

Table 1. *Epistemic and regulative dimensions of shared epistemic agency*

Epistemic Dimensions	Examples
Identification of problems or alleviation of lack of knowledge	Locating and examining sources of information Collecting new sources of information
Creation of shared understanding	Sharing information Exploring meaning through questioning Discussing misunderstandings
Generative collaborative actions	Negotiating to establish new ideas Constructing intermediate knowledge objects Revising one's thinking Using feedback constructively
Regulative dimensions	Examples
Projective activities	Planning ahead Establishing goals Anticipating problems
Regulative activities	Monitoring the progress of the knowledge object Reflecting on actions, ideas, and problems Making adjustments to plans or current strategy
Relational activities	Overcoming social conflict Redirecting critical feedback Creating space for other's contributions

It is important to note that Damşa et al. (2010) make no clear distinction between individual and group epistemic and regulative actions. This is discussed at greater length in the section on *Reconciling individual and group level contributions* which begins on page 30.

Human Agency

To fully understand Damşa et al.'s (2010) concept of SEA, it is necessary to review what is meant by individual and group agency, and how these ideas have developed within a range of disciplinary contexts.

Agency in individuals. Agency, when viewed across multiple disciplines or domains of inquiry, ultimately relates to an individual's capacity to exert control over his or her actions, and is related to the philosophical concepts of free will, freedom, and choice (Reed, 2001). Lipponen and Kumpulainen (2011) synthesized a number of disciplinary perspectives to describe human agency as "an enabling factor that contributes to an individual's intentionality, purposefulness and autonomy in determining and implementing a course of action" (p. 812).

At the same time, the meaning of human agency is shaped by one's epistemological perspective. For example, Bandura's social cognitive theory proposes that individuals who demonstrate agency purposefully influence their functioning and life circumstances. Human agency, as characterized by Bandura, has four essential properties. It is: (a) intentional; (b) based on forethought and planning; (c) self-regulating; and (d) self-reflective (2006). In other words, human agency is achieved through goal setting and is expressed through self-control and beliefs about one's own ability to put them into effect, i.e., self-efficacy. These same elements also account for individual cognitive,

affective, and psychosocial characteristics and are affected by a broad network of social influences and interactions (2001).

Bandura's thinking stands in contrast to the views of cultural psychologists who hold that human agency is grounded in meaning-making. Mead describes agency as emerging amid temporal events with human actors "responding to changing environments" as a way of "understanding their view of the past, as an attempt to understand . . . the emergent present." In turn, this understanding is used "to control and shape their responses to the future" through the development of reflective consciousness (Mead, 1932, p. 76 as quoted in Emirbayer & Mische, p. 968-969). Bruner, a former cognitivist with strong ties to cultural psychology, related agency to identity and self-esteem: "It derives from the sense that one can initiate and carry out activities on one's own" and also includes the capacity for "completing our acts, implying skill and know how" (1996, p. 35).

Other views of agency are shaped by disciplinary perspectives informed by critical theory. In Giddens' (1979, 1984) sociological view, individual agency and personal action are shaped by structures that arise from practices that are produced through norms, values, and access to power within a society. Bourdieu (1990) attributes structure with producing patterns of activity that become habitual; past activity structures future activity, and people who are aware of this relationship consciously engage with structure to reproduce or change it.

In contrast, Emirbayer and Mische (1998) and Holland, Lachiotte, Skinner, and Cain (1998) have countered that structural views of agency are too confining. Instead, they argue that the emphasis on habitual action fails to consider the creative and

emancipatory potential of human agency. Holland et al. propose that that agency is mediated by identity, and together they result in acts of improvisation that transcend structural or cultural constraints, as well as acts of "self-directed symbolization" which result in the human ability to envision imaginary worlds (p. 278).

Agency in groups. The ability to act with intentionality and purpose applies not just to individuals, but can be embodied and exercised at the group level through social interaction. For example, Bruner describes the "agentive mind" which seeks out "dialog and discourse" with other active minds (1996, p. 93). Salomon and Perkins (1998) identify a form of collective agency that emerges as a social system among groups of people engaged in a common task, such as a team or organization, who share tacit assumptions. Bandura (1989, 2001, 2006) discerns similar phenomena among groups of people who share similar goals and beliefs about their ability to achieve them, which contribute to productive collective efforts.

Origins of Epistemic Agency in Educational Research

The word epistemic refers to knowledge and knowing. When used within the context of education, epistemic agency relates to students' thoughts and actions, as individuals or in groups, as they engage in intentional and purposeful learning. The earliest studies of learner agency focus on K-12 classrooms. Brown and Campione (1990), Brown (1997), and Brown, Ash, Rutherford, Nakagawa, Gordon, and Campione (1993), through their research program called Fostering Communities of Learners, based in the Oakland, California schools during the 1980s, demonstrated that agency is a vital element contributing to the development of reflective, collaborative communities

comprised of teachers and students, which are essential to transforming passive classrooms to active centers of inquiry, engagement, and discourse.

Bereiter and Scardamalia (1989) advance the concept of intentional learning, in which cognitive processes have learning as a goal rather than an incidental outcome. Their research examines how K-5 students engage in knowledge building, a discourse process that parallels the work of scientists, while using the CSILE system to refine and improve their ideas (Scardamalia & Bereiter, 1991). A decade later, Scardamalia highlights epistemic agency among their 12 core principles of knowledge building (2002).

Learners manifest epistemic agency when they: (a) set forth their ideas and negotiate between their own and the ideas of others; (b) evaluate their ideas and thinking relative to others; (c) sustain knowledge advancement goals themselves rather than relying upon their teacher to do this for them; (d) assume responsibility for setting goals; (e) conduct long term planning; and (f) monitor their motivation and progress (2002). In the same paper, Scardamalia also identifies a related concept called collective cognitive responsibility. This is demonstrated when two conditions are present in a student work group. The first requires that "the success of a group effort is distributed across all the members, rather than being concentrated in the leader" (p. 2). The second occurs when the group assumes shared "responsibility for what needs to be known and insuring that others know what needs to be known" (p. 2).

In the years since the research of Brown and Campione and Scardamalia was first published, interest in this concept has been expanded and studied in fourth grade math classrooms (Moss & Beatty, 2006), middle school participants in Drexel University's

Virtual Math Teams (Charles & Shumar, 2007, 2009), middle school science classes (Chen & Looi, 2011; Hakkarainen & Palonen, 2003), high school students studying a tragic public event (Lund & Hauge, 2011), and a hospital professional development setting (Russell, 2002).

Studies of epistemic agency have also been taken up in higher education among pre-service teachers taking online courses (Brett, Woodruff & Nason, 2002), undergraduate psychology students in fully online and blended courses (Cacciamani, Cesari, Martini, Ferrini and Fujita, 2012), graduate students studying computer supported collaborative work in an online course (Chang, Woo & Chaing, 2002), a mixed group of undergraduate and graduate students in a blended instructional design course (Damşa et al., 2010), pre-service teachers in two summer instructional design courses (Erkunt, 2010), and graduate level blended cognitive psychology courses (Muukkonen, Lakkala and Hakkarainen, 2005). Finally, two dissertations examined undergraduates enrolled in several large pharmacy courses (Sibbald, 2009, 2010) and graduate students in an online course engaged in collaborative writing (Woo, 2011).

Operationalization of epistemic agency

The earliest studies examining epistemic agency in higher education focused broadly on learner participation, engagement, and their contributions to knowledge building communities as conceived by Scardamalia and Bereiter (Brett, et al., 2002; Russell, 2002; Chang, et al., 2002). In line with this, Woo (2011) developed a coding scheme which draws directly from Scardamalia and Bereiter's definition: "Participants set forth their ideas and negotiate a fit between personal ideas and the ideas of others, using contrasts to spark or sustain knowledge advancement – dealing with problems of

goals, motivation, evaluation and long term planning" (p. 71). The following codes resulted: (a) evaluating current status of community knowledge; (b) asking for feedback, help, or more information about the topic; (c) responding to others' ideas, questions, needs, or reporting new status; and (d) suggesting new ideas or evaluation, and long term planning (p. 72).

In contrast, Hakkarainen and Palonen (2003) were the first to propose four levels of the construct: 1) pursuing one's own inquiry; 2) communicating with immediate peers; 3) taking a central role in advancing the cognitive inquiry efforts of the community; and 4) assuming collective cognitive responsibility for sharing knowledge across the larger community. In comparison with Woo, these constructs reflect both a directional level of agency and responsibility which shifts from individual concerns to that of moving the larger community forward.

Other researchers have sought to articulate other salient dimensions describing learner contributions most indicative of the construct. For example, Moss and Beatty (2006) defined epistemic agency in terms of *how* learners demonstrated epistemic intent in the process of group knowledge building. They identified two aspects: students contributing evidence and justification for their ideas, and the extent to which their thinking was fully explained. Muukkonen, Lakkala and Hakkarainen's (2005) research examined variations among the sources students used to build their jointly shared knowledge using these categories: (a) questions asked by students; (b) student generated explanations; (c) source based explanations; (d) assessments of one's own or the group's learning; (e) quoting other students; and (f) referencing the lecture.

Cacciamani et al. (2012) defined epistemic agency as a deliberate process aimed at creating, improving, or advancing ideas in the interest of the entire community, and proposed two levels of the construct based on their analysis of online discussions. The first identified a basic level of epistemic engagement which is consistent with simply "providing an answer," versus an advanced level where students offer a problem or hypothesis or demonstrate reflection (p.878).

When the above conceptualizations of epistemic agency are compared to Damşa et al.'s (2010), this empirical based study succeeds in first identifying and then drawing a clear distinction between epistemic and regulative activities. Further, Damşa et al. invite a discussion of the distinct roles of individual and group level activities that contribute to *SEA*.

Reconciling Individual and Group Level Contributions

Any definition of a construct that arises from group collaborative learning must take into account the relative contributions of both individual and group level cognition. Epistemic agency, as originally advanced by Scardamalia (2002) as part of the knowledge building pedagogy, was grounded in a socio-cognitive view of learning in which individuals, as the loci of cognition, developed and refined their own thinking. Student interactions with peers and their instructors served as a form of social scaffolding in which they shared and transferred ideas, negotiated meaning, and worked toward improvement of their individual and collective understandings (Pea, 1993). Similar stances are evident in the following studies: Brett et al. (2002), Cacciamani et al. (2012), Chang et al., (2002), Russell (2002), Moss and Beatty (2006), Sibbald (2009, 2010), and Woo (2011). Only Erkunt's (2010) study of epistemic agency, among students in an

online course, emphasizes more individualistic contributions to group knowledge construction than found in other studies.

Other researchers have adopted an epistemological stance which has a more socio-cultural orientation: Charles and Shumar (2007), Damşa et al. (2010), Hakkarainen and Palonen (2003), and Muukkonen et al.(2005) have sought to align Scardamalia and Bereiter's original concept of the "conceptual artifact" with Vygotsky's concept of the mediating artifact and Engeström's activity theory. In the latter, the joint creation of an artifact becomes the object of an activity system, which is embedded in a macro level context that goes beyond individual contributions to include collective and community considerations. Drawing from this, Lipponen and Kumpulainen (2011) caution that "agency work cannot be studied by focusing on the individual and his/her participation in collective action but rather by focusing on distributed action among participants and how particular contributions are 'taken up' and what consequences arise" (p.818).

Damşa et al.'s epistemological position offers a middle ground that adopts Paavola and Hakkarainen's (2005) knowledge creation metaphor of learning, in which the development of shared epistemic objects is at the center of socio-cultural processes, while making clear that they "do not take a stance on group cognition" (p. 154). Instead, they affirm the conceptual positioning of Akkerman et al. (2007) who posits that "cognition is an individual property but the individual itself as an inherently social entity, constituted through its social relations with others" (as quoted by Damşa et al., p. 154-155). Within this frame, inter-subjectivity is explicitly expressed in collaborative actions as well as in the negotiation of ideas and knowledge. Illustrative of this is the work of Gresalfi, Martin, Hand, and Greeno (2009). In their study of middle school mathematics

discourse, they demonstrate how individual agency is evidenced in actions taken or withheld, and also contributes to the trajectory of shared actions within a group (section 2.1.)

Damşa and colleagues (2010) have characterized SEA as a process in which learners act as intentional productive participants and contributors to the process of knowledge creation. Learners assume responsibility for goal-directed, sustained involvement in knowledge-driven, object-oriented, collaborative activities (p. 149). Although Damşa et al. have been unwilling to address the question of group cognition directly, they do acknowledge multiple levels of epistemic agency found within both individuals and the groups they participate in, and lay the foundation for further exploration of the construct's dual dimensions of epistemic and regulative actions.

Self- and Group-Level Regulation

As described previously, Damşa et al. identify a second broad category of intentional regulative actions which contribute to group level management of collaboration. They include projective activities that have planning and goal setting, as well as other types of anticipatory aspects of developing a shared knowledge object, and regulative activities centered on monitoring, reflecting, and making adjustments to advance the group's progress. A third element is focused on relational concerns among participants, in terms of managing conflict, making productive use of feedback, and recognizing the contributions of others.

Damşa et al.'s group level or shared regulative activities are consistent with constructs identified by other researchers. Hadwin and Oshige (2011) describe socially-shared regulation as the process students use to manage their collective activities.

Through the creation of shared goals and standards, two or more learners work toward socially-shared cognition. In this model, "personal goals are inseparable from social goals and are achieved through social interaction" and through "regulatory processes and products that are distributed to the group" (Hadwin, Oshige, Gress, Winne, 2010, p. 801). Through this holistic process, learners support each other by providing guidance and confirmation of shared activities, attitudes, practices, and values based on the common learning or problem space they share. Like Damşa et al., studies by Saab, Van Jooligen, and Van Hout-Wolters (2011) and Janssen, Erkens, Kirschner, and Kanselaar (2011) have also identified similar forms of group social regulation.

Just as theorists differ in their characterizations of group level cognition, the same applies to conceptions of collective regulation (Chan, 2012). This raises the question: Do individual contributions aggregate to form group level cognition, or does a separate collective cognitive entity emerge that is more than the sum of its parts? For example, Charles and Shumar (2007, 2009), in their study of virtual math groups, observe that successful collaborative processes require learners to be both self-directed and group-directed in order to elicit mutual efforts to engage in productive interaction. They describe the ability to regulate at the individual and group level as a form of agency, which is a necessary prerequisite to produce shared meaning and build common understanding.

Summary

This section outlined the theoretical framing of this study, which is the construct of SEA as proposed by Damşa et al. (2010). I discussed its theoretical origins in Vygotsky's triadic relationship among subjects, objects, and their mediation by material

tools and symbols, its relation to Engeström's activity theory, and described the epistemic and regulative dimensions of the construct. I examined the concept of human agency at the individual and collective levels from several disciplinary perspectives and explored its development in the field of educational research in the work of Brown and Campione, Bereiter and Scardamalia, and other studies ranging from elementary schools to higher education. This section concluded with a discussion of the dual levels of the construct that encompass both the individual and collective epistemic and regulative dimensions, and the middle ground offered by Damşa et al. (2010).

Instructional Design to Support SEA

In this section, I examine four elements of instructional design that offer the potential to scaffold the development of SEA in a six week long fully online collaborative project delivered through an LMS: 1) temporal considerations; 2) instructor role; 3) using wikis for knowledge construction activities; and 4) using team contracts for project work. My purpose is twofold. First, I appraise how temporal concerns and instructor roles have been conceptualized in prior studies of SEA and consider how they relate to the advancement of SEA in a fully online LMS delivered course. Second, I examine research on the use of wikis for knowledge construction purposes and the implementation of team contracts as instructional design elements to assist in cultivating SEA in team activities.

Temporal considerations. The temporal dimensions of SEA are significant if the development of this construct emerges over time and are grounded in the epistemic and regulative interactions that take place among learners who direct their efforts to the construction of a shared knowledge object. SEA does not arise spontaneously when students find themselves assigned to collaborative tasks or in work groups for project-

based work (Barron, 2000, 2003; Scardamalia & Bereiter, 1991). Yet it is not known how much time is required for students to begin to comprehend, assimilate, and effectively use these epistemic and regulative actions that comprise SEA.

Among prior studies of epistemic agency in higher education, there is considerable variation in the duration of student activities that are the subject of study. For example, in online courses, some activities are based on modules of several weeks' duration, such as Woo's (2011) group writing module and Chang et al.'s (2002) study of the preparation for and the execution of an online debate. Damşa et al.'s (2010) instruction design project accounts for the majority of the course work over a 10 week period. Still other studies examine student activity over the duration of a course, with some summer courses lasting just six weeks (Erkunt, 2010) and other courses lasting 13 to 15 weeks (Sibbald, 2009, 2010; Cacciamani et al., 2012; Muukkonen et al, 2005). Lastly, Brett et al. (2002) studied the emergence of epistemic agency over a period of two years among a cohort of 24 pre-service teachers.

Based on these studies, it is not known to what extent is it possible to systematically scaffold students who work in project teams at a distance within an online course to assume greater responsibility for their collective learning and group regulation of their collaborative processes. This gives rise to the question: How can instructional design be used to generate productive epistemic and regulative efforts among students that result in higher levels of SEA over the duration of a collaborative project?

Instructor role. Focusing solely on measures of interaction or collaboration is insufficient to encourage the advancement of collective knowledge and assist students to assume greater responsibility for their learning. From a pedagogical perspective, there is

a need for further research to identify practices and approaches that promote these outcomes (Muukkonen, Lakkala, Hakkarainen, 2005).

When considering the role of the instructor in promoting SEA, an inherent tension arises. On one hand, educators want nursing students to take ownership of their epistemic and regulative activities within their own work groups. On the other hand, there is a need to clarify the most appropriate role for the instructor. Too directive an approach can dampen group initiative and agency; too little engagement may leave teams to flounder unnecessarily (An, Shin & Lim, 2009; De Latt, Lally, Lipponen & Simons, 2007; Dennen, 2005; Mazzolini & Maddison, 2003, Vandergrift, 2002; Winograd, 2003).

If this is so, researchers need to examine what types of instructional design supports can be provided to guide teams to become more active participants in their own learning. Based on a review of the literature presented in this chapter, and taking into account the BSN curricular requirements identified by the AACN (2008) and Jensen et al. (2012) that call for the development of competencies in communication, cooperation, collaboration, and the creation of new knowledge, nursing educators designing online courses need to better understand the nature of instructor facilitation to encourage BSN students to assume greater responsibility for their teams' knowledge creation and regulative processes.

A review of the role of the instructor in Scardamalia and Bereiter's knowledge building using CSILE and Knowledge Forum indicates that the instructor typically does not participate with students in the documentation and improvement of ideas within the system. Instead, the teacher, as a member of the knowledge building community, works with students in the classroom to discuss their progress, highlights problems of

understanding, directs students to sources of information, aids in designing experiments, and encourages meta level conversations about learners' discourse.

Among the existing studies of epistemic agency, particularly within the context of computer-mediated learning, the majority are silent on the role of the instructor (Brett et al., 2002; Charles and Shumar, 2007, 2009; Erkunt, 2010; Chang et al., 2002; Tan, 2010; Woo, 2011). Damşa et al.'s (2010) research, which is the theoretical framing for this study, provides no detail other than to note the role of the course instructor and two tutors in supervising the two collaborative groups examined in their study.

Only two studies have attempted to explore how an instructor or tutor might engage with students to cultivate SEA. Cacciamani and colleagues (2012) examine how facilitator style, student participation, and metacognitive reflection influence knowledge building and SEA in online courses hosted in Synergeia, a computer supported collaborative learning (CSCL) environment. In this study, two groups of students participate in a discussion forum led by a facilitator, who is instructed to take an oppositional stance, and whose purpose is to "generate cognitive conflict" and encourage argumentation. The other two groups interact with a discussion facilitator who has a more supportive style intended to deepen and advance student discourse by offering resources, information, and encouragement, and highlighting student contributions (p. 875). Among these four groups, all students demonstrated higher levels of advanced epistemic agency, measured in terms of student postings that demonstrate hypotheses, inquiry questions, and metacognitive reflection. However, only in those groups with facilitators with a supportive style, as opposed to those moderators who encourage cognitive conflict, is this result statistically significant.

Muukkonen, Lakkala, and Hakkarainen, (2005), in their study of SEA and technology-mediated learning, examine the contribution of tutors in directing students' knowledge production in inquiry-based learning. Using qualitative content analysis to track the progression of student discourse, tutor participation was found to be particularly valuable in scaffolding students to revisit earlier questions, ideas, and theories as a way of deepening their inquiry. When facilitating tutors were combined with the use of a CSCL collaborative learning environment, the affordances of this technology were able to assist students in their collective efforts to jointly monitor the advancement of their thinking. Students who did not use this learning environment spent more time trying to evaluate and understand the theoretical content of their inquiry, but did not engage in the shared development of ideas. Despite these results, what this study does not reveal is this: Had the tutors reduced their involvement over time, to what extent would these learners assume greater responsibility for advancing their own inquiry efforts?

With just these two studies to consider, clearly more research is needed to determine how instructors and tutors can best guide learners participating in an online course to develop and sustain their collective regulative and epistemic resources to advance and improve shared knowledge objects. Instructor facilitation can take a variety of forms within a course with the purpose of encouraging teams of students to demonstrate higher levels of collective agency for their knowledge construction. However, just as too much instructor participation in an online discussion may diminish student-to-student discourse, a parallel question arises as to the optimal frequency and type of instructor facilitation needed to successfully launch and sustain students' progress

in advancing their own SEA (Antonacci, 2011; Mazzolini & Maddison, 2003, 2007, Dennen, 2011).

One approach is to investigate the contribution of instructional design elements to guide students toward purposeful engagement in sustained collaboration that results in the creation of new knowledge. Another is to explore instructor patterns of epistemic and regulative focused facilitation. It may also be useful to examine students' expectations of their instructors when they are required to engage in an extended team-based final project.

Use of wikis for knowledge construction activities. For over a decade, wikis have been promoted as important educational tools that allow users to create and share content within a collaborative workspace. A wiki, as defined by Leuf and Cunningham (2001), is a "freely expandable collection of interlinked web pages, a hypertext system for storing and modifying information – a database where each page is easily editable by any users" (p. 4). Wikis provide a medium for storing, organizing, and reformulating the ideas that are contributed by each community member and "open the possibility for students to take an active role writing the content of the site" (Foley and Chang, 2008; Jonassen, Howland, Marra & Crismond, 2008). As such, wikis offer the potential to host learning activities and the artifacts that emerge as a result of knowledge construction activities, as well as provide insight into understanding these processes.

Although wikis continue to be promoted as innovative learning activities, there has been a dearth of systematic research that goes beyond self-reported data on student learning. Hew & Cheung (2013), in a larger review of Web 2.0 technologies used in K-16, identify only five studies of wikis that meet their criteria for empirical studies that

examine student learning outcomes. Four of the five studies demonstrate positive impact with significant statistical difference. The fifth reports none. It should be noted that these studies were conducted in writing-intensive disciplines, and students were required to participate in group work that often involved drafting and editing a joint report, discussing a topic, or brainstorming ideas.

I also attempted to identify another body of research that situated the use of wikis within a knowledge building or knowledge construction context. Of the 30 studies I retrieved, only a small cluster of studies by Cress, Kimmerle, Moskaliuk and their circle have advanced a framework explaining how collaborative knowledge building takes place in wikis, and measured its outcomes (Cress & Kimmerle, 2008; Moskaliuk, Kimmerle & Cress, 2009; Kimmerle, Moskaliuk & Cress, 2011; Kump, Moskaliuk & Dennerlein, 2013). The model that these authors put forth is grounded in the interplay between an individual's knowledge and the public knowledge or information in a wiki, such as found in a Wikipedia article. They posit that an incongruity between individual knowledge and the content of the wiki will lead to two forms of learning. The first is the acquisition of factual and conceptual knowledge when students are presented with a wiki page that they must build from scratch or contains too much information. The second form of learning they refer to is *knowledge building,* which is the result of assimilation and accommodation in individual learners when they must interact with a moderate amount of pre-existing content.

When I examined the nursing education literature that utilized wikis, I found confirmation of the patterns described above. For example, of the four studies that used wikis as the basis for collaborative group work in nursing curricula, in one, no details

were provided about the nature of the learning activities in which students engaged (Strickland, Adamson, McInalley, Tiittenanen & Metcalfe (2013). In the 2012 Morley study, the wiki was used for an introductory activity as a place for students to post questions following a face-to-face class. In the Ciesielka (2008) study, students in an online Master's level course in health promotion for families and communities were assigned to teams to jointly author a community study using a wiki. Yet, in advance of this, the instructor created wiki pages that corresponded to the sections of the final report. In this instance, students were merely required to fill out an outline, rather than engage in inquiry-based negotiation of shared meaning and understanding.

Similarly, teams of nursing students in a first term Sociology of Heath course were given a wiki to complete introductory activities or to answer a question that followed a live class section (Morley, 2012). These relatively brief activities were not comparable to the extended inquiry that is required of knowledge construction pedagogy. The fourth study, authored by Stephens, Robinson, and McGrath (2013), was promising in that 100 nursing and 50 radiography students were divided into mixed teams and assigned to a four week long project in which they were required to work together to explore the care of an acutely ill patient who had suffered a stroke. The purpose was for the two groups of students to gain a greater understanding of interdisciplinary practices. The authors' analysis of the wikis does not use learning outcome measures, but instead is limited to system-level counts of wiki page views, edits, and number of contributions.

Team contracts. To encourage students to assume greater responsibility for their learning in collaborative projects, the use of team contracts or charters as an instructional design element offers the potential to scaffold the development of SEA. According to

Mathieu and Rapp (2009), a team-generated contract represents the "codified plans for how the team will manage teamwork activities" (p. 91). A team contract also provides the basis for students to articulate, discuss, and negotiate their "mutual expectations regarding the behavior of the group" (McDowell, Herdman, and Aaron, 2011, p. 80). When given instructor-developed guidelines, students can be expected to specify their goals, norms, standards for performance and evaluation, and roles and responsibilities (Hunsacker, Pavett & Hunsacker, 2011).

Two studies have found that team contracts have positive effects on group process and performance levels (Mathieu & Rapp, 2009) and emergent norms affecting communications, effort, cohesion, and mutual support (McDowell et al., 2011). Furthermore, in the case of teams that authored democratic contracts that allowed the group to adopt differentiated grading, the authors find a significant correlation between performance at both the individual and group levels (Hansen, Owan & Pan, 2006). Given the past effectiveness of this team-based practice, incorporating a requirement for teams to negotiate guidelines to which they will hold each other accountable may provide a firmer foundation for cultivating SEA within project groups.

Summary

In this section of Chapter Two, I addressed four areas related to the role of instructional design in the development of SEA in collaborative learning activities delivered through an LMS. The first theme focused on the temporal dimensions of the construct and the need to better understand how much time is required for students to comprehend, assimilate, and effectively develop the necessary epistemic and regulative actions and skills. Next, the role of the instructor was reviewed, with a discussion of the

need to achieve a balance between providing too much or too little direction to students, and in what ways the instructor can productively contribute to joint knowledge construction in student collaborative teams. I also evaluated past research on wikis related to learning outcomes, knowledge construction pedagogies, and their use as learning activities in nursing curricula.

In conclusion, the implementation of a thoughtful design approach for the support of learning may offer the potential to stimulate the cultivation of SEA among nursing students engaged in knowledge creation activities in which they develop a shared knowledge object. Furthermore, the leveraging of the wiki's affordances within the LMS environment has the potential to create better integrated learning spaces where nursing students can assume greater responsibility for collectively advancing their shared knowledge construction and group regulative processes in preparation for their future professional work on interprofessional heath care teams.

Chapter 3 Methodology

Research Design and Rationale

In my previous chapters, I described the potential for nursing educators to leverage online learning as a way to develop theory-based learning experiences to support the development of collaborative knowledge construction and group regulation skills in BSN students to support their academic and future professional work. In response, the purpose of this study was to explore the role of instructional design in the development of shared epistemic agency (SEA), when three teams of RN to BSN students worked in teams to complete a six week long collaborative project in an online course. This study examined the following research questions:

1. What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?

2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object?

2b. How did the instructor's online interaction enhance or constrain each team's epistemic and regulative decisions?

2c. How did each team's use of project technology tools affect the development of their shared knowledge object?

3. What contributed to supporting or suppressing SEA in each team?

This mixed methods study used a convergent parallel design in which I collected both quantitative and qualitative data, which was analyzed separately and then merged through a written synthesis found in Chapter Six (Creswell & Plano Clark, 2011).

The rationale for my research approach was based on the need to examine together the results of both my quantitative data, which measured group epistemic and regulative actions, and my qualitative data, which described student experiences as a

result of their participation in this collaborative project. My intent was to gain a fuller understanding of how SEA unfolded among student teams and the ability to highlight distinctions between and among them, which would have been incomplete if I had limited my study to a single research paradigm.

Just as different epistemological perspectives shape the definition of a research problem, its theoretical framing and the ultimate design of a study, these same assumptions have also been addressed in this dissertation. As described in the previous chapter, I am also concerned with how individual cognition and attitudes relate to how students who work in teams assume responsibility for their shared epistemic and regulative activities as they collaborate in developing a group knowledge object. I believe that Damşa et al.'s (2010) construct of SEA offers a productive way to understand how individuals contribute to group level processes. This framing of individual contributions as regulative and epistemic actions and team decisions, directed toward the creation of shared knowledge objects, makes it possible to understand how *individual* learners operating within a situated learning context can contribute to *group* level efforts that emerge among students working in small teams.

When these separate data sets are analyzed and considered in combination, their results will provide a richer and more complete picture of how SEA emerged among the students who comprised the teams that displayed different types of patterns of shared epistemic and regulative actions and decisions. As Greene and Caracelli (2003) note, these two paradigms when used in isolation "offer a *partial* … lens on human phenomena" (p. 97). When combined, they offer the potential to address in greater detail the research questions at the center of this inquiry.

Study Context and Access

The site selected for this study was a comprehensive state college for working adults in the northeast. I gained access to the site as a result of my employment at the college where the course is offered. Through my inquiries among college faculty and instructional design staff, I identified several online courses which met my criterion-based sampling requirements described below. Once I identified a course that met these criteria, I interviewed the faculty member responsible for its development and delivery to confirm whether it was a suitable candidate for consideration. Once this was negotiated, I next secured permission from the dean of the program to conduct this study.

I developed these criteria to identify a study site in which BSN students were engaged in a team-based collaborative activity that was grounded in knowledge construction pedagogy. In addition, I sought a nursing educator who would be willing to use the college's LMS-based wiki to create an integrated learning environment to allow students to draw connections among project activities and build on them over time.

I based my selection criteria on the following course characteristics. The course required: 1) a fully-online format offered during a regular 15 week term with multiple sections taught by the same instructor; 2) an extended collaborative learning activity with a duration of no less than six weeks; 3) small teams comprised of no more than four or five randomly assigned students; 4) a collaborative activity that required students to generate a product that met the criteria of a shared knowledge object as defined by Damşa et al. (2010); 5) a separate discussion area or other electronic space that was used by each group to document *all* aspects of their work processes including team communications; and 6) a second separate collaborative space for each team, such as a

wiki, where students jointly developed their term projects, the shared knowledge object which could display prior versions of the document as it evolved.

The final site selected for this study was a fully online course offered through the School of Nursing's RN to BSN online program. During the September 2013 term, seven sections of this course were delivered online. I worked with the course supervisor to find two identical sections which were led by the same instructor.

The course was offered as part of a baccalaureate program that builds upon the foundational clinical and academic work completed by students who have already completed their registered nurse credentials. As such, the program and the course selected for this study are illustrative of the curricular and instructional design challenges facing nursing educators who seek to use online learning as a way to help RN to BSN students develop the necessary collaborative knowledge construction skills required for effective teamwork in their academic and professional work. Based on the standards detailed in the AACN's *The Essentials of Baccalaureate Education for Nursing Practice* (2008), student outcomes in this course meet standards III, VI, VII, and IX in Table 2 below.

Table 2. *American Association of Nursing Colleges nine essentials of baccalaureate education for nursing practice (2008)*

I.	Liberal Education for Baccalaureate Generalist Nursing Practice
II.	Basic Organizational and Systems Leadership for Quality Care and Patient Safety
III.	Scholarship for Evidence Based Practice
IV.	Information Management and Application of Patient Care Technology
V.	Health Care Policy, Finance, and Regulatory Environments
VI.	Interprofessional Communication and Collaboration for Improving Patient Health Outcomes
VII.	Clinical Prevention and Population Health
VIII.	Professionalism and Professional Values
IX.	Baccalaureate Generalist Nursing Practice

Students typically enroll in this four-credit course, Advanced Heath Assessment (NUR-302), during their first year of the program. It focuses on the synthesis of independent and collaborative health assessment information, and requires students to integrate concepts and theories of biological, psychological, and sociocultural knowledge to impact health promotion, health maintenance, and illness care. Students are also expected to address concepts of prevention, anticipatory guidance, and early detection of risk factors as dimensions of holistic care. Lastly, students are expected to demonstrate use of evidence in practice, critical thinking skills, and interdisciplinary communications skills, which are vital competencies for professional nurses.

The course chosen for study is a 15 week course comprised of seven modules delivered through the Moodlerooms LMS. In addition to course readings, self-assessments, and group learning activities such as online discussions, in the first six modules, students are required to read and complete written interpretations of five case studies of patients of diverse socio-economic and cultural backgrounds and health histories. In module five, students are assigned to small teams which revisit one of these prior cases studies in-depth for the purpose of designing an interprofessional plan of care for a fictional patient beginning in module six and continuing through module seven. It is in these two modules in which students work in teams to complete their six week final projects, which are the focus of my study.

Sample and Participant Recruitment

The design of this study called for a purposeful sample of students who experienced the phenomenon under study (Creswell & Plano Clark, 2011). Enrollment in this course typically averages 18 to 25 students. To aid in recruiting participants, I

obtained the formal endorsement of the course instructor who allowed me to create a course module with information describing my research study that would be posted in the course. Here I posted a letter written by the instructor that was addressed to the class encouraging their participation. I also added a link to a one minute-long video in which I introduced myself and my research project. I also uploaded a letter to students with details about my background and describing how their anonymity would be protected and the need for their written consent confirming: 1) their voluntary participation; 2) willingness to have me record two interview sessions, and 3) my access to their discussions, chats, and final project artifacts generated during the online learning activities of the course (See Appendix A).

Students were e-mailed consent forms (Appendix B) upon expressing interest in participating in the study. These signed consent forms were returned to me via fax before the start of the first interview.

Separate from the return of the consent form, each participating student was e-mailed a $25.00 gift card from Amazon as a token of appreciation during the month of October 2013, six weeks before the interviews began. I then contacted these students by email to arrange for a phone call to review their consent forms prior to the start of interviews in late November.

Study Participants

In all, fourteen students volunteered to participate in this study. The five students in Section 01 were assigned to Team A. The nine students in Section 02 were randomly assigned to either Team B or Team C. Although three teams originally participated in the study, only the teams in Section 02 were selected for analysis. The team in Section 01

was removed from the study when the group decided to develop their shared knowledge object using authoring software that only one of five team members had direct access to, severely restricting the collaborative development of their shared knowledge object.

Design of Final Team Project

In this section, I describe the purpose of the final team project, its component tasks, i.e., learning activities, project instructions and related documents, and project and research activity time lines, as well as define the roles and responsibilities for myself—as the researcher—the course supervisor, instructor, and instructional designer. Lastly, I present my rationale for using an integrated LMS wiki to host this collaborative team-based project.

Purpose. The final project for this course is a team authored document: an interprofessional plan of care for a fictional patient case study.[3] In addition to serving as a form of summative assessment, this assignment made it possible to examine both the product and process of knowledge creation within Paavola and Hakkarainen's model of trialogical learning (2005). The *product,* i.e., the written document which developed over time, served as the shared knowledge object that embodied the contributions of individual expertise and the project team's communal knowledge. The *processes* of knowledge creation and group regulation, through which team members contributed both individually and collectively to the development of this knowledge artifact, were made

[3] A traditional patient care plan is a document developed after the patient assessment. It identifies the nursing diagnoses to be addressed in the hospital or clinic. The plan of care includes the outcome identification, nursing interventions, and a time frame for accomplishment and evaluation. To meet the objectives of this course, students were required to interview other health care specialists to create an *interprofessional* plan of care that prioritized and integrated a broader set of viewpoints.

visible through the epistemic and regulative actions that comprised the two dimensions of SEA. These activities were documented in the student and instructor interactions that took place within each of the defined areas within final project wiki that was hosted within the LMS. See Figure 2.

When considered in terms of curricular standards, this team project illustrates the types of learning activities that encourage the development of group knowledge construction and collaboration skills that nursing students need to be effective members of intra- and interprofessional health care teams.

Project tasks. To successfully complete this team project, students were expected to participate in the following tasks, i.e., learning activities. Table 3 below provides a description of the project tasks, whether the team or the individual student was responsible for the product, and a schedule of when the activity took place or was expected to be completed.

Project planning for the interprofessional plan of care. All teams were provided with a dedicated discussion area for their use in developing their care plans. Students also had access to a team chat room which automatically saved a transcript of their sessions.

Interprofessional Plan of Care. Each team was assigned a fictional case study as the starting point for their project. The Team B was assigned a middle-aged African American woman with congestive heart failure and diabetes. Team C was assigned a Hispanic youth, aged 10, who had asthma and was overweight. Students were instructed to develop an interprofessional plan of care and create a "collaborative and interactive

document" that focused on health promotion for their patient. See Appendix G for the care plan instructions.

Table 3. *Team project tasks*

Project Tasks	Description	Responsibility	Schedule
Project Planning	Students document their work, communications, and decision making related to the ongoing process of planning, negotiating, and implementing this project	Team	Over the six week duration of the project
Team Contract	Students negotiate, jointly author, and agree to team contract	Team	Due at end of week 9
Interprofessional Interviews	Students interview at least one heath care specialist for an assigned patient case history	Individual Student	Due at end of week 11
Interprofessional Plan of Care	Each team jointly author a care plan based on fictional case	Team	Due at start of week 15
Self-Assessment	Written document in which student reflects on personal learning and contributions to team	Individual Student	Due at end of week 15
Team Assessment	Written evaluation of team's performance and peer contributions	Individual Student	Due at end of week 15

Interprofessional interviews. Within each team, students identified an individual from their workplace or community who represented a disciplinary specialist to be a member of the case study's health care team. This might be a physician, nurse practitioner, case manager, dietician, pharmacist, physical or occupational therapist, social worker, or other specialist who was interviewed to obtain input on the team's assigned case. During their interviews, students presented background on their case to

each practitioner and asked for his/her priorities for the patient's care. Using this information, students returned to their teams, discussed and evaluated their findings, and used this information to establish priorities for the patient's care plan.

Team contracts. To encourage students to assume greater responsibility for their learning in this collaborative project, each team was required to develop a team contract at the start of the project. This was used to establish a set of mutually agreed upon guidelines governing how team members would work together. Students were provided with the following instructions: The contract was to be authored in the designated area in the course wiki and all discussion related to its development should take place in the dedicated discussion area. Each team was provided with guiding questions to focus their efforts, and was instructed to address the following topics: team communication, performance expectations, conflict resolution, and other criteria as needed. See Appendix G. Students also received a list of twelve tips that described *How to Work Effectively as a Team*, which designed to incorporate elements of Damşa's regulative and epistemic actions. See Appendix H.

Individual self- and team assessments. All students were required to complete two additional tasks as part of this final project. The first was a written self-assessment in which students were asked to reflect upon their personal learning and contributions to the team project. The second was a confidential team assessment in which students were asked to describe and assess the contributions of their peers to the final project.

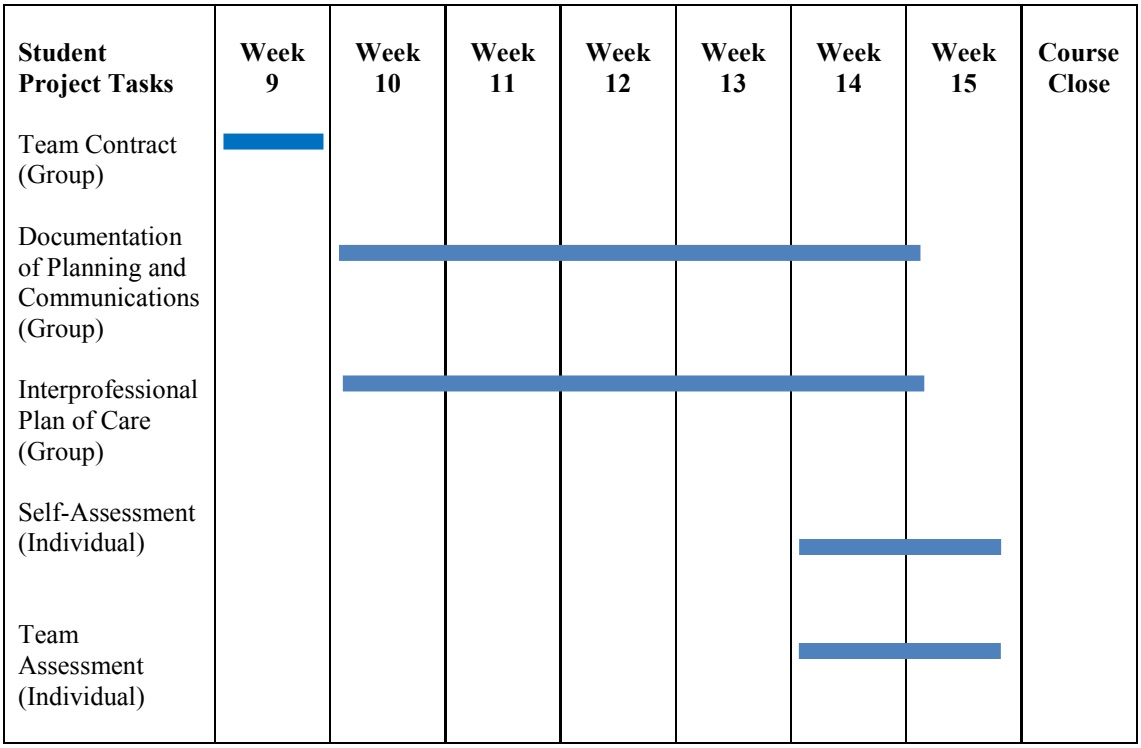
Project instructions and related course documents. In order to encourage all students to assume greater responsibility for their learning, the design of the final team project included the following three documents which provided a context for students to

be exposed to the concept of SEA in general, and its regulative and epistemic dimensions. The Introduction to module 7 (Appendix I) provided the rationale for the extended team project in terms of explaining the need for interprofessional collaboration. The specific activities connected with the team project were explained in a document entitled Instructions for Case Study (Appendix J), and the link to the *How to Work Effectively as a Team* document was again included (Appendix H) to provide concrete examples of epistemic and regulative actions.

Timeline of Student Team and Individual Project Tasks for Final Project

Figure 1 below shows the sequence and duration of team and individual student tasks required for the completion of the final project in each course section.

Figure 1. *Timeline of student team and individual final project tasks*



Instructor Role in Final Project

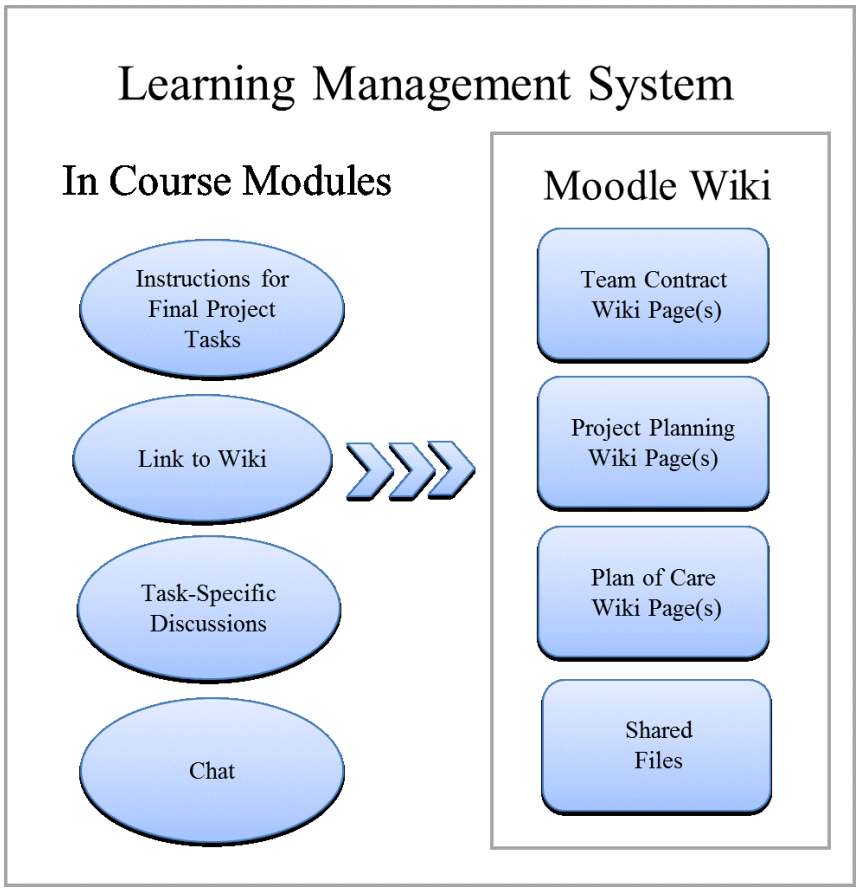
In both course sections, the instructor functioned as a course facilitator. Her instructional approach was to monitor all online activities during the six week long project and provide direction to students. This was accomplished through posting course announcements at the start of each module and activity, sending messages to specific teams and students who needed additional guidance, responding to problems connected with the LMS and wiki, and providing feedback on project tasks submitted as assignments, such as the team contract. The instructor agreed that she would follow the regular practices she used in teaching prior course sections. As a result, she did not routinely participate in the team discussions, but agreed to provide additional guidance or clarification if warranted. In addition, for the purpose of this study, I provided the instructor with background information on SEA (Appendix K) and I encouraged her to participate in student discussions to support each team to successfully advance their collaborative and epistemic processes and knowledge creation efforts as they worked on their interprofessional plan of care.

Design of the Project Team Work Areas in LMS

To overcome the often isolated and temporally disconnected nature of collaborative knowledge construction learning activities found in most LMSs (Lakkala et al., 2009), I attempted to address these concerns through the design of this work space. I selected the Moodlerooms wiki feature with the goal of using it as an integrated collaborative work area within the current LMS where students could move easily between the wiki and corresponding project discussion areas that were created to support the main project tasks.

For this project, I created a wiki for each team with three areas to help students organize their work: 1) a team contract page where students were instructed to author and document their expectations for working with each other by establishing norms, goals, performance standards, and roles and responsibilities; 2) a planning page where students were instructed to post information to help with outlining and assigning the tasks they must complete; and 3) a plan of care page where each team authored their final project document, which serves as the shared knowledge object. See Figure 2 below.

Figure 2. *Project team work areas*



Each of the modules in which students were expected to complete team project tasks also featured a link to the project wiki. For example, module 5 not only housed instructions describing the team contract task, but also the link to the wiki page where students wrote their team contract, and the corresponding discussion area. Module 6 contained instructions for team interviews, the discussion area for planning the interviewing assignment, and the wiki link where interviews could be posted. Module 7 contained all resources required for authoring the interprofessional plan of care. This included case study information assigned to each team, performance expectations, and participation guidelines.

In addition to the pages established in each team's wiki, students were also free to use the space to create new pages to share information or jointly author new documents. The Moodlerooms wiki also featured a shared file area where students could post a variety of text, image, and application files. Lastly, a link to the Moodlerooms chat was also made available in both the wiki and the course modules that housed the project tasks. These transcripts were automatically saved at the end of each session. The only wiki feature which was not enabled was the comments feature because this area was common to the entire wiki and had the potential to distract students from using the assigned discussion areas for project tasks.

It should also be noted that the original design of the wiki workspace called for much tighter integration between the wiki and the discussion areas, by embedded links to

each discussion area within each wiki page, but several technical constraints precluded their use.[4]

Researcher Role

My role relative to the participants in this study was that of a researcher, rather than a researcher participant. I worked with the course supervisor to design the learning activities for the final project; I was responsible for data collection and analysis, and I interviewed the course instructor and students. I did not have any direct interaction with students in connection with their completion of their final project, with the exception of conducting the first round of interviews at the mid-point of the final project. My contact with the course instructor involved providing her with a firm grounding in the concept of SEA (See Appendix K) so that she was able to use this knowledge to encourage regulative and epistemic activities among the teams in this study. I also provided technical assistance to the instructor and the course designer when questions arose about the wiki and its features.

Table 4 below describes the responsibilities of the researcher and the three staff members in the nursing program who were responsible for the study site. Note that both the course supervisor and course instructor were both nurse educators.

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[4] Although the team project and associated learning activity were included in every section of this course which is offered three times a year, the links to the discussions could not be replicated reliably within the wiki on an automated basis. More importantly, it was not technically feasible to keep both the wiki and chat or the wiki and discussion areas open at the same time to allow students to move seamlessly between them.

Table 4. *Roles and responsibilities of researcher and nursing program faculty and staff*

Role	Responsible for:
Researcher	Design of the study Consultation on learning activity design Develop team contract learning activity Develop team project and discussion guidelines that mapped to epistemic and regulative actions Develop summary on SEA for instructor Data gathering and analysis Conduct interviews with students and course instructor Technical assistance with wiki
Course Supervisor	Oversee course content and section instructors Identify course sections for study site Learning activity design and course documents Assist with QCA coding
Course Instructor	Input into learning activity design Facilitate course under study Participant as interview subject
Instructional Designer	Modify existing course content Add course documents Set up project workspace in LMS

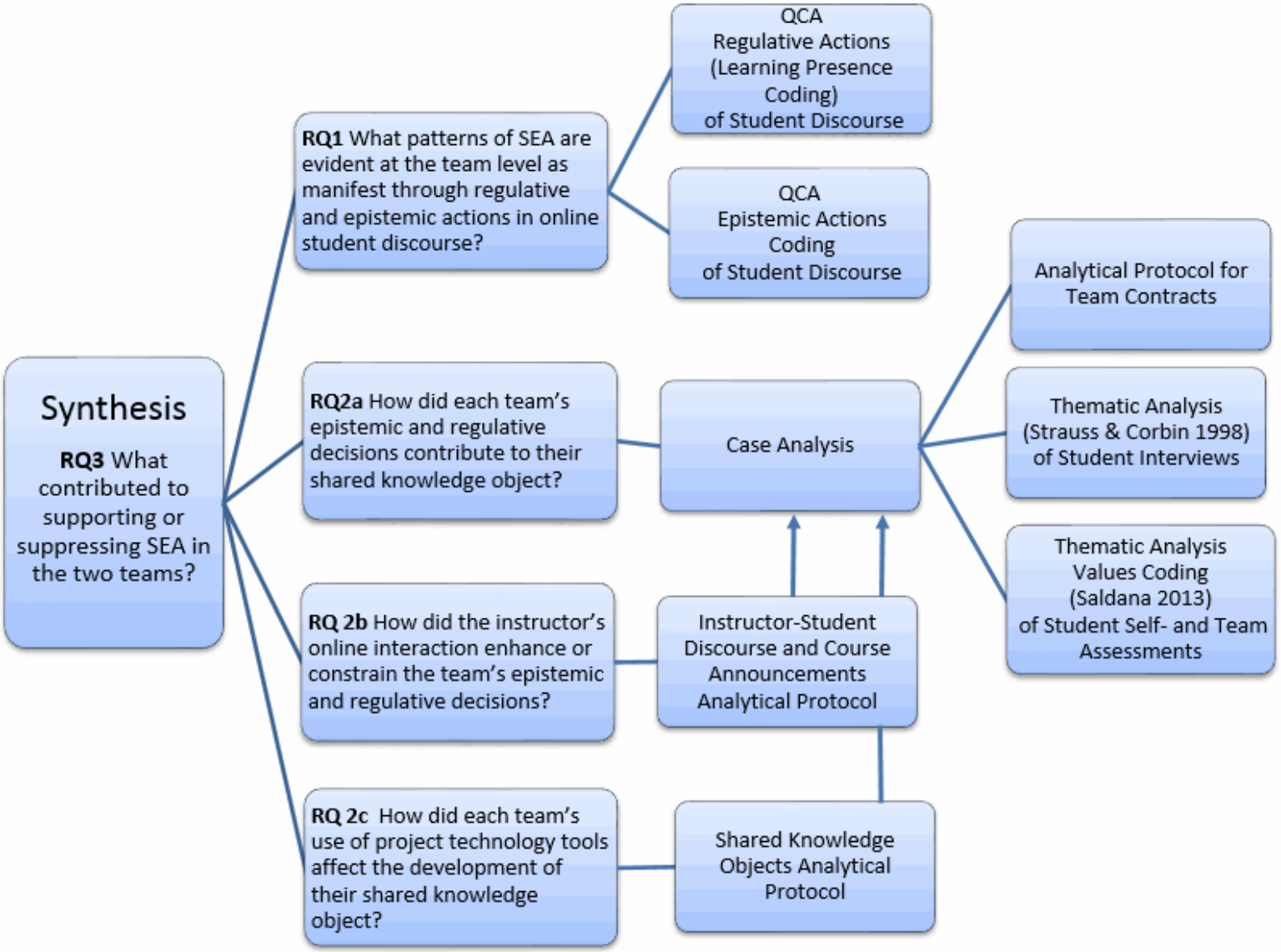
Data Sources and Data Analysis

In developing my data collection and data analysis strategies for this inquiry, my decisions were guided by the concept of triangulation. First, both Creswell (2007) and Patton (2002) recommend using multiple sources of data about the same phenomenon in order to increase the credibility and trustworthiness of the study. To accomplish this, I identified the following data sources as key elements of my study: student and instructor discourse in transcripts from each team's project discussion areas and chats; interviews with students and their instructor and; artifacts, such as the shared knowledge object (i.e., the interprofessional plan of care final project generated by each team), student self-assessments, student team assessments, team contracts, and course documents. These varied data sources have value in gauging consistency and divergences between accounts of events and findings.

Second, my research design also took into account methodological triangulation, which "uses multiple methods to study a single problem or program" (Patton, 2002, p. 247). This was achieved through the following types of data analysis methodologies: 1) quantitative content analysis of student discourse; 2) establishing a chronology of each team's activities and decisions; 3) two different approaches to thematic analysis of student interviews and student self- and team assessments; 4) case and cross-case analysis of the two teams selected for this study; and 5) analytical protocols for examining instructor interaction with students, team-authored contracts, and the shared knowledge object submitted by each team. My intent was to use these analytical methods to identify patterns of convergence or divergence within my qualitative analysis and to gain a deeper understanding of the phenomenon under study through use of diverse, yet complementary, methods.

In the sections that follow, I describe the data sources and analytical methods used to address each of my two research questions. Refer to Figure 3 which provides a conceptual mapping of how my two questions, their data sources, and analyses relate to each other.

Figure 3. *Research questions flow chart for convergent parallel mixed methods study*



Research question 1

The first research question that shaped my inquiry was: What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?

Data sources. To address this question, I examined student discourse found in each team's discussion forums and chat transcripts associated with their final projects. I also examined the final projects and related transitional documents to verify the outcome of specific epistemic actions. These documents served as the shared knowledge object, or conceptual artifact, that students developed over time as the physical manifestation of their knowledge creation processes.

Data analysis of student discourse. I analyzed these areas using quantitative content analysis (QCA), a research method used to categorize and count frequencies using a pre-established or emergent coding scheme often used in studies of computer-mediated communications and learning (DeWever, Schellens, Valcke, & Vankeer, 2006; Gunawardena, Lowe & Anderson, 1997; Henri, 1992; Rourke, Anderson, Garrison & Archer, 2001). For the purpose of measuring SEA, I adapted the research of Damşa et al. (2010) who described two dimensions of this construct: epistemic actions and regulative actions.

Measures of epistemic actions. To examine patterns of epistemic activity in the two teams under study, it was necessary to identify and classify evidence of intentional knowledge-related actions that supported and advanced the shared knowledge object. The

2010 study by Damşa et al. described a coding scheme that was never published.[5] To develop my own coding scheme, I used Damşa et al.'s 2010 study where the authors identified four main categories and indicators of purposeful agentive activity that supported student collaboration in the production of shared knowledge objects (p 175-176). These formed the basis of my coding scheme.

1) Creating awareness. Damşa cited the ability to recognize a lack of knowledge and problems as necessary prerequisites to creating new knowledge. Without this awareness, students are unable to move forward with their inquiry or recognize that they have encountered a barrier to developing or deepening their knowledge.

2) Alleviating a lack of knowledge. Three indicators are present in this category: examining given sources, collecting additional information, and structuring new concepts; all of these represent productive student actions to acquire and structure existing knowledge. It should be noted that the use of this knowledge is intended as the means to a specific end, and is not related to pursuing deep understanding.

3) Creating shared understanding. In this category, there are five indicators: sharing information from sources, giving meaning to new concepts, discussing misunderstandings, sharing ideas and knowledge, and reframing the problem. According to Damşa et al., these actions establish a common "conceptual basis for the collaborative creation of knowledge objects… [and] synchronize the knowledge level of the group members and reach a common understanding of ideas and knowledge" (p. 176). Refer to

[5] Subsequent related research by Damşa and Ludvigsen (2011) also mentioned the use of a related coding scheme, but like the original study, details were never elaborated for replication. Correspondence contacting the first author to request this information went unanswered.

Appendix L for the complete coding scheme and detailed information on indicators, definitions, and examples.

4) Generative collaborative actions. These actions contribute to and support the process of producing the shared knowledge object. They bear the fruit of agentive and productive collective thinking: generating new ideas, negotiating new ideas, engaging in collaborative uptake of ideas, framing and reframing the knowledge object, constructing intermediate knowledge objects, revising ideas and knowledge object drafts, and using feedback constructively.

Developing the epistemic actions coding scheme. The 2010 Damşa et al. study was explicit in highlighting two important considerations that shaped the development of their initial coding schemes. The first was that all analysis must be *contextualized* to the learning task at hand. The second was that the analysis should focus on "the intersection of individuals' efforts and group processes in an effort to preserve the group as the primary unit of analysis." To contextualize the application of my coding scheme, I began by conducting a pilot study using archived student discourse and artifacts from a prior section of NUR 302 which was offered during the January 2013 term.[6]

I extracted the student discussions and the plans of care developed by each of the four project teams that were established by the instructor. All student identifying information was removed and was replaced with generic identifiers, i.e., S1 for Student 1, etc. All first level discussion threads were arranged in chronological order. If students set up chat sessions, these transcripts were added into the chronological record.

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[6] This pilot study was covered in the IRB approvals issued by the University at Albany and at the host college where the course was offered.

Following a thorough reading of these materials, the final project instructions, course objectives, and a conversation with the course supervisor and instructor, I identified key learning outcomes for the interprofessional plan of care. I then mapped them to examples of student evidence to provide a meaningful framework to apply the four categories of epistemic action codes. See Table 5 below which shows this translation.

Table 5. *NUR 302 Learning outcomes mapped to evidence*

Learning Outcomes	Types of Evidence
• Recognizing and treating the "whole" patient • Acknowledging complexity when managing multiple medical conditions • Integrating patient's social, cultural, and spiritual life • Understanding the contribution of genomic factors • Identifying anticipatory opportunities for patient education or planning	• Providing educational materials tailored to patient and family needs and background • Creating lab or test results that illustrate diagnoses or management of conditions • Creating medical and family histories illustrating course concepts • Incorporating cultural practices and beliefs • Introducing realia[7] as teaching aids

Unit of analysis. In the 2010 exploratory study, the researchers selected an episode of interaction between students for examination. This was consistent with their goal to preserve the group as the primary unit of analysis. (p. 159). Unlike the present study which was conducted in a fully online course, Damşa et al.'s study was delivered using blended instruction which combined live lectures, face-to-face project meetings, and as needed

[7] Using objects from real life as teaching aids.

tutorial sessions, and was supplemented by the Blackboard LMS to "facilitate communications during these activities." The Damşa et al. analysis was further enriched by 20 hours of audio recording of the face-to-face meetings and discussions of each team (p. 157). Given the fragmented nature of asynchronous communication using discussion areas and the limited use of chat[8] by the two teams in the present study, I determined that it was unrealistic to use the episode as the unit of analysis. My goal instead was to approximate the same "intersection of individuals' efforts and group processes" by examining individual student postings, using them to construct a broader view of the advancement of epistemic actions as they affected the development of key concepts as taken up by peers, and incorporated them into their team's shared knowledge object.

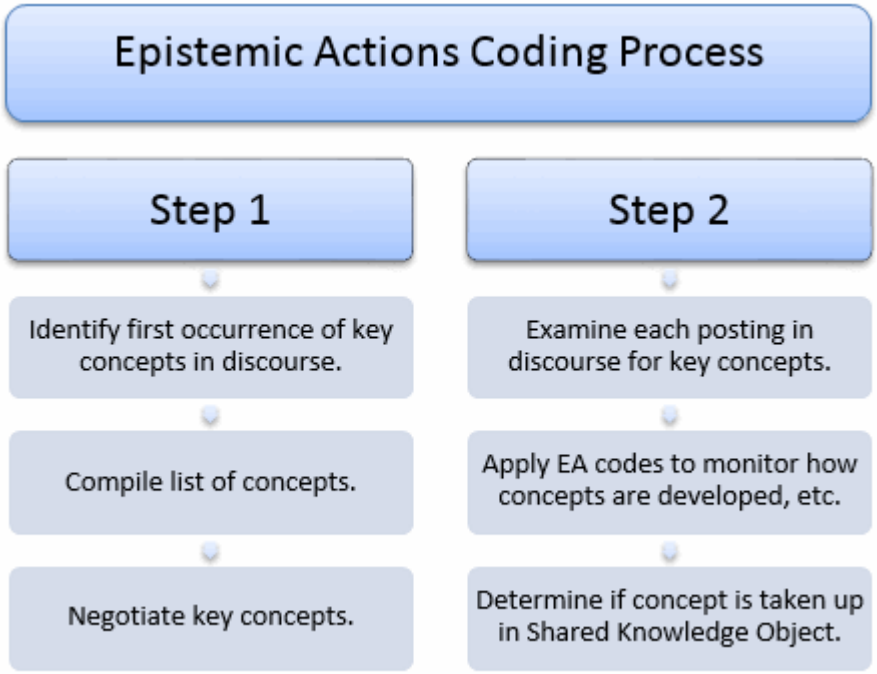
Coding process. I next recruited a second researcher, a doctoral student, to work with me to test, refine, and document the final coding process using the data obtained from the archived NUR 302 course. Over a period of ten weeks, we worked to define each category and indicator and to select examples to illustrate each code. Each time we coded, we refined the process based on what we had learned from the previous session. At the end of the ten weeks of practice, we arrived at the following two-step process which was used to code the discourse found in the two teams under study. See Figure 4 below.

In the first phase of coding, we individually identified the first occurrence of all important concepts or ideas that each team discussed in planning and developing their interprofessional plans of care. These were to serve as the building blocks for the team's knowledge construction process. To accomplish this, we read all of the team's discourse

[8] Details on the specific uses of chat within each team are discussed at length in Chapters Four and Five.

and reviewed its final plan of care submissions to compile our own lists of concepts. We next compared these concepts and negotiated a final list that represented our shared understanding.

Figure 4. *Epistemic actions coding process*



In the second phase of coding, we began by examining every posting, sentence by sentence, using the list of concepts to identify key areas of discourse for coding. We used the coding scheme to identify and monitor how these concepts were used, developed, and eventually incorporated into the team's shared knowledge object: their interprofessional plan of care. Thus, the four main categories of the EA coding scheme—creating awareness (CA), alleviating lack of knowledge (ALK), creating shared understanding (CSU), and generative collaborative actions (GCA)—represent progressive phases of development in the knowledge construction process. To be assigned higher level codes such as CSU or GCA, student discourse also had to demonstrate some level of advancement of the concept

through inclusion of a rationale, elaboration, or drawing connections between concepts. Refer to coding scheme in Appendix L.

Inter-rater reliability. Because this was a first attempt to implement this new coding scheme, we measured the presence or absence of the indicators by category. This meant that we did not have to agree upon *which* indicator within the category was applicable.

To evaluate our consistency in applying the coding scheme during our practice coding, I calculated inter-rater reliability based on the full sample of coded chronological discourse associated with each team's final project. Initially two measures were selected. Cohen's Kappa (*k*) was first calculated, but these results were set aside. This was due to imbalances in marginal distributions of the coding table which resulted in in high levels of observed agreement, but a very low *kappa* caused by the preponderance of "no codes" relative to much lower counts of EA indicator categories (Feinstein & Cicchetti, 1990). See Table 6. As a result, I determined that Holsti's coefficient of reliability (CR), which measures percent agreement, was an adequate IRR measure.

Table 6. *Comparison of IRR using Cohen's kappa and Holsti's coefficient of reliability*

	Epistemic Actions Practice Coding					
	Initial *kappa*	Negotiated *kappa*	Initial (CR)	Negotiated (CR)	Total Posts	Final NC Posts
Practice Team 1	0.39	0.96	0.88	0.99	190	131
Practice Team 2	0.26	0.91	0.83	0.98	132	113

***Analysis*.** To examine patterns of epistemic actions in the main study, I first identified and tallied the frequencies of all postings within each team that had been assigned EA codes and categories. I then recorded the creation date for each of these postings, and

aggregated them by weekly intervals to obtain tallies by EA category for the duration of the team project. See Table 7.

Table 7. *Frequencies by week of epistemic actions indicators by category*

Team B						Team C					
Week	CA	ALK	CSU	GCA	Total	Week	CA	ALK	CSU	GCA	Total
9	0	0	0	0	0	9	1	1	0	0	2
10	1	1	1	0	3	10	1	3	1	1	6
11	4	3	0	0	7	11	0	0	1	1	2
12	4	3	6	0	13	12	0	1	1	3	5
13	5	1	7	8	21	13	0	1	0	1	2
14	0	0	0	0	0	14	1	5	4	11	21
15	0	0	0	0	0	15	0	0	0	0	0
Total	14	8	14	8	44	Total	3	11	7	17	38

To determine the independence of the combined epistemic action frequencies for Team B and C over the six weeks of the project, I used a chi-square test for independence. In order to satisfy one of the requirements of this test, it was necessary to eliminate frequency counts of zero from some of the cells. To accomplish this, I combined this data into two week intervals: weeks 9 and 10; weeks 11 and 12; weeks 13 and 14; and week 15. See Table 8.

Table 8. *Epistemic action frequencies combined weeks in Teams B and C*

	Team B	Team C	Total
Weeks 9-10	3	8	11
Weeks 11-12	20	7	27
Weeks 13-14	21	23	44
Week 15	0	0	0
Total	44	38	82

I also aggregated epistemic action frequencies by student in order to discern patterns among students within each team, and for the purpose of combining this data with

learning presence frequencies to determine if there was a relationship between the two measures See Table 9.

Table 9. *Epistemic action frequencies by student in Teams B and C*

Team B						Team C					
Student	CA	ALK	CSU	GCA	Total	Student	CA	ALK	CSU	GCA	Total
Denise	1	2	2	1	6	Althea	1	1	0	2	4
Fern	8	4	5	4	21	Crystal	0	4	2	9	15
Molly	1	0	2	2	5	Pat	1	2	1	3	7
Sarah	2	1	3	1	7	Samantha	1	4	4	3	12
Tess	0	2	2	1	5		3	11	7	17	38
	12	9	14	9	44						

Measures of regulative actions. Damşa et al. (2010) also identified three categories of intentional process-related activities that support the shared management of the collaborative process: 1) projective activities; 2) regulative activities; and 3) relational activities. There is a high level of consistency between the first two categories cited above—projective and regulative activities—with the learning presence construct advanced by Shea et al. (2012), which has been used to examine learner self- and co-regulation within the Community of Inquiry framework of online learning. See Table 10 below. Given that the learning presence coding scheme and indicators have been used with repeated success to measure self- and co-regulation in online learning, I used this as a more detailed proxy in lieu of developing a coding scheme based on Damşa et al.'s regulative actions (Shea et al, 2012, Shea et al, 2013).

The construct of learning presence "reflects learner self- and co-regulatory processes in online educational environments" (Shea et al. 2013, p. 429) and describes how online learners demonstrate self-direction through their use of specific processes that are directed toward the completion of a learning task. Learning presence is grounded in

Zimmerman's (1989, 2000, 2008) socio-cognitive view of self-regulation, which is the result of interaction among three key areas: behavioral (the individual), environmental (the setting in which learning takes place), and social (interactions with others) and provides a framework for understanding what contributes to the success of online students who are able to demonstrate self and co-regulation.

More specifically, the learning presence coding scheme aligns with the three phases of self-regulative processes identified by Zimmerman (1989) and emphasizes the goals and activities of online learners. The first is forethought and planning, which encompasses goal setting, planning and coordinating, delegating, or assigning tasks to oneself or others. Performance is the second, and is comprised of two elements: monitoring and strategy use. Monitoring involves systematic observation and checking the quality or progress of one's efforts. The last phase is reflection. Monitoring can be applied in a number of areas: judging one's understanding, identifying problems, noting completion of tasks or progress, evaluating, appraising engagement, recognizing learning behaviors (metacognitive awareness), advocating effort or focus, and noting use of strategies. The second component of performance is found in strategy use. This includes seeking, offering or providing help, reviewing one's work, noting outcome expectations, and making adjustments to the current strategy in use. Lastly, the reflection category encompasses the articulation of changes in thinking and the causal attribution of results to individual or group performance in the online activity.

Modifications to learning presence coding scheme. In preparation for this stage of coding, I reviewed Damşa's epistemic and regulative actions and compared them against Shea et al.'s (2012, 2013, 2014) learning presence coding scheme. My purpose was to

verify that the existing learning presence indicators aligned with regulative actions and none overlapped with any of Damşa et al.'s epistemic actions. See Table 10.

Table 10. *Comparison of regulative actions from Damşa et al. (2010) and learning presence indicators (Shea, Hayes, Uzuner-Smith, Vickers, et al. (2012).*

Regulative Actions Indictors	**Learning Presence Indicators**
Projective • Setting common goals • Creating a joint plan of action • Engaging in proactive conduct	**Forethought and Planning** • Goal setting • Planning • Coordinating, delegating, or assigning tasks to self and others
Regulative • Monitoring object advancement • Coordinating object-related activities • Reflecting on actions, ideas, and problems • Adjusting the group's current strategy	**Monitoring** • Checking for understanding • Identifying problems or issues • Noting completion of tasks • Evaluating quality • Observing or monitoring during performance and taking corrective action • Appraising personal interest, engagement, or reaction • Recognizing learning behaviors of self or group (i.e., metacognitive knowledge) • Advocating effort or focus • Noting use of strategies
	Strategy Use • Seeking, offering, or providing help • Recognizing a gap in knowledge • Reviewing • Noting outcome expectations • Seeking or offering additional information
	Reflection • Change in thinking • Causal attribution of results to personal or group performance
Relational Actions • Transcending (social) conflict • Redirecting critical feedback • Creating space for others' contributions	

As a result of this review, I made three modifications to the LP coding scheme. In addition, two other modifications were made during the coding process to refine the M1 and SU1 codes. These modifications are described in Table 11. Appendix M contains the full coding scheme with categories, indicators, definitions, and examples.

Table 11. *Modifications to original learning presence coding scheme (Shea et al., 2012, 2013, 2014)*

Learning Presence Indicator	Category	Revision to Learning Presence coding scheme
M1 *Checking for understanding*	Monitoring	Changed to *Checking or confirming*. Definition limits this to seeking verification that a task or process aligns with *instructions*
M5 *Observing or monitoring during performance and taking corrective action*	Monitoring	Removed from Monitoring category. Renamed *Adjusting current strategy* and re-assigned to Strategy Use category as SU6
SU1 Seeking, offering, or providing help	Strategy Use	Changed help to *guidance*
SU2 *Recognizing a gap in knowledge*	Strategy Use	Removed. Similar to Damşa 's *Identifying a lack of knowledge*
SU5 *Seeking or offering additional information*	Strategy Use	Removed. Similar to *Sharing information from sources*

Damşa et al. also reported on a relational category which was presented as part of regulative actions in the 2010 study. These actions included the following: transcending conflict, i.e. rising above social conflict; redirecting critical feedback, i.e., repurposing this feedback for constructive purposes; and creating space for others' contributions, by which all team members were given the chance to pose their ideas and contribute to the development of the shared knowledge object. This category and indicators were not addressed in the learning presence coding scheme, but these concepts are explored in the qualitative strand of this study.

Unit of analysis. Paralleling the considerations for the coding of epistemic actions, a similar approach was used for learning presence coding. As a result, the unit of analysis used for this stage of coding was the individual discussion or chat posting in order to use this approach to construct a broader view of the regulative actions within the team.

Coding process. I recruited a second researcher, with whom I had worked previously to develop and test the original learning presence coding scheme. Our main objective was to apply the revised learning presence coding scheme to examine each of the two team transcripts that had been prepared for the prior content analysis of epistemic actions. As in the epistemic action coding phase, we practiced using this coding scheme using two of the archived team discussions from the January 2013 term of NUR 302 to calibrate our consistency in applying the learning presence codes.

We worked independently to examine each sentence within a posting to identify one of the four learning presence categories and select the appropriate indictor. Instructor postings were also excluded, consistent with the approach used for epistemic actions coding. As reported in prior learning presence research, we maintained the practice of coding for the presence or absence of indicators by category (Shea et al., 2012; Shea et al., 2013; Shea et al., 2014). Following this initial phase of coding, I calculated inter-rater reliability measures and we met to negotiate our disagreements, using this information to refine the coding process and calculate the final IRR for each team's discourse.

Inter-rater reliability. For the purpose of consistency with the IRR measures used for the epistemic actions coding, I used Holsti's coefficient of reliability (CR). The results of the practice coding are provided in Table 12 and are considered acceptable measures of inter-coder reliability (Neuendorf, 2002, p. 145).

Table 12. *Inter-rater reliability for learning presence practice coding*

Holsti's Coefficient of Reliability		
	Initial (CR)	Negotiated (CR)
Practice Team 1	0.81	1.00
Practice Team 2	0.88	1.00

Analysis. To establish consistency between the learning presence results and those reported for the epistemic actions coding, I used the same approach to organizing and analyzing my data. I totaled the frequencies of all postings within each team and then recorded the creation date for each posting and aggregated them by week to obtain weekly counts for the four main learning presence categories: forethought and planning, monitoring, strategy use, and reflection. I also repeated the same process for each student. See Tables 13, 14, and 15.

Table 13. *Weekly counts of team learning presence indicators by category*

Team B						Team C					
Week	FP	MO	SU	RE	Total	Week	FP	MO	SU	RE	Total
9	0	0	0	0	0	9	5	5	2	0	12
10	0	1	0	0	1	10	8	7	3	0	18
11	2	13	5	0	20	11	7	13	8	0	28
12	23	32	16	1	72	12	0	0	0	0	0
13	35	41	25	0	101	13	5	5	1	0	11
14	13	23	10	0	46	14	18	38	20	1	77
15	0	4	0	2	6	15	0	1	0	3	4
Total	73	114	56	3	246	Total	43	69	34	4	150

Table 14. *Learning presence frequencies combined weeks in Teams B and C*

	Team B	Team C	Total
Weeks 9-10	1	30	31
Weeks 11-12	92	28	120
Weeks 13-14	147	88	235
Week 15	6	4	10
Total	246	150	396

Table 15. *Learning presence frequencies by student in Teams B and C*

Team B						Team C					
Student	FP	MO	SU	RE	Total	Student	FP	MO	SU	RE	Total
Denise	11	26	7	0	44	Althea	12	12	3	1	28
Fern	31	39	26	2	98	Crystal	10	22	11	1	44
Molly	12	23	12	1	48	Pat	5	8	3	1	17
Sarah	17	18	13	0	48	Samantha	15	26	19	1	61
Tess	4	4	0	0	8		42	68	36	4	150
	75	110	58	3	246						

To determine the independence of the combined learning presence frequencies for Team B and C for the six week long team project, I used a chi-square test for independence. I also aggregated learning presence frequencies by student in order to discern patterns among students within each team and for the purpose of combining this data with epistemic action frequencies to determine if there was a relationship between the two measures.

To determine whether there was a statistically significant association between measures of epistemic actions and learning presence, I calculated the Spearman correlation coefficient using the rankings of each student's total learning presence indicators.

Research Question 2

My second research question and subquestions provided the basis for a qualitative inquiry into the experiences of the two teams to better understand the meaning and context shaping each group's epistemic and regulative decisions as they collaborated online to complete their six week long project.

2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object?

2b. How did the instructor's online interaction enhance or constrain each team's epistemic and regulative decisions?

2c. How did each team's use of project technology tools affect the development of their shared knowledge object?

Data sources. To address this research question and subquestions, I used the following data sources: 1) student and instructor interviews; 2) team contracts; 3) student artifacts that included each team's shared knowledge object, i.e., interprofessional plan of care and the team and student self-assessments; and 4) team chronologies documenting key decisions and events that occurred during the final project.

Team contracts. As described previously, at the start of the project, each team negotiated and signed a written contract. This provided a transparent framework for establishing guidelines for individual and group behavior, performance standards, goals, and processes for the duration of the project.

When developed prior to the start of a project, team contracts can provide insight into students' beliefs and expectations about how they intend to work with their peers. At the same time, a contract can also document the extent to which the same guidelines have served to guide the team's activities over the duration of the project.

From an instructional design perspective, the instructions for this learning activity were written by the researcher with the purpose of scaffolding each team to both assume greater responsibility for their work together and explicitly articulate shared guidelines through which the team could exert its SEA. These instructions were conveyed with two documents. The first presented several broad areas and questions for each team to consider related to team communications, performance expectations, and conflict resolution. The

second provided 12 examples of productive ways of working effectively in a team, drawn from Damşa's regulative and epistemic dimensions. (See Appendices G and H).

Team Chronologies. Using student discourse from each team's chats and discussions, interview data, and student artifacts, I developed a detailed chronology for each team during the six weeks of the final project. Its purpose was two-fold: to highlight the main activities and events related to each team's collaboration and to provide a comprehensive perspective for understanding the regulative and epistemic decisions that shaped the development of SEA within each team.

Interviews. I conducted interviews with students to better understand and describe their collaborative learning experiences in each team and how they unfolded. To increase the comparability of responses during the data analysis, I used semi-structured interview protocols (Patton, 2002). Interviews were conducted with each student at the mid-point of the team project (during weeks 12 and 13) and again during the three weeks following the close of the course. My purpose was to gain a better understanding of each student's team experiences and the meanings they ascribed to: a) their epistemic, regulative, and relational interactions and decisions made with their peers; b) specific events and decisions; and c) their observations about individual or shared beliefs that may have emerged within the team. See Appendix E for the student interview protocol.

I also conducted two semi-structured interviews with the course instructor at the mid-point of the collaborative project (week 12) and shortly after the completion of the course. The purpose of this first interview was to obtain the instructor's perspectives and observations on her interaction with the teams under study. The second interview was used to gain a broader understanding of the instructor's perceptions of each team's epistemic and

regulative progress as they developed their interprofessional plan of care, the extent to which they moved toward assuming greater responsibility for their learning, and the nature of her interactions with each team. These data were used to confirm my understanding of student's contributions to their shared knowledge objects, to better understand the instructor's facilitation of the course and team projects, as well as to provide insight into student perceptions of their course experience. See Appendix F for the instructor interview protocol.

Given the statewide geographic distribution of the participating students in the two course sections, I conducted these interviews by phone using Skype. These sessions were audio recorded, having obtained prior written permission from each participant. Only one student requested that her interview not be recorded; I relied on handwritten notes to capture her responses. On average, these sessions ranged between 45 to 60 minutes in length and were scheduled at the convenience of the participants based on their availability, usually before or after work. Of the 28 interviews that were completed, I transcribed the two instructor interviews, and 12 of the student interviews. The remainder were transcribed by a third party. Each interview was submitted to participants for member checking.

Student self-assessments. This learning activity, which was submitted at the end of the group project just before the close of the course, required students to compose a brief essay of 300 words that reviewed their individual contributions relative to their peers, described any challenges related to their personal understanding of the case study and interprofessional plan of care, and explained their role in participating and contributing to

the team's knowledge construction and group processes. These were analyzed to identify themes connected with student values, attitudes, and beliefs.

***Student team assessments*.** Each student was also required to compose a 300 word essay to evaluate both the team's collective performance and peer contributions in the following areas: effectiveness of the team, how individuals contributed to the team's understanding and application of course concepts, how conflicts were addressed or resolved, the value of the team contract, the distribution of work, and changes in the team's thinking over time. Like the self-assessment, this assignment was submitted at the end of the team project at the start of the final week of the course. These also were used in the thematic analysis focused on values, attitudes, and beliefs.

***Interprofessional plan of care submissions*.** Each team authored an interprofessional plan of care for their assigned fictional case. This document and its associated files and transitional documents were considered the shared knowledge object generated by each team. As such, each was examined as a data source to determine the extent to which students were able to construct new knowledge beyond that which was provided to them at the start of their project.

Data Analysis. This section provides a brief summary of the analytical approaches used in the qualitative strand of my research.

Thematic analysis. I used two distinct approaches to thematic analysis to analyze student interviews and student team and self-assessments. For the first, which I refer to as my main thematic analysis, I followed Strauss and Corbin's (1998) open and axial coding and Glaser's (1965) process of continuous comparison. For my secondary thematic analysis

of the student self- and team assessments, I used another inductive method, Saldaña's (2012) values coding.

Approach to main thematic analysis of student interviews. To begin, I immersed myself in my data by completing several readings of the interviews to familiarize myself with each team and gain some initial impressions of how they worked together. Consistent with Strauss and Corbin's inductive approach, I did not begin with a preconceived view of my data; however, over time I did use my understanding of online learning and group knowledge construction pedagogies as sensitizing concepts.

I next moved to open coding to systematically "uncover, name and develop concepts by opening up the text to expose the thoughts, ideas and meanings within" (p. 102). I accomplished this by examining each transcript line by line, comparing these data for similarities and differences in order to manually assign codes. See Table 16. Over time, I sought to convey action in my codes by using gerunds, and also developed definitions that described and explained each one.

Table 16. *Open coding examples*

Sample Extracts from Transcripts	Example of Open Coding	Definition
"Maybe if the teacher had made bullet points to show what she wanted in the final project. If she provided examples." (25:13)	Wanting detailed project guidelines and examples	Expressing discomfort with a perceived lack of instructor provided direction and model projects
"But for some reason this group seems to have it together so to speak. Everybody's doing their part. Doing all of the group discussions, putting in all your information that you're supposed to, so there's nobody doing all the work." (8:5)	Contributing equally	Articulating the desire to spread the work of the team evenly
"…We're so used to having a structure and then when the professor allowed you to have a mind of your own, you're not used to it." (17:12)	Facing ambiguity	Students acknowledge, ambiguity or uncertainty associated with their team project

Through the process of continuous comparison, I repeatedly reviewed these concepts to identify subconcepts by returning to the coded extracts and transcripts to examine more closely their relationships to each other in order to aggregate similar data into codes and subcodes. I found Charmaz's (2006) clustering technique useful in visualizing the relationships between concepts. See Figure 5 below for an example.

Figure 5. *Example of clustering using theme "adapting to unfamiliar expectations"*

Through this process, I refined my original codes and subcodes, reducing them to seven concepts and 34 codes. See Appendix M for my final coding protocol which I used to review my data set.

Although I did not make formal use of Strauss and Corbin's process coding method (1998) in the above procedures, their concepts of conditions, actions/reactions, and

consequences provided a useful framework that guided my thinking in the development of my themes and thematic analyses. As I read and re-read my coded extracts with the goal of refining these concepts into themes that captured the meaning of the students' team experiences as they worked to complete their final project, I found this framework aided me in describing the how and why of each team's interactions with each other, their instructor, their technology tools, and their shared knowledge object.

Approach to secondary thematic analysis of self- and team assessments. At the close of the project, each student was also required to submit a self-assessment of her contributions to the project and a peer evaluation of her team members. To find confirmatory evidence of the themes generated from student interviews, I analyzed these artifacts using an alternative coding approach called values coding. Saldaña (2012) describes this as an affective coding method which is useful for exploring interpersonal experiences to identify concepts that "reflect a participant's values, attitudes and beliefs, representing his or her perspectives or worldview" (p. 110-111).

Values coding subsumes the following constructs: *beliefs*, which are those things that people believe to be true; *values* which are things that people believe to be important; and *attitudes*, which refer to the way people think about themselves, other people, objects, or ideas. Most importantly, they are manifest in the thoughts, feelings, and actions of individuals and groups and can provide insight into the collective meaning shared by a team. From a semantic perspective, these are important distinctions; however, Saldaña has noted that it is not necessary to differentiate among these three constructs when the purpose of the analysis is data triangulation (p. 111). In line with this recommendation, I considered beliefs and attitudes to be representative of values.

I first made several readings through the nine student assessments from the two teams to familiarize myself with these data sources. I began with a descriptive coding approach (Miles, Huberman & Saldaña, 2013), working sentence by sentence to assign labels, in the form of nouns or short phrases, summarizing any value, attitude, or belief in order to capture examples of student thinking about the meaning of their online project, teamwork, and collaboration. I also tried to label issues of importance that contributed to student interactions, their expectations for each other, the role of the team contract, and areas of concern as they related to the project. I also sought to better understand the reasons behind *how and why* the team conducted their communications and used their project technology tools. During this descriptive coding phase, I identified 43 initial codes, for which I developed definitions. I then transferred these codes, their definitions, and these artifacts into Atlas TI 7.1 and recoded these documents.

I then began the process of focused coding (Charmaz, 2006) to "synthesize and explain larger segments of data" (p. 57). I examined the most significant and frequently appearing codes from my first phase of coding in order to move to a higher level of abstraction. I used Glaser's constant comparative method to compare "data with data" (1965, p. 47) to move beyond these reorganized concepts to develop new theoretical categories that explained larger segments of my data.

Case Analysis. The strength of case analysis is found in its "ability to investigate complex social units consisting of multiple variables" and its power to answer questions related to understanding how and why a phenomenon occurs (Merriam, 2009; Yin, 2009). I chose this research approach because it also affords a deeper exploration of the situated context which contributed to shaping each team's epistemic and regulative decisions as

they collaborated to develop their interprofessional plan of care during their six week final project.

Stake (2008) defined a case study as a "bounded system under investigation" (p. 2). I adopted this approach to explore the two teams drawn from the same course which were separated by distance and asynchronous time. I determined that each team would stand on its own merit as a bounded system, which permits direction comparison. This provides the rationale for the remaining analyses that are described below.

Analysis of team contracts. To determine the extent to which each team's contracts aligned with Damşa et al.'s epistemic and regulative dimensions of the SEA construct (See Table 10), I developed an analytical protocol which used pattern matching to compare a team contract with the epistemic actions found in the coding scheme developed earlier in this study and the learning presence coding scheme (Shea et al., 2012; Shea et al., 2013, Shea et al., 2014). See Appendix O.

Analysis of instructor interaction. I next developed an analytical protocol to classify the instructor's interaction with students as having a regulative or epistemic focus. See Appendix P. This analysis was applied to the extracted instructor discourse with the two teams under study in their discussion area and the instructor's course announcements. The two instructor interviews were used to confirm these findings.

Analysis of shared knowledge objects. With the purpose of standardizing the methods by which each team's shared knowledge objects would be evaluated, I developed an analytical protocol for examining these artifacts. This protocol (Appendix Q) called for: 1) reviewing each team's initial wiki pages and comparing them against the pages originally provided at the start of the course; 2) checking the revision history of each page;

3) reviewing all files that the team uploaded in the file sharing area of the wiki; and 4) generating a report from the LMS to determine who within each team had accessed the wiki instructions.

Research Question 3

This mixed methods study, which uses a convergent parallel design, requires synthesis of my quantitative content analysis and qualitative research strands addressed in my first two research questions to provide a richer and more complex picture of the two teams under study. With this in mind, I used my third research question to focus my merged analysis: *What contributed to supporting or suppressing SEA in each team?* This synthesis is addressed in Chapter Six.

Data Collection Schedule

Table 17 provides a summary of my data sources and their collection schedule.

Table 17. *Data Sources and collection points for team projects*

Data Source	Collection Point
Initial interviews with students and instructor	November 25 – December 10 2013
Second interview with students and instructor	Late December 2013 – January 2014
Team contracts	Late December 2013 – January 2014
Student discourse from project planning, and final project work areas in wiki	Late December 2013 – January 2014
Student self-assessment of learning (individual)	Late December 2013 – January 2014
Team assessment (individual)	Late December 2013 – January 2014
Interprofessional plan of care	Late December 2013 – January 2014

Alignment of Research Questions, Data Sources and Data Analysis

In summary, I provide Table 18 below to demonstrate the alignment between my study's research questions, the data sources required, and my data analysis methods.

Table 18. *Alignment of research questions, data sources and data analysis*

Research Question	Data Source	Data Analysis
1. What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?	• Student discourse • Shared knowledge objects	• Quantitative content analysis (QCA) using epistemic actions coding scheme • QCA using learning presence coding scheme as proxy for regulative actions • Shared knowledge objects used to confirm uptake of course concepts that were identified in epistemic actions found in student discourse
2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object?	• Student interviews • Student self- and team assessments • Team contracts • Team chronologies	• Thematic analysis based on Strauss & Corbin (1998) • Thematic analysis based on values coding (Saldaña, 2013) • Contract analysis protocol • Case analysis
2b. How did the instructor's online interaction enhance or constrain the team's epistemic and regulative decisions?	• Instructor interviews • Student and instructor discourse in discussion area • Instructor course announcements	• Instructor's perceived instructional role • Analysis of instructor's interactions with teams to determine if regulative or epistemic in focus
2c. How did the team's use of project technology tools affect the development of their shared knowledge object?	• Team chronologies • Shared knowledge objects	• Technology themes from student interviews • Shared knowledge object analytical protocol
3. What contributed to supporting or suppressing SEA in each team?	• Synthesis of previous RQ results	• Data sources described above

Validity Considerations

When conducting mixed methods studies, issues of validity must be addressed relative to each paradigm. Within the context of qualitative research, which is based upon

constructivist and interpretivist epistemologies, research quality is *not* related to validity. Instead, trustworthiness and dependability are considered essential values (Creswell, 2007; Patton, 2002). As with all qualitative research and methods such as case analysis and content analysis, the researcher serves as the primary instrument for data collection and analysis. Unless rigorous systematic methods are used and documented, bias may affect the final product.

Validity also pertains to the quantitative content analysis strand of this study. To meet these requirements, I trained two other coders to ensure that we established a shared understanding and application of the coding schemes for the epistemic and regulative actions that comprised the SEA construct. To accomplish this, we dedicated several weeks and considerable effort to practice coding, calculating initial inter-rater reliability, and negotiating differences to achieve a high level of calibration in our ability to apply these codes with consistency (Rourke et al. 2001; Shea, Hayes & Vickers, 2010).

In addition to member checking of transcribed interviews and the incorporation of data triangulation methods, I have included as appendices in this study my interview protocols, coding schemes, and relevant course materials that permit theoretical replication (Yin, 2009).

Ethical Considerations

Because this study was conducted at another campus, I obtained IRB approval from both University at Albany and the study site campus. I provided all study participants with consent forms apprising them of 1) the scope of the study; 2) their rights to confidentiality; 3) possible risks; and 4) the right to withdraw from the study at any time. See Appendices B and C for student and instructor consent releases.

To protect the confidentiality of study participants, I replaced all student and instructor names with pseudonyms in my interviews and student discourse transcripts, as well as in student artifacts and related assessments. All identifying data were kept in a locked file cabinet in my office, and will be destroyed within seven years from collection, consistent with University at Albany requirements.

Study Timeline

The following table documents the completion of project milestones.

Table 19. *Study timeline and milestones*

Month	Milestone
March 2013	Submitted IRB proposals for pilot and full study
April 2013	IRB approval granted
June 2013 – August 2013	Piloted epistemic actions coding scheme
September 2013	Course began
November 2013 – January 2014	Conducted interviews
April 2014	IRB renewed
January – July 2014	Completed quantitative content analysis Completed quantitative analysis Completed case analysis

Summary

I began this chapter by describing the rationale for my research design, a convergent parallel mixed methods approach, followed by background on my study's context, how I obtained access to my study site, and my development of purposive sampling criteria to select the course that is the subject of this study. I detailed the nature of the course selected for this study and described how it was illustrative of the curricular and instructional design challenges that face nursing educators who wish to implement online learning to provide RN to BSN students with the collaborative knowledge construction skills needed for their academic and professional work.

I also described in detail the nature of the online collaborative team project which is the locus of this study, and its purpose in making visible both the product and processes of knowledge creation in Paavola and Hakkarainen's trialogical model of learning (2005) as it relates to the development of SEA viewed through epistemic and regulative actions. In terms of instructional design to support SEA, I outlined the six project tasks that provide the foundation for the team final project, how each was designed to support the development of this concept, as well as the student instructions and related course documents used to guide each team's work.

To address the frequently isolated and disconnected nature of collaborative knowledge construction activities offered through LMSs (Lakkala et al., 2009), I examined the affordances of using the native wiki feature found in the Moodlerooms LMS to contribute greater coherence and flexibility as students move between a variety of project tasks.

I outlined my proposed data sources and data analysis methods and described how each contributed to my convergent parallel mixed methods design. To conclude this chapter, I reviewed considerations related to my study's validity, ethics, and limitations, and detailed my study's timeline.

Chapter 4 Quantitative Content Analysis Results

In my previous chapters, I described the focus of this study in exploring the role of instructional design in shaping the development of shared epistemic agency (SEA) over time, when RN to BSN students work in teams to complete a six week long collaborative project in an online course. In Chapter Two I examined the theoretical underpinning of SEA as advanced by Damşa et al (2010) and provided a literature review related to several important instructional design aspects of this construct: temporal considerations, instructor role, the use of wikis for knowledge construction activities and team contracts. Chapter Three detailed my mixed methods convergent research design, in which I employed quantitative content analysis of student discourse as well as thematic analysis and case analysis to present an in-depth understanding of how SEA developed among the members of two teams as a result of their six week collaboration to complete their final projects.

The purpose of this chapter is to report on two strands of content analysis research which were used to measure the two main dimensions of SEA within each team. The first examined epistemic actions (EA) which are indicators of purposeful agentive activity which students used to support their collaboration in the production of shared knowledge objects. The second used learning presence (LP), an established measure of online learner self- and co-regulation (Shea et al., 2012; Shea et al., 2013; Shea et al., 2014), as a more detailed proxy for Damşa's regulative actions. This data was analyzed to answer my first research question: *What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?*

Epistemic Actions Coding

For Team B, 314 postings, which were extracted from the dedicated discussion areas associated with the team's project and their three chat sessions which formed the chronological record of student discourse, were read line-by-line. For Team C, there were 121 posts drawn from the discussions and one chat. In the initial phase of the coding process, we first identified the primary concepts that each team discussed and advanced in their discourse. These served as the conceptual building blocks that were used in the team's knowledge construction process and allowed us, during phase two of the coding process, to contextualize our decisions by tracing the advancement of specific topics within the team's discourse and their shared knowledge object: the plan of care.

Table 20. *Team B and C concepts identified in student discourse*

Team B Concepts	
A	Culture
B	Patient Education
C	Medication
D	Diet/Nutrition
E	Treatment Priorities
F	Labs
G	Physical Therapy/Exercise
H	Physical Exam
I	Risk Factors
J	Format of Care Plan
K	Presenting Patient as Real
L	Comorbidity/Anxiety
M	Pamphlet
N	Insurance

Team C Concepts	
A	Medication
B	Education to Prevent Symptoms
C	Medication Plan and Education
D	Family History and Physical Exam
E	Plan of Care
F	Nutrition
G	Mexican Culture
H	Psycho-social Concerns
I	Barriers to Education

During this second phase we examined every sentence within a posting to determine if an indicator was applicable from one of the four epistemic actions categories: creating

awareness (CA), alleviating lack of knowledge (ALK), creating shared understanding (CSA), or generative collaborative actions (GCA).

Inter-rater Reliability

Using Holsti's coefficient of reliability (CR), the initial inter-rater reliability (IRR) for Team B was 0.93. Following negotiation of disagreements and the correction of transcription errors, the final IRR was .99. For Team C, IRR for initial coding was .96 and 1.00 for negotiated. For exploratory research, an IRR of 0.70 is considered acceptable (Lombard, Snyder-Duch, & Bracken, 2002). See table 21 below.

Table 21. *Initial and negotiated inter-rater reliability using Holsti's coefficient of reliability for epistemic actions*

Holsti's Coefficient of Reliability		
	Initial (CR)	Negotiated (CR)
Team B	.93	.99
Team C	.96	1.00

Results

Results are presented in the following order: statistical significance, followed by broad team comparisons, detailed team results, and within-team comparisons.

Chi-square Test of Independence

The results of this test found a significant association between the teams and the frequency of their epistemic actions in each of the two week segments of their team project, X^2 (2, N= 82) = 8.23, p = 0.016.

Team Comparison: Epistemic Actions Density

Looking across the six weeks of the team project, the students in Team B appeared to interact with each other more frequently (314 postings), but their discourse yielded less evidence of epistemic actions indicators when compared to students in team C, who

interacted less often (121 postings). Furthermore, although Teams B and C had comparable total counts of EA indicators, 44 and 38, respectively, density measures, i.e., the ratio of total postings to total EA indicators, were much lower with .14 for Team B compared to .31 for Team C.

Team Comparison: Distribution of Epistemic Actions Indicator Frequencies by Category

Figure 6 below shows that the distribution of EA categories was not consistent between the two teams. Most notably, Team C's largest concentration of indicators was in the generative collaborative actions (GCA) category, accounting for 45% of the team's actions, compared to just 18% for Team B. If we accept that the underlying structure of the epistemic actions coding scheme represents progressive phases of higher levels of cognition in the knowledge construction process, it is clear that Team C performed at a higher level than Team B.

Figure 6. *Team comparison: Distribution of epistemic actions frequencies by category*

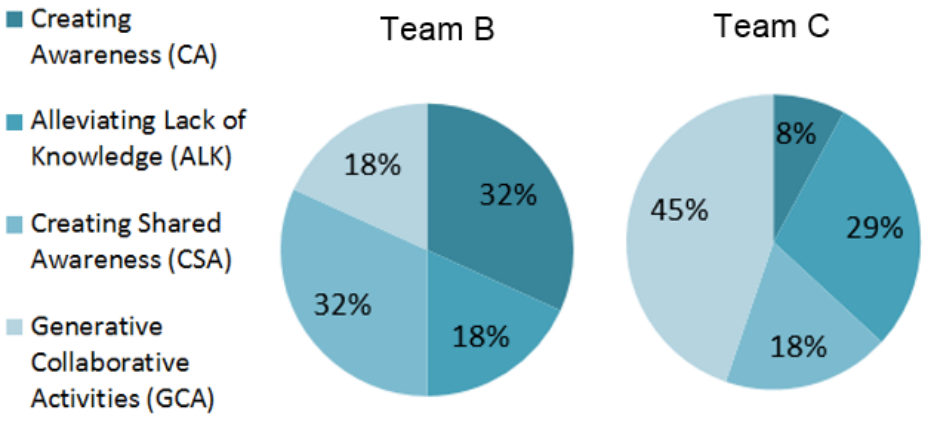
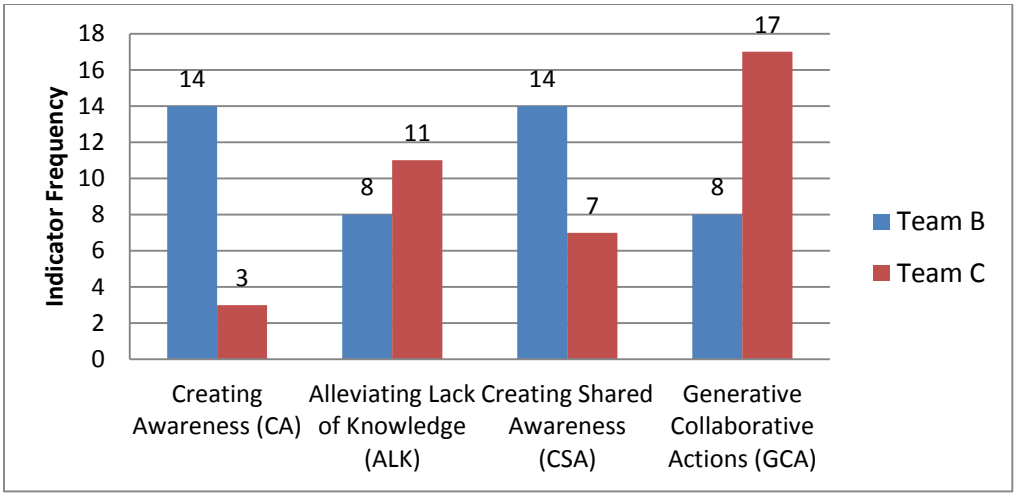


Figure 7 shows that in the creating awareness (CA) category, Team B exceeded Team C by a ratio of nearly 5:1. For Team B, approximately half of these postings were associated with identifying a lack of knowledge in the various subject disciplines connected

with the interviews conducted with health care specialists. The other postings were classified as identifying knowledge-related problems that were likely to have a negative impact on the team's outcome if not resolved. Many of these concerns were related to Team B's need to find ways to incorporate information related to earlier versions of their individual care plans that were not patient-focused. In contrast, the majority of Team C's creating awareness occurrences were focused on trying to get a solid initial understanding of the project guidelines at the onset of the project.

Figure 7. *Team comparison: Epistemic actions frequency by category*



For the alleviating lack of knowledge category (ALK), Team B totaled eight occurrences. Because the team posted the text of their interviews in their discussion area, relevant sections of these interviews were coded as examining a given[9] source or as beginning efforts to structure new concepts when students relied upon the presentation of factual information. Team C followed a similar pattern but had slightly more with 11

[9] Given source refers to materials that are directly assigned or provided to the team. In this instance the team interviews were a required learning activity.

occurrences in all, based on the decision of the team to collect additional information, from places such as web sites and consumer health promotion materials that were targeted to children and families, to share with their assigned patient: an overweight Hispanic youth with asthma.

The epistemic actions that comprised the creating shared understanding (CSU) category helped the team move toward a common understanding of concepts as they advanced their collaborative knowledge construction efforts to create their shared knowledge object: the team's plan of care. Team B had twice the creating shared understanding (CSU) occurrences as Team C. Both teams also had similar patterns among creating shared understanding (CSU) indicators relating to sharing information from sources and sharing ideas and knowledge, as evidenced by postings that explored different approaches to care plans and ideas for incorporating the instructor's requirement for creativity.

Yet unlike Team C, Team B had several postings in the December 2 chat where they spent considerable time discussing misunderstandings, which were the result of the team's earlier mistaken interpretation of the project instructions to develop an APA paper instead of a patient-centered interdisciplinary plan of care. Although Table 17 shows that Team B's creating shared understanding (CSU) discourse generated 14 concepts, many were not taken up by the team or fully developed at the generative collaborative actions (GCA) level. In contrast, Team C generated only seven concepts, but demonstrated more active engagement in the knowledge creation process, and as a result, made their care plan both more patient-centered and incorporated more health promotion elements.

The generative collaborative actions (GCA) category encompassed intentional and productive actions that contributed to and supported the development of the concepts that comprised the team's shared knowledge object. Team B had only 8 occurrences compared to 17 for Team C, and these were restricted to the team's need to rework its care plan based on their instructor's feedback. Most of these indicators were concentrated in the team's eventual awareness that they needed to reframe their prior care plan to become more patient-focused.

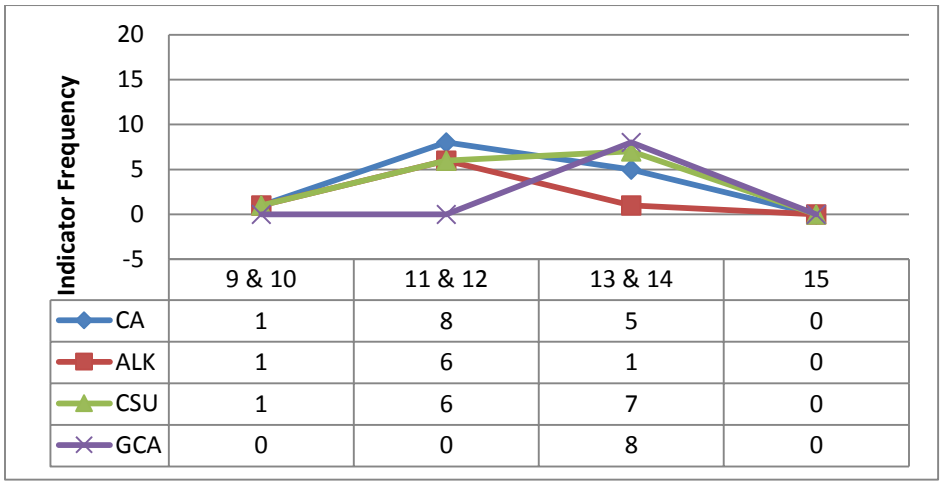
Team C's generative collaborative actions (GCA) indicators were concentrated among the first three indicators in this category and involved generating new ideas, negotiating new ideas, and engaging in collaborative uptake of ideas. In their knowledge construction process, Team C used these actions to draw connections between many of the concepts provided in Table 17. As a result, their care plan was better developed and integrated, particularly in connection with the concepts they chose to work with in their shared knowledge object.

Team B: Epistemic Actions Indicator Frequency over Duration of Project

Figure 8 below shows that Team B's overall distribution of EA indicators was considerably truncated, with no indicators present in the team's discourse for either week 9 or 14. This indicated that the team got off to a delayed start and stopped engaging in epistemic actions after week 13, a full week prior to the submission date for their plan of care, which was due at the start of week 15. As a result, most of the team's EA indicators were clustered within weeks 11 through 14, when the team scheduled two of its three chat sessions.

Indicators for the creating awareness (CA) category (Figure 9) increased steadily over this four week span, and represented two areas of discourse. The first related to a group of postings that were coded as identifying a lack of knowledge, as many new concepts were introduced through the summaries of the team's interviews which were posted within the discussion area. See Table 17 for concept list. The second related to the team's extended efforts to make sense of the project guidelines during week 12, and the need to rework their existing information once the instructor clarified the purpose of the care plan during week 13. All of these postings were coded as identifying a problem.

Figure 8. *Team B: Comparison of epistemic actions indicators by project weeks*

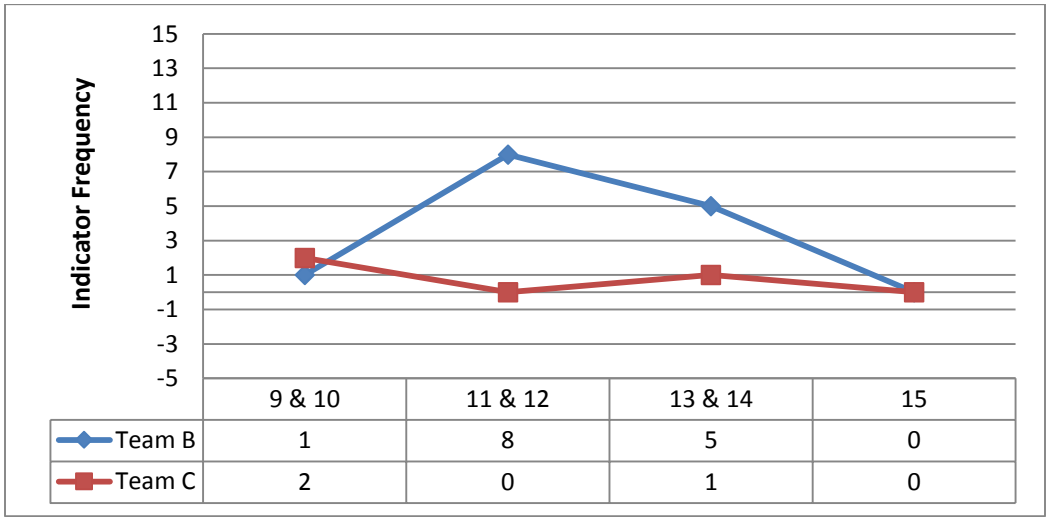


	9 & 10	11 & 12	13 & 14	15
CA	1	8	5	0
ALK	1	6	1	0
CSU	1	6	7	0
GCA	0	0	8	0

The alleviating lack of knowledge (ALK) category paralleled creating awareness (CA) for the first four weeks, but declined after week 12. See Figure 10 below. Most of these postings were categorized as structuring new concepts, and were related to the team's efforts to articulate these concepts through literal use of facts that were taken directly from the text of the interviews described above.

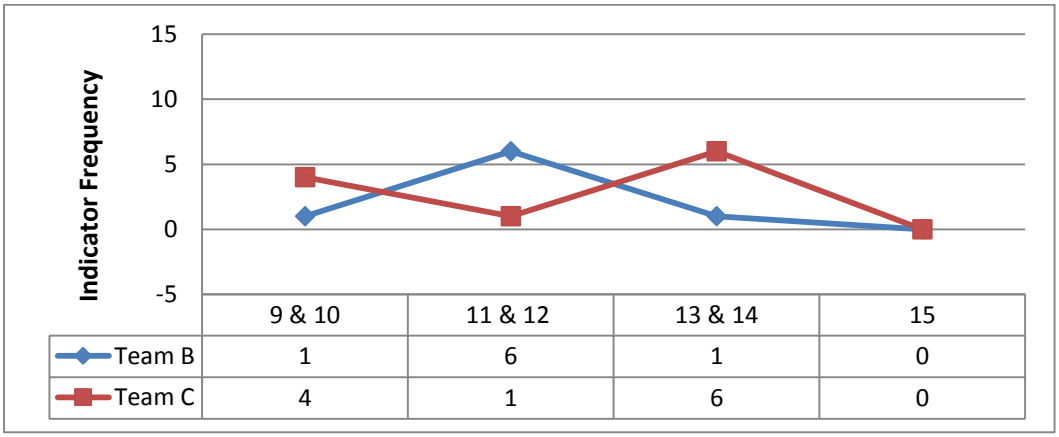
The drop off of alleviating lack of knowledge (ALK) indicators appeared to be the result of a shift as the team tried to develop a common understanding of the concepts they believed would be most relevant to their plan of care. They attempted this by sharing information from sources and sharing ideas and knowledge, although as described previously, only a subset of the original 14 concepts were taken up and elaborated.

Figure 9. *Team comparison: Creating awareness (CA) indicators by project weeks*



	9 & 10	11 & 12	13 & 14	15
Team B	1	8	5	0
Team C	2	0	1	0

Figure 10. *Team comparison: Alleviating lack of knowledge (ALK) indicators by project weeks*



	9 & 10	11 & 12	13 & 14	15
Team B	1	6	1	0
Team C	4	1	6	0

The team also devoted considerable time during the two chats held during weeks 11-14 to discussing their misunderstandings of the project. This discourse accounted for a large number of creating shared understanding (CSU) indicators in Figure 11.

Figure 12 shows that evidence of generative collaborative actions (GCA) indicators did not occur until the latter half of the project during week 13, when Team B was required to rework their approach to their care plan to take into account the broader social and cultural dimensions of the patient. In addition, very few of the concepts that the team had identified earlier were advanced by the team by generating or negotiating new ideas. The only evidence of collaborative uptake of ideas was limited to the team's realization they had misunderstood the project's instructions and in their reframing of their prior knowledge objects to reflect a patient-centered focus.

Figure 11. *Team comparison: Creating shared understanding (CSU) indicators by project weeks*

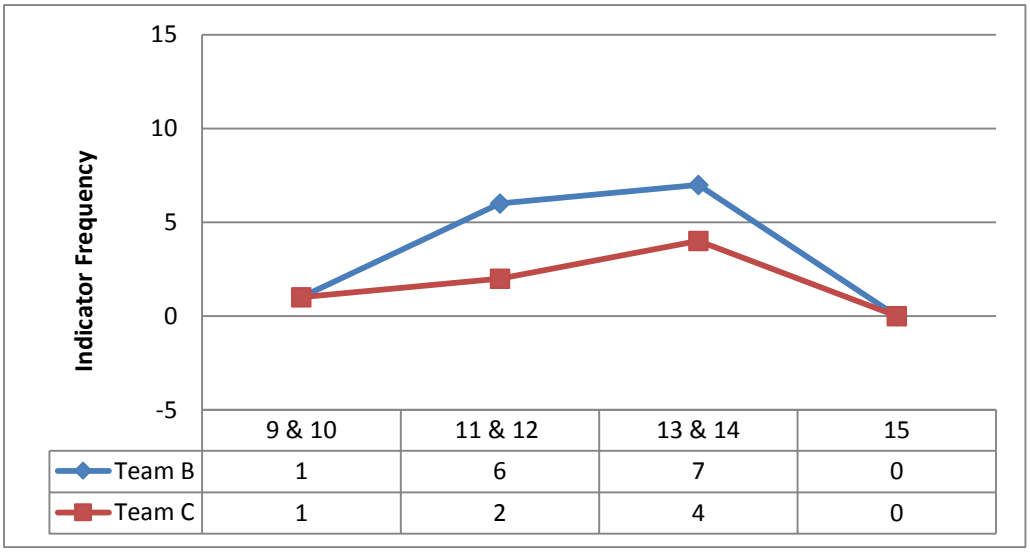
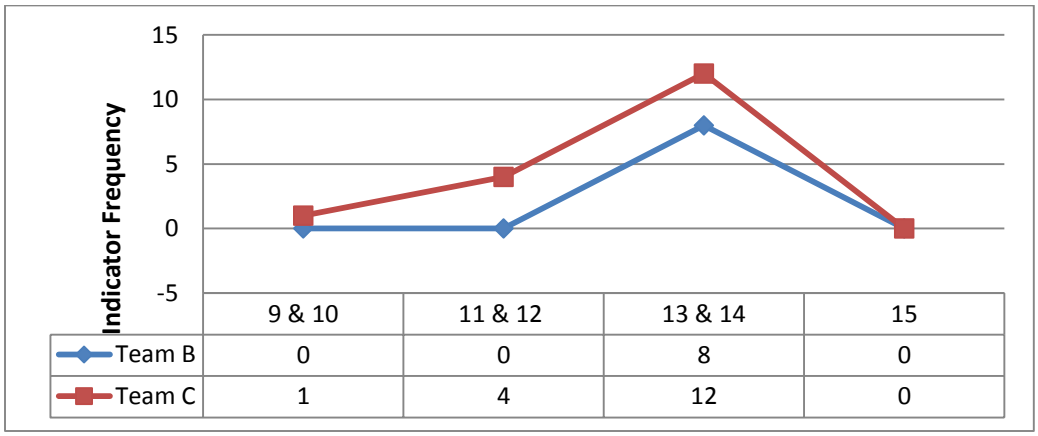


Figure 12. *Team Comparison: Generative collaborative actions (GCA) indicators by project weeks*



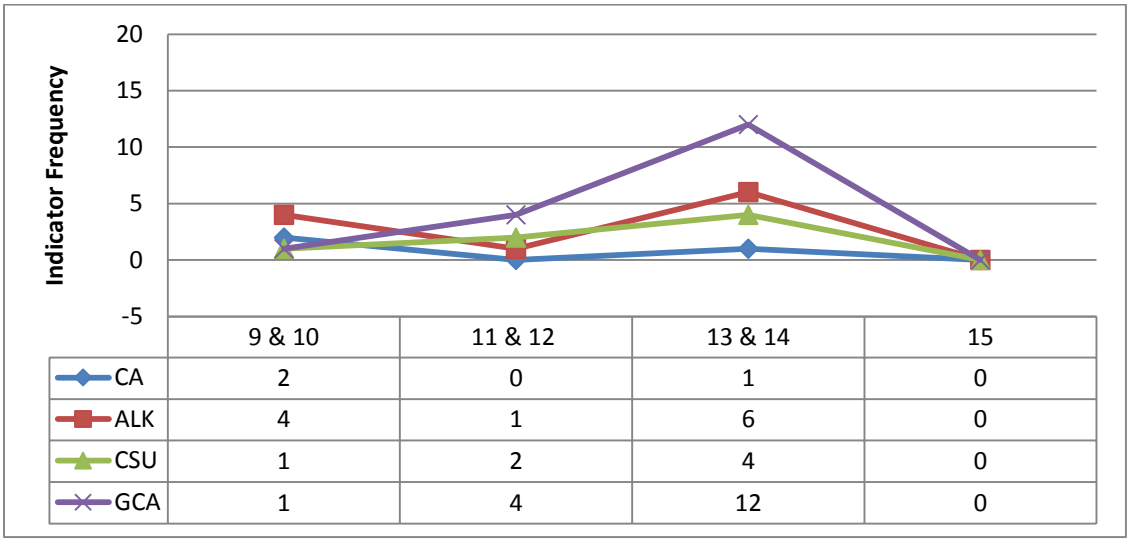
	9 & 10	11 & 12	13 & 14	15
Team B	0	0	8	0
Team C	1	4	12	0

Team C: Epistemic Actions Indicator Frequency over Duration of Project

Figure 13 shows that during the first four weeks of their project, Team C demonstrated low levels of creating awareness (CA) and creating shared understanding (CSU) indicators. It was during this period that the team worked on their contract, discussed and conducted their interviews, and began developing their plan of care. Two notable exceptions were a small jump in alleviating lack of knowledge (ALK) indicators at the start of the interviewing assignment during weeks 9-10, and a similar increase in generative collaborative actions (GCA) during weeks 11-12.

Although creating awareness (CA) indicators were generally low throughout the project, indicators in this category rose slightly during weeks 9-10. See Figure 9 above. This was attributed to the team's efforts to create awareness by identifying specific information needs as they began to think about how they might approach their interviews. As the team entered the final two weeks of the project, all of the remaining epistemic actions categories posted a dramatic increase.

Figure 13. *Team C: Comparison of epistemic actions indicators by project weeks*



	9 & 10	11 & 12	13 & 14	15
CA	2	0	1	0
ALK	4	1	6	0
CSU	1	2	4	0
GCA	1	4	12	0

The increases in alleviating lack of knowledge (ALK) indicators appeared to be the result of the team's need to discuss and add new educational resources targeted to the assigned patient and his family. The increases in creating shared understanding (CSU) indicators during weeks 13-14 (Figure 11 above) were related to discussions on how to best organize and present the educational materials selected for the patient and his family.

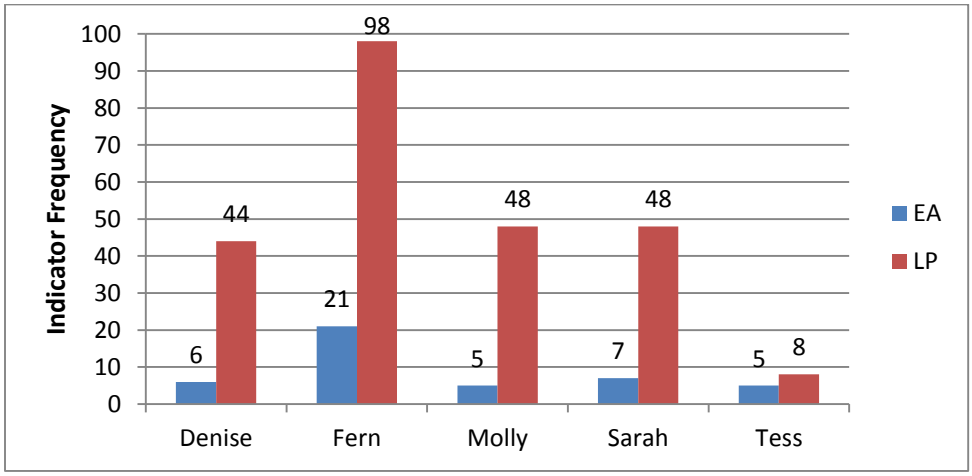
Perhaps most striking was the spike in generative collaborative actions (GCA) indicators during weeks 13-14 (Figure 12 above). These actions were grounded in the generation of new ideas and further development of previously introduced concepts as they were taken up by others on the team and were further elaborated and refined. For example, the team devised important narrative details about the patient's family which they used to enrich the care plan. The team also discussed how to manage Manny's exposure to secondhand smoke from his grandfather, a heavy smoker, who lived with the family. As a result, they added several smoking cessation resources in Spanish for the grandfather's use. In another example, Tess obtained information from Wal-Mart and Target on the pricing of generic asthma medications, including eligibility requirements and application materials.

She also developed a customized chart for Manny's height and weight for his use with a peak flow meter to monitor his breathing. These tools were intended to guide the patient and his family in determining whether it was necessary to seek further treatment.

Within Team Comparisons

Team B: Epistemic actions indicators by student. Figures 14 and 16 illustrate that Fern demonstrated the highest levels of epistemic actions within her team, with 21 occurrences. This is consistent with her role as perceived team leader. Sarah ranked far behind with seven, followed by Denise with six, and Molly and Tess with five each. It should be noted that Tess's results were lower than the rest of her team because she was unable to attend the three team chats.

Figure 14. *Team B Students: Comparison of epistemic actions and learning presence*



Team C: Epistemic actions indicators by student. Figures 15 and 17 show that Crystal and Samantha, who generated the largest EA frequencies, had 15 and 12, respectively. They were followed by Pat with seven and Althea with four. Althea's low frequency count is notable because during the interviews with her team she was identified

as the team's leader, but it appears that her contributions were not focused on advancing or deepening the team's knowledge.

Figure 15. *Team C students: Comparison of epistemic actions and learning presence*

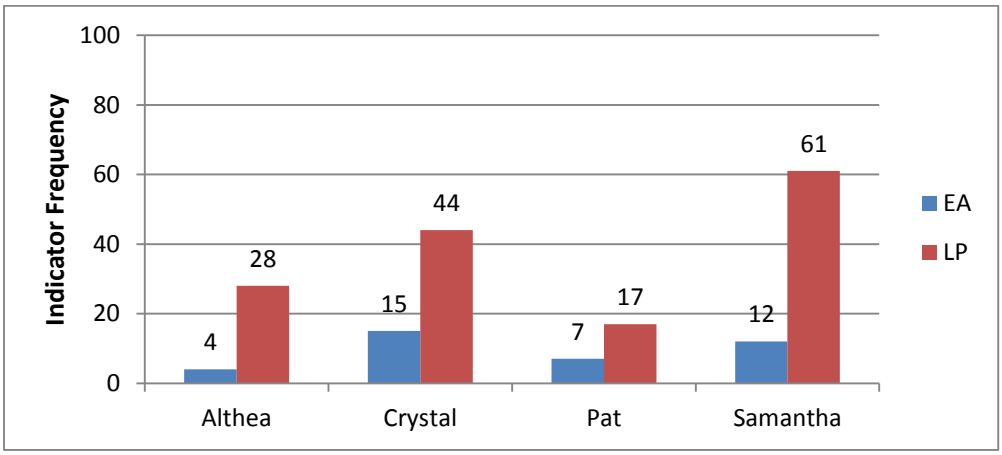
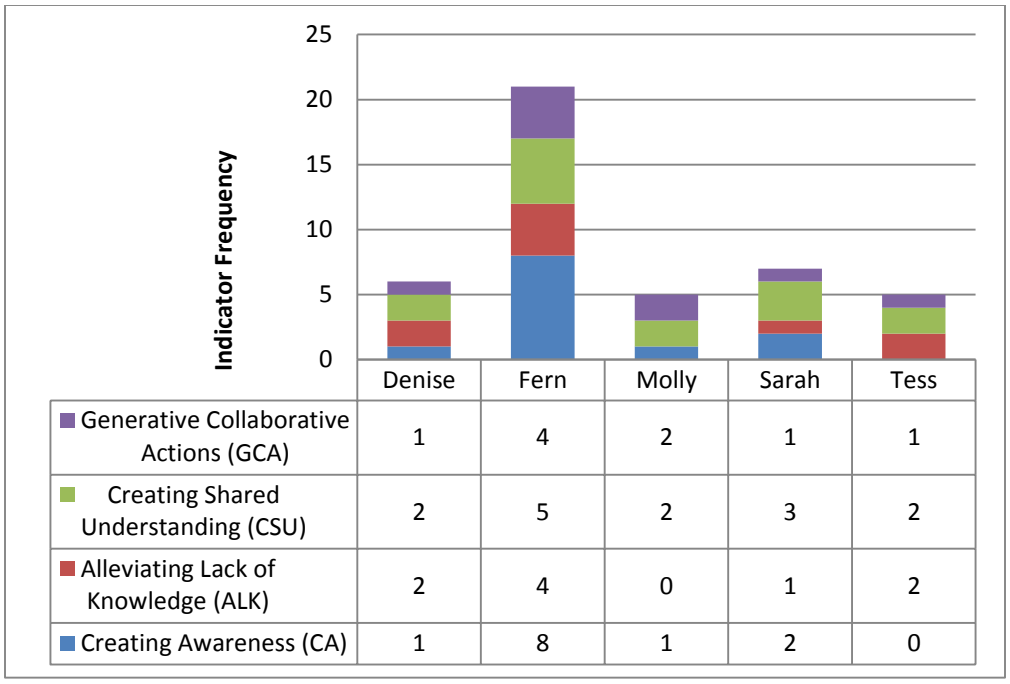
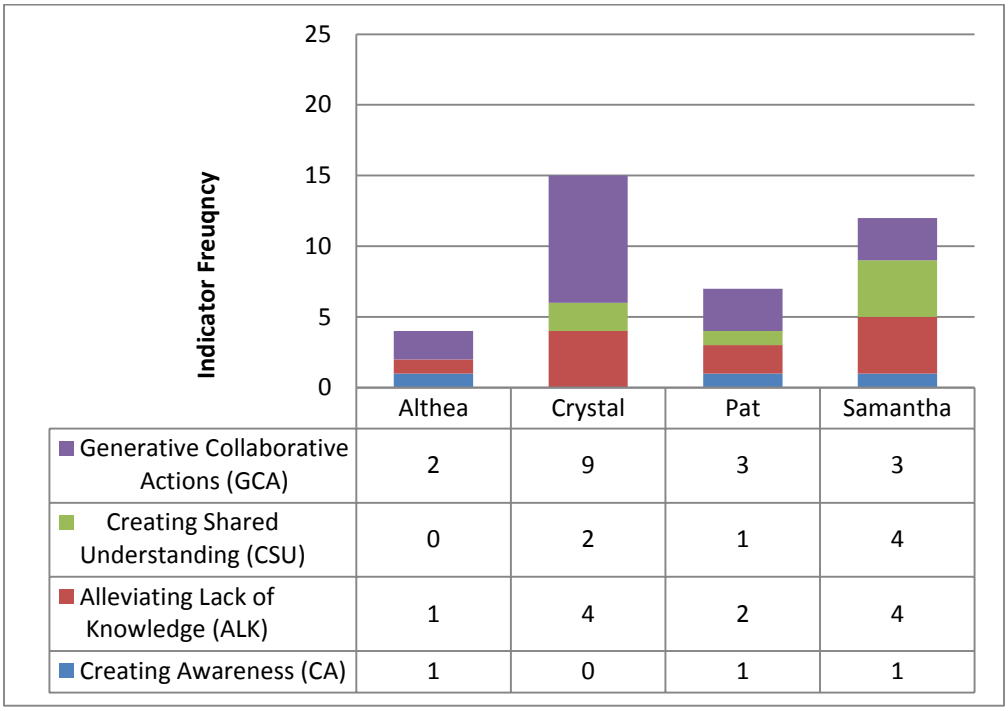


Figure 16. *Team B students: Distribution of epistemic actions indicators*



	Denise	Fern	Molly	Sarah	Tess
Generative Collaborative Actions (GCA)	1	4	2	1	1
Creating Shared Understanding (CSU)	2	5	2	3	2
Alleviating Lack of Knowledge (ALK)	2	4	0	1	2
Creating Awareness (CA)	1	8	1	2	0

Figure 17. *Team C students: Distribution of epistemic actions indicators*



	Althea	Crystal	Pat	Samantha
Generative Collaborative Actions (GCA)	2	9	3	3
Creating Shared Understanding (CSU)	0	2	1	4
Alleviating Lack of Knowledge (ALK)	1	4	2	4
Creating Awareness (CA)	1	0	1	1

Epistemic actions summary and discussion. For this exploratory study I developed a contextualized coding scheme to measure epistemic actions among two teams who were tasked to develop a patient-centered care plan that was focused on health promotion as part of a six week long final project. Although both teams did exhibit all four categories of epistemic actions, the distribution of indicators within each team showed considerable variation at the aggregated project level, over time and among the members of each team.

Team B, which appeared to compress its knowledge construction efforts into just four weeks, started the first two weeks slowly, as evidenced through its low levels of EA indicators. Furthermore, the team showed a pattern of increasing creating awareness (CA) indicators during the second two weeks that were related to their lack of knowledge in

specific subject disciplines connected with their interviews and the need to identify knowledge-related problems requiring resolution in order to move forward. Although during the two final weeks the team had progressed to actions that supported creating shared understanding (CSU), these efforts were spent remedying their misunderstandings of the project instructions.

Given the time they devoted to this, Team B was unable to develop sufficient momentum to sustain generative collaborative actions (GCAs) to explore concepts and negotiate new ideas because they were focused on trying to reframe their earlier care plans to align with their instructor's feedback. Another telling indicator was the low density of epistemic actions indicators (.14) per total postings, indicating that the team, while posting twice as often as Team C, was much less productive in their knowledge construction process. Lastly, a comparison across categories of EA indicators revealed that the students in Team B generated more frequencies in the categories associated with lower levels of knowledge creation.

Team C, on the other hand, had fewer total posts and exhibited a much higher epistemic actions density (.31). This may have been the result of the members engaging in more productive knowledge construction discourse over the full six weeks of the project. Equally important was the team's early demonstration of generative collaborative (GCA) indicators at mid-project and its peak during the final two weeks. Furthermore, the total number of these indicators outranked those found in all the other epistemic actions categories, providing further evidence of Team C's higher levels of sustained knowledge construction.

Even though each group had recognized leaders, the contributions of these students to the knowledge construction efforts of their respective teams were very different. Fern, the acknowledged leader of Team B, had the greatest number of EA indicators relative to her peers. But despite her efforts, the team lost valuable time that could have been spent exploring more deeply the concepts they identified in their discourse (Table 20) because they misunderstood the nature of their assigned project. This stands in contrast to Team C where two students, Crystal and Samantha, each contributed to advancing and deepening the team's knowledge and understanding of the concepts they incorporated into their care plan.

Why was Team C so much more effective than Team B in their knowledge construction process? One contributing factor may have been the more modest but consistent number of creating awareness (CA), alleviating lack of knowledge (ALK) and creating shared understanding (CSU) indicators generated over the early weeks of the project which contributed to establishing a firm foundation for using generative collaborative actions (GCA) actions to arrive at higher level discourse. In contrast, Team B's slow start and misdirected efforts during the first half of the project resulted in a significant disruption at the start of week 13. At that point they were faced with having to shift their plan. The resulting need to revisit prior decisions and decide upon a new focus for their care plan meant that Team B ultimately spent less time advancing, developing, and integrating the concepts they had identified through their discourse into their brochure.

Learning Presence Coding

As described previously, I chose the LP coding scheme, which has been used with repeated success to measure self- and co-regulation in online learning, as a more detailed proxy in lieu of developing a coding scheme based on Damşa et al.'s regulative actions (Shea et al., 2012, Shea et al., 2013; Shea et al., 2014). Team B's 314 postings were read line-by-line. They were extracted from the dedicated discussion areas associated with the team's project and their three chat sessions which formed the chronological record of student discourse. For Team C, there were 121 posts drawn from the discussions and one chat.

During this second phase, we examined every sentence within a posting to determine which indicators were applicable from one of the four LP categories: forethought and planning (FP), monitoring (MO), strategy use (SU), or reflection (RE).

Inter-rater reliability

Using Holsti's coefficient of reliability (CR), initial inter-rater reliability (IRR) for Team B was 0.77. Following negotiation of disagreements and the correction of transcription errors, final IRR was 1.00. For Team C, the IRR for initial coding was .79 and 1.00 for negotiated. Neuendorf (2002) considers an IRR of 0.70 to be reliable, although .80 is preferred by other researchers (Lombard, Snyder-Duch, & Bracken, 2002). See Table 22.

Table 22. *Initial and negotiated inter-rater reliability using Holsti's coefficient of reliability for learning presence*

Holsti's Coefficient of Reliability		
	Initial (CR)	Negotiated (CR)
Team B	.77	1.00
Team C	.79	1.00

Results

My presentation of results begins with statistical significance, followed by broad team comparisons, detailed team results, and within-team comparisons.

Chi-square test of independence

The results of this test found a significant association between the teams and the frequency of their regulative actions measured as LP in the combined weekly segments of their team project, X^2 (3, N= 396) = 56.52, $p < 0.00001$.

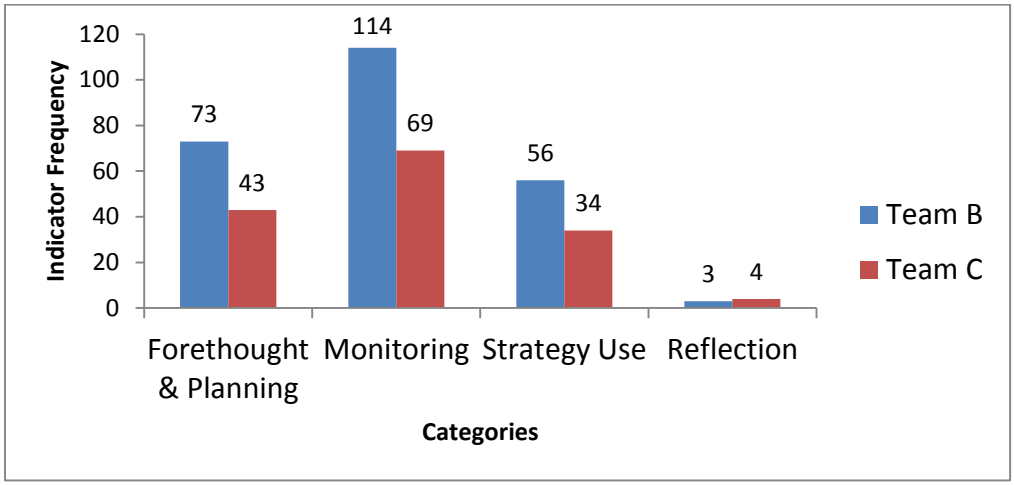
Team Comparison: Learning Presence Density

Looking across the six weeks of the team project, the students in Teams B and C had very high densities of LP relative to the total number of postings for each group. Although Team C had only a total of 121 posts, there were 1.24 LP indicators for every posting made by the team. Team B, which had an even higher level of interaction with 314 posts, had a relative lower density of .78.

Team Comparison: Distribution of Learning Presence Indicator Frequencies by Category

Figure 18 illustrates a comparison of the total frequency counts of the four LP categories found in student discourse. Team B with 246 indicators exceeded Team C's 150 in all areas except reflection. Therefore, it might initially be concluded that Team C, with just 60% of Team B's total LP indicators, demonstrated significantly lower levels of forethought and planning, monitoring, and strategy use.

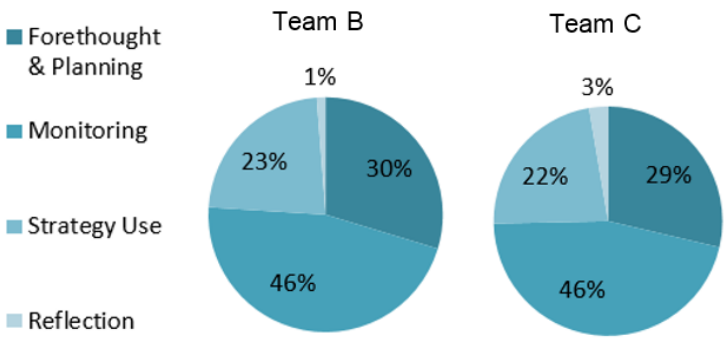
Figure 18. *Team comparison: Learning presence frequency count by category*



However, Team C's much higher LP density of 1.24 versus Team B's .78 was likely the result of two differences between the teams. First, Team B had higher levels of interaction as a result of the three chats that the team scheduled for its project, compared to Team C which relied largely upon its discussion area. Unlike a threaded discussion, which is asynchronous and allows for responses to occur over a period of days or weeks, a chat takes place in real time and is often characterized by several simultaneous conversations. Second, Team B was faced with a mid-project correction when their instructor informed them that their project did not align with her instructions. As a result, the overall volume of Team C's discourse was considerably smaller than Team B's, which used both communications media for its project.

Yet despite this difference, Figure 19 shows that the distribution of indicators by category was nearly identical in each team. Monitoring accounted for 46% of all LP indicators, followed by forethought and planning with approximately 30%, strategy use with approximately 23%, and reflection in the 3% range. The section that follows provides selected examples of how each team demonstrated LP in these areas.

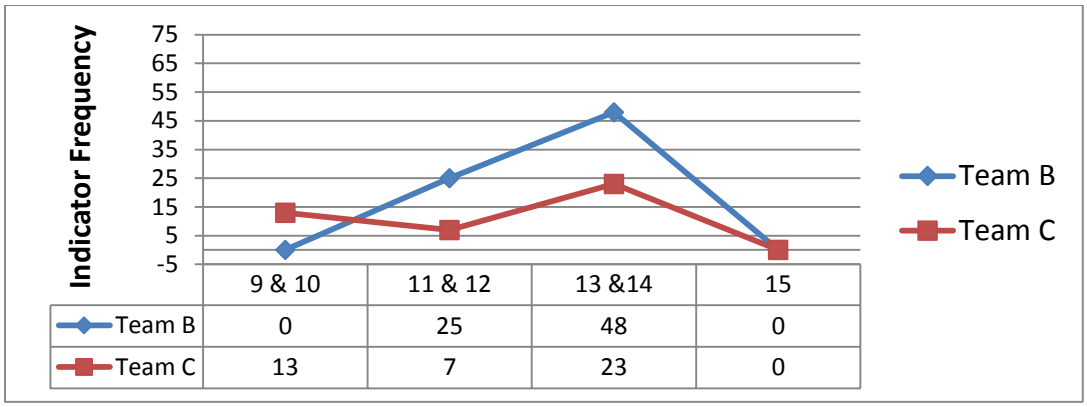
Figure 19. *Team comparison: Distribution of learning presence frequencies by category*



Team Comparison: Forethought and Planning. Both teams spent considerable effort pursuing actions that were focused on organizing their project in terms of establishing goals and tasks and assigning them for completion. Figure 20 below shows that Team C began with slightly higher levels of forethought and planning (FP) during the first two weeks, compared to Team B. Although Team B did exceed Team C during weeks 11 and 12, both teams peaked thereafter.

Although the teams had different trajectories, they made similar use of planning. The following posting from Pat illustrated a typical example of the FP-2 code for planning: "We need to decide what [the interview] questions will be and how many" (Team C, posting 7). Students on both teams frequently assigned tasks to themselves or others (FP-3). In this example Sarah inquired of Molly: "Can you do diet since I interviewed a PT [physical therapist] and then I can focus on exercise" (Team B2, posting 41). It is interesting to note that although each team did complete a contract, there were still many statements that illustrated forethought and planning. This was especially evident in Team B's discourse. Even with a contract that included many specific planning decisions and task assignments to individuals, the team still needed to discuss many of the practical aspects of these decisions.

Figure 20. *Team comparison: Forethought and planning (FP) indicators by project weeks*



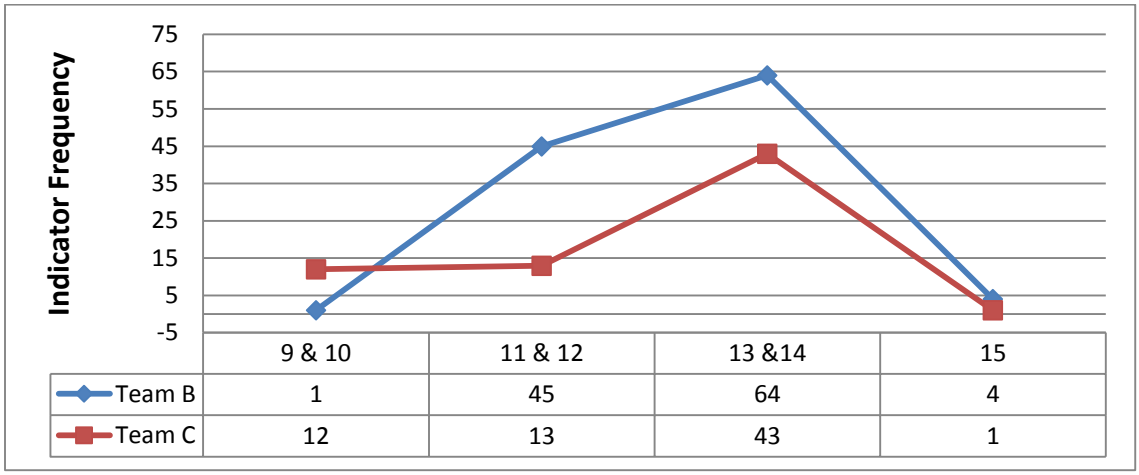
	9 & 10	11 & 12	13 &14	15
Team B	0	25	48	0
Team C	13	7	23	0

Team Comparison: Monitoring. Figure 21 shows that Team B increased its monitoring actions during weeks 11 and 12, exceeding Team C. This may have been the result of the density of interaction found in Team B's chats, which was further supplemented by their discussion posts. Overall, Team C did have lower levels of monitoring, but like Team B, this activity peaked during the last two weeks of the project.

The two teams also made extensive use of monitoring in several key areas. Students on both teams frequently sought to confirm their understanding of project instructions that the team discussed or agreed upon (MO-1), as seen this example at the start of the project when Pat asked, "My question is are we going to be given a new case study or are we going with the previous one about Manny?" (Team C, posting 3). They also routinely reported on problems that they had encountered (MO-2). In this example, Denise described difficulty using the MS Word Template that Team B had selected for their brochure: "…I am having issues opening everyone's brochure where they added information…" (Team B2, posting 147). Students on both teams also provided regular updates on their progress as they completed smaller tasks (MO-3): "I was able to interview a nurse who works at Stony Brook Hospital Med Surg floor who gave me some valuable insight on what is done when

there is a cultural barrier" (Team B1, Posting 1). Other common forms of monitoring related to statements about personal reactions to project activities or tasks (MO-6). In this example, Sarah described her concerns as the team neared their deadline: "I guess I was just nervous and want to be sure we didn't miss anything" (Team B2, Posting 169).

Figure 21. *Team comparison: Monitoring (MO) indicators by project week*

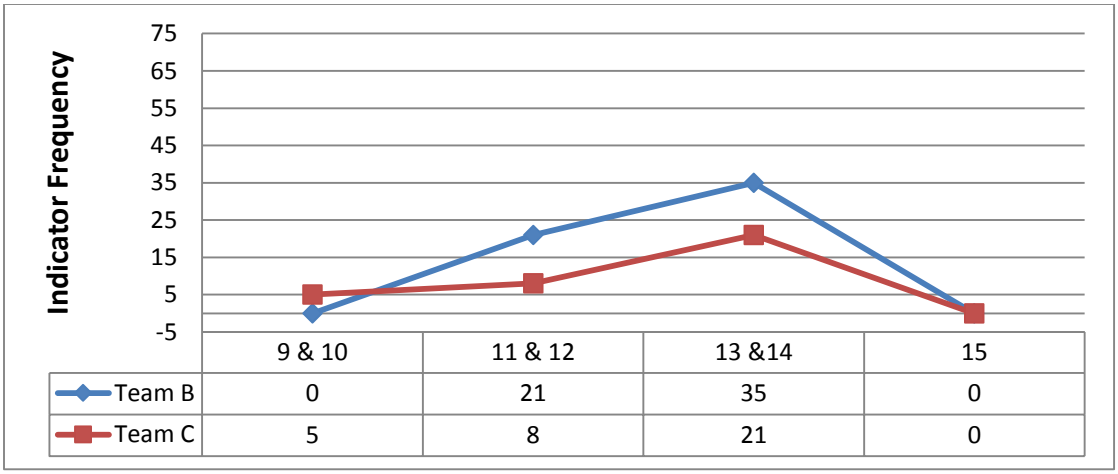


	9 & 10	11 & 12	13 &14	15
Team B	1	45	64	4
Team C	12	13	43	1

Less prevalent were statements where team members evaluated the quality of each other's contributions (M-04). In order to be assigned this code, students were required to include substantive explanations, evidence, or other forms of justification for their judgments (MO-4). In this example, Fern suggested to the team that their care plan "needs to be formatted better, for easier reading for the patient" (Team B2, posting 105). Least common were metacognitive forms of monitoring related to recognizing learning behaviors in one's self or the group (MO-7). Here, Samantha described to her team her use of a strategy (MO-9): "I think the interviews were a starting point to guide us through our research. I have been keeping my interview in the back of my mind the whole time while working on the care plan…" (Team C, posting102).

Team Comparison: Strategy Use. Strategy use (SU) refers to those conscious actions that learners use to help themselves complete a task or goal. Figure 22 illustrates that Teams B and C had similar bi-weekly distributions of strategy use (SU) indicators as seen previously in the forethought and planning (FP) and monitoring (MO) categories. In this pattern, Team B began slowly, and then exceeded Team C. Both teams peaked during the final two weeks of the project.

Figure 22. *Team comparison: Strategy use (SU) indicators by project weeks*



	9 & 10	11 & 12	13 &14	15
Team B	0	21	35	0
Team C	5	8	21	0

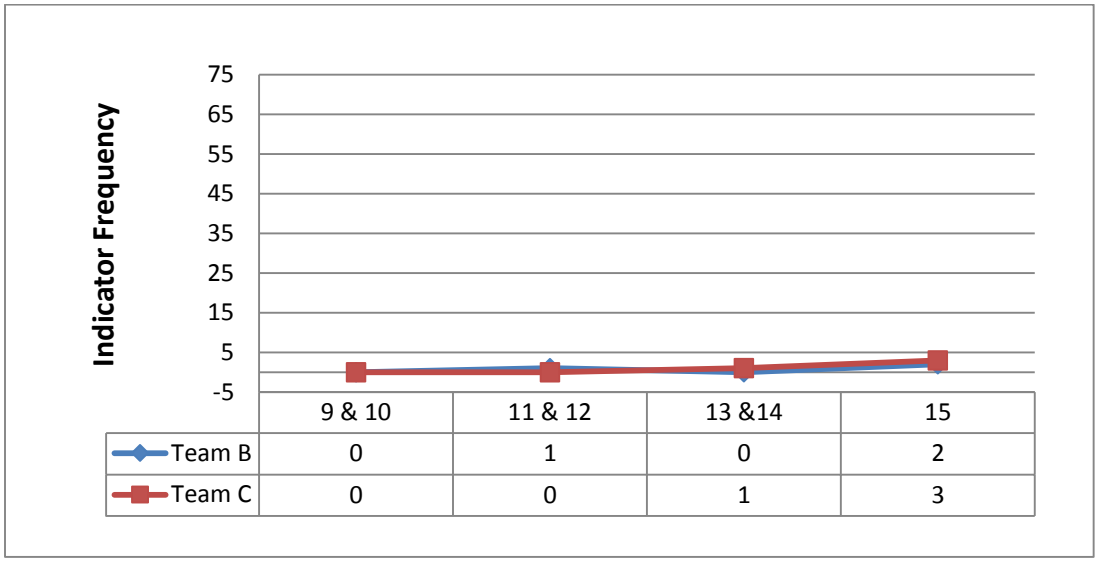
The strategy most commonly used within the two teams was that of seeking, offering or providing guidance or assistance (SU-1). Below, Pat from Team C, expressed her concern about finding someone to interview who was familiar with pediatric patients. Samantha provides some guidance in her response:

> Pat: "I work in home care, so I have access to Medical Social Workers, and Registered Dieticians, only ISSUE I see is that most of the clientele that these professions deal with are seniors…" (Team C, Posting 3)
>
> Samantha: "What about interviewing a social worker? They usually deal with all types of patients and families" (Team C. Posting 4).

The members of Team C made many references to reviewing or revisiting course content and instructions (SU-2) as seen in this example where Crystal explained: "I went back and read the instructions again" (Team C, posting 10). Team B's failure to do so resulted in the team's misunderstanding of the nature of their plan of care. The two remaining strategy use indicators were evidenced much less frequently. Noting outcome expectations (SU-3) relates to students acknowledging the relevance of the current task or process. In this example, Samantha explained: "I think interviewing the dietician will help us deal with his obesity as well as ways to address Manny's mother who seems to think that Manny is just "a healthy growing boy" (Team C, posting 6). In this excerpt Fern described how she made an adjustment in her strategy to remedy an approach that was not working (SU-4): "I was unable to format my part of the brochure properly to be presentable after multiple attempts. Instead of a brochure I made an educational flyer" (Team B2, posting 152).

Team Comparison: Reflection. Figure 23 shows that both teams demonstrated very modest levels of reflection, and only two examples were found prior to the closing weeks of their projects. In all, there were a total of seven examples of reflection found in both teams. Of this number, six were coded as causal attribution of results to personal or group performance (RE-2) rather than a conceptual change in thinking (RE-1). In the RE-2 examples, students from both teams expressed their beliefs that the success of their projects were the result of their teams working effectively together to overcome individual problems.

Figure 23. *Team comparison: Reflection (RE) indicators by project weeks*

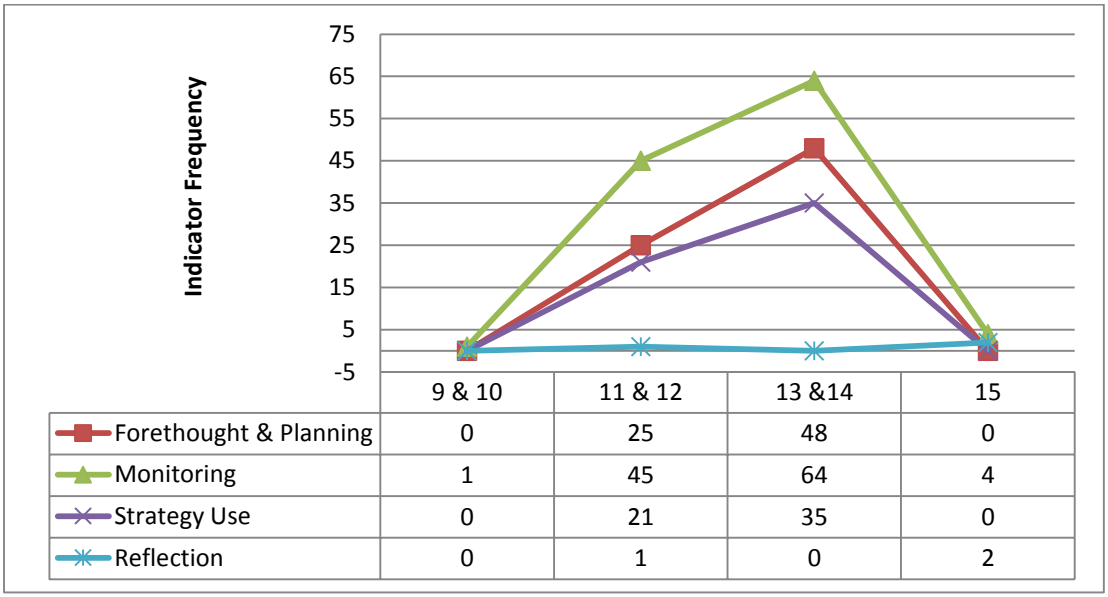


Team B: Learning Presence Indicator Frequency over Duration of Project

Figure 24 below shows that Team B had no LP activity during the first two weeks of the project in weeks 9 and 10. In contrast, in the middle weeks of the project during weeks 11 through 14, the team demonstrated its highest levels. A closer look at Team B's discourse revealed that despite their efforts to organize the project by assigning tasks and responsibilities through their contract, the team encountered a major setback on the first day of week 13 when the instructor communicated to the class that her project instructions called for an interdisciplinary plan of care based upon their interviews with other health care professionals, not an APA style research paper.

As a result, the team was forced to stop to determine whether they could modify their completed work-to-date or if they needed make a fresh start. The spike in subsequent LP occurrences during weeks 13 and 14 represented the team's intensive efforts to repair their misunderstanding of the project instructions.

Figure 24. *Team B: Comparison of learning presence indicators by project weeks*



	9 & 10	11 & 12	13 &14	15
Forethought & Planning	0	25	48	0
Monitoring	1	45	64	4
Strategy Use	0	21	35	0
Reflection	0	1	0	2

Team C: Learning Presence Indicator Frequency over Duration of Project

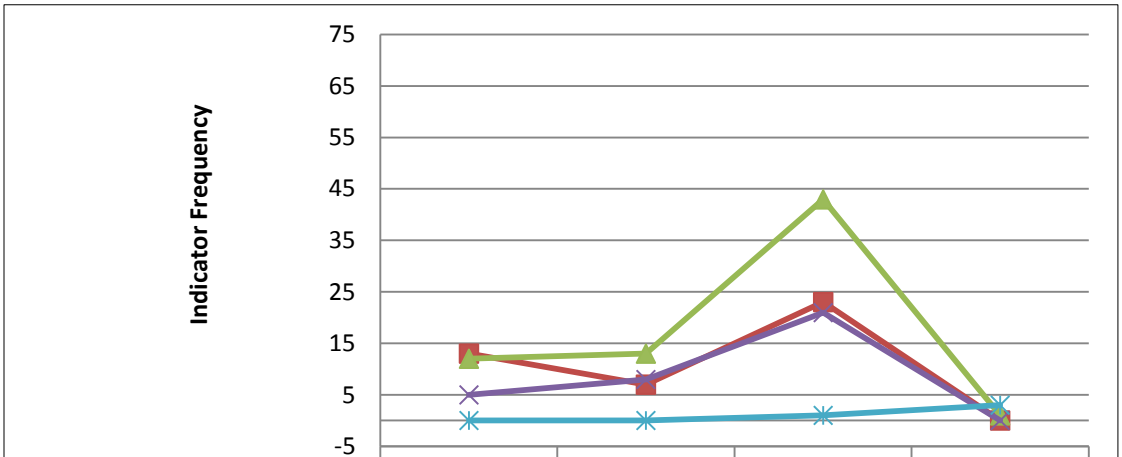
In contrast to Team B, Team C's regulative trajectory began promptly at the start of the project and continued in a steady and sustained way through weeks 11 and 12. See Figure 25. The team posted higher levels of monitoring and lower, but comparable, levels of forethought and planning (FP) and strategy use (SU). Yet, relative to Team B, all of the team's LP indicators were lower. Also contributing to this was the team's inactivity during week 12, the Thanksgiving holiday week when many of these students were working 12-hour shifts.

Within-Team Comparisons

Team B: Learning presence indicators by student. Figure 26 illustrates that Fern, with nearly 100 occurrences, far exceeded her team members on a scale of almost 2 to 1. This may have been the result of her role as facilitator of each of the team's three chat sessions where she took an active role posing a series of questions and summarizing the team's decisions. In comparison, Molly and Sarah had 48 occurrences, followed by Denise

with 44. Tess had only eight. These were concentrated in the team's discussion area because Tess was unable to attend the team chats.

Figure 25. *Team C: Comparison of learning presence indicators by project weeks*



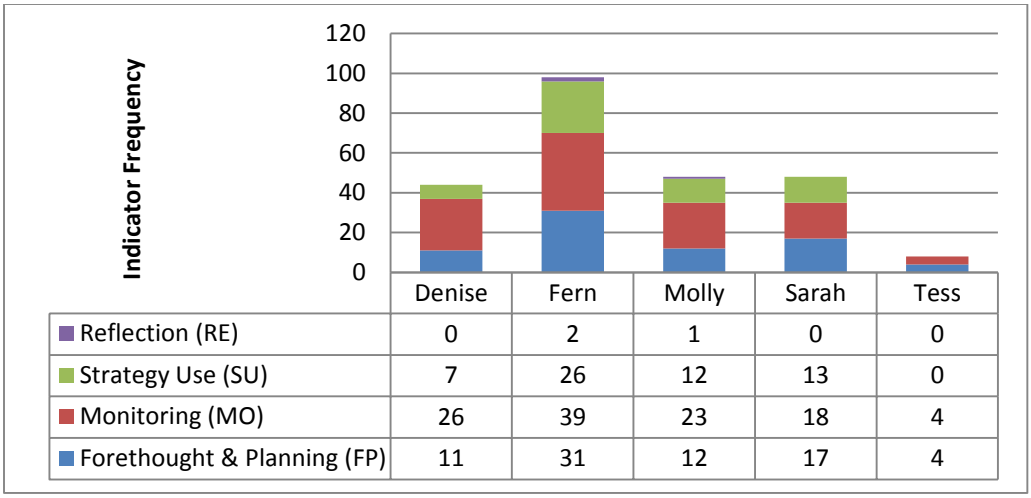
	9&10	11&12	13&14	15
Forethought & Planning	13	7	23	0
Monitoring	12	13	43	1
Strategy Use	5	8	21	0
Reflection	0	0	1	3

Figure 26 shows that Fern also ranked highest in her team based on the forethought and planning (FP) category with Sarah a distant second with about half of Fern's count. The same pattern was repeated in the monitoring (MO) and strategy use (SU) categories. Most notably, in Team B, there were only 3 occurrences of reflection. Fern was responsible for two, and one was from Molly.

Team C: Learning presence indicators by student. Figure 27 shows that Samantha had by far the largest number of LP indicators in her team with 61 indicators, followed by Crystal, who had two-thirds of her volume. Althea, the student who was recognized as the team's leader, had approximately one quarter of Samantha's indicators, followed by Pat with just 17.

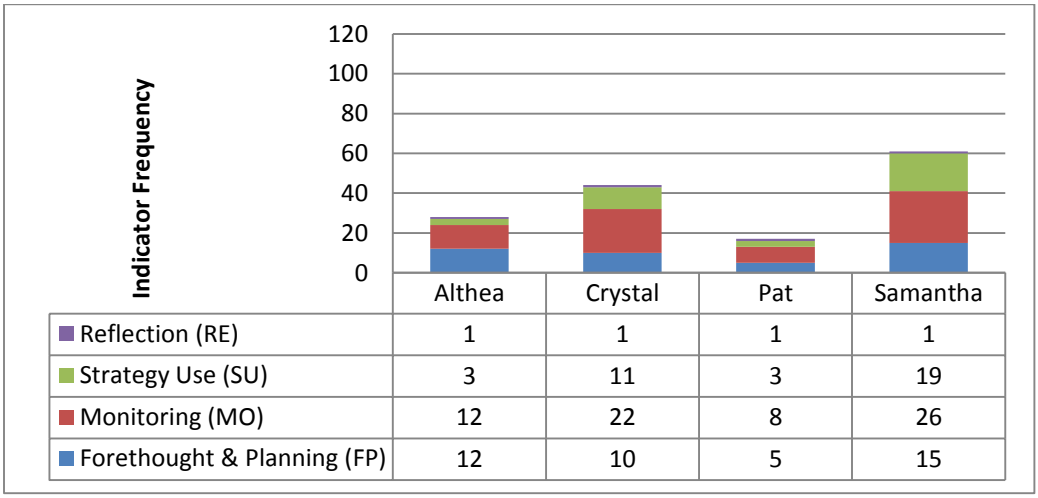
A closer look at the forethought and planning (FP) category showed that Samantha and Althea were the most active with 15 and 12 occurrences each. Samantha also dominated the monitoring (MO) indicators with 26, followed by Crystal with 22. In the strategy use (SU) category, Samantha ranked first with 19 indicators, again followed by Crystal. Pat consistently ranked the lowest in each of the four LP categories, although she and her other team members each contributed one occurrence to the reflection category.

Figure 26. *Team B students: Distribution of learning presence indicators*



	Denise	Fern	Molly	Sarah	Tess
Reflection (RE)	0	2	1	0	0
Strategy Use (SU)	7	26	12	13	0
Monitoring (MO)	26	39	23	18	4
Forethought & Planning (FP)	11	31	12	17	4

Figure 27. *Team C students: Distribution of learning presence indicators*



	Althea	Crystal	Pat	Samantha
Reflection (RE)	1	1	1	1
Strategy Use (SU)	3	11	3	19
Monitoring (MO)	12	22	8	26
Forethought & Planning (FP)	12	10	5	15

Learning Presence Summary and Discussion

In this segment of my study, I used Shea et al.'s (2012, 2013, 2014) construct of learning presence as a proxy to measure regulative actions within each team. Overall, the two teams demonstrated very high levels of LP density. Team B's average was 1.24 indicators for every chat or discussion posting made by the team. Team C had an average per posting density of .78. Further, the overall distribution of LP indicators across the four categories were consistent across the two teams, with monitoring (MO) accounting for the largest proportion of all indicators with 46%, followed by forethought and planning (FP) with 28-29%, strategy use (SU) 22-23%, and reflection (RE) accounting for less than 3%.

This consistency is notable because, as described previously, the two teams had very different experiences in terms of their ability to move their projects forward. Team B encountered significant difficulties at the project midpoint when they learned that they had misconstrued the instructions for developing their plan of care. Team C, on the other hand, encountered few, if any, obstacles and slowly built up its momentum that culminated during the last two weeks of the project.

In terms of each team's trajectory, both teams demonstrated their highest levels of total LP indicators during weeks 13 and 14, the last two weeks of the project. Team B had a slow start with virtually no LP evident during weeks 9 and 10. Team C followed a somewhat different path. During the first four weeks of the project, the team took a slow and steady approach in which they focused their efforts primarily on monitoring (MO), forethought and planning (FP), and some strategy use (SU). By weeks 13 and 14 the team accelerated its collaborative process with sharp increases in all areas except reflection (RE).

The frequency and distribution of the forethought and planning (FP) indicators over the six week project suggested that this was a continual process that students relied upon even if they had established prior decisions, as Team B did in their contract. Looking more closely at the monitoring (MO) category, it appears that the two teams engaged in these actions most frequently and consistently across the entire duration of the project. Although this analysis did not aggregate frequencies within each category, it appears that certain types of monitoring appeared more often in each team's discourse—monitoring that was related to *communicating*, such as: checking or confirming instructions with each other (MO1); noting the completion of tasks (MO-3); reporting problems (MO-2); describing personal reactions to tasks and activities (MO-3); or advocating effort or focus (MO-8).

Much less common were those indicators that were related to metacognition, such as recognizing learning behaviors in oneself or others (MO-7) or noting use of strategies (MO-9). Paralleling this, there were a limited number of examples of the evaluating quality (MO-4) indicator because this required students to make an intentional effort to provide evidence or substantive explanations as part of their evaluating.

Among the four strategy use (SU) indicators, the need for reciprocal guidance and assistance (SU-1) stood out as the most frequent action in this category, followed by reviewing (SU-2), which was evident in Team C, but not in Team B. The indicators for noting outcome expectations (SU-3), where students acknowledged the relevance of current tasks or processes to the future, and making adjustments in strategy (SU-5) were found infrequently. Again, these indicators required an additional level of intentionality and self-awareness.

Evidence of reflection in the two teams' discourse was quite rare. In the seven instances in which reflection was found, most did not address a conceptual change in thinking (RE-1), but instead related to students crediting the successful results of the project to the efforts of their fellow team members (RE-2). Again, this may have been the result of how students are reluctant to pause and review the implications of their prior actions.

Lastly, examining patterns of LP indicators within teams revealed divergent results in terms of students who were perceived as leaders within their groups. In Team B, Fern far exceeded her peers across all four categories of LP frequencies. This appeared to be the result of her initiative in facilitating each of the three scheduled team chats. In Team C, although Althea was recognized as the team leader, she ranked far below both Samantha and Crystal in terms of LP frequencies.

Considering the relationship of epistemic actions to learning presence

Damşa et al. (2010) have posited that the concept of SEA is comprised of two discrete constructs based on epistemic actions and regulative actions. The epistemic are intentional knowledge-related learner actions that support the advancement of the knowledge construction process as it is manifest in the shared knowledge object. The epistemic actions construct was operationalized through the development of an EA coding scheme. The second construct, regulative actions, referred to intentional actions that students engage in that support the collaborative processes of the team. The regulative actions construct was operationalized by using the LP coding scheme as a proxy for this measure. Given the modest scale of this study which involved just two teams comprised of nine students, it was not feasible to attempt any form of causal analysis.

In lieu of this, I calculated the Spearman correlation coefficient to determine whether an association existed between the nine students' EA frequencies and their LP results. Using the above rankings, the test indicated a statistically significant positive relationship between the two measures (rho = .0975, 7 d.f., $p < 0.001$).

This finding also confirms a positive correlational relationship between LP, which measures self- and co-regulation, and cognitive presence, another measure of epistemic activity among online learners, conducted by Shea and colleagues (2014) in a study extending the Community of Inquiry framework first introduced by Garrison, Anderson, and Archer (1999).

Although these findings that associate regulative and epistemic activities are not unexpected, they do pose more questions than answers. For example, in what way and to what extent are these two constructs related? Why do students appear to demonstrate higher levels of regulative actions relative to epistemic actions? Do students demonstrate the same degree of intentionality in their regulative actions as in their epistemic actions? Clearly this study has just scratched the surface of our understanding of how students, who are put into situations where they are expected to work together for the purpose of knowledge creation, attempt to organize, manage, and move toward assuming greater responsibility for their regulative and epistemic efforts.

Chapter 5 Qualitative Analysis

The construct of shared epistemic agency (SEA) calls for learners to demonstrate both regulative and epistemic intentionality as they relate to the creation of new knowledge as embodied in the production of shared knowledge objects (Damşa, 2010). The epistemic refers to knowledge-related activities that support group collaboration in the production of shared knowledge objects. The regulative encompasses activities that support team level collaborative processes in which learners demonstrate forethought and planning, monitoring and reflection on their progress, and making adjustments in strategy.

This mixed methods study explores the role of instructional design in the development of SEA when RN to BSN students work in teams to complete a collaborative project in an online course. It is argued that in order develop the necessary knowledge creation and group regulative skills and to support effective collaboration in their academic and professional work, it is crucial to better understand and improve these processes in the online course environment.

In the previous chapter, I presented the results of my first research question, *What patterns of SEA are evident at the team level as manifest through epistemic and regulative actions in online student discourse?* In this strand of qualitative research, my purpose was to examine the experiences of the two teams to better understand how each worked together to complete their final project, as well as to study the meanings they attributed to their collaboration. I used the following research questions to guide my qualitative inquiry:

2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object?

2b. How did the instructor's online interaction enhance or constrain each team's epistemic and regulative decisions?

2c. How did the team's use of project technology tools affect the development of their shared knowledge object?

To accomplish this, I conducted interviews with the two teams and their instructor, and examined the following student artifacts: their self- and team assessments, the shared knowledge objects generated by each team, their team contracts, and their discourse.

For each of these data sources, I used a separate form of analysis. I analyzed the student interviews using Strauss & Corbin's inductive approach (1998) and Glaser's process of continuous comparison (1965) to develop my main thematic analysis. My purpose was to identify key themes that provided insight into learning experiences within each team to uncover student perceptions and meanings that shaped how SEA emerged through individual and group decisions that shaped their shared knowledge object.

My secondary thematic analysis examined student self- and team assessments using Saldaña's values coding (2013) to obtain confirmation of my main themes. I also examined team contracts, their shared knowledge objects, and the course instructor's interactions with each team using specific analytical protocols that are documented in Appendices O, P, and Q. I then used case analysis to integrate these results.

My findings are presented in the following order: primary themes, secondary confirming themes, analysis of instructor interaction with each team, case analysis for Team B and Team C, and my conclusions.

Primary Themes

The purpose of my main thematic analysis was to describe and organize the patterns of each team's experiences during this six week long project, while using a phenomenological approach to arrive at a deeper understanding of the meanings of their

everyday experiences. I have distilled these patterns and meanings into two overarching themes, *uncertainties* and *disjunctures*, as well as their component themes which I identified from my corpus of interviews with the students in each team.

Uncertainties

My first overarching theme related to *uncertainties*: the qualms that students in each team expressed related to working with others on a mandatory team project, their instructor's expectations, their understanding of the project, and their doubts about using technology tools for collaboration. The teams expressed their unease working as part of an assigned team in which they knew little about their peers or the resulting risks associated with sharing responsibility for the team's performance. This was reflected in their awareness of past experiences and anecdotes describing the difficulties that arise from online group work. Second, both teams were faced with instructor and project expectations with which they were unaccustomed. Third, concerns about the lack of face-to-face contact with team members fueled doubts as to whether the project technology tools could be used productively to overcome this deficit.

These concerns were particularly important because the concept of SEA calls for student groups to intentionally engage in and perform sustained collaboration that results in the creation of new knowledge which is embodied in shared knowledge objects. A significant barrier to designing and implementing online learning activities and environments are uncertainties that students experience when confronted with the unfamiliar. When viewed in combination, these unknowns had the potential to derail a well-intentioned instructional design plan in support of developing SEA, resulting in two

teams who initially questioned their ability to organize their collaborative process and their knowledge creation efforts.

Apprehensions about team members. This theme, theme U.1, captured a potent mix of concerns that were potential barriers to students who must work together for the purpose of knowledge construction. As most members of both teams were newly admitted students to the BSN program, their hesitancy about the nature of their peers and their team were not unfounded, based upon anecdotal information and their prior experiences with group projects in their associate degree nursing programs. These uncertainties were further underscored by the reality imposed by the project, namely that each team was required to both share the responsibility and risk for the team's performance.

The two teams were keenly aware that they were mutually dependent and collectively responsible for the team's success or failure, and that the commitment of their peers, in terms of meeting deadlines and contributing their fair share of the work, would determine the outcome of their project. In order to demonstrate SEA, students must believe that they, individually and collectively, have the agency to act with purposefulness and intent. The reality is that many students, particularly those starting out in a new program, must come to terms with their fears and concerns related to successfully participating in and completing a team project, as well learning the skills necessary to function effectively in an unfamiliar online environment.

Table 23. *Themes and subthemes from main thematic analysis of student interviews*

Uncertainties: Overarching Theme I		
Main Theme	Subtheme	Definition
U.1. Apprehensions about team members	U.1.a. Preparing for the worst	Many students have had or heard about negative experiences with online team projects
	U.1.b.Sharing responsibility has its risks	Students acknowledge that their team performance and grades are mutually dependent upon the contributions of all members
	U.1.c. Really knowing team members despite lack of face-to-face contact	Online team projects make it difficult to know "what kind of people" you are working with
U.2. Anxieties about instructor and project expectations	U.2.a. Expecting project guidelines and models	Students believe that they need explicit guidelines and models from the instructor to be successful
	U.2.b. Making sense of instructor's expectations for creativity	Students struggle to translate what the instructor meant by creativity into meaningful examples
	U.2.c. Adapting to a facilitative rather than a directive instructor	Many students were unsettled by the instructor who functioned as a guide, rather than an authority figure
U.3. Doubts about using technology tools for collaboration	U.3.a. Is collaborating possible if team is not face-to-face?	Many students questioned whether it was feasible to complete an online team project.
	U.3.b. Using communications and authoring tools productively	Teams used different approaches to using the communications and authoring tools.

Disjunctures: Overarching theme II		
Theme	Sub Theme	Definition
D.1. Discordant beliefs about collaborative learning	D.1.a. "Getting things done"	Students focus on completion and expedience over epistemic engagement
	D.1.b. Assembling individual contributions	Students believe learning takes place as through individual task and activities; these contributions are compiled into team projects
D.2. Contradictory views of conflict	D.2.a. Avoiding or denying conflict	Students intentionally sidestep potential sources of conflict with their peers or deny it occurs
	D.2.b. Seeing conflict as inevitable at work	Students admit they must address conflict in their workplaces
	D.2.c. Appreciating multiple perspectives	Students voice this but have difficulty transferring this to managing disagreements, providing constructive criticism and feedback
D.3. Discrepant views of leadership	D.3.a. Preferring informal or shared leadership	Students state they support sharing project leadership but defer to those who demonstrate initiative
	D.3.b. Recognizing regulative leaders	Students acknowledge peers who assume leadership in planning and organizing

Anxieties about instructor and project expectations. Theme U.2 has its roots in the discomfort and unfamiliarity that students confront with changes in pedagogy that accompany online learning; shifts in which the instructor becomes a facilitator, and acquisition and procedural approaches to learning are replaced with unfamiliar expectations that focus on knowledge construction and working with ill-defined problems.

Students on both teams expressed misgivings about the final project they were required to complete. Many believed that the instructions provided in the course modules were insufficiently detailed to convey the project requirements. Further, students felt strongly that their instructor should have provided exemplars or models to guide their efforts. Still another cause of considerable concern were the difficulties encountered by certain students and teams in translating what the instructor meant by "creativity" into meaningful examples that could be pursued and replicated. Related to these uncertainties were those students who were unsettled by an instructor who saw her role as facilitative or guiding, rather than directive.

Doubts about using technology tools for collaboration. Theme U.3 encompassed student *doubts about using technology for collaboration*. Each team gave voice to their initial doubts whether it was possible for a team to effectively communicate and collaborate when separated by time and distance. As the project progressed, each team struggled to find productive ways to use the project's communications and authoring tools.

In terms of communications, both teams successfully experimented with using a combination of discussions areas and chats to support their project conversations and decision-making. The two teams diverged, however, in their use of authoring tools. Team C, after some initial hesitation, successfully used the wiki to jointly author a shared

knowledge object that represented their more expansive knowledge creation process. Team B, after demonstrating their reluctance to use the wiki, restricted its use to storing and sharing files. As a result, this team developed their final project using an alternative technology that severely constrained their epistemic interactions to develop and advance their shared knowledge object: the brochure they developed as their interprofessional plan of care.

Disjunctures

The second overarching theme related to *disjunctures* in student attitudes that interfered with each team's assumption of greater responsibility for their learning. This referred to a series of student beliefs about the nature of collaborative learning, expediency, conflict and its role in learning, and leadership within teams. Both individually and in combination, these disjunctures represented significant gaps to be bridged between the construct of SEA and students' understandings of what was required for them to assume greater responsibility for their collaborative processes and advancing their knowledge creation efforts as part of a team. These disconnects were found in three areas: beliefs about collaborative learning, conflict, and leadership and initiative.

Discordant beliefs about collaborative learning. Theme D.1 described two areas in which students' beliefs and values had the potential to undermine the development of SEA. In the first, both teams referenced views of learning within teams as being grounded in *individual* cognition. This had further implications in that these same students perceived that collaborative learning was accomplished through the compilation of individual contributions which were edited into a "coherent whole." The second area was represented by pervasive use of the phrase "getting things done," a task-oriented approach in which

students in both teams appeared to favor the completion of tasks over engagement in advancing or refining their knowledge as a group. This was significant because neither of these perceptions of learning are supportive of knowledge construction pedagogies.

Contradictory views of conflict. Theme D.2 highlighted the need for students to reconcile their negative views about conflict with their recognition that multiple viewpoints and a diversity of thinking were needed for collaboration to succeed. In order to advance a team's knowledge creation process, its members were required to consider and evaluate others' ideas and suggestions through their collective ability to recognize that *different* understandings are not necessarily sources of conflict. Instead, these differences are a starting point for negotiation to arrive at deeper *shared* understanding. To fully demonstrate SEA, groups of learners are required to productively address two types of disagreements. In the first, students must resolve disagreements that are related to their group processes so that they can sustain their collaboration over time, i.e., the *regulative* dimension of SEA. The second deals with conceptual disagreements that must be resolved in order to jointly advance the team's shared knowledge object, i.e., the *epistemic* dimension.

Through their interviews, teams brought to light certain beliefs that illustrated areas of underlying tension that may have interfered with cultivating SEA. For example, students expressed their discomfort with conflict. Some stated that they had experienced no discord at all within their team, which was positioned as a positive occurrence, while others in the same team readily admitted their more negative attitudes toward disagreements and conflict. I also identified certain topics that were contentious and were not pursued by the team, which will be addressed later in each case study. Furthermore, although many students in both teams also spoke of the value of multiple perspectives, most encountered

difficulties moving beyond this abstraction to demonstrate that they also had the skills to manage disagreements and provide constructive feedback and criticism to their peers. Yet despite this shortcoming, several students affirmed that dealing with conflict was a fact of life in their workplaces.

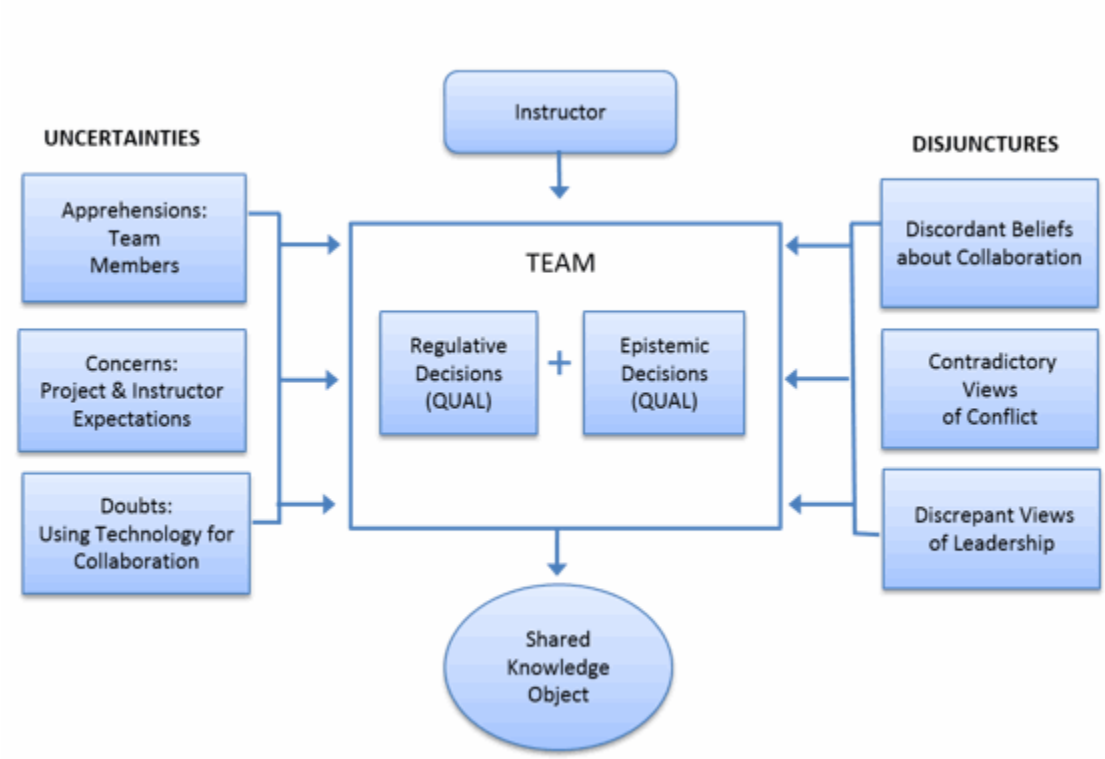
Discrepant views of leadership. Theme D.3 addressed two levels of discrepancy. At a theoretical level, the construct of SEA, as advanced by Damşa et al. (2010), is silent on the contributions of leaders and those who demonstrate initiative within groups that collaborate. Yet at a practical level, the reality was that both teams did identify leaders, and students were willing to discuss the contributions of those who moved into these roles, including themselves. Students from both teams acknowledged that they preferred sharing leadership responsibilities within their teams by pointing to their team contracts and describing how they put this into practice. At the same time, both teams did recognize peers who demonstrated initiative and assumed leadership roles. What is notable about the contributions of these team leaders was that they focused their efforts largely within the regulative dimension of SEA, through planning, organizing, and keeping the team moving forward to meet their deadlines. In contrast, students were less cognizant of those who emerged as leaders in the team's knowledge creation process.

Summary of Primary Themes

As described previously, the purpose of my main thematic analysis was to describe and organize the patterns and meanings of each team's experiences as they related to the development of SEA while working on their six week long final project. I identified two overarching themes, uncertainties and disjunctures, which provided framework for understanding how each team approached its epistemic and regulative decisions and how

they contributed to their respective shared knowledge objects, their interprofessional plans of care. See Figure 28.

Figure 28. *Main thematic analysis: Mapping of student uncertainties and disjunctures as they affected SEA within the context of team final projects*



Secondary Thematic Analysis: Values Coding Findings

I used Saldaña's values coding to identify an overarching theme, *apprehensions about online team projects,* and four main themes that represented the values, beliefs, and attitudes that I identified in the self- and team assessments submitted by the students in the two teams under study. Refer to Table 24 below to see their hierarchical mapping.

Online Team Project Required Students to Work Through Their Mixed Feelings About Group Work

This overarching theme, V.1, pervaded these student artifacts and corroborated themes U.1 and U.2 (described earlier in the student interviews). For all the participants, this was their first online team project and many highlighted this fact in their self- and team assessments. Some expressed skepticism and others noted that "an online project did not seem like a good idea and seemed unachievable" (Molly 10:14). Some students posed questions about how the group would collaborate, meet deadlines, and communicate. Interestingly, none of the students began the project expecting it to be easy, as evidenced by comments indicating that, in general, working as a team was "not the easiest task" and was more often considered "challenging." Yet despite these concerns, most students were able to work through their apprehensions related to commitment and conflict, as evidenced by their acknowledgment of the value of their team contracts, sharing their work equitably, and establishing good communications.

Concerns about the Team Were Eased When Members Demonstrated Commitment

In theme V.2, students from both teams expressed their concerns related to knowing little about their team members, as a result of the instructor assembling the teams without their input. As Fern noted "Often you may find yourself involved with team members you don't even know" (5:13). Central to this was an underlying and unanswered question about the *commitment* of the rest of the team.

In their self- and team assessments, students described specific beliefs and values related to how the commitment of their peers was realized and made visible within their own teams. In my analysis, I identified three subthemes that explained how and why team members were able to quell their concerns about the commitment of their peers: by

demonstrating respect; using the team contract to formalize mutual expectations; and by sharing the work equally, while encouraging initiative. This theme corroborated main themes U.1.b and U.1.c.

Table 24. *Themes from values coding*

Overarching Theme	The online team project required students to work through their mixed feelings about group work
Main Theme	V.1. Concerns about the team were eased when members demonstrated commitment
Subtheme	V.1.a. By demonstrating respect
Subtheme	V.1.b. By formalizing mutual expectations through a team contract
Subtheme	V.1.c. By sharing project work equally, while providing room for initiative
Main Theme	V.2. Good communication was essential to team success because of the lack of face-to-face communication
Main Theme	V.3 Conflict is undesirable
Main Theme	V.4 Project instructions and learning wiki were sources of confusion
Main Theme	V.5 Despite initial concerns about the final project and team, many fears were unfounded

Demonstrating respect. In theme V.1.a, the importance of respect as foundational value was cited many times in multiple contexts by students. They spoke of their "respect for each other as colleagues" (Althea 1:10; SA 7:4), "providing feedback that was respectful of differences" (Fern 5:17), and discussions that "showed respect and trust in each other's abilities to complete the work required" (SS 8:9). Fern noted that her team was "respectful with time management," a reference to the fact that the time required to coordinate project work was a particularly scarce commodity for working adult students (5:2). Lastly, Althea noted that her team "all respected the contract," indicating its importance in making visible and public each member's mutual obligations to the team (1:10).

Team contract formalized mutual expectations. In this theme, V.1.b, students on both teams acknowledged the value of the team contracts they had authored with their peers in shaping how they interacted with each other and what was required from each to complete the project. In her team evaluation, Crystal observed, "By establishing a contract we all agreed upon, we were able to set the foundation for the expectations each of us were expected to accomplish" (3:2). It also made explicit the team's expectations that the project work would be fairly distributed. Sarah noted that "By writing out the contract, we all agreed on equal participation" (8:3). The importance that students accorded to equal participation, contributions, and effort was particularly striking in both their interviews and assessments; however, the connection between the team contract and this particular expectation was not directly confirmed.

Sharing project work equally while providing room for initiative. Theme V.1.c reflected a consensus within the two teams that everyone in their groups contributed equally, as evidenced by numerous comments that echoed this assessment. The following observations from Denise in Team B and Althea in Team C were representative of others on their teams:

> I believe we all did our parts, and it's rare in a group setting to have everyone truly pull their weight, but I believe my group did their parts. (Denise, 4:12)

> I truly felt that the contributions of each team member were equal, and that we probably all spent an equal amount of time working the project. (Althea, 1:9).

This theme corroborated main theme D.3.a.

At the same time, although the teams expected their members to contribute their fair share toward completing the project, students also appeared to encourage and recognize

initiative among their peers. Pat acknowledged the constructive role that Althea played in helping Team C begin the process of writing their plan of care:

> [We] all felt a little lost at one point. Althea finally took the ball and ran and did a great job with the outline of the project, and this set the rest of the project rolling along with everyone then adding something to it (Pat 6:4-5).

In Team B, Sarah described Fern's "role as the group leader:"

> She kept the team on track by submitting the team contract as well as reaching out to the one group member who could not attend the chats. [She]… kept the project moving with input of all the team members (7:17-18).

In terms of their focus, both Fern and Althea were most active by attending to regulative functions related to keeping their teams "on track" and moving forward, corroborating main theme D.3.a. This acceptance of a flexible approach also aligned with the earlier decisions of the two teams to use a distributed approach to leadership in their contracts, and also provided confirmation of main theme D.3.b. Team B made no mention of leaders, whereas in Team C, co-leaders were assigned for the two main project tasks.

Good Communications was Essential to Team Success Because of Lack of Face-To-Face Communication

In theme V.2, several students verbalized their concerns that the lack of face-to-face communications had the potential to pose problems of misunderstanding and misinterpretation. Pat preferred direct eye contact with her peers so that "I know what you are thinking and you know what I am thinking. I need to know if we are all on the same page" (Pat 6:8). This theme corroborated main theme U.3.b.

In response to this concern, many students on both teams believed that it was important to schedule some type of real time chat meeting, although several described how

difficult it was to juggle their work schedules to set up and attend these sessions. Yet despite these constraints, both teams were able to use this feature. Team B scheduled three chats where they planned and revised their interprofessional plan of care, while two students from Team C met via chat for a coaching session where one assisted the other to learn how to add content to the wiki. Both teams later acknowledged that the chats and discussions were most useful for sharing and reviewing ideas and making decisions. The two teams also encouraged their members to check their discussion areas for daily updates, particularly during the last two weeks of the project.

Conflict is Undesirable

Theme V.3 corroborated a similar theme found in several of the student interviews described previously, where some students asserted that there were no disagreements within their teams (D.2.a). For example, Denise from Team B noted, "Thankfully the group I worked with did not encounter conflicts, which I thought was great, and it helped the project flow smoothly" (4:4). Yet, her team member, Fern, was slightly more forthcoming. She stated that "Overall the team was able to manage their conflicts well" (5:6). Although she provided no additional information, Fern's comment may have been a reference to Tess' document which was never formally discussed in terms of being incorporated into the team's brochure.

Project Instructions and Learning to Use the Wiki Were a Source of Confusion

Theme V.4 was a universal concern among all students. Samantha from Team C noted that "In the beginning of the project, the team was a bit confused as to what the directions for the project were and what it entailed" (8:6). Within Team B, Sarah recounted that "not having a clear expectation of the final project submission lead to some

misinterpretations amongst the group" (7:15). Of particular concern to this team was their misunderstanding that they had been instructed to develop an APA style academic paper on congestive heart failure, rather than a care plan based on a case study patient *with* this condition. This theme also corroborated main theme U.2.a.

Compounding this uncertainty were students' reactions to the introduction of the wiki as a collaborative authoring tool. Sarah admitted she "had never encountered a group project presented online in such a way," and had difficulty grasping "how the project would flow" (7:26). Similarly, her fellow students also needed time to familiarize themselves with its features. Pat, Sarah, and Crystal noted that they felt they had gotten off to a slow start as a result of having to learn this new tool. These findings were substantiated as well, confirming main theme U.2.b.

Despite Initial Concerns about the Final Project and Team, Many Fears Were Unfounded

My final main theme, V.5, reflected the attitudes of the students at the close of the project. Nearly all of the students on in both teams related that they had overcome their apprehensions. Students acknowledged that they had "a great experience," were "pleasantly surprised," and that their teams "worked very well together." Paralleling this were comments in which students noted the importance of building trust among their peers. Fern stated that "getting to know people helps build a trust relationship" (5:15). Samantha echoed this: "Our discussions showed respect and trust in each other's abilities to complete the work required" (8:9). Crystal summed up her experience with these words: "The obstacles and challenges I faced were overcome with the help of my team mates" (3:14).

Summary of Secondary Thematic Analysis

In this analysis of each team's self- and team assessments I used values coding to explore the values, attitudes, and beliefs of the students in each team to better understand their personal experiences, and to seek confirmation of the themes identified in my student interview findings. Six of the nine values themes were confirmed in the main thematic analysis.

Instructor Interaction with Teams B and C

In this section, I set out to examine the nature of the instructor's online interaction with the two teams over the duration of the team's six week project, to better understand how she enhanced or constrained their regulative and epistemic decisions, which in turn were manifest in their shared knowledge object.

Background

The instructor of this course was not responsible for its development and design. The team project, which was introduced in the Module 7 overview (Appendix H) and the instructions for the interprofessional plan of care (Appendix I) were not altered. The original design of this study called for the instructor to participate in three discussions to be held during weeks 11, 13, and 15 where students were to engage in a *metadiscourse* discussion in which they were to review their epistemic and regulative progress as they advanced and refined their understanding of the course concepts they were developing in their shared knowledge object, their care plan.

Prior to the start of the course, the instructor was provided with background information on SEA and how she could use this information to facilitate each team's discussions. (See Appendix J). However, as a result of a family emergency, the instructor

was unable to fully enact this part of the study in these focused team discussions. Instead, she facilitated the team projects in a manner that was consistent with the normal expectations of the BSN program.

Using this as a baseline, all of the instructor's announcements and discussion posts were examined to determine how they enhanced or constrained the regulative or epistemic decisions of the two teams. A posting was classified as regulative if its purpose was to support the team's collaborative process or as epistemic if it supported the team's knowledge creation activities in the development of their shared knowledge object. Refer to Instructor Interaction Analytical Protocol in Appendix L.

Instructor and Her Role

The instructor saw her instructional responsibilities as monitoring the online team activities and providing direction and guidance to each team. She described her approach in this way: "My philosophy is to let the students create and manage this [their project] and I'm a resource and facilitator if they need one" (IN 2:5). She accomplished this through posting course announcements at the start of each module and activity, sending messages to specific teams and students who needed additional guidance, responding to problems connected with the LMS and wiki, and providing feedback on project tasks that were submitted as assignments. In terms of the team's discussions related to developing their interprofessional plan of care, the instructor followed her usual practice of monitoring each team's progress, and intervened when necessary to provide guidance or clarification. At the same time, she also sought to help the teams advance their thinking, "to let them get creative and use their own knowledge, and then along the way just prod them along to think about areas [they can develop further]" (IN 2:6).

Team B: Resistance to Epistemic Prompts

The instructor – student interactions, described below were almost evenly divided between the regulative and epistemic. In the former, the instructor focused on providing reminders and clarification in order to assist the team to move their collaborative process forward. In general, Team B followed up on these prompts. In the latter, her epistemic postings were intended to help the team advance their knowledge construction efforts. These, however, were not always taken up or addressed by the team.

The instructor's first three epistemic posts were intended to provide positive feedback as the team struggled to recover from their misconception that the project was to be an APA style academic paper. In her fourth posting, the instructor used a prompt to ask the team to consider two issues. See Figure 10 for the text of this posting. This was presented as a question asking how health insurance coverage and financial concerns might impact their patient's plan of care. In her interview, the instructor explained that her purpose was to help the team "use your nursing knowledge to explore building this case" (IN 1:1) in order to think beyond the facts that were provided to help the team make connections between course concepts and the real world.

Tess and Fern did reply to the first prompt posed by the instructor, although they rejected her suggestion:

> I was considering doing something involving insurance issues but I felt it would be moving away from hands on nursing and not on the administrative side. I was gearing my project towards the care of the patient (Team B, Post 93).

> I agree Tess, we should stick to patient care pirorties [sic] for Libby. Libby was actively working for a law firm until the recent MI

[mycocardio infarction]. I don't think lack of insurance is a concern at this time for Libby (Team B, Post 94).

Figure 10. *Instructor's epistemic prompt to Teams B (Posting 92) and C (Posting 31)*

Thoughts to consider as you develop your interdisciplinary plan of care
Instructor - Monday, December 2, 2013, 7:51 PM

As you develop the interdisciplinary plan of care for your client, think about the current issues that individuals may face in regards to health care today. For example, you may want to reflect upon and examine issues related to health care reform and access to affordable care. You may want to apply those issues to your case study.

You can build your case and expand on it however you want (there is no right or wrong answer).

You may want to think about incorporating real life issues into your plan of care. For example you may want to add factors such as insurance and or financial issues into the situation/case study. Consider:

- Does your client have insurance coverage?
- Is their insurance coverage adequate?
- Has their insurance coverage changed (increased co-pays for office visits, medications that may no longer be available on insurance formularies, increased cost for care and/or medications, etc.)?
- Is the family able to afford the prescribed treatment plan (medications, prescribed diet, etc.)?

You may also want to explore the interdisciplinary perspective. Do all disciplines have the same goals/objectives for the client? If not, consider how the team can achieve a resolution for a plan of care that is best for the patient?

These are just some thoughts that you and your team may want to consider as you design your interdisciplinary plan of care. Instructor

This reluctance to explore the insurance and financial aspects of the case was consistent with the limited approach found in the team's initial care plans. In the first response, Tess spoke for the team and framed her response in terms of a familiar, but narrow, nursing perspective, rather than taking into account the broader socio-

economic considerations that were among the course learning objectives. Fern re-affirmed this with her very literal response. She referred to the case study notes that stated the patient was employed by a law firm, and was likely to have insurance coverage. The instructor explained her rationale for this prompt this way: "What we're trying to get them to look at is to identify potential things that may happen. Both potential and unknowns, and to be anticipatory" (IN 1:3). Unfortunately, Team B did not take up this question for further discussion, nor was this addressed in their care plan.

In the same posting, the instructor also asked the team to consider how they might reconcile conflicting priorities among the disciplinary specialists that they interviewed. In this question, the instructor was probing for two responses. First, she wanted the team to address the fact that their case had several co-morbidities: congestive heart failure, diabetes, and hypertension. At a broader level, the instructor wanted the team to engage more deeply with considering how to manage the implications of her diagnoses in terms of their plan of care. Again, the instructor explained her rationale:

> "As they progress they are going to have to work in groups, multidisciplinary or within their own team of nurses, and this is a way to help them address conflicts and work together. And this is a skill that they are going to need if they progress to a higher level of nursing (IN 1:5).

Again, the team did not pursue this in their discourse. Neither was it reflected in their intermediate knowledge objects, nor in the initial nursing-focused plans of care that they each uploaded to the wiki's file sharing area.

Table 25. *Classification of instructor interactions with Team B*

Message	Purpose	SEA Focus	Format	Week
Use wiki to write contract	Reminder	Regulative	Announcement	9
Interviews due 11/24; Final Project due 12/16	Clarification	Regulative	Announcement	11
Gave positive feedback on Tess's focused care plan that addresses dyspnea and heart disease. Reminded team to post this information in wiki as part of care plan	Feedback Reminder	Epistemic Regulative	Discussion Post Discussion Post	13
Project is not APA paper; Reiterated project instructions from Module 7; Directs students to discuss their project in discussion area, wiki or chat	Clarification	Regulative	Announcement	13
Gave positive feedback on Tess's summary of research related to African American women and heart disease that was posted in discussion. Reminded team again to add this to wiki as part of the team's plan of care	Feedback Reminder	Epistemic Regulative	Discussion Post	14
Affirmed Sarah's suggestion that the team develop an educational brochure	Feedback	Epistemic	Discussion Post	13
Asked team to consider: 1) the family's insurance and finances 2) how to manage conflicting priorities that may arise from interviews with different health disciplines (See Fig. 11.)	Prompt	Epistemic	Discussion Post	13

Team C: Limited Response to Epistemic Prompts

Like Team B, the instructor's interactions with this team were divided almost equally between posts with a regulative purpose and those with an epistemic intent. See Table 26. The only exception was that Team C identified a problem with the wiki's file sharing feature, which needed to be turned on by the help desk.

Table 26. *Classification of instructor interactions with Team C*

Message	Purpose	SEA Focus	Format	Week
Use wiki to write contract	Reminder	Regulative	Announcement	9
Interviews due 11/24; Final Project due 12/16	Clarification	Regulative	Announcement	11
Informed team that wiki file storage area now working	Technical Assistance	Regulative	Discussion Post	11
Project was not APA style paper; Reiterated project instructions from Module 7; Directed students to discuss their project in discussion area, wiki, or chat	Clarification	Regulative	Announcement	13
Asked team to consider the family's insurance and financial situation Asked how team would to manage conflicting priorities that may arise from interviews with different health disciplines	Prompt	Epistemic	Discussion Post	13
Affirmed Althea's suggestion that the use the ADPIE framework to organize their care plan Asked team to consider the integration of "anticipatory care" to address future problems that may occur in the future related to Manny's asthma (Figure 11)	Feedback Prompt	Epistemic Epistemic	Discussion Post	14

More important, however, were two instructor discussion postings that were directed to the epistemic work of the team to help them advance their knowledge creation efforts. As in Team B, the instructor used the same posting to prompt the team to consider how their patient and his family's financial situation and health insurance coverage might affect their ability to afford treatment. See Figure 10. Although none of the students on the team responded directly to the instructor, Crystal did take up this question and notified the rest of the team through a discussion post that she had incorporated the relevant information into the medication intervention section of the team's care plan:

> I added some more information today. I looked in to [sic] medication costs and availability. All the generic forms of meds that I listed are medicaid [sic] approved and only the albuterol for neb [nebulizer] treatment is available through Target and Walmart $4.00 prescription programs. I made note of this at the end of the med list. [Team C Discussion, Posting 103].

Additionally, Crystal also incorporated comparable insurance coverage questions related to their patient's family in two other areas in the care plan: as part of the initial assessment of the patient's asthma management, and during the family's scheduled interview with a medical social worker.

The second question in the instructor's posting, which asked Team C to consider how conflicting goals among the interdisciplinary team might be managed, was not taken up by the team, paralleling Team B's response. This may have resulted because the team had previously discussed the fact that all their interviews with the other disciplinary specialists had corroborated each other. However, this fact was not communicated to the instructor (Team C discussion Sarah, Posting 18; Pat, Posting 19).

Team C's response to the second prompt (Figure 11), in which the instructor suggested that they think about anticipatory care was more difficult to document. Although the team included information describing how all 50 states permitted students to carry and self-administer asthma medication at school, and recommended that the patient's parents work with the school to ensure this, the team did not provide any further information related to contingency planning if Manny experienced problems away from home or school.

Figure 11. Instructor's second epistemic prompt to Team C

35. Re: Team Progress for Week #13
Instructor Sunday, December 8, 2013, 6:26 PM

The "nursing process" or ADPIE - assess, diagnose, plan, identify outcomes, and evaluate is used by many disciplines in healthcare, and would be a great framework to organize your project. Great job smile

You may also want to consider integrating into your project, what I refer to as "anticipatory" care. Think about problems that may happen in the future with Manny (that may not yet have occurred just yet) and integrate into your plan of care an explanation of how you could you educate the patient, family, caregivers, school staff etc. regarding that issue.

For example what if Manny suffered an asthma exacerbation in a situation (i.e. at a friend's house, in the cafeteria at school, on the playground) etc...Describe how that could be handled and dealt with.

Keep up the good work and contact me if you have questions or concerns.
Instructor

During her interview, the instructor explained that she pursued this question for two reasons. First, it aligned with her goal to have the team identify anticipatory elements into their care plan that would give Manny and his family more control over his situation, from a health promotion perspective:

> Anticipatory. Anticipate a head of time. So for example, my clinical background is critical care and you may think "okay this patient is stable" ... but you're always [thinking] in the back of your head what [else] could happen now and have a plan. I guess that could even [happen] with the child with asthma in case 2. While he's in school, what happens next? Maybe there's a new school nurse. Maybe there's a new teacher. What happens next that we have to be planning for?
>
> And so they could explore, for example... Manny after school wants to visit friends. What kind of home environment is he going to be going to with his friends? Do they have a smoker in the house? Do they have allergens? Or maybe the school nurse is going out for a while and there's going to be a substitute nurse. To make them think of other things. So there's always the

potential for something to go on and how would they handle that (IN 1:15-16).

Had the team included and developed scenarios like these, they could have demonstrated their creativity applying their knowledge to elaborate upon real life contextual details to enrich the original two paragraph long case history provided at the start of the project.

To summarize, this subquestion examined patterns of instructor online interaction with each team based upon analysis of her course announcements and discussion posts. The instructor saw herself in the role of a resource and facilitator, monitoring each team's progress and intervening as necessary to provide direction or guidance. For both teams, the instructor's interactions were almost evenly divided between those with a regulative purpose and those with an epistemic goal. The former served to provide reminders and clarification; the latter served as prompts to help the team deepen their thinking and advance understanding of their case. The instructor's regulative interactions were generally followed by both teams; however her epistemic prompts were not taken up or addressed by Team B in their discourse or their shared knowledge object. Of the two epistemic prompts directed to Team C, only one was directly addressed.

Case Analysis

The case analyses presented in this section are intended to provide a deeper understanding of the experiences of the two teams as interpreted through the construct of SEA. Using the thematic analysis findings presented earlier in this chapter, I described how and why each team made the regulative and epistemic decisions that shaped key aspects of their shared knowledge objects. My purpose was to convey a holistic yet particularistic view of each group through use of thick description to capture the contextual complexities

of each team. I also adopted Strauss and Corbin's (1998) process analysis conventions for describing circumstances, actions/reactions, and consequences to illuminate the work of each team during their final projects.

To focus my analysis, I examined each team's regulative and epistemic decision-making in the following areas to understand how they contributed to the development of their shared knowledge object, their interprofessional plan of care submission: 1) determining the nature of their team contracts; 2) interpreting the project requirements; 3) advancing their understanding of their assigned cases; 4) exercising initiative and leadership; and 5) using project technology tools. To establish the necessary context for each team, I provided a brief summary of the team members, a chronology of each team's project activities, and a brief description of their assigned case study.

Team B: Highly Organized, but Misdirected

Participants. The five students who were assigned to Team B were all female working adults, between the ages of 28 and 48, who had returned to college to complete their BSN degree. All were in their first year of the program; all but one were enrolled in their first term of study. The following provides some brief background information on each student.

Sarah, a student in her thirties, originally studied mass communications. She completed her associate degree in nursing at a local community college. After earning her RN in 2011, she worked for two years at long term care facility. In the Fall of 2103 she was employed as a nursing supervisor in a rehabilitation facility.

Tess also graduated from a community college and completed her associate degree in nursing in 2013. Now in her mid-forties, she noted that her original college degree was

in sociology. She had worked in the past as a home health aide and as a secretary. At the time of her enrollment in NUR 302, she was employed by a private gastroenterology practice doing outpatient procedures. She chose this position because, as the parent of a young child, she preferred a 9 to 5 schedule over working 12-hour shifts.

Fern, in her forties, had the longest working experience as an RN, having completed her associate degree in 2006. She spent her first two years working with patients who were mentally ill and mentally handicapped, and supplemented this with part-time employment in correctional nursing. For the past four years was employed in a hospital emergency department.

Molly completed her associate degree in nursing in 2012 while working in a variety of direct support positions at facilities serving developmentally and physically disabled patients. Upon completing her degree, she was promoted into an RN position. She was in her early thirties and was the parent of eight-year-old daughter.

Denise completed her associate degree in nursing in 2012. Her previous work experience was as an aid in a nursing home. At the time she was enrolled in the Advanced Health Assessment course, she was employed as a school nurse in a religious school. She noted that this arrangement allowed her the flexibility to concentrate on her studies and permitted adequate time to complete the three courses she carried that term, which exceeded the BSN program's recommendation of two. Her long-term goal was to obtain a position in a hospital emergency department.

Team B's assigned case: Adult with heart failure. Mrs. Elizabeth Gardner (Libby) is a 63 year-old African-American woman who is arriving at the outpatient heart clinic for her first visit. She is married, has two adult children and four grandchildren.

Libby and her husband, Joe, live in a middle class suburb, and her children live locally. Until this hospitalization, she worked as an administrative assistant for a law office. Her husband has recently retired and stays busy with community activities.

She was discharged from the hospital one week ago after experiencing a large anterior wall myocardial infarction (MI) which resulted in left-sided heart failure. The discharge summary from the hospital includes the following data:

- BP 136/88
- P 96 and regular
- R 20 and clear
- T 98.8°F temporal
- Weight of 156 pounds
- S3 heart sound audible in early diastole
- Bilateral non-pitting edema present in feet and ankles

Libby states a past medical history of hypertension, elevated cholesterol, and type 2 diabetes mellitus; she states that all of these conditions "run in [her] family." Her reported medication history includes: an ACE inhibitor, Beta Blocker, diuretic, statin, and oral hypoglycemic agent. The patient states she is "pretty good" about taking her medications and following dietary recommendations.

Intake assessment data at the heart clinic includes:

- BP 162/96
- P 92 and regular
- R 32 with crackles in the bases, bilaterally
- T 98.2 temporal
- The patient denies pain
- She is mildly anxious and complains of shortness of breath at night and with mild activity
- Bilateral 2+ pitting edema is present in ankles and feet

Source: Module 1. Competence in Health Assessment

Team B chronology. This chronology highlights the main activities, events, and decisions that provided the context for Team B's work during this six week long project. Refer to Appendix R.

Team contract as an agentive approach to managing risk. The team's approach to developing their contract was shaped by the following external circumstances. In particular, the BSN program in which they were enrolled sought to prepare its students for interprofessional cooperation in their healthcare work environments, as outlined in the AACN standards. This provided an important rationale for the team project.

Within the team, four of the five members were in their first term of their online degree program and expressed their apprehensions as new students who had been randomly assigned to a team where they knew little about their peers and the nature of the project ahead of them. Fern recounted:

> Especially if you don't really have a relationship with your team member, other than the classroom. And you're limited on what you actually know about that individual. So just trying to think positive, and hopefully we get good grades, and you know, have a good experience from one another (6:66).

Another source of concern expressed by Tess was illustrated in her recounting of her prior negative experience from an earlier community college course:

> Other group projects were in my other school. I had two other group projects and both were complete disasters. People tend not to listen to what the professor wants done, or they do it carelessly, or there's no communication, or they think they're the only people that have something going on in their lives. So it was, you know, a real struggle. So when the teacher said 'oh, we have a group project,' my head went down on the table like here we go again! (8:4)

In the following statement, Tess highlighted the risks associated with group projects, especially when members are mutually dependent and must share responsibility for their efforts:

> You fail together or you pass together. And people know that, so that's why it was kind of like, oh great, 20% of my grade is going to be on this project, and you get concerned because you work hard and you were just hoping that you wouldn't have to go through any of that (Tess 8:43).

Fern also acknowledged similar concerns in light of her plans to pursue graduate school:

> Just an impact on the grade, overall grade, the project, it says 25% of our overall grade....and I'm trying to do good and then in the future I can hopefully go to further schooling and I know they look at grades and I'm just hoping for a good grade, that's all (6:69).

If grades serve as an external measure of a team's success in meeting their shared responsibilities, the members of Team B also described two internal measures which they considered to be just as important: contributing one's fair share and meeting commitments on time.

> We met all our deadlines, we all did our fair share of interviewing the professionals we were supposed to interview (Fern, 6:11).

> Everybody's doing their part. Doing all of the group discussions, putting in all your information that you're supposed to, so there's nobody doing one, all the work (Tess, 8:5).

> Everyone's just really happy that all the work's getting done. Nobody's dragging us, we're not picking up the slack for anybody or anything. Everyone's doing their part, so that's probably a high point. It's nice to see that there's not one person who is slacking or not doing their part (Denise, 15:34).

These topics emerged at the midpoint of the project and were repeated consistently in the end of course interviews and self- and team assessments.

Given the weight of these concerns in the minds of students, the introduction of a team-designed contract as a learning activity provided a purposeful intentional approach for articulating team members' expectations for each other and as a means of determining accountability. Furthermore, it offered the potential for students to assume greater responsibility for their learning and collaborative process, a goal consistent with the cultivation of SEA.

Contract reinforced regulative over epistemic focus. When the team developed its contract, the students responded in a routine way by relying heavily upon the course provided guidelines to organize its content. The contract itself was highly task oriented, emphasized the division of labor, and featured a preponderance of due dates for submissions and scheduling three chat sessions. In addition, the team included provisions for shared leadership, majority vote/group consensus, and a progressive approach to conflict resolution in which disagreements were to be addressed "directly with the source professionally with respect" and then escalated to the team, and finally to the instructor.

These elements of the contract were illustrative of the team's strong regulative orientation in its decision-making. Another important characteristic of Team B's contract was its strong emphasis on documenting tasks and monitoring to systematically observe and check the progress of their collaboration. In contrast, however, the team appeared to overlook the need for any epistemic decisions. As a result, there were no substantive provisions that related to the knowledge creation dimensions of their shared work, such as expectations that their choices of project resources should meet standards for academic quality and evidence-based research. See Table 28.

Additionally, it should be noted that the team may have gone too far in applying this regulative approach to the epistemic work of the team. The team, as part of their contract development work, also identified and assigned responsibility for researching ten topics they believed to be the key elements for inclusion in their interprofessional plan of care based on their assigned case study, an African American with congestive heart failure (CHF). See Table 27.

Table 27. *Team B's topics identified for further research*

Topics identified for inclusion in plan of care	Assigned to
Compare and contrast various cultures, and cultural aspects of CHF	Tess
Define CHF and both types Systolic and Diastolic CHF	Denise
Causes: genetic predispositions, life styles, environmental and economic relationships	Denise
Hypertension	Molly
Signs and symptoms	Molly
How to diagnose CHF	Sarah
Treatment	Molly
Prevention/ interventions	Fern
How to improve health	Fern
Patient outcome	Fern

Source: CHF Group Project Contract, November 10, 2013.

The significance of this decision was that it provided initial evidence that the team had not developed an adequate understanding of the nature of the project that they had been assigned, an issue that the team struggled with for several weeks. Had they reviewed the project instructions, they would have realized that they were not to collaborate on a typical research paper, but instead were to use the information from their interviews with other health care professionals to author a creative interprofessional plan of care with a health promotion focus using the project wiki.

Table 28. *Analysis of Team B's contract based on epistemic and regulative dimensions of SEA*

Regulative Actions	*Provision*
Goal setting	Implied
Planning	Detailed information related to where the team will communicate and how often Due dates provided for submitting contract and final project Will spend at least eight hours a week to keep project moving forward
Delegating tasks	Specific assignments provided for each student in connection with interviews and research areas connected with plan of care
Monitoring	Minimum weekly update to team through discussion area Daily check in through discussion to keep up to date
Identifying issues or problems	Conflict to be addressed quickly "with the source directly, professionally and with respect. We agree to seek guidance and support from each other if needed to process the situation further and fairly." Instructor will be asked to intervene as a last resort
Evaluating quality	Not addressed
Inclusion of strategies	"Utilize each other to troubleshoot problems"
Providing help	General statement "We will support each other throughout the project"
Reviewing	Not addressed
Reflection	Not addressed

Epistemic Actions	*Provision*
Awareness of lack of knowledge	Not addressed
Identifying lack of knowledge and knowledge-based problems	Not addressed
Collecting and examining sources	Not addressed
Discussing misunderstandings	Contract addressed procedural, not knowledge-based misunderstandings
Producing, negotiating, refining ideas	Not addressed
Using feedback productively	Not addressed

This misalignment in emphasizing regulative decisions over the epistemic had further consequences. Although the team submitted their contract a day ahead of schedule and demonstrated considerable initiative in this initial learning activity, there was limited

evidence of negotiation among the participants in their discourse where they actually discussed their understanding of the project or evaluated the relative merits of what they had proposed. Without this level of epistemic awareness, this section of the contract might be alternately be viewed as simply as a checklist of topics, providing early evidence of the team's disposition toward expedience and its focus on *compiling* individual efforts into a collaborative team project.

Moving beyond familiar ways of thinking. As new students in their first term of study facing a novel assignment with unfamiliar tools, Team B struggled to make sense of the project instructions. At the same time, the instructor, in updating her course section, determined that she would not provide examples or prior projects because she believed that students in the past had simply used them as templates in which they filled in the blanks. In combination, these conditions fueled a heightened sense of discomfort and confusion on the part of the team in three areas: the seeming ambiguity of the project instructions; the desire to see models of completed projects; and adapting to an instructor who saw her role as facilitative rather than directive.

Several students struggled with their perception that the project instructions were not clearly defined: "So I guess it made me feel a little uncomfortable not having strict guidelines for the final project" (Sarah 25:9). Some students were concerned about the lack of instructor-provided models: "I think if the teacher had maybe provided initially had provided examples, like you know, create a brochure or a PowerPoint or a pamphlet or something, then there would have been less confusion" (Sarah 25:7).

Reacting to these concerns, the team relied upon on a familiar way of interpreting the project instructions and believed that they were responsible for authoring an APA style

academic paper, a frequent requirement of written assignments in their associate program. The team also exhibited similar patterns of thinking when they determined that they would organize their plan of care using a widely used nursing framework that was a key learning outcome of their RN studies. Referred to as ADPIE, this was a mnemonic for *Assess, Diagnose, Plan, Identify Outcomes, and Evaluate.* Moreover, rather than synthesizing or prioritizing the findings in their interview data, which represented different disciplinary views, the team determined that they would organize their care plan based upon *nursing* diagnoses instead.

Getting off track. In a similar vein, the team initially neglected to integrate a health promotion focus, which was a critical requirement described in the instructions for their interprofessional care plan. Because this concept is grounded in enabling people to increase their control over their health and assume greater responsibility for their well-being, the teams were expected to set aside interventions focused on providing direct care to the patient in a hospital or office setting. Instead, they were to consider approaches that allowed their patient to become more proactive in managing her medical conditions, while taking into account the social and environmental dimensions of her life. With this in mind, the identification of the audience for the team's care plan, namely the patient, was a key epistemic decision.

The above actions were clearly misaligned with the project's instructions which called for a creative and interactive interprofessional plan of care that was focused on health promotion for their assigned case, Mrs. Libby Gardner. Although members of the team did contact the instructor for additional clarification, from an epistemic perspective, the assumptions behind this decision revealed that the team was unable to recognize their

lack of knowledge about the project requirements and the need to return to the project instructions to confirm their understanding.

One of the consequences of these decisions was that the team spent several weeks in their discussion area and subsequent chats, planning for a traditional research paper, writing care plans that focused on nursing diagnoses, and ignoring the more valuable information that they needed from their interviews to complete their assigned project. Another was that the team needed to shift to a broader social, economic, cultural, and environmental focus, setting aside more familiar ways of viewing patient care.

Adjusting to a different kind of instructor and new ways of learning. Perhaps most importantly, the team experienced difficulties adjusting to the expectations of their instructor. Having come from associate degree programs, the team was more familiar with the directive clinical teaching and learning styles in which the instructor functioned as the sole source of authority within the course. Instead, the team encountered something very unfamiliar: an instructor whose role was that of a facilitator of learning and knowledge creation.

Three of the five team members appeared to acknowledge that their instructor had a different role to play. For example, when the team was struggling to define the format of their care plan, Tess noted that "the professor's participation is there when needed but not, not overbearing like some have been. She'll have a suggestion for us" (8:47). Sarah observed that "I think the professor [was] overseeing our discussion and kind of guiding us in the right direction....that's a big help" (14:7). Molly echoed her team members: "And then I guess when the professor was reading over everything she realized that we were

going in the wrong direction and she said [it was] not an APA scholarly paper. A project…" (24:54).

Perhaps most importantly, the biggest adjustment in understanding what this novel project entailed became evident in the following comments from Molly and Tess. Molly captured the essence of the team's struggle:

> Then we got another clarification saying that it's not a scholarly paper, and then the professor gave us [descriptions of] examples. Now we understand it. It still is confusing but now we understand it a little better. *I don't think it was presented in a way we directly understood* (7:25).

Tess gave voice to a more nuanced understanding of both the nature of the project and the role of the instructor:

> But every step of the way I think all of us had a little bit of uncertainty about are we going in the right direction of what she was looking for. And that's what we all I think [we] were coming back to. We didn't want to get all the way to the end and [have] it be completely, something completely different than what we wanted…. because usually it would be the other way around that *we're so used to having a structure and then when the professor allowed you to have a mind of your own, you're not used to it* (17:11-12).

Clearly Tess pinpointed the challenges of asking teams to assume greater responsibility for their learning through the process of knowledge creation.

"Getting things done." In describing how the team approached their knowledge creation efforts to advance their understanding of their assigned case, their epistemic and regulative decision-making was shaped by several distinct sets of beliefs that represented disjunctures or gaps needing to be bridged in order to successfully cultivate SEA. The first was a task-oriented approach that emphasized "getting things done" where students focused on expediency over the engagement of advancing or refining their thinking. The

second was related to the team's beliefs about the nature of collaborative learning. The last dealt with their contradictory views toward conflict.

In terms of context, as adults with families and other obligations, many students spoke of the pressures of working full time and balancing their coursework, and as a result, this sense of expediency was no surprise. Many students used the phrase "getting things done" as a form of shorthand that conjured up images of crossing items off a to-do list. Tess described the thinking of her peers in terms of how they viewed the process of working together to plan and implement their team project: "We're all older so … someone will have a better idea than someone else. It doesn't matter [if your idea is better than mine] so as long as *it gets done* we're okay with it" (8:10). This remark was particularly telling because Tess acknowledged that the team's time constraints made it unlikely that they would be willing to devote the additional time to exploring or evaluating the merits of alternative approaches or ways of thinking.

Compilation versus knowledge creation. As a consequence, when required to participate in a team project, the same students also referenced a model of learning which was grounded in individual learning rather than group knowledge creation, which was based on shared understanding through negotiation of meaning. Instead, each member of the team worked alone to advance their personal understanding, then returned to the team to post a document that summarized what they had learned. Sarah described how her team approached their plan of care:

> Well, the research that I generate, I attach files. Like the interview I attached into a file … [And] my submission on how to diagnose CHF and the care plan, I submitted as a file. And [then] I submitted another file as my information [which was] condensed and put in a brochure. So I submit those files so the other teammates can look at them *so we can kind of piece together the final project* (14:45).

In fact, the team's decision-making processes were more closely aligned with the regulative dimension of SEA, which emphasized the management of the team's collaborative process rather than the epistemic. As a result, rather than constructing new knowledge, the team merely compiled their individual contributions to create a coherent document. Tess described the editing process in this way: "so what we need to do is maybe take parts of everybody's reports and you know, really focus it or channel it into one *cohesive* thought" (8:26).

Seeking multiple viewpoints; Sidestepping conflicts. A second barrier to the team's ability to advance their knowledge creation process was the team's ambivalent beliefs about the value of conflict and disagreements. For example, many in the team voiced support for being open to hearing a range of perspectives on an issue, as illustrated by Molly's comments:

> You definitely have to, in order to be a team player, be patient and willing to listen. I really don't have a problem with that. I always try to listen, even if I know something is right because I've done it before, I always listen to everyone, everyone's opinions or decisions or ideas (24:25).

Yet the team also struggled with attitudes that cast disagreements in a negative light. These contradictions were played out in how the team failed to address an important epistemic decision related to how best to use Tess's contribution to the plan of care. This episode highlighted how necessary it was for the team to be willing to surface and address disagreements, as well as consider and evaluate differences in opinion in a productive way, through discussion and feedback.

Tess, because of a recent job change which took place concurrent with the start of the team project, informed her team that she was unable able to participate in the three

scheduled team chats. Instead, Team B agreed that she would post her contributions in the team discussion area before and after each chat, for the team's feedback. In addition, Fern volunteered to be the liaison between Tess and the rest of the team.

Tess was not present during the second chat, when the team determined they would refocus their original plan of care with its nursing diagnoses to a brochure designed for the patient that provide interdisciplinary information on living with congestive heart failure. Rather than offering to contribute to this brochure, Tess reworked information she provided earlier to the team when they shared their initial nursing diagnoses-based care plans. She created a separate document intended for the health care providers who would work with the patient which addressed two key topics in the course: acknowledging cultural differences and genomic considerations related to race and ethnicity.

Although the team's initial reaction to Tess's information was positive when she posted her content in the discussion area, several students indicated during their interviews that they were surprised at Tess's decision not to incorporate her content into the team's brochure:

> But in the last discussion, we did decide on the educational brochure, and I noticed in one of the things she [Tess] posted online in the section discussion area [was] that she wants to do a PowerPoint instead of the brochure. But we already, we all agreed on the brochure and we're kind of planning it that way. I guess in the third [chat] session, that's going to be a topic of conversation (Sarah 14:10).

Yet despite this, Sarah did not raise her question in either the discussion area or the team chat, nor did anyone else on the team.

Struggling to deliver constructive feedback. It appeared that the team was also uncomfortable with discussing this event in their team evaluations. Only Sarah made

mention of it, and she characterized Tess's separate document as the result of a misinterpretation of the team's decisions during the second chat. When the topic of Team B's submission was brought up by members of the team in the second round of interviews, Denise described her reluctance to provide direct feedback:

> I think it's better to comment to the person like a private message as opposed to doing it on the discussion board. …You never want to make someone feel stupid. You just, it's more about helping them. Like what parts of the project I didn't understand like what to do, so I was asking a lot of questions, and personally I was a little nervous that someone, some of the other students were going think I was stupid for [asking] my questions. So I would rather a personal conversation, you know, messaging with the person that they have the questions or something like that. You never want to make anyone feel dumb. Ever. It's the worst feeling (15:37).

When asked if she provided any feedback to Tess on her section of the project, Denise stated that she wasn't able to comment on that section of the project:

> I had nothing to do with that section so I kinda can't. I focused more, I did a lot of the research on just congestive heart failure in the general population. There was another one of the group members that did it all for the African American because that was the actual case study itself was an African American woman, so all the research that I chose to do was more about, I didn't focus on the specific ethnicity, I focused more on like age and familial traits and is it, it could be hereditary and things like that. I just had different types of heart failure. That was my section. So I really can't discuss the other part (23:8).

In her final interview, Sarah ventured this explanation for the team's reluctance to discuss Tess's contribution:

> But she had put so much work into it that I don't think anyone felt comfortable saying "Hey, you need to scratch that brochure and put a small piece into the group brochure" so it was submitted as two final submissions (25:16).

Key epistemic issues left undecided. Another consequence of the team members' willingness to cast themselves as agreeable and non-confrontational was that the team failed to discuss the implications of not integrating Tess's content into the brochure. A review of the team's discussions and chat transcripts indicated that this topic was never taken up. As a result, the team failed to surface and address several important issues that that weakened the quality of their final project submission. Ironically, the content of Tess's contribution was in line with the instructor's documented learning outcomes, and would have strengthened the team's plan of care.

Yet, when asked if there were topics within the team that were a source of disagreements or different understandings, all members of the team chose to highlight positive interactions as seen in these two comments from Molly and Fern:

> And you know, we talked and everyone was able to agree. It was never argument, never any dispute. And it worked really well compared to how I thought it would work (Molly, 24:12).

> Yeah, and everyone has been very, how do you say it, no one's confrontational. Everyone kind of goes with the flow. And very respectful (Fern, 6:21).

Balancing regulative and epistemic initiative. In terms of context, it is interesting to note that the team's approach to organizing itself was decidedly informal. Molly described the arrangement in these simple terms: "Like my team, we decided at the beginning not to have leaders or a leader and everyone just agreed upon what was going to be done." Yet at the same time, the team's contract belied several more complex considerations. First, the contract implied a shared leadership arrangement which relied heavily upon the team's strong regulative focus by documenting the many necessary tasks, responsibilities, and due dates to be met. Second, the contract also was grounded in the

belief that all five members would deliver on what they had agreed to, by virtue of their formal endorsement of the contract which was submitted to the instructor.

Nevertheless, the actions and decisions that unfolded within the team reveal a different story of one individual whose initiative throughout the project was acknowledged as the impetus for moving the team forward to meet its project goals. It was Fern who took the lead in developing the contract. Sarah noted that "one group member [Fern], she actually asked everyone what they would want to do in the group and she created the contract and submitted it" (25:37). She posted an initial draft, incorporated their comments and revisions for review in two additional drafts, and submitted the final document to the instructor.

Fern continued in this role by moderating the three chat sessions and volunteering to be a liaison with Tess, whose work schedule precluded her participation. When the team faced the instructor's feedback that they needed to refocus their project, Fern suggested the brochure concept and identified the Microsoft Word template that served as the format of the final project. Sarah praised Fern's contributions, which were echoed by two others on the team:

> I feel like we kind of had one member that was the group leader. She kept everyone on track and due to the lack of guidelines for the project. I think that it was good that we had a group leader because otherwise…there would have been a lot of confusion and we wouldn't have stayed on track (25:35).

These comments were particularly telling because Sarah underscored an important belief that a leader *keeps the team on track* to accomplish its mission. This was especially significant because managing the team's collaborative process was another example where the regulative dimension was accorded primacy within the team. In contrast, the team made

no mention of the need for leadership or initiative to advance the knowledge-based work of exploring and evaluating ideas or clarifying or refining their understanding. This lack of awareness and recognition for epistemic leaders had significant consequences for the team.

In retrospect, only Tess with her contributions focusing on two of the course's big ideas related to culture and genomics, demonstrated the potential to fill this role. However, her inability to participate in the chats where important decisions were made reduced her ability to influence the team's knowledge creation process. The consequences of her isolation were manifest in two ways. First, the team was reluctant to discuss how they could have integrated her material into the team's brochure. Second, the rest of the team's commitment to using the Microsoft Word brochure template resulted in their decision to abandon the course wiki, which ultimately constrained the extent to which team members were able to see each other's contributions to collaboratively integrate and improve their plan of care.

Lack of face-to-face contact fueled doubts about using technology for collaboration. The team's use of technology tools to develop their shared knowledge object was initially shaped by their qualms related to using technology to support an online collaborative project, one of the primary themes identified in the student interviews. Sarah described her concerns this way:

> I was a little uncomfortable because I wasn't, I wasn't really sure what was expected and working in a group online, you know, there's already a lack of communication because you're online, you're not face-to-face (25:8).

Sarah not only identified her discomfort associated with unknown expectations in terms of using unfamiliar technology tools in her first online project, she also pinpointed a second

worry: how the team would communicate if the members were unable to meet face-to-face. The latter was problematized by Denise:

> Obviously when you're typing something, it's really easy [for someone] to misconstrue a sentence, as opposed to if you hear someone speaking it and you can hear the tone. But at the same time, it's easier to see the words. I like that because you can really see what somebody is trying to say as opposed to you're being misheard. But you feel like you have a chance of misreading (15:42).

Building upon this, Sarah envisioned how this might affect the work of a team trying to establish the focus of their project:

> There is going to be a lot of misinterpretation of what the final idea is going to be. One member might think it's going to be this way, or another might think it's going to be another way. So it's easy to kind of think of the final project as like, everyone kind of thinking it's a different way (14:33).

With this comment, Sarah highlighted the need for effective communications in order to ensure that the team shared a common understanding of each other's meanings of the ultimate direction of their project. In response to these concerns, Team B made a series of intentional decisions to ensure that they would establish adequate communications among themselves over the duration of the project.

Chats and discussions used as productive communications solutions. When drafting their initial contract, Team B was explicit in describing how they intended to communicate and how often. They designated the following provisions: use of discussion area and wiki space for communications; weekly discussion-board postings to provide updates on progress; daily discussion check-ins to stay up-to-date; and scheduling of three team chats to be attended by all group members.

Yet, a contingency emerged which interfered with the team's plan to have everyone present at the chat sessions. Tess, who had agreed to the terms of the contract, missed the

first chat session because she had just accepted a new position with new work hours. When she shared this information with the team, Fern agreed to act as a liaison between Tess and the rest of the team, who decided they would retain their chat schedule. This was to have further implications as the team authored their plan of care.

Despite this change in plans, the team was satisfied with the communication arrangements they put in place, and found the chats particularly helpful. Those who participated observed that the chats were useful for obtaining immediate responses related to "clarifying questions" (14:16), "clarifying ideas" (25:25), and for providing "direction on how we wanted to work" (23:21). For those who missed a chat session, the automatically generated transcript was viewed as a valuable record of what had been discussed (24:24).

The team also believed that they were making good use of their discussion area. Denise noted the value of the team discussion "to recap some of the real time conversation[s] and ask other questions if you weren't in the actual conversation" (23:46). Fern also described how the team used it to make decisions:

> And we're all communicating in discussion board okay, and we're coming to a consensus, like people throw out ideas and then we all take a vote, kind of like, a majority kind of vote. So that's going fairly well" (6:14).

Yet, given the priority accorded to communications, the team appeared to be less purposeful in their consideration and use of the course authoring tool, the wiki, which was set up for the team and awaiting their use.

Replacing authoring tools alters regulative and epistemic activities of team. Although the final project instructions for the team contract called for students to use the wiki page established for this purpose, Team B ignored this. Fern, the student who took the

lead in starting the contract work, posted a preliminary draft of contract *in the team's discussion area* for her peers' feedback. Within the text of her draft, she embedded her questions to the team. As her peers posted comments and recommended revisions, Fern incorporated these changes offline into a new draft which was then pasted into a new discussion post for further review. This process was repeated three times to arrive at the final version of the contract. Only after this was completed did Fern paste the team's final negotiated text into the designated wiki page; it was submitted through the assignment drop box.

Having established this pattern of use for the discussion area, Team B continued in this way to develop their plan of care. The team determined that everyone would author an offline plan, focused on a specific nursing diagnosis, which was to be posted in the team's discussion area for review, rather than use the team wiki page designated for this purpose. When Team B finally did begin to use the wiki, they used it primarily to upload *individual* files to share with the team, rather than as a shared authoring tool. As a result, the team set themselves on a path that severely constrained their *collaborative* knowledge creation process. With this approach, each of the team members continued their pattern of working alone to write up their contributions which would then be compiled into the larger project.

Unintended consequences for shared knowledge object. The development of the team's shared knowledge object underwent several transformations as they struggled to fully understand the requirements of the final project and made multiple attempts to revise and refocus their efforts, as evidenced in their transitional artifacts. Figure 12 provides an overview of the development of the team's shared knowledge object.

The team encountered a significant setback to their progress when they received feedback from the instructor reminding them that their objective was to develop a *single* interprofessional plan of care that established priorities using the information gathered from the health professional interviews and a care plan focused on health promotion for their assigned case that should include creative elements such as incorporating useful information, such as images, videos, diagrams, etc.

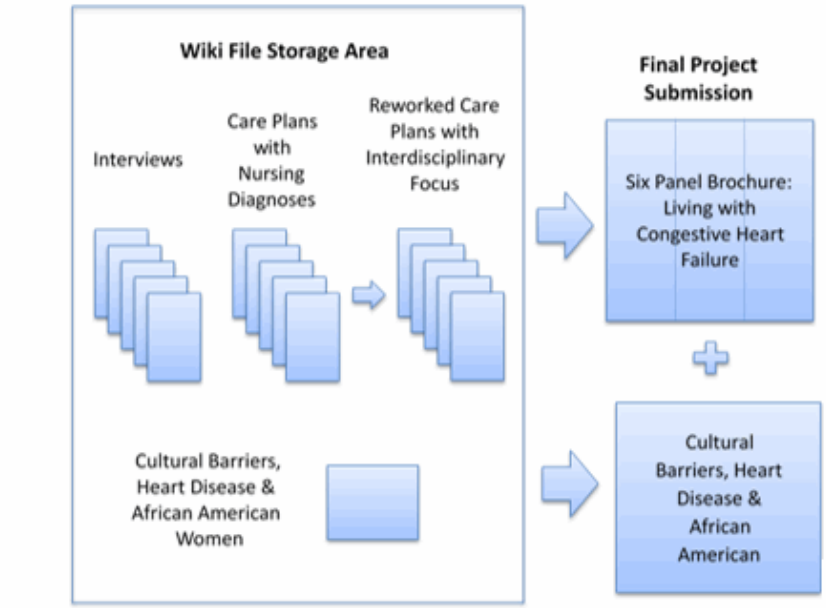
As a result, the team determined that they needed to rework their individual care plans, which were based on their nursing diagnoses, to align with the diagnoses and recommendations from their interviews with the other healthcare professionals. They then determined that they would use this information to refocus their project to create an *educational brochure* for Mrs. Gardner, their hypothetical patient, which focused on living with congestive heart failure. The team, in their next chat session, decided they would develop a six-panel double-sided brochure using a Microsoft Word pre-formatted template.

Meanwhile, Tess, the student who was unable to participate in the weekly chats where the team was discussing these issues and making decisions, struck out on her own. In addition to her care plan, Tess developed a separate document that summarized information on cultural barriers that had the potential to derail effective communications with patients as well as evidence-based research related to the genomic dimensions of heart disease and African American women.

Knowledge creation derailed. Ultimately, this sequence of events constrained the ability of the team to fully engage in the knowledge creation process, as evidenced in their failure to create an actual shared knowledge object that embodied their collective understanding. First, the team's decision to upload their care plan files in the wiki rather

than post the text in the wiki page meant that they were unable to interact with this content in order to in order to extend, refine, or elaborate on each other's thinking. Second, these ideas were never brought into a common space for further discussion or possible integration. Moreover, the storage of the team's transitional artifacts as files within the wiki (i.e., the plans of care that were to provide the necessary conceptual building blocks that the team was expected to work with) required additional effort to access and open. Furthermore, the team's choice to use the Microsoft Word template was unfortunate because this did not allow them to take an expansive approach to their knowledge construction efforts. Instead, with its pre-formatted bulleted presentation, the brochure format favored simplification, or at best distillation, over elaboration. Finally, this choice of presentation precluded the integration of Tess's information on culture and genomics, and resulted in the team submitting two separate documents that fell far short of representing a robust process of shared knowledge creation.

Figure 31. *Representation of Team B's failed shared knowledge object*



Team C: Slow, Steady and On Target

Participants. The four students who were assigned to Team C were all female working adults between the ages of 23 and 52, who had returned to college to complete their BSN. Three were enrolled in their first term, taking two courses during the Fall 2013 term. The fourth student was in her fourth term, enrolled in one course. The following provides some brief background information on each.

Althea, in her early twenties, studied at a local community college following high school and completed her associate degree in nursing. At the time of her enrollment in the RN to BSN program, she was employed at a hospital where she worked in the orthopedics and post-operative recovery units. She wanted to pursue critical care nursing in the future.

Samantha was in her late twenties and grew up in Montreal, Quebec. She was bilingual in French and English, and completed prior undergraduate studies in photography. After finishing her RN studies, she worked for several years in Montreal before moving to Brooklyn, New York, where she worked in a neonatal intensive care unit.

Pat first began working as a personal care aide in the 1980s, eventually progressed to home health aide work, and later completed her certification as a Licensed Practical Nurse. In 2008, she finished her associate degree in nursing, when she was in her early forties. She was in her fourth term of study in BSN program. She was employed as a nurse supervisor for a home care agency.

Crystal was 18 when she first volunteered for her local ambulance squad and became an EMT (emergency medical technician), which led her to becoming an RN. While studying for her associate degree at a community college, she worked in a hospital

emergency department. Upon completion of her license in 1998 she was offered a nursing position.

Team C's assigned case study: Boy with asthma. Manny Rivera, ten-years-old, is the oldest of three children. He is 4'6" tall and weighs 112 pounds. He lives with his parents, siblings, and maternal grandfather in an inner-city neighborhood. Manny's father is employed as a shift-supervisor (evenings) at the local grocery store; his mother cares for the home and family. The family is of Mexican heritage and has lived in the United States for eight years; the grandfather joined them just six months ago after his wife passed away.

Manny was diagnosed with asthma when he was four. As the school nurse for three years, you have assessed Manny's health, evaluated his ability to recognize symptoms, and monitored his use of the rescue inhaler; his technique is good. However, Manny is now in the nurse's office for the third time in two weeks, requesting his inhaler for difficulty breathing. These visits to the nurse's office have increased in frequency over the past few months, and this is a new pattern for Manny. Vital signs are:

- BP 112/76
- P 116
- R 40
- T 97°F orally

Team C chronology. This chronology highlights the main activities, events, and decisions that provided the context for Team C's work during this six week long project. Refer to Appendix S.

Using contract to manage risks of team unknowns. Team C's work on developing its team contract was affected by both internal and external circumstances. The inclusion of an intensive collaborative project in which students were required to author an interprofessional plan of care in their course was a curricular decision made by the BSN

program consistent with the need to prepare bachelors students for interprofessional cooperation as required by the AACN academic standards.

Within the team, three of the four members were in their first term of online study, and all described their unease with undertaking a fully online team project that precluded any face-to-face contact. Adding to their qualms were concerns about not knowing their fellow team members, their levels of commitment, or their work ethic. For example, Althea noted that "my only concern would be if everybody didn't put in a good effort and that affected my grade" (9:48). Paralleling this, Samantha observed that "when you're first starting to work with people, you don't really know how they work, and that kind of thing, but we all want to hand in a project to get a good grade" (28:56). Also adding to these individual worries were the widely shared stories of team projects that had gone bad. Pat recounted one: "At work there's a PA [physician's assistant] that was going for his master's and said 'oh my god when you have to do a group project, it's horrible' …He's doing it online" (27:41).

Fortunately, the team recognized the opportunity to address these concerns through their approach to their contract, and enacted a series of intentional decisions that allowed them to proactively offset any potential problems that could derail the group's collaborative efforts in the coming weeks. Their decisions were essential to helping the team lay a foundation for cultivating SEA and took into account the regulative and epistemic dimensions of this construct, and also an unexpected third area: the social domain.

Broadening the contract beyond regulative concerns. The team's regulative focus was evidenced in their efforts to manage their collaborative processes. For example, the team included several due dates, the most important of which was that the team would

submit its final project two days prior to the instructor's deadline. The team determined that all decisions would be made by consensus. They also established a model of informal shared leadership, in which "each member will be the leader of a different part of the project."

Perhaps most importantly, the team also placed a premium on the value of shared responsibility, one of the major concerns addressed at the start of the project. This was illustrated by this provision in their contract: "Poor participation and failure to complete tasks by any member will have to be absorbed by the group." Samantha explained why this was important to the team:

> You know, so if someone didn't pull their weight, obviously the rest of us would do it. But you know, we're hoping if you're in a program like this then you will be somewhat self-independent to get your work done (28:57).

Crystal's comments further underscored the importance of commitment and follow through:

> But the project has to get done whether one person does the whole entire project or four people do the project. It doesn't matter, it has to get done, and the same thing in nursing. You take care of your patient because [if] somebody doesn't do something [it] doesn't mean the patient doesn't get that care. So you know…it just says that we're going to pick up the slack if somebody else doesn't do it, but you can't have the end goal not done. Somebody's got to pick it up (10:55).

The inclusion of a provision that required the team to take up the slack for a non-performer may have highlighted the strong professional ethics and work standards of the nursing profession. At the same time, expecting team members to fully meet their commitment clearly established a minimum threshold of participation for everyone on the team.

The team also addressed one important epistemic decision. Their contract included a modest provision that called for students to consult high quality resources for their project. Its inclusion meant that the team agreed to submit work that was scholarly and evidence-based, which demonstrated their growing awareness of this program level standard. See Table 29.

Table 29. *Analysis of Team C's contract based on epistemic and regulative dimensions of SEA*

Regulative Actions	*Provisions*
Goal setting and Planning	Will submit project "two days in advance of due date"
Delegating Tasks	Interviewing tasks to be led by two members; Plan of care led by remaining two members
Monitoring	Team expected to check wiki every three days or as needed to meet deadlines
Identifying issues or problems	Conflicts will be "discussed when they arise and be met with professionalism and compromise" Infractions of guidelines will be discussed and a compromise will be sought
Evaluating quality	Each member is expected to submit work that this "evidence-based and scholarly"
Inclusion of strategies	"Failure to complete tasks by any member will have to absorbed by the group"
Providing help	Team members "will step in to help/assist if a team member is struggling" We will "ask for help when needed, early on in each section so that we stay on task"
Reviewing	Not addressed
Reflection	Not addressed
Epistemic Actions	*Provisions*
Awareness of lack of knowledge	Not addressed
Identifying lack of knowledge and knowledge-based problems	Not addressed
Collecting and examining resources	Each member is expected to submit work that is "evidence-based and scholarly"
Discussing misunderstandings	Not addressed
Producing, negotiating, refining ideas	Not addressed
Using feedback productively	Not addressed

Looking beyond epistemic and regulative decisions, the team also sought to incorporate a social element that they believed was an important contributor to their success, the inclusion of elements that described the team's expectations for providing mutual support and assistance. This was accomplished through several provisions that reflected these values: a willingness to step in provide help if another team member was struggling; making it okay to ask for assistance; recognizing the need for flexibility in meeting team goals; and encouraging a "spirit of compromise as working adults with many commitments."

Among the consequences of adopting the contract, Samantha noted that creating it had a positive effect on the work of the team:

> It was all kind of written up in the initial contract as a team and so … we didn't really have like conflicts or disagreements or someone not pulling their weight, so I think that kind of helped and made it quite seamless (28:52).

Pat noted that the team met its self-imposed deadline:

> I think it was very useful because ... we all followed it and we all got it in and …we said we were going to get it in two or three days before and we did (27:36).

Perhaps most importantly, Pat noted that the team's strong level of commitment to each other may have mitigated the emphasis on "getting things done" and encouraged each member to contribute their best efforts:

> [My team] *wanted to get it done, they wanted to do a good job.* I'm sure if you had other people that were like, you know [uncommitted], the contract wouldn't have meant anything… I feel that they were … "*Let's get this done. Let's get a good grade. Let's do our best…*" (27:36).

Although the contract learning activity was a relatively a low risk exercise and presented little challenge, it did provide the team with a positive approach that allowed them to address their concerns about each other's level of commitment in a productive way.

Adapting to new ways of demonstrating learning. A key element of SEA is the extent to which a team can make the transition to assuming greater responsibility for their learning. Team C had several important adjustments that were required: becoming more comfortable working without detailed project guidelines and models; making sense of the instructor's expectations for creativity; and learning to rely on each other instead of the instructor.

Contributing to these challenges were the following conditions. First, this team of four students was comprised of three who were new to the BSN program; all were participating in their first extended online team project. Second, the team was faced with a project that gave them considerable discretion to interpret, plan, and organize their efforts. Furthermore, this learning activity was very different from what the team had been exposed to in their associate degree programs.

The team's response to these concerns can be interpreted through a series of incremental epistemic decisions that provided the foundation for the team to make sense of the instructor's requirements for the project. For example, Althea noted in one of her discussion posts that she needed to re-read the case study instructions many times to understand what the team was being tasked to deliver. As a result of sharing this information, the team was able to quickly establish two important facts: first, that this was *not* to be an academic paper, and second, that they had been directed to use their team wiki to jointly develop the content of their interprofessional plan of care.

Nevertheless, the team was left unsettled by the latitude presented to them in organizing their work. Several team members recalled conversations with their peers in which they discussed their beliefs that the instructor should have been more explicit in specifying her expectations:

> We have [laugh] talked about how the project has been a little bit vague. We've been kind of having some discussions where we're saying 'I think she [the instructor] wants us to do this' or 'It sounds to me like we're supposed to do this' (Althea, 9:26).

> … I just wish they had this whole project and they showed us what exactly the outcome of it was (Crystal, 10:40).

Yet, one consequence was that some team members began to comprehend that the instructor had shifted the responsibility to the team to shape their response to what was perceived to be an ambiguous set of instructions. Pat observed that the project was *intended* to be open-ended rather than prescriptive:

> I think it was more of how the course was set up. … [The] professor wasn't really saying, "This is what exactly you have to do," you know, A, B, C, and D. It was more or less 'okay, whatever you do isn't going to be wrong.'... And I think that was a little confusing to people (27:23).

Interpreting the instructor's expectations for creativity. Related to this same concern, the team also struggled to make sense of the instructor's expectations for creativity. Pat made the following perceptive observation in her first interview: "But because all case studies skim the surface so you really have to look more into it and use your imagination" (11:9). With this in mind, Pat initiated a conversation with her peers that led to another important epistemic decision. After she read two of her team members' interviews with respiratory specialists, who suggested using a peak flow meter to help the patient better understand his asthma symptoms, Pat proposed that the team try find a photo

of a peak flow meter to make the care plan more interesting for a ten-year old boy. As a consequence, Crystal took up this idea and volunteered to develop a chart to record his results. Over the course of the project, this concept was fully elaborated in the care plan with customized peak flow zone targets based on the patient's height and weight, family-friendly instructions, web links to a video demonstration, and other educational materials. Through this example, the team demonstrated that they fully understood how the peak flow meter made it possible for the youth and his family to take a proactive role in managing his condition, and they met the project's requirements for a health promotion focus.

Moving beyond "getting things done." Initially, Team C students identified several beliefs that might have predisposed them to approach their project in ways that may have constrained the development of SEA. The first was related to an emphasis on task completion that seemed to deter students from taking adequate time to engage deeply with each other to advance their shared knowledge object. As working adult students with family and other obligations, this team also made frequent reference to "getting things done." Yet despite this, as described earlier, the team's contract, rather than having a strictly regulative emphasis on due dates and assigned tasks, included provisions for providing mutual support which emphasized that *how* the team got things done was as important as completing a task. For example, in the following quote from Althea, she noted that her team tried to remain conscious of each other's needs as they worked on the project:

> I think we all just did what we were supposed to do and...*everyone kind of looked back for each other and made sure that what we tried to do went well,* and it was going to be, turn out to be a nice, a good project (26:15).

Group learning as a compilation of individual efforts. Team C also shared Team B's beliefs that group learning within a collaborative project was the result of individual contributions that were assembled into a group product. Crystal observed:

> It's been a good experience, I have to honestly say I'm learning a lot and *I'm learning a lot more on my own.* You know…everything that you look up or research makes you want to explore even more than what, the basic knowledge. …One question leads to another question. In that sense, *I think you're almost teaching yourself* (10:10).

Although this pattern of working alone on a task and then reporting back to the team by itself was a reasonable first step in the knowledge creation process, if used exclusively it could have resulted in a form of decision-making that was biased toward the regulative rather than the epistemic. In the former, students believed their learning is complete once they post their contribution. In the latter, the team used this information to further explore, expand, test, and evaluate the ideas and concepts provided by the team to generate new ideas and concepts, an essential aspect of SEA.

Samantha also described a similar tactic for approaching a writing task, which confirmed the reason the instructor gave in her interview for not providing examples from prior classes. The members of her team used the wiki to flesh out Althea's initial outline, which was based on the ADPIE framework, for the team's plan of care: "So we each kind of filled in each category with our information" (28:19). Equally problematic was the belief that editing was sufficient to "come up with a cohesive project" (44:5). A further disadvantage to this fragmented approach, which relied on editing instead of discourse, was that it became more difficult for the team to arrive at a higher level of shared understanding about how to best integrate and prioritize all the needs, both physical and psychosocial, of the patient. Pat captured the essential weakness of this approach: "It should be holistic and

all together. Not … like separate. You need to bring it all together for that one patient" (27:11).

Limits of framing disagreements as conflict, while seeing need for multiple viewpoints. Lastly, for teams to assume greater responsibility for advancing their learning and participating fully in the knowledge creation process, students must be able to approach disagreements and differences in understanding in a productive way. Yet despite this, several members of Team C, when asked about their experiences with these types of situations, were quick to deny that there were any problems of this nature. Althea responded that there "hadn't been any conflict or disagreement" (9:25). Crystal affirmed that "there hasn't been any conflict there at all" (10:33).

Although both Samantha and Pat also concurred that there were no major disagreements within the team, they seemed to have a more nuanced understanding of how a comment that appears to express disagreement has the potential to surface alternative interpretations or approaches that might not have been considered by the team. Samantha described the following situation from the team's discussion on organizing their care plan:

> One girl had mentioned that she works on care plans quite a bit so she maybe had [a] structure that she frequently uses. She suggested … [using] that…Another girl had responded beyond the good idea but instead -- because we were not really going to be able to evaluate patients -- so maybe just [focus on] what our goals will be. *So I'm not disagreeing, but maybe just adding to enhance it,* and make it a little better (12:30).

Nevertheless, interviews with the team members revealed several instances where this discomfort with potential conflict constrained the team from digging deeper and advancing their knowledge creation efforts. During the initial period when the team was trying to decide on the format for its interprofessional plan of care, Crystal, in her discussion posting, floated a suggestion that the team consider developing its care plan

using PowerPoint and uploading the final document to the wiki. Althea, in her response to the team was unwilling to commit to this, and side-stepped the question by sending the instructor an email asking if this was acceptable. During her interview, Althea explained her thinking, but *not* to her peer Crystal, who made the original suggestion:

> I think one of the students mentioned doing it in a PowerPoint but it sounds like we're supposed to submit it in the wiki space. [Pause] And I guess for me this project is supposed to be for everyone who would be involved in Manny's case, not directed toward Manny or his family but directed toward like doctors and physicians and physician's assistants... I guess that's the audience I had in mind. Especially with our case, our patient being ten [years old] [laugh] I guess we'd have to... I think it would almost be too simplified if we were to direct it to him. And it might look overwhelming to him if we showed him the care plan (9:32).

By failing to take her concerns directly to Crystal through the discussion, Althea precluded the team from determining the *exact* audience for their care plan. In her recollection of Crystal's suggestion, Pat explained why she believed using PowerPoint to be a bad idea:

> It [the wiki] made the whole project a lot easier because I didn't have to figure out... I have not used PowerPoint much either… I think it [the wiki] was just easy because it was already in the project and it was kind of a blank page set up. We all knew we could access it and yeah, I think it definitely made a group project easier...We didn't have to worry about finding a medium for everybody (28:44).

Like Althea, Pat never shared her perspective with Crystal and the rest of the team for further discussion.

Despite these intentional efforts to sidestep differences in opinion, several students from the team acknowledged that conflicts in the work place were unavoidable. Samantha quipped that "There are more disagreements at work than within the group so far" (12:49). In contrast, Pat, described a more serious reality:

> You're going to have to compromise and come together to [determine] what's best for the patient. It might not always be what you think is best ….Because when you do get into a hospital you are working as a team. And you are going to have conflicts because not everybody is going to think the same, and everybody's not going to see the same thing for that patient (11:23-25).

The students in Team C also appeared to have an appreciation of the value of multiple perspectives as they related to group learning in general. Pat described what she had observed after taking several online courses:

> Everybody brings something different to the table and you can learn so much from each other if you just listen and respect what other people have to say, which I don't think always happens….You might have experiences I don't have, and I might have experiences you don't have, so we can all learn from each other (11:15).

Samantha, who worked in a neonatal intensive care unit (NICU), described how the team project affected her thinking:

> It was good to see what another nurse's perspective is -- even in a different field because I think quite a few people in this class … work in assisted living, home health care. That's like a really foreign place for me in an NICU which is like its own little world … (12:38).

Based on Crystal and Samantha's remarks, this openness and receptivity to other points of view was an asset worth further cultivation, but without the skills to constructively explore differences in thinking without fear of generating "conflict," this deficit reduced the ability of the team to fully participate in the knowledge creation process.

Regulative initiative recognized by peers; epistemic contributions were not. As described previously, the team's contract called for informal shared leadership in which two members were designated to co-lead two main project tasks. Samantha and Pat were assigned responsibility for overseeing the team interviews; Althea and Crystal were

responsible for the development of the care plan. Yet despite the formalization of these arrangements in the contract, other dynamics shaped the reality of the team's work together. From the beginning, Althea distinguished herself by her initiative. Althea took the lead in developing the team's contract and helped the team move forward with their plan of care. Pat described her contributions this way:

> I do not feel that we knew were [sic] to go with the project and all felt a little lost at one point. Althea finally took the ball and ran and did a great job with the outline of the project and this set the rest of the project rolling along…" (43:1)

In fact, many of Althea's contributions related to the regulative dimensions of SEA. She demonstrated that she was particularly capable of planning, monitoring, and guiding the team's progress through her well-timed discussion postings. Samantha was also very active in the team's discussion area, but her contributions were less substantive and appeared to have less influence upon her peers in terms of generating responses.

At the same time, two other students, who were perhaps less visible, also played an important role in the epistemic development of the team: Pat and Crystal. It was Pat who helped the team first see the potential for using the peak flow meter and the opportunities to be creative in fleshing out their assigned case with fictional details. Pat, by virtue of her longer tenure in the program, had some thoughtful insights on the importance of initiative:

> …you know, I've taken a few [online] classes and I've noticed that when we have discussions nobody want to be the first one to start the discussion. You just wait and wait. And you know what? I'm just going to post my stuff here…everybody can respond to it when they want….nobody wants their stuff critiqued… (11:30-32).

Although her initial effort at posting an outline in the wiki for the plan of care for the team to refine and develop further was lost, Pat did take an active role in the writing of the team's plan of care in the wiki.

It was Crystal who suggested creating a separate area in the care plan for gathering educational materials that could be targeted for Manny and his family's use, an important contribution related to clearly identifying the audience for their plan of care. In addition, her work in customizing the educational materials for Manny's peak flow meter also demonstrated her ability to think creatively.

A check of the wiki's history of revisions indicated that Pat led her team in terms of adding and editing the content of their plan of care in the wiki, the site of the team's shared knowledge object. Crystal ranked second, followed by Samantha and Althea, who simply pasted in their contributions to the report. When Pat and Crystal's revisions were examined more closely, both students not only refined their own contributions but also worked to expand and elaborate upon the work of their peers.

Initial doubts and confusion about using technology for group work. Prior to the start of the project, several members of Team C expressed their reservations about the lack of face-to-face contact and their difficulties in imagining how the project could be accomplished online. Pat captured the feelings of her team when she spoke about having to adapt to a new way of working with her peers:

> It's different than being in a classroom, and being able to meet and sit down and you know this is what it's going to be [like]… It was more difficult than that because you can't sit down as a group …We all worked opposite hours and when they could get on[line], I couldn't get on[line], and when I couldn't get on[line], they couldn't get on[line]. So it was trying to communicate through messages (27:16).

Once the project got underway, two others on the team described their concerns about the project tools. Crystal, an older student, had reservations about her computer skills relative to her younger peers and described her sense of disorientation after looking at the wiki: "You know, I'm just trying to navigate. And figure[ing] it out on your own is horrible. Absolutely horrible!" (10:8). Samantha, who considered herself to be "fairly computer literate" (12:13) was confused by the addition of the wiki to the more familiar discussion area and the chat. She described her reaction this way: "Now that we have added the wiki….some of our discussions are like "what the heck is going on?" (12:15). More importantly, her confusion was shared by the rest of the team.

Discussion area evolves as communications hub. In the contract that the team developed during the first week of the project, the members agreed to communicate using the wiki space and email, if necessary, but soon came to rely on the discussion area as their regular mode of communication. Althea described this informal decision: "We used the discussion. I know that we could have left notes in the wiki but I think we just it was kind of an unspoken general consensus that we were just going to use the discussion" (26:26). According to Samantha, the discussion area was most useful in providing a place for the team to stay in touch (28:13) and for addressing questions on how to proceed with the project (42:5). The team also ruled out scheduling regular chat sessions, given the constraints of their work schedules. The fact that three of the four team members worked 12-hour shifts made it particularly difficult to find a convenient time for all to participate.

Investing the effort to learn and understand the wiki. Yet, despite their initial reactions, the team slowly took responsibility for learning to use the wiki. Pat recounted in her interview: "I was a little confused about how to get things into it [the wiki] at first, and

then I sat here for like three hours one night trying to figure it out!" (27:14). During their interviews, both Samantha and Althea described accessing the wiki guide to make better sense of how to use this unfamiliar tool.

Despite Crystal's seeming vociferous dislike of the wiki, she demonstrated surprising agency and tenacity in learning how to use this new tool. For example, she was the first to attempt to access the file sharing area and it was through her efforts that the instructor learned that this feature was not working and arranged to have it turned on. Not satisfied with her solo efforts in teaching herself how to use the wiki, Crystal also sought help from Samantha who appeared to be more tech savvy. They arranged a chat session in which Samantha explained to Crystal how to copy and paste the text of her care plan from her original word processed text into the wiki's editor so that it could be saved and displayed on the wiki page. They also practiced uploading image files. Another indicator of Crystal's determination to master the wiki was the fact that she accessed the wiki user guide 11 times, exceeding all her team members.

Perhaps most telling was Crystal's determination to do a Google search to "actually look up 'what is a wiki'" (10:7). The article that she found was a particularly relevant one authored by a nurse educator. She shared this with her team in their discussion area and provided this rationale explaining *why the wiki was selected as a project tool*: "We are building on each other's research and experiences" and correctly quoted and cited the authors Kardong-Edgren, et al. (2009): "With a wiki learners can share information, experiences, and resources and can work together as a group" (Team C, Post 19). At the close of the project, she referred to and applied many of the concepts from the article in her self- and team assessments.

Most importantly, despite their initial misgivings, all four members of the team made full use of the wiki and all its features. Samantha described how the team worked: "We just kinda discussed outside in our designated area and then would like kind of go over back to the wiki and contribute" (28:4). One interesting thing to emerge from this process was that the team did make fewer discussion postings. According to Samantha:

> "… our discussions were, I guess, just somewhat less frequent because we were kind of just working on our own in the sense that we were kind of just contributing to the project [in the wiki] and we would kind of just go in, edit each other's work, keep adding stuff and then do a discussion and we'd kind of just let each other know what we were doing and where we were (28:1).

Ultimately, it was the team's persistence and tenacity in mastering the wiki and its features that established a solid foundation upon which to develop a shared knowledge object that met the instructor's expectations for a creative and interactive plan of care.

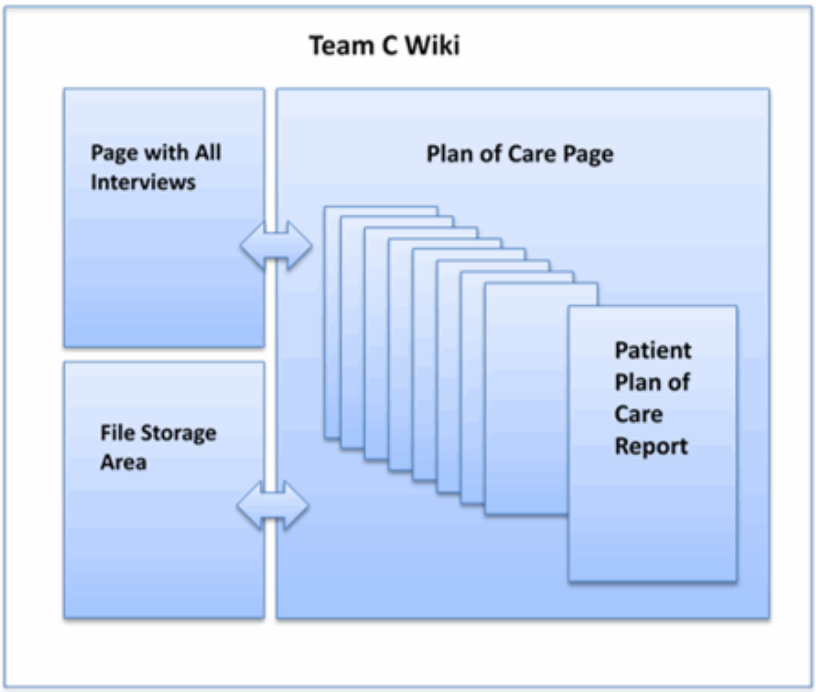
Evolution of the shared knowledge object. Although the team made use of the wiki's file sharing area, it served a secondary purpose for the storage of images under consideration for inclusion in their plan of care, rather than housing different versions of the interprofessional care plan. The only intermediate knowledge object developed by the team was a Microsoft Word document with the text of Crystal's initial contribution to the plan of care, which she then moved into the wiki when Pat taught her how to use the wiki editor.

Once Althea posted her preliminary outline using the ADPIE framework, the team quickly began adding new material and sections and began the process of interacting with each other's contributions. The development of content in the plan of care appeared to be organic in nature, with team members assuming responsibility for researching, identifying,

and adding initial information. Others on the team then jumped in and interacted with this content by editing to refine ideas and advance concepts.

The team also devoted considerable effort to elaborating various areas of the care plan. For example, the team expanded the narrative of Manny's family and his living arrangements, added images to the diagnosis section, created a plan with specific nutritional and medication interventions, incorporated personalized information on the use of the peak flow meter, and created a specific section with web-based resources that were focused on educating Manny and his family so that his asthma and obesity could be better managed with fewer visits to the hospital or clinic. Most notably, the team's efforts were continuous, meaning that the wiki was revised 69 times and accessed every day until its final submission, two days prior to the deadline. See Figure 32.

Figure 32. *Representation of Team C's development of shared knowledge object*



Conclusions

In this section I return to the research questions that guided my inquiry and summarize my findings.

2a. How did each team's epistemic and regulative decisions contribute to their shared knowledge object? My second research question in this qualitative inquiry examined the regulative and epistemic decisions made by the two teams in four areas: 1) determining their contract; 2) interpreting project requirements; 3) advancing their understanding; and 4) exercising initiative and leadership. A discussion of my conclusions and their implications follows.

Determining their contract. The provisions incorporated into the team contracts developed by Teams B and C addressed very real uncertainties that contributed to their anxieties about knowing little about their fellow team members with whom they had been assigned to work. At the root of this were unknowns about each person's work ethic, commitment, willingness to contribute their "fair share," and more broadly, the realization that shared responsibility has its risks. These are well-documented concerns among students who participate in online team projects (Janssen, Erkens, Kirschner & Kenselaar, 2012; Tseng & Yeh, 2013).

The inclusion of elements into the contracts that addressed responsibilities for specific tasks, determined procedures for dealing with noncompliance, and managing these risks affected each team's shared knowledge object indirectly to the extent that each team established a clear set of expectations for managing their collaborative process to develop their interprofessional plan of care. This same emphasis on the regulative dimension of SEA was also evidenced in each team's contract. Team B's contract emphasized due dates,

tasks, and procedural concerns. Team C's was less prescriptive and instead provided a broader framework for how the team would work together. Unlike Team B, they included a single epistemic requirement that members contribute resources that were scholarly and evidence-based.

Interpreting project requirements. Both teams shared similar apprehensions about their project and their instructor. In the first, the teams described their struggles to translate the project instructions into meaningful understanding of the instructor's expectations for a creative and interactive interprofessional plan of care, and believed that this difficulty could have been remedied with more detailed project guidelines and models. Contributing to these concerns was the need for both teams to adjust to a new type of instructor—one whose role was facilitative rather than directive—a common challenge for new online learners (Burkle & Cleveland-Innes, 2013).

As a result, the shared knowledge objects generated by each team were the result of very different regulative and epistemic decisions. Team B's superficial understanding of the project instructions resulted in their misconception that their project was to be an APA style academic paper. By incorporating this error into their contract and subsequently assigning research topics, the team mistakenly applied a regulative approach to an epistemic decision. As a result, when the instructor intervened at the mid-point of the project, the team was forced to re-conceptualize their project and lost valuable time that could have been spent on knowledge creation activities.

In contrast, Team C handled their concerns about the "ambiguity" of the project by returning to the project instructions for further discussion. As a result, their shared knowledge object not only met the project requirements, but they had sufficient time to

engage in the knowledge construction process by exploring, elaborating, and refining their shared thinking once they were able to translate the instructor's expectations for creativity. More importantly, by the close of the project, several on the team had acknowledged the instructor's project rationale and approach.

Advancing their understanding of the assigned case. The two teams frequently spoke of their need for "getting things done," which aligns with research by Fransen, Kirschner & Erkens (2011) that learning teams frequently act pragmatically when they must deliver results when working under short time frames. Unlike Team B, Team C did rise above this instrumentalist approach by incorporating elements related to mutual support into their contract that effectively conveyed that that *how they approached their work* was just as important as its completion. This strategy may have benefited the team by redirecting their efforts to engage more fully in the knowledge creation process.

The two teams also shared similar misconceptions about the nature of collaborative learning. Members of each group made reference to a model of learning in which students, when assigned to a team, work individually on research, write up their results, and then submit them so they can be edited into a "coherent" project. Team B adopted this pattern with their conscious decision to abandon the team wiki and worked offline to develop content that was pasted into a Microsoft Word template to create a one-page brochure divided into six panels. Although Team C initially adopted a similar approach in their wiki, over time, these students began to interact with each other's ideas to broaden and deepen the range of health promotion interventions they proposed in order to meet the needs of a ten year old Hispanic boy and his family in their shared knowledge object.

The two teams were also united in their dislike of conflict, which served to constrain each team's ability to surface and address disagreements related to their epistemic decisions. This finding is consistent with prior research related to online discussions (Byam, 1996; Clouder, Goodman, Buteau, Jackson, Davies & Merrian, 2011; Guiller & Durndell, 2006; Martin, 2013). As a result, Team B failed to develop an actual shared knowledge object that was fully conceptually integrated because the team was unwilling to discuss how Tess's document covering culture and the genomic aspects of heart disease among African American women might be incorporated into their brochure. Paralleling this, Team C side-stepped an important conversation in which they might have discussed more fully the audience for their plan of care, which could have sharpened the focus of their shared knowledge object. Although the students on both teams affirmed the need to respect other opinions and ways of thinking, they chose not to pursue these areas of disagreement. Lastly, this intentional avoidance of conflict was important to the realization of each team's project because this decision underscored the beliefs held by the two teams that internal disagreements were likely to be present potential barriers to completing their project.

Exercising initiative and leadership. Both teams took slightly different approaches to shared leadership, with Team B naming no leaders but documenting all their decisions within their contract, and Team C creating co-leaders for the two main project tasks. Yet despite this, both teams acknowledged that one student stepped forward in each group who managed their team's collaborative process. In both cases, these students distinguished themselves by their strong regulative focus by "keeping the team on track." This pattern of shared leadership, along with recognition of those who coordinate or supervise the team's

progress have been documented in other research on online learning teams (Fransen et al., 2011; Johnson, Suriya, Yoon, Berrett & La Fleur, 2002).

In contrast, neither team recognized comparable epistemic leaders who contributed to advancing the knowledge-based work of their teams, although in Team B there was one student, and in Team C there were two who demonstrated this potential. In both cases, if these students and their teams had recognized this role, their resulting care plans may have reflected greater depth and breadth in their development.

2b. How did the instructor's online interaction enhance or constrain each team's epistemic and regulative decisions? This subquestion examined how the instructor's interaction with each team enhanced or constrained their regulative and epistemic decisions in connection with the advancement of their shared knowledge objects. The instructor saw herself in the role of facilitator for this project, and accomplished this by monitoring each team's activities and providing direction and guidance when needed. An analysis of her postings found them to be almost evenly divided between those with a regulative purpose and those with an epistemic purpose. The former were used by the instructor to provide reminders and clarification. The latter served as prompts to help the teams deepen their thinking and advance their knowledge. It is interesting to note that the instructor's regulative interactions were generally followed by both teams; however, her epistemic prompts were not. In Team B, these were not taken up or addressed in their discourse or in their shared knowledge object. Of the two epistemic prompts directed to Team C, only one was indirectly addressed.

2c. How did the team's use of project technology tools affect the development of their shared knowledge object? In technology-mediated learning which is intended to

support knowledge construction pedagogy, the shared knowledge object developed by the team embodies the team's interactions and collaborative efforts (Paavola & Hakkarainen, 2005). Given this, a closer examination of this shared artifact, in its emerging forms as drafts and transitional/intermediate objects, is warranted. So too is a closer look at how and why each team used the project technology tools provided to them in their course to develop their shared knowledge object, the plan of care which was submitted as each team's final project. Examining the evolving artifact through the team's use of technology tools can also illuminate the extent to which the team was able to demonstrate SEA, by acting productively, intentionally, and systematically to organize both their collaborative process and their knowledge construction efforts.

The introduction of the project tools—the wiki, related discussion areas, and chat—as part of a dedicated team collaborative workspace presented challenges to the team's collective agency at two levels. First, the team members needed time to learn how to use unfamiliar tools and features in order to *use them purposefully*. They also required practice to become adept in using the course links to navigate among these tools. Second, the team had to *determine how best to use these tools to support their knowledge creation process* and the development of their shared knowledge object.

Although both teams made different choices about their communications tools, not all of these were sound and supported their regulative and epistemic decisions related to managing their collaboration and advancing the knowledge creation process of their team's shared knowledge object. Team B used the chats to schedule regular project meetings where the team reviewed their progress and made decisions. Team C used the chat function on an ad hoc basis to support a coaching session.

In their use of the discussion areas, the two teams demonstrated divergent approaches. Team B relied upon it to post different versions of their contract, interviews, and final project and to obtain feedback from each other, *in lieu* of using the wiki as a shared authoring tool. Team C used their discussion area to organize themselves, leave notes, questions and comments related to their progress *within the wiki* as they developed their interprofessional plan of care.

In terms of authoring tools, all of the members of Team C used the wiki to jointly contribute to the development of their interprofessional care plan by adding text and images, and elaborating and refining their thinking. In contrast, Team B appeared to resist learning to use the provided wiki, except as a file sharing tool, and as a result opted to use a Microsoft Word template to develop their shared knowledge object, a brochure. As a result, the team no longer had a central location where all team members were able develop and interact with its content. This decision severely constrained the team's knowledge creation process. Team B's epistemic decision to develop a brochure further reduced the ability of the team to demonstrate the advancement and refinement of their thinking, because this format ultimately encouraged a reduction and simplification of their ideas.

Chapter Summary

In this chapter, I addressed my second research question and two subquestions by examining student interviews to develop primary themes using Strauss and Corbin's inductive approach and secondary themes from student interviews using Saldaña's values coding. I also examined the instructor's interactions with each team, their team contracts, their use of project technology tools, and their shared knowledge objects. I presented my findings with case analyses of each team in which I described the meanings that each team

brought to their interactions as they developed their interprofessional plan of care. Using the conventions of process analysis, I addressed how and why each team undertook their epistemic and regulative decisions and how this was manifest through their shared knowledge objects.

Chapter 6 Synthesis, Implications, Recommendations

This study has explored the role of instructional design in the development of shared epistemic agency (SEA) when RN to BSN students work in teams to complete a six week long collaborative project in an online course. Because nurses are expected to collaborate in the workplace on an intra- and interprofessional basis, SEA is important to the emerging research related to knowledge construction pedagogies in the field of online nursing education, and SEA-informed instructional design has the potential to shape productive learning spaces in learning management systems (LMSs) to support team based learning in their academic and future professional work.

In this convergent parallel mixed methods study, I conducted one strand of research using quantitative content analysis (QCA) to examine each team's discourse to count frequencies of SEA indicators that measured the extent of student knowledge creation and group regulatory processes. My second strand examined interviews conducted with project teams and their instructor for the purpose of thematic analysis, and combined this with analyzing student artifacts and instructor interviews to develop case studies that described the regulative and epistemic decisions of each team to understand how this affected their shared knowledge objects.

The QCA strand provided quantitative measures of individual student and team regulative and epistemic actions that were derived from the theoretical work of Damşa et al. (2010) and Shea et al., (2012, 2013, 2014) to create coding schemes to measure these two constructs. These frequency counts by category revealed what students talked about in their discourse and how this was translated into schemas of different epistemic and regulative actions, and how often. In terms of the regulative dimension of SEA, both teams

followed very similar patterns with monitoring being most prevalent, followed by comparable levels of forethought and planning, strategy use, and most infrequently, reflection. In terms of epistemic actions, Team C explored fewer concepts than Team B, but had twice the overall number of generative collaborative actions, indicating a higher level of knowledge creation. Perhaps most striking was the fact that both teams' regulative actions far exceeded their epistemic actions on a scale of approximately five to one.

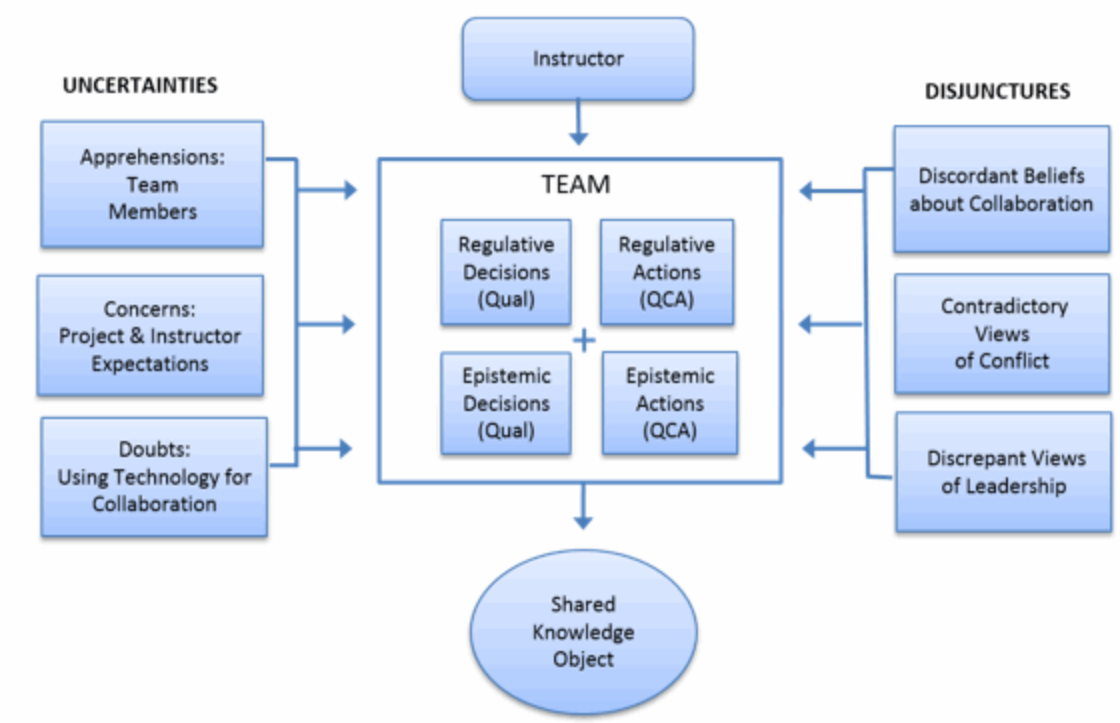
Taken on their own, these results cannot explain why or how the above actions occurred within each team. To identify the complex variables that provided the context for these results required a separate qualitative inquiry to examine concurrently the *epistemic and regulative decisions* of each team as they worked to create team contracts, developed their shared knowledge objects, interacted with their instructor, and made use of their project's technology tools. Only by examining the experiences and the meanings that each team brought to their participation in this six week long project could a more complete picture of SEA be presented.

What emerged were a series of apprehensions related to working on teams at a distance, concerns about the instructor and her expectations, and doubts about using technology for collaboration. In addition, students brought with them certain attitudes and beliefs about collaboration, conflict, and leadership that shaped their interactions and their final projects. Figure 33 represents how these two strands of research were analyzed in combination to provide a fuller understanding of how and why SEA was, or was not, manifest within the two teams.

The remainder of this chapter begins with a review of the construct of SEA. I then used my final research question to structure the synthesis of my quantitative and qualitative

findings: *What contributed to supporting or suppressing SEA in the two teams?* This chapter concludes with implications, recommendations, study limitations and final thoughts.

Figure 33. *Synthesis of Combined Quantitative and Qualitative Results*



Shared Epistemic Agency

SEA, as advanced by Damşa et al. (2010), describes a theoretical concept that is demonstrated by small groups of learners working together who assume joint responsibility for developing and advancing shared conceptual artifacts and demonstrate they are active and productive contributors in a sustained process of knowledge creation. It is through this collaboration that they systematically organize their efforts to achieve collective epistemic goals in which they advance their own knowledge. As such, SEA

parallels the nature of work and skills required of knowledge workers, particularly among nurses who are expected to participate in intra- and interprofessional healthcare teams to plan and deliver quality care for patients.

SEA, as it relates to knowledge construction pedagogy, is an emergent process that does not rely upon the acquisition of facts or procedural approaches. Instead, learners participate in the creation of new knowledge by going beyond the content originally provided to them by their instructor or found in assigned resources and texts. Knowledge is arrived at through the sharing, negotiation, and refinement of their thinking.

According to Damşa et al., SEA has two distinct dimensions. The regulative is concerned with the management of the team's intentional collaborative process in which learners demonstrate forethought and planning, monitoring, strategy use, and reflection in connection with the production of their shared knowledge object. The epistemic refers to purposeful learner knowledge-directed actions that include identifying problems or lack of information, finding solutions, creating shared understanding, and undertaking generative collaborative actions to explore, evaluate, and improve new ideas.

The focus of these activities is materialized as a jointly created shared knowledge object, which takes the form of artifacts such as reports, essays, models, or other concrete embodiments of knowledge that make explicit the contributions of both "individual expertise" and "communal knowledge" to cognitive processes (Damşa et al., 2010, p. 154). In this study, teams of online students were provided with discussion areas, an online chat tool, and a dedicated team wiki within their LMS in which to collaboratively develop their shared knowledge object: an interdisciplinary plan of care focused on health promotion for their assigned case.

What Contributed to Supporting or Suppressing SEA in Each Team?

In this section, I outline six key factors that enhanced, constrained, or resulted in mixed outcomes related to SEA in the two teams. See Table 30 below.

Team contracts addressed concerns about shared risk and responsibility. The addition of the team contract learning activity provided students with a constructive way to address their initial apprehensions related to knowing little about their fellow team members with whom they had been assigned to work. At the root of this were unknowns about each person's work ethic, commitment, and willingness to contribute her "fair share." By scheduling the contract as the first task that was undertaken by each project team, this activity made it possible for students to act with purpose, intentionality, and autonomy to establish guidelines and clear expectations for how they intended to work with each other. Team B's contract was notable for its reliance upon assigning tasks and due dates. Team C's was somewhat more broadly focused in that it also provided a framework for how the team would work together by focusing on shared values and adding a provision that called for the team to take up the slack for nonperformers, while using their team assessment process to document this. However, what was most notable was that both teams, consciously or unconsciously, chose to direct their attention to considerations that were *not* directly associated with the knowledge creation aspects of their project.

Table 30. *Contributors to supporting or suppressing SEA by team*

Factor	Impact		Timeframe	Comments
	Team B	Team C		
Team Contracts	Mixed	Supported	Project start	Neither team revisited their contract during project, but felt they addressed their concerns about shared risk and responsibility
Wiki	Constrained	Supported	Project start +	Team B did not generate a shared knowledge object due to its limited use of the LMS wiki Team C made investment of effort to learn wiki and created a robust shared knowledge object.
Propensity for regulative over epistemic actions	Constrained	Mixed	Project start +	Students were most familiar with planning and organizing aspects of collaboration to the exclusion of epistemic actions
Narrow views of conflict	Constrained	Suppressed	Mid-point +	Discomfort with conflict resulted in unaddressed regulative and epistemic issues and withholding of feedback in both teams
Misperceptions about collaborative learning	Constrained	Mixed	Mid-point+	Viewed as series of compilation and editing tasks; This was a barrier to engaging effectively in knowledge construction
Instructor's role	Mixed	Mixed	Through-out	What is the optimal role? Monitoring and intervention needed at key decision points in each team

LMS wiki was a viable authoring tool for developing shared knowledge objects, when its full functionality was used. The SEA construct is grounded in a knowledge-construction pedagogy called the trialogical model, in which students participate in collaborative inquiry with the goal of creating new knowledge through their sustained work on shared epistemic objects (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004; Paavola & Hakkarainen, 2005; Paavola, Lipponen & Hakkarainen, 2004). In this model learning occurs when individuals work collaboratively to develop mediating shared artifacts through their interaction. Thus, technology-mediated learning environments have the potential to support the development of shared knowledge objects that direct, focus, and organize the learning community's activities around artifacts that represent the efforts of their joint inquiry.

The selection and implementation of the Moodle wiki as the locus for the development of the teams' shared knowledge objects was successful in only one of the two teams. Team C was able to make effective use of the wiki largely because its members were willing to invest the necessary time and effort to learn to use it. They accomplished this by using the wiki guide that outlined its features and functions, experimenting with the tool itself, and supporting each other by offering tips, hints, and answering each other's questions in their discussion area. Other examples of intentional effort included a student sharing an article she found on how wikis are used for collaboration in nursing education, and a chat session where one student tutored another in adding content to the team wiki.[10]

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[10] As described previously, Team A was removed from the study because the group decided to develop their shared knowledge object using authoring software that only one of five team members had direct access to, severely restricting the collaborative development of their shared knowledge object.

In contrast, Team B never mustered a concerted effort to learn to use their assigned wiki, but instead sought alternatives by turning to more familiar, but limiting, technology tools. The team used their discussion area to post multiple versions of their contract that reflected the work of individuals editing in serial fashion, rather than interacting with each other's contributions. They also relied upon the wiki's file storage feature to upload individual care plans rather than adding this content to their wiki page for review and further interaction. Lastly, Team B determined that they would use a Microsoft Word template to develop their final project, with the result that they did *not* actually generate a shared knowledge object that represented the mediation of their joint inquiry.

As a result, only Team C was able to fully engage in the knowledge creation process in which they interacted with other's ideas through their collaborative authoring process. This approach ultimately made their thinking visible via their continuous contributions to the wiki. By using the course-designated wiki, the team was able to jointly establish the structure of their care plan, elaborate upon the narrative of their patient's family life, develop patient centered educational materials, and incorporate a wide range of web resources that supported health promotion for their assigned case.

Lastly, it should also be noted that it was not possible to integrate the team discussion areas and chat feature with the LMS wiki as a single work area for each team due to technical limitations. Yet, despite these shortcomings, both teams did not appear to be disadvantaged by having to move between the wiki and these communications tools.

Students' propensity for regulative actions. The results of the quantitative content analysis showed that regulative actions outnumbered epistemic actions in both teams. This was further reinforced by findings that the two team contracts included many regulative

provisions such as planning, assigning tasks, and due dates. This was particularly evident in Team B, which focused narrowly on these concerns. Not surprisingly, both teams also accorded primacy to managing their collaborative processes over advancing their knowledge creation work.

This may have been the result of students gravitating toward more familiar tasks that they readily associated with collaborative project work. Still another contributing factor may have been the emphasis on "getting things done" that underscored the pressures these students experienced as working adults with families and other obligations.

Furthermore, despite contracts that called for shared or informal leadership, students from both teams highlighted the contributions of a single person on their team who they acknowledged as leader. In both instances, these students were recognized for their regulative contributions that kept their teams on track and moving forward to meet their deadlines. More importantly, neither of these students, nor anyone else on their teams, was acknowledged for their epistemic contributions that advanced their teams' knowledge creation process.

Student views of perceived conflict constrain deeper epistemic engagement. The results of the student interviews indicated that the two teams needed a better understanding of the goals and purposes of knowledge construction pedagogy in order to participate effectively. Although many students made reference to the need for multiple viewpoints in collaborative work, they were unable to translate this thinking into productive action. With but a few exceptions, most students had difficulty recognizing that not every disagreement in thinking was, in fact, a conflict and that there was value in

exploring differences in understanding to arrive at shared meaning, which is essential to advancing a team's knowledge.

Misconceptions about the nature of collaborative learning inhibit knowledge creation. Students on both teams referenced a modest model of collaboration in which students, who are assigned individual tasks, go off and complete their work and then return to assemble their results. This was particularly evident in Team B. Even within Team C, during their initial stages of working in the wiki, the contribution of the ADPIE framework as a way of structuring their care plan was construed by some as an opportunity to "fill in the blanks." Paralleling this, some students referred to the need to edit each other's contributions for consistency and coherence as a key strategy for developing an artifact that represented the team's shared knowledge.

Understanding the optimal instructor role in team project. Although Damşa et al.'s 2010 study did not specifically address the role of the instructor, this deserves further attention. In this course, the instructor saw herself in the role of "a resource and facilitator," who monitored each team's progress and intervened to provide direction and guidance when needed. This aligned with the BSN programs' expectations for all instructors of this course. An examination of her online interaction with the two teams found that her course announcements and discussion posts were almost evenly distributed between supporting each team's regulative and epistemic efforts in the development of their shared knowledge object.

The most significant regulative contribution of the instructor to Team B was the course announcement reminding students that their final project was not an APA style paper, but instead an interprofessional plan of care focused on health promotion. This was

instrumental in helping the team to reconsider their original approach and modify their plan of care. Her two separate discussion posts during weeks 13 ad 14 reminding the team to post their work in the wiki were followed, only to the extent that the team uploaded their individual documents to the wiki's file area, rather than adding this content to the page established for authoring their plan of care.

The instructor used several discussion postings as epistemic prompts to deliver positive feedback on their progress. She also attempted to engage each team by asking them to consider the financial and insurance situations of their assigned cases as a way of stimulating anticipatory thinking. It was notable that Team B did not take this up in their discussion, and in Team C, this generated no further discussion within the team, with the exception that one student researched state-funded low cost prescription plans on her own and added it to the plan of care.

A related issue was students' perceptions of their online instructor. Students in both teams described their initial discomfort as they slowly became accustomed to someone who did not adopt the role of a highly directive teacher who provided detailed examples and checklists of requirements for use in completing their team projects. One result was that both teams struggled to make sense of the instructor's expectations for creativity in their care plans.

Team C was more successful in eventually seeing the potential to expand their patient's narrative and develop educational materials, such as their collection of peak flow meter information that was customized for their patient's height and weight. Team B believed that developing an educational brochure for their assigned case, Mrs. Gardner, met this creativity requirement, but their inability to jointly author its content resulted in its

failure as a shared knowledge object. Only at the course's conclusion did some students realize that the nature of their project was intended to be open-ended and that their confusion was the result of having to adapt to a new form of learning.

Implications

If agency is the belief that one has the freedom and ability to act, then ensuring that students, who are expected to work in teams with the goal of knowledge creation, are well prepared to act in *productive* ways is a fundamental concern. According to Lipponen and Kumpulainen (2011), agency is an enabling factor that contributes to *intentionality, purposefulness, and autonomy.* Thus, it follows that these three elements provide more general, but equally meaningful criteria for assessing when SEA is evident in student teams.

Intentionality, however well meaning, without a firm grasp of purpose results in misguided effort; autonomy without meaningful direction is unproductive. This, in essence, distinguishes the more successful outcomes of Team C from Team B. With these concerns in mind, students who are expected to cultivate SEA need systematic guidance and direction to establish clear purposeful goals and develop practical strategies to advance their epistemic work and manage their collaborative process. They must also be able to sustain their collective knowledge construction efforts by advancing and deepening their understanding. Lastly, they must comprehend the purpose of their efforts, embodied in their shared knowledge object, as the physical manifestation of their collective thinking.

These are challenging expectations for students in general, but were especially so for the nine BSN students who comprised the two teams that comprised this study, because seven of these nurses were enrolled in their first term of study in a fully online program.

When considered within this context, the efforts of these two teams to quickly organize themselves within a period of six weeks, to research, interview, and co-author a creative interdisciplinary care plan using the tools provided within their LMS was clearly a substantial effort.

Despite their uncertainties associated with working at a distance with unfamiliar peers, both teams demonstrated their willingness to collaborate, and their awareness that this was a very real expectation of their workplaces. However, in order to develop, foster, and sustain SEA among nursing students during their BSN studies and beyond, there is a need to better understand this construct and its elements to promote and support intentional and purposeful agency and informed autonomy when they are called upon to work in teams.

Theoretical and Practical Implications

Because the construct of SEA is grounded in the ability of students working in groups to assume greater responsibility for their learning, one finding of this study was that students working in teams need adequate preparation and guidance to cultivate more productive and informed types of regulative and epistemic autonomy. From a theoretical perspective, this study identified two areas that require further exploration: the contribution of student leaders and initiative within teams, and the role and functions of the instructor in helping teams develop SEA.

Leaders within teams. As described previously, there is a need to reconcile the contributions of students who are recognized as leaders with Damşa et al.'s construct, which does not account for this type of initiative. As this study has shown, students on both teams did recognize their peers who they believed moved their teams forward to

successfully complete their project, even if their perceptions were limited to acknowledging only the *regulative* dimension of SEA. Of particular concern was the inability of Team B to recognize that they and their perceived leader were responsible for a series of misguided epistemic decisions.

As a result, these findings surface new questions: To what extent are leaders necessary in this model of learning? What, if any, is the role of a leader in a team that has made a conscious decision to share collective responsibility for its learning? If and when leaders do emerge, what types of roles should they play, and what might the optimum balance be between an epistemic and regulative focus?

Role of the instructor. There is still much more that needs to be understood concerning how instructors can best support the work of independent teams who are engaged in computer-mediated knowledge creation activities. The instructor in this study saw her role as "a resource and a facilitator" who monitored each team's progress and intervened when necessary, in line with the BSN program's expectations for instructors for this course.

Overall, the instructor's interaction was nearly evenly divided between regulative and epistemic purposes. The instructor's most important regulative messages were directed to Team B, reminding them to post their work to their wiki page, which the team skirted with unfortunate results for their shared knowledge object. In a similar vein, the instructor's epistemic interactions with both teams, which were intended to stimulate anticipatory thinking, had only limited results because neither team used these prompts as the basis for further discussion. Instructor scaffolding and modeling, and subsequent

fading, of specific questions to deepen a team's awareness of their knowledge creation process, may also be a productive approach.

There is a pressing need for future research to explore more robust approaches to guiding instructor interaction that might better align with specific aspects of SEA. For example, there is a need to further unpack the regulative dimension of SEA to confirm and refine our initial understanding of the communicative versus metacognitive aspects of SEA.

Furthermore, another avenue for investigation is the implementation of the originally planned *metadiscourse* discussions, in which teams intentionally review the progress of their collaboration. Given that the current study found that students demonstrated five times as many regulative actions relative to epistemic actions, it is recommended that the focus of this metadiscourse analysis be restricted to *epistemic* concerns. Future inquiry should also explore the optimal combination of regulative and epistemic actions that result in teams that are most effective in their shared knowledge creation process.

Another important consideration is how best to use the instructor's valuable time supervising and monitoring multiple team projects. One approach might be to identify preparatory work that can begin prior to the start of the project in the form of scaffolds, resources, and learning activities that are focused on helping teams develop the necessary skills and confidence to engage effectively in this new form of learning. With this foundation in place, instructors may be able to be more strategic in their timing of their participation, diagnosing of problems, and providing effective interventions.

Instructional Design Recommendations

With these findings in mind, I offer the following instructional design recommendations as interim solutions to better prepare BSN students for more effective participation in the knowledge creation process.

Assist BSN students to understand what knowledge creation-based learning is and why it is important. For students to meet or exceed learning outcomes using knowledge construction pedagogies, it is necessary to provide additional information that contextualizes and rationalizes this approach. This could be accomplished by the inclusion of brief readings, videos, or mini lectures that explain how the nursing profession has been impacted by a shift to a knowledge-based economy, and its implications in the workplace as intra and interprofessional collaboration is required to plan, evaluate, and develop new forms of knowledge as part of delivering high quality health care. Additionally, students who are returning to college following an associate degree study that is clinically-focused need to understand that learning is no longer limited to the acquisition of factual information or mastering procedural approaches, and that new skills related to knowledge construction and group collaboration are required.

Develop student awareness of the distinctions between regulative and epistemic activities as they relate to collaboration. This study revealed that students clearly gravitate toward the familiar, and find it easier to manage their collaborative process rather than their epistemic activities. To establish a firmer grounding in what takes place during knowledge creation activities, students who work in teams need to understand not only the difference in focus between epistemic work and group regulative processes, but that *both* areas are necessary in this form of learning. These distinctions can be conveyed through

checklists or mid-project assessments that require teams to answer questions that map to different types of actions within each category in order to diagnose problems and provide feedback.

Guide new BSN students toward gaining a better understanding of the nature and purpose of academic conversations and how to participate effectively. To participate effectively in online discussions and collaboration, many new students need help understanding the conventions of academic conversations. Without this awareness, many students may be uncomfortable offering their thoughts on a topic, or perceive a response that does not affirm their position as a slight or a source of conflict. Also related is the need to help students understand that the nature of meaningful academic discourse is more complex and nuanced than simply choosing sides of an issue.

To move new students in this direction, there are a number of strategies that provide concrete ways to stimulate discussion, generate alternative ideas, and advance and deepen these conversations. There are existing lists of common questions that can be used to develop critical thinking skills that can be adapted and incorporated into project resources to provide students with a toolkit of concrete examples of effective questions, such as materials published by the Foundation for Critical Thinking or found in the work of Allison King (1995).[11] By encouraging student use of these probing questions and prompts, a team can be assisted to shift from focusing on procedural or factual concerns to the business of generating, clarifying, advancing, and evaluating ideas.

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[11] See Paul, R. & Elder, L. (n.d.) *The Miniature Guide to Critical Thinking* Concepts and Tools, Tomales, CA: Foundation for Critical Thinking, p. 12, retrieved from http://www.criticalthinking.org/files/Concepts_Tools.pdf. In addition, Alison King has developed question stems in Inquiring minds really do want to know: Using questioning to teach critical thinking, *Teaching of Psychology* 22(1), p.14.

Explain why teams will be working in a wiki and how it supports group collaboration. As described previously, students bring to their collaborative projects a number of concerns and apprehensions related to their peers, sharing responsibility and risk, and questions about the feasibility of accomplishing the work that needs to be done using online tools when they are physically separate. At a practical level, teams can benefit from watching a brief video that demonstrates how a wiki works. Common Craft's popular 4-minute long video called *Wikis in plain English* shows how a wiki can be used to coordinate the efforts of a group planning a picnic.[12]

Among adult learners, research has shown that understanding the relevance of instruction is frequently cited as an important expectation (Donaldson, Flannery and Ross-Gordon, 1993). With this in mind, providing a rationale for the selection of the wiki tool that describes its practical affordances in providing a shared platform for joint authoring at a distance, its ease of access as a common tool in the LMS, and its value in permitting ongoing revisions can go a long way in satisfying student curiosity and concerns.

Give students more opportunities to practice epistemic activities. Knowledge construction pedagogies are an unfamiliar form of learning for many students who are returning to college. Even with the very best instructional design and instructor facilitation of SEA-focused learning activities, new students need adequate time to acquire these skills, put them into practice, and then refine them. Within a nursing program, this might mean requiring collaborative projects that use technology-mediated knowledge creation pedagogies in more than one course, or in a series of courses that culminate in a capstone

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[12] Available at http://www.commoncraft.com/video/wikis. In prior sections of this course this video was included. It was inadvertently omitted by the researcher during the Fall 2013 study.

collaborative team project. Another alternative is to leverage shorter learning activities by designing online discussions with topics that encourage small groups of students to use the toolkit of model questions that support critical thinking.

Encourage use of regulative functions of metacognitive awareness and reflection. All of the preceding recommendations have focused on enhancing student awareness and skill in the epistemic dimension of SEA. Nevertheless, the reality is that there is still a need for students working in teams to develop higher order regulative skills at both the individual and group levels. Thus, students can benefit from becoming adept at recognizing and verbalizing their thought processes and learning behaviors so that they can model these skills within their teams. In a similar vein, teams that understand the value of reflecting upon what is working and what is not, and are receptive to considering changes to their current strategy, also stand to improve their learning outcomes.

Paralleling the recommendations described above for providing a toolkit of questions to advance epistemic work by incorporating critical thinking, the creation of a similar checklist of regulative practices related to metacognition and reflection may also be useful. For example, this might include questions that prompt specific regulative actions: Has your team reviewed the project instructions and fully understands the requirements? Has your team set aside time to evaluate the quality of your work? What will you use to accomplish this?

Study Limitations

The task of finding an appropriate research site that met my criteria for an online course that offered an extended team project resulted in my selection of an online course in a discipline outside of my area of expertise. Having no training as a nursing educator may

have limited my ability to recognize student misconceptions and other content-related errors or patterns of thinking that are specific to this domain. To mitigate this concern, the doctoral student who was recruited to work on the development and testing of the epistemic actions coding scheme held a B.S. in health sciences, had previous experience working directly with other health care specialists and patients in a hospital setting, had both taught online in nursing and health care programs, and had extensive instructional design experience. Her knowledge of current health care practices informed our decisions throughout this process. I believe that my knowledge of online pedagogies and instructional design also strengthened our decision-making.

Furthermore, the qualitative aspects of this study required that I serve as the research instrument, and to this extent, my own biases and perceptions may have colored my interpretations, such that another researcher may have described student and instructor experiences differently.

Strictly speaking, case studies cannot be generalized to a larger population. In this particular study, the students under investigation were registered nurses working toward their baccalaureate degrees. It would be incorrect to assume that these results can be generalized to other nursing students studying online or in other online nursing programs. By selecting a course from the BSN nursing curriculum, my findings are not generalizable to other online courses in other subject areas. That said, in many ways, the subjects of this study are relatively typical of the growing cohort of online nursing students. Creswell has noted that qualitative research may serve the purpose of allowing other researchers to "transfer information to other settings to determine whether the findings can be transferred" (Creswell, 2007, p. 209).

Another consideration was the duration of the team project under investigation. In this instance, the project was only six weeks long. The same study conducted using a project that is several weeks longer might, in fact, generate different results.

Lastly, the technical constraints in the Moodle LMS made it difficult to fully integrate links to project discussions, chats, and other project tools directly into the wiki. As a result, these restrictions required students to shift between the project module and the wiki, which may have been a cause of confusion and reduced the effectiveness of the wiki as a centralized project work space for each team.

Despite these limitations, I believe this exploratory study laid the foundation for providing a better understanding of how SEA can be cultivated through the introduction of purposeful instructional design, and articulates many of the complexities of real world implementations of collaborative online pedagogy for nursing students.

Closing

Online learning in BSN programs offers one solution to meeting the growing demand for nurses as the U.S. population ages and current practitioners retire from the workforce. At the same time, nurses with bachelor's degrees must be adequately prepared for a knowledge-based society in which they will be expected to function as members of intra- and interprofessional health care teams that are responsible for planning and delivering high quality patient care.

To develop these twenty-first century competencies, nursing educators have the opportunity to advance the widespread use of active and collaborative online instructional methods that prepare BSN students to work in complex environments that call for multifaceted collaboration skills that advance group level knowledge work and the

management of their collaborative processes. With these objectives in mind, further investigation into the construct of SEA and its application to online course design is warranted.

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Appendix A
Student Recruitment Letter

Dear [student]

I hope you had the chance to view my brief introduction that was included in the Research Study Information folder found in the first module of this course, NUR 301 Health Assessment. I am writing to ask you to participate as a potential interview subject in a research study that I am conducting on team based projects in online learning.

I am a doctoral student at the University at Albany in the final stages of my program, and this study is one of my degree requirements. My advisor, Dr. Peter Shea, will be supervising this research project. My results will be published as a dissertation, and I hope to publish a version of this work in an academic journal in the future.

Like many of you, I am an adult learner, having returned to graduate school. I am an administrator at Empire State College and have developed a strong interest in online learning since I began my work at the college over ten years ago. My role in this study, however, will be that of a student researcher.

I selected this course for two reasons. First, I have a very high regard for the college's nursing faculty and staff and the work they have done in designing the courses that make up your online program. Second, the course you are enrolled in features an extended collaborative team project that takes place in a wiki in the Moodle learning management system.

To complete this study I would like to: 1) interview all the students in this course individually about their experiences working in online teams to complete the final project which begins in Module 7 and 2) examine your final project related online activities and written assignments.

I plan to conduct two interviews with each participant. Each interview will take an estimated 45 minutes to complete. During these sessions I will ask questions about several of the learning activities and how your team went about accomplishing them. I plan to conduct the interviews by phone or by Skype, based on your preference. I will record the interviews with your permission.

To protect your confidentiality, I will use pseudonyms in the transcription of the interviews and to mask your identity in connection with your interactions with other students and in your written assignments. Your name will only be found in the list of pseudonyms that will be stored in a locked filed cabinet in my office. I do not believe that any harm could result from your participation in this study and because your participation is voluntary, you can withdraw at any time during the interviews.

To express my appreciation for the time you will spend with me, I will be sending participants a $25.00 gift card from Amazon.com prior to the start of the first interview.

You will find copies of the participant consent form for your review in a special folder in your course that has information about this study. If you are interested in participating or have any questions about the study, please contact me using my email below and I will work with you to arrange a convenient time for us to review the consent form. Please include your email address and phone number and the best time of day for me to contact you.

Thank you for considering my request.
Suzanne Hayes suzanne.hayes@esc.edu

Appendix B
Student Participant Informed Consent

Study Title

A Mixed Methods Study of Shared Epistemic Agency in Team Projects in an Online Baccalaureate Nursing Course

Principal Investigator & Contact Information

Suzanne Hayes, Ph.D. Candidate, Department of Educational Theory and Practice, School of Education, University at Albany, State University of New York. (518)698-9936, suzannehayes2001@gmail.com

Supervising Advisor

Peter Shea, Ph.D. Department of Educational Theory and Practice, School of Education, University at Albany, State University of New York. (518)442-4009, pshea@albany.edu

Purpose of the Study

This **research** study explores the development of shared epistemic agency over time, in an upper level online course, where undergraduate nursing students work in teams to complete a six week-long online collaborative project focused on a developing a detailed plan of care for an assigned case study. Shared epistemic agency refers to the ability of groups to intentionally engage in and perform sustained collaboration that results in the creation of new knowledge. This study will be used by the investigator, Suzanne Hayes, to prepare a dissertation research project.

Procedures

The investigator will schedule two interviews (one at the midpoint of the collaborative activity, and one at the end of term) with volunteering participants to understand the experiences that shaped their participation in the team project. Each interview is expected to last approximately 45 minutes. In addition to this, the investigator will observe student discussions and interactions connected with the team project. Once the course is completed, the researcher will have access to student work, communication, feedback, grades and discussions associated with the team project.

Role of the Investigator

The investigator's role is limited to conducting the research study. She will have no responsibility for grading students at any time before, during or after the study. She will not interfere with the natural sequence of events in the project teams. During the online observations, she will not participate in course activities or discussions.

Risks and Discomforts of Participation

The investigator does not anticipate any risk in a volunteering student's participation other than he or she might become uncomfortable talking about a topic related to an interview question. If this occurs, the participant can refuse to answer any questions.

Potential Benefits

Although you may not receive direct benefit from your participation in this research study, others may ultimately benefit from the knowledge generated from its results. These results may contribute to enhancements in the design of online collaborative group projects and improved learning outcomes for students who participate in these types of activities.

Confidentiality of Records

All information obtained in this study is strictly confidential unless disclosure is required by law. In the addition, the Institutional Review Boards of University at Albany and the institution where you are enrolled, the sponsor of this study (National Institutes of Health, Food and Drug Administration, or the U.S. Department of Education) or the university or government officials responsible for monitoring this study may inspect these records.

All identifiable information will be removed from all student work and discussion areas. The investigator will use pseudonyms in place of your actual identity before analysis of data begins, and these will be retained in the dissertation and any future presentations or publications.

Data will remain in the direct physical possession of the investigator. Recorded interviews and consent forms will be kept in a safe and secure place, and digital copies of student work and recording transcripts will be kept in a locked file cabinet. All transcripts, forms, digital recordings, and other materials obtained from students will be destroyed upon completion of this research.

Voluntary Nature of Participation

Participation in this study is voluntary. Your grades and standing in this course will not be affected by your decision to participate or not. Even after you agree to participate in the research or sign the informed consent document, you may decide to leave the study at any time without penalty or loss of benefits to which you may otherwise be entitled. Upon leaving the study, your records will be destroyed.

Contact Information

One copy of this document will be kept with the research records of this study. You will also be provided a copy of this form to keep for your personal records. If at any time, you have questions regarding this study, your participation in it, or wish to withdraw from the study for any reason, please contact the investigator. Her contact information is listed on the first page of this consent form.

Compensation

Students who wish to participate in the interviews will be compensated for their time with a gift card from Amazon.com in the amount of $25.00. This will be presented at the start of the interview. Participants who withdraw from the study or discontinue the interview will keep the gift card.

IRB Contact Information

If you have questions concerning your rights as a research participant or if you wish to report any concerns about the study, please contact:

University at Albany's Office of Regulatory Research Compliance at its toll-free number 1-866-857-6459 or via email at hsconcerns@albany.edu

Lorrie Anthony, Compliance Officer, Empire State College, One Union Avenue, Saratoga Springs, NY 12866 518 587 2100 ext. 2358.

Consent

Please initial your choice.

Participation

_____ I voluntarily agree to participate in the two interviews for this study.

_____ I DO NOT agree to participate in the two interviews for this study.

Audio Recording for students who have agreed to participate in the above interviews

_____ I voluntarily agree to have the above interviews audio recorded.

_____ I DO NOT agree to have the above interviews audio recorded

Online Observations and Examination of Interactions and Written Assignments

_____ I voluntarily agree to have the investigator observe my participation and examine my course related activities connected with the final team project activities of NUR-301-section xxxx as described above.

By choosing this option you are granting permission to the investigator to examine 1) your postings, interactions, and related transcripts, and; 2) your written assignments within the areas of the course used to complete the Module 7 team project of this course.

_____ I DO NOT agree to have the investigator observe my participation and obtain access to my course related activities connected with the final team project activities of NUR-301-section xxxx

By choosing this option you not give the investigator permission to examine 1) your postings and interactions, and their related transcripts, and; 2) your written assignments within the areas of the course used to complete the Module 7 team project of this course.

Name	Signature	Date
_____	_____	_____

Rev. 4/19/2013

Appendix C
Instructor Participant Informed Consent

Study Title

Shared Epistemic Agency: A Mixed Methods Study of Team Projects in an Online Baccalaureate Nursing Course

Principal Investigator & Contact Information

Suzanne Hayes, Ph.D. Candidate, Department of Educational Theory and Practice, School of Education, University at Albany, State University of New York. (518)698-9936, suzannehayes2001@gmail.com

Supervising Advisor

Peter Shea, Ph.D**.** Department of Educational Theory and Practice, School of Education, University at Albany, State University of New York. (518)442-4009, pshea@albany.edu

I have been asked to give permission to the investigator to gain access to my NUR-301 Section XXXX online course to conduct a dissertation study that has been reviewed by the Institutional Review Boards of University at Albany and SUNY Empire State College.

This study explores the development of shared epistemic agency over time, in an upper level online course, where undergraduate nursing students work in teams to complete a six week long online collaborative project focused on a developing a detailed plan of care for an assigned case study. Shared epistemic agency refers to the ability of groups to intentionally engage in and perform sustained collaboration that results in the creation of new knowledge**.** The students who will be invited to participate in this study will be enrolled in the NUR-301 Section XXXX course that I will teach in the September 2013 term at SUNY Empire State College. This study will be used by the investigator, Suzanne Hayes, to prepare a dissertation research project.

I understand that:

1. The time frame for this study will be one semester.

2. During the semester the investigator will observe the work of student teams found in the areas of the course used to complete the Module 7 team project.

3. While conducting online observations, the investigator will not participate in any of the course activities of discussions. The investigator will have no responsibility for teaching or grading students before, during or after the study. She will not interfere with the natural sequence of events or assist students with their projects.

4. The investigator will obtain an ESC Moodle user account which will allow her to observe the online portions of the course connected with the team project in Module 7 and my interactions with students in connection with the metadiscourse activity.

5. I agree to be interviewed to have the investigator understand the experiences that shaped my perceptions of student participation in the team project in my course, and in the metadiscourse activity, in particular. Two 45 minute interviews will be scheduled. The first at the midpoint of the team project and the second after the course is completed

6. The investigator will also schedule two interviews (one at the midpoint of the collaborative activity, and one at the end of term) with volunteering participants.

7. The investigator will observe student discussions and interactions connected with the team project.

8. The investigator will have examine course documents, to student work, team discussions, work products, communication, feedback, final project assessments, and the associated wiki area assigned to each team

as her data sources for her study. The instructor's name and student names will be replaced with pseudonyms before any analysis takes place

9. Participation in this study will not provide any direct benefits to me. However, the study's results may inform future instructional design refinements or improvements to this course in the future.

10. All information obtained in this study is strictly confidential unless disclosure is required by law. In the addition, the Institutional Review Boards of University at Albany and the institution where you are enrolled, the sponsor of this study (National Institutes of Health, Food and Drug Administration, or the U.S. Department of Education) or the university or government officials responsible for monitoring this study may inspect these records.

11. The investigator will be presenting study results to her dissertation committee. She also anticipates disseminating study results at academic conferences and in scholarly journals. To protect student and instructor confidentiality, she will change or omit any potentially identifying information.

I have read and understand the explanation provided to me. I agree to give permission to the investigator to gain access to my course and to conduct this study. I have been given a copy of this consent form.

Instructor Name	Signature	Date
_____	_____	_____
Investigator Name	Signature	Date
_____	_____	_____

If you have questions concerning your rights as a research participant or if you wish to report any concerns about the study, please contact:

University at Albany's Office of Regulatory Research Compliance at its toll-free number 1-866-857-6459 or via email at hsconcerns@albany.edu

Lorrie Anthony, Compliance Officer, Empire State College, One Union Avenue, Saratoga Springs, NY 12866 518 587 2100 ext. 2358.

Appendix D
Student Interview Protocol

Interview 1

Hi _____. Thank you for agreeing to participate in this study.

I have a few things to review before begin the actual interview.

I have your signed consent form here and I would like to take a few minutes to review it with you.

- You have agreed to participate in two phone interviews.
- You have given me your permission to record them.
- You have given me permission to observe your participation in your course.
- All of your responses will be treated in confidence and I will remove your name and use a pseudonym in my transcription and analysis.
- The same applies to your contributions within the course.
- Do you have any questions or concerns?

Next I'd like to go over some details about the interview itself:

- You can ask me to stop at any time if you need to take a break.
- If we run into any technical problems and we get disconnected, I will try to call you back. I will wait a minute and then try to call you back.
- If you decide not to continue with this interview I will need an email from you confirming you do not wish to continue.
- Once the interview is transcribed, I will email you a copy of the transcript to review.

Now we are ready to begin with my first question.

1. I would like to understand, from your perspective as a nursing student, what it's been like for you to participate in the online team project in your Advanced Health Assessment course. I'm going to ask you some questions about your experiences related to working and learning as part of a team.
    a) To begin, why don't you tell me a little about your group project and your team.

2. Tell me about the progress of group project.
    a) What is going well?
    b) What might be contributing to this?

3. Three weeks have passed since your team began working together.
    a) Can you tell me about any problems or obstacles your team has encountered?
    b) How have you and your team resolved them?

4. Please describe a high point in your team's collaboration so far.
    a) Why was this significant?

5. Now describe a low point.
    a) Why do you think that this important?

6. All groups have moments when they disagree.
    a) What types of disagreements have arisen in your team?
    b) Please describe one of these in as much detail as possible
    c) How was it resolved?

7. How would you describe "learning" when undertaken by a team?
    a) What kinds of things could a team "learn" together?

8. We are going to wrap up now. Is there anything you would like to add before we end this session?

Interview 2

As you may recall, last time we talked about your experiences as a nursing student in an online course, what it has been like to participate in the Advanced Health Assessment course. Now that you have completed this course and the final team project, I would like to know more about your experiences working as learning as part of a team.

1. Take me through what has happened during the last 2 or 3 weeks of your team project.

2. How successful do you think the team was in terms of its focus and channeling its efforts into a cohesive project?
    a) What kinds of obstacles did the team encounter?
    b) How were they overcome?
    c) How did this make you feel?

3. How comfortable were you at first with the flexibility presented to you in this project?
    a) How comfortable was the rest of your team initially?
    b) How do these feelings compare now that the project has been completed?
    c) What might be done to help teams get used to working more independently?

4. Were there any topics or issues that were left undecided by the team?
    a) Related to content?
    b) Related to the process the group used to get the project done?
    c) What were they?
    d) Why do you think they were not addressed?

5. Thinking back to your work on the project, I'd like you to describe a moment or example where you arrived at an important moment of learning in this project.

a) Was this the result of something you discovered on your own?
b) What role did the team play in this?

6. What will you take away about your understanding of learning as part of a group?
    a) How might this have changed since you first started in this course?

7. How useful was the contract to your team?
    a) In what way?

8. To what extent were the technology tools (wiki, chat, discussion areas, etc.) provided to you in this course useful in completing your project?
    a) How so?
    b) Which ones were most useful?
    c) Less useful?
    d) Did this change over time?

9. Is there anything you would like to share with me or add before we finish up?

Appendix E
Instructor Interview Protocol

Interview 1

Thank you for agreeing to participate in this study. I would like to understand, from your perspective as the instructor, your thoughts and observations of the online team project in your section of the Advanced Health Assessment course. This interview will be audio recorded and then transcribed. Your responses will be treated in confidence and I will only use a pseudonym in my transcription and analysis. You can ask me to stop the interview at any time.

I'd like to start off asking you questions about the project in general based on your impressions of the two course sections.

Then I'd like to talk more specifically about the three teams that we are examining for this study. To help keep things straight, if it's alright with you, this is how I'd like to refer to each of the teams. You may want to jot this down:

Team A – Section 01 -Adult with congestive heart failure
Team B – Section 02 - Adult with congestive heart failure
Team C – Section 02 - Child with asthma

1. I'm interested in hearing about your overall impressions of the initial three weeks of the team project.
    a) How do you think it is going?
    b) What do you think is working well?
    c) What do you think isn't.

2. Among the three teams, how would you characterize each team's progress to date?
    a) Among the ones making good progress, what do you think sets them apart or contributes to this?
    b) Among the teams that are struggling, what do you think is holding them back?

3. Based on what you have seen so far, to what extent do you think the teams have assumed responsibility for their progress?
    a) First I'd like you to talk about their progress in organizing themselves related to things like planning, monitoring their progress, taking corrective action?
    b) Next, can you talk about their progress in terms of advancing or deepening their understanding of the case study as it relates to the course concepts.

4. What do you think has been most helpful to your students in this first area of organizing themselves?
    a) What kinds of actions have you taken?
    b) What would you do differently?

5. Is there anything we haven't covered that you'd like to discuss?
Interview 2

Thank you for returning for this second interview. Your responses will be treated in confidence and I will only use a pseudonym in my transcription and analysis. You can ask me to stop the interview at any time.

To start, I like to go over the final project as a whole and talk about its purpose, learning objectives and your broad impressions of the work that the students did in the teams that were in this study. Then I'd like to talk about each project submitted by Teams A, B, and C focusing on their project content and their process. Then to close we'll cover some general questions.

1. To begin, I'd like you to describe the final project each team was assigned

2. Would like you to talk about learning objectives that were associated with it:

3. Overall, what were your general impressions of the three final projects that were submitted by the three teams?

4. Next I would like to review with you each of the three team's final projects. For each team's project I'd like to talk first about the content of the project, and then we'll talk about the process that the team used to work together to complete the project.

Team A – Section 01 Adult with congestive heart failure
Team B – Section 02 Adult with congestive heart failure
Team C – Section 02 Child with Asthma

5. In terms of content: Please tell me your thoughts on:
- Strengths
- Areas for improvement
- Any unique aspects
- To what extent do you think students went beyond the information originally provided to them?
- Were there any areas or topics in the project that could have been developed more fully?
- Observations in how the group changed over time?

6. Next I'd like to have you talk about the process of the team in working together to produce the final project:
- Strengths
- Areas for improvement
- Key issues that emerged
- Your assessment of how the team resolved them
- Observations in how the group changed over time?

7. Each student wrote a self-evaluation and an evaluation of their team members. What were your impressions of these submissions?

- What were you looking for when you read them?
- In what ways do you think students benefit from these type of activities?

8. Lastly, I'd like to have you talk about your thoughts about the role of the instructor in a collaborative project such as this.

- What do you believe to be the most important things that an instructor should do in an extended team project? Why?
- What things are less important? How so?

9. Is there anything we haven't covered that you'd like to discuss?

Appendix F
Team Contract Instructions

At the end of week 9 in Module 5, a team contract is due, which explains how you will work together on your team project.

A discussion area is provided for you in this module to allow for communication about the content of your contract; all team members must approve the terms of the contract and submit an individual statement of agreement in the Module 5 discussion forum.

Please write your contract using the Team Wiki.

Once the contract is completed, designate a team member to cut and paste the text of the contract from the Wiki into a word document. This should be submitted in this module's dropbox.

While there is no required format for the team contract, the following areas need to be addressed with specific information about performance expectations and team interactions:

Section 1: Identifying Information

- Name of your team by assigned case study. (Note: case studies are a continuation of those already presented in this course)
- Team members by name

Section 2: Team Communication

- Note: Communication is expected within the course (discussion areas and Wiki space)
- What other forms of communication will you use (synchronous or asynchronous)?
- Preferences for leadership (individual; shared; formal or informal)?
- How will decisions be made (majority vote; group consensus; by leaders)?
- How often is communication expected between team members?

Section 3: Performance Expectations

- How will work be distributed equally among team members?
- What is the timeline for the project?
- How will individuals stay on task to meet team deadlines?
- What level of quality is expected from individual contributions; how will this be determined?

Section 4: Conflict Resolution

- How will conflicts be handled within the team?
- How will the team deal with infractions of the terms of this contract?

Section 5: Other - space to add any other criteria decided by the team.

For detailed information on the Team Project, please see Module 7.

Appendix G
How to Work Effectively in a Team

Discuss how you, as a group, want to approach this project: establish a plan, schedule, goals, tasks, and stages of work.

Establish a team contract for how you will interact with each other.

Communicate in the assigned discussion areas of the Wiki. If communication occurs outside of the course, provide a summary of the meeting within the Wiki assignment.

Seek out the opinions of all participants in your group.

Be mindful of your contributions as well as those of your team members.

Ask questions and seek clarification if you are unsure of something.

Confirm your understanding of another's explanation in your own words.

Use "I" statements; "I think that a reasonable alternative might be…"

It's OK to disagree; do so courteously.

Criticize the idea, not the person.

Remember that online communication does not allow for gestures and facial expressions; it is easy to misconstrue what someone is really saying. Don't react - seek first to understand.

Give each other the benefit of the doubt.

Appendix H

Module 7: Interprofessional Collaboration in Health Care - Overview

Module Objectives:

At the end of this module, you should be able to:

1. Apply principles of interprofessional collaboration in the health assessment process.
2. Synthesize a comprehensive plan of care from an interprofessional perspective.
3. Work collaboratively in an online environment.
4. Evaluate professional growth in health assessment competencies.

Instructor Commentary:

Nurses, no matter where they work, typically function as part of a larger team of professionals. The unique knowledge and skills of other disciplines - dietary, physical therapy, respiratory, social work, spiritual care, the list goes on - contribute to the holistic and comprehensive care of an individual. Oftentimes, the registered nurse is the coordinator of appropriate members of the health care team, for the benefit of the patient. It is this interprofessional collaboration this is integral to ensuring optimal patient outcomes.

Research shows that better results are achieved when multiple perspectives on a problem or issue are shared. Each person brings different experiences, skills, and background; consider these assets. This project provides practice in developing effective skills for working on collaborative activities. Exploring and evaluating various alternatives requires critical thinking, and different points of view enrich understanding.

As a registered nurse, you already have experience with developing plans of care for patients. For the Module 7 assignment, a small group of classmates (your team) will develop an interprofessional plan of care for an assigned case study, one of the five already presented in this course. In order to provide an interprofessional focus, each of you will interview one other health care discipline and represent its perspective on the patient. Your team will then work to design an individualized plan of care based on identified priorities.

In order to work as a team in an online learning environment, it is necessary to have a common "space" that everyone can access simultaneously. We will use a space called a "Wiki". The Wiki is a virtual workspace, akin to assigning a small group of people to a conference room for project work. Your team will be able to access and use this workspace to communicate with one another (via a discussion forum) and complete the case study assignment. It is not necessary to have any prior experience with a Wiki; with just a few instructions, it is easy to navigate. Please review the instructions...and have fun as you work together on this team assignment!

Appendix I
Case Study Instructions - Weeks 10-15

Before starting this activity, be sure to review all of the Wiki and activity directions.

For this activity, small teams have been assigned to work on one of the case studies already presented in this course. The team project has three components. Each student will ***interview one discipline*** (representing a different profession within the health care team) to obtain input on the priorities for the assigned case study. Then the team will compile all of the data to ***create an interprofessional plan of care*** that focuses on health promotion. After the teamwork is complete, each student will ***submit a confidential peer review*** to reflect on the activity and provide feedback to the instructor. The team case study projects are due at the beginning of week 15 –Monday morning at 0900.

There is a discussion forum within the Wiki space for use by your team. Please be sure that ALL communication regarding the case study takes place within the Wiki. If you have a telephone or in-person conversation with a peer regarding the case study, transcribe the summary of this meeting into the Wiki discussion forum.

- ***The Interview***: For this project, each team member (student) will interview one individual (representing a different discipline of the health care team) to obtain input on the priorities for the assigned case study. You should have input from a variety of sources (physician, nurse practitioner, pharmacist, case manager, dietician, physical/occupational therapist, respiratory therapist, counselor, etc.). The interview should be with someone that you have convenient access to, such as a colleague at your place of employment. Present the known case study information to that individual, and ask for his/her perspective on priorities for patient care. Discuss this input with your team members, and integrate the information into the plan of care.
- ***The Interprofessional Plan of Care***: In the Wiki space, each case study team will create a collaborative and interactive document for a patient. Each team decides what design, what structure, and what information to include in the patient's case. When working collaboratively it is imperative that the team form, identify roles, and set etiquette standards. The Wiki allows all team members to edit the shared page, and it also allows for discussion to facilitate communication between members. You will be able to discern on the Wiki page your own contributions and the contributions of your team mates, as will the instructor for the course. Please conduct all communication in the discussion space on the Wiki. Support your work with resources and scholarly articles from the nursing literature; each student must include at least two references.
- ***The Peer Review***: In a brief paper, provide a review of the team activity including such information as: contributions of members; roles that members assumed; ability to work with others in the team; timeliness of peer contributions; conflict in the team; and mechanisms to manage conflict. This paper will also include a self-assessment.

Wiki page design: Your team page can be of any design you choose. It can include photos, videos, and other pertinent links. Feel free to add sub-pages to your page. All this is up to you. A case study, in and of itself, can be rather dry material. You are encouraged to build your plan in any creative ways you feel are appropriate. The point is to make the content as "real" as possible and the facts as accurate to reality as possible.

Technical skills: The Wiki is fairly easy to navigate, and the nursing faculty is confident at least one member of the group will be able to handle the technical construction of a Wiki page. Consult the instructor for technology assistance if you need it.

Appendix J
Background for Instructor on Shared Epistemic Agency

I. Study Context: Shared Epistemic Agency

Shared Epistemic Agency is the ability of groups of learners to intentionally engage in and perform sustained collaboration that results in the creation of new knowledge which is embodied in shared knowledge objects.

SEA is found in groups of learners who collectively:

- Are active & productive contributors to the team
- Assume responsibility for their own learning
- Systematically organize their inquiry
- Create new knowledge* thru negotiation & refinement of thinking
- Develop, advance & improve conceptual artifacts (physical documents, papers, drafts, illustrations, etc.)

*Note that new knowledge refers to understandings that are *new to the students*.

Overall, the instructor can support teams by:

- Helping them to be more aware of their team process (regulative) and knowledge related (epistemic) activities
- Prompting groups to "think about their thinking"
- Encourage them to assume greater responsibility for their collaboration and understanding
- Spurring them to think critically about the process and product of their intellectual efforts
- Asking them to consider their progress toward their objectives
- Identifying areas in need of improvement
- Highlighting areas where deeper investigation is needed.

More specifically, SEA has two dimensions.

Epistemic Actions are knowledge activities that support collaboration in production of shared knowledge objects (i.e. PRODUCT). This can be seen in the following types of knowledge activities undertaken by students:

- Identifying problems or lack of knowledge
- Alleviating lack of knowledge by examining new resources; collecting addition information; developing new concepts
- Creating shared understanding by sharing information, ideas and knowledge; discussing misunderstandings; or reframing problems.
- Undertaking generative actions such as developing, negotiating and refining new ideas; taking up and advancing the ideas of others; creating intermediate artifacts; revising drafts; and using feedback in productive ways.

Regulative Actions are **i**ntentional processes related to the shared management of collaboration (i.e. PROCESS). This can be seen in the following types of student actions:

- Planning such as setting goals; deciding on approaches and strategies; coordinating or delegating tasks.
- Monitoring the group's progress in terms of identifying process related problems; noting completion of tasks; checking for understanding; evaluating quality; appraising interest and engagement of self or team; recognizing learning behaviors; encouraging participation or focus; and noting use of strategies.
- Using strategies such as seeking, offering or providing help; reviewing work that has been completed; acknowledging the relevance of current tasks to future outcomes; making adjustments in strategies that are not working.
- Reflecting on a change in thinking that has taken place or recognizing the connection between results and individual and team performance.

Appendix K

Epistemic Actions Coding Scheme

Code	*Indicators*	*Description*	*Example*
	Creating Awareness		
CA-1	Identifying Lack of Knowledge	Recognizing that self or group do not have a an adequate or complete understanding of a concept or idea	I was thinking we should try to interview a home health care nurse and a care coordinator for our case. I believe that the topic of the patient's diet should be discussed in the case study.
CA-2	Identifying problems	Recognizing knowledge-related concern that is likely to have a negative impact if it is not overcome or resolved.	This article is out of date. The information that he downloaded from that web site is incorrect.
	Alleviating Lack Of Knowledge		
ALK-1	Examining given source	Using materials directly assigned or provided to the group by the instructor or found in the course.	The textbook describes the use of medicinal herbs among people of Asian descent.
ALK-2	Collecting additional information	Seeking materials that go beyond those that are assigned or provided within the course content.	I see you added a web site about effective contraceptives. Here's a picture of what a healthy brain looks like compared to one with Alzheimer's.
ALK-3	Structuring new concept(s)	Initial or preliminary efforts to articulate a concept or ideas. [May include literal use of facts or information from other sources.]	Drug interactions. Good idea. This could cause a person to have issues with falling. Any chance one of you could do a comprehensive nutritional plan for the patient?
	Creating Shared Understanding		
CSU-1	Sharing information from sources	Making reference to information or ideas from materials to improve or advance mutual understanding.	This article says that danshen can affect digoxin levels by giving falsely elevated serum levels.
CSU-2	Giving meaning to new concepts	Exploring the meaning and implications of newly identified ideas to enhanced group understanding.	I'm addressing medication and its interaction with foods. Drugs like Coumedin and dan shen need to be included in both areas.

CSU-3	Discussing misunderstandings	Participating in exchanges aimed at clarifying or correcting disagreements related to or understanding of facts concepts or ideas.	So it looks like forget the APA format. We need to do a care plan based on the professional we interviewed.
CSU-4	Sharing ideas and knowledge	Sharing information for the purpose of arriving at mutual understanding.	Libby was actively working for a law firm [until her recent heart attack]. I don't think her lack of insurance is a concern at this time.
CSU-5	(Re)framing the problem	Helping others change the way they perceive a problem or issue by offering alternative ways to view it.	Maybe the drug info, which reads like a label on a bottle, could be streamlined for the patient and her daughter.
	Generative Collaborative Actions		
GCA-1	Generate new ideas	Drawing connections among ideas or offering suggestions with the purpose of creating new related concepts.	How about [we say] she uses dan shen for trouble sleeping caused by rapid heartbeat related to her afib?
GCA-2	Negotiate new ideas	Participating in an extended exchange to arrive at new or advanced concepts by refining, reworking, transforming or considering alternatives to prior concepts.	Adding more information in the psychosocial section about living with the extended family due to financial concerns may add to stress or be a contributing factor for other health issues.
GCA-3	Engage in collaborative uptake of ideas	Referencing or reusing concepts that have been put forward by others in prior exchanges without prompting.	Considering the history of past abortions I thought it was important to educate this patient to avoid future unwanted pregnancies. [References abortion history introduced by another student]
GCA-4	(Re)frame the object	Identifying a new purpose, focus or understanding of the shared knowledge object.	Maybe our pamphlet should focus on the professionals that a CHF patient may have to visit.
GCA-5	Engage in shared construction of intermediate objects	Developing or creating discrete knowledge objects that contribute new or deeper understanding in connection with the original knowledge object.	I started a chart with medications that the patient is taking that consists of possible side effects and compatibility with other medications.
GCA-6	Revise ideas and object drafts	Making substantive improvements or enhancements to concepts or ideas within the knowledge object.	NA
GCA-7	Use feedback constructively	Accepting and using feedback or assessment in productive ways to improve or enhance understanding of concepts and ideas.	NA

Adapted from Damşa, Kirschner, Andriessen, Erkens & Sins (2010).
Rev. April 10, 2014

Appendix L
2013 Coding Scheme for Learning Presence (LP)
Revised 6/27/14 for use with Damşa's Epistemic Actions

Code	Indicator	Description	Example	Comments
			Forethought and Planning	
FP1	Goal setting	Deciding upon specific actions and outcomes	At the end of next week, as a team, we have to submit a summary of our discussion points. Our goal is to submit a two page position paper defending the position against outsourcing.	
FP2	Planning	Deciding on methods/strategies appropriate for the task	Why don't we list (all of us) what we perceive to be the cons of outsourcing. I was thinking we should decide what arguments we want to use in this paper.	Methods and strategies are used to meet goals Only definitive statements. No hedging
FP3	Coordinating, delegating or assigning tasks to self and others	Distributing, sequencing tasks and sub-tasks to others/self for future completion	I will take care of the intro and the summary. I have to work all night tonight. I will submit it for the group tomorrow evening sometime	Only definitive statements. No hedging Methods and strategies are accomplished through tasks
			Monitoring	
MO1	Checking or confirming	Confirming that a task or process aligns with instructions	In regards to the instructor's email, I can label the first brochure as "final submission 1" and the second brochure as "final submission 2"?? ..As long as we submit everything how the professor wants it , I am ok with it.	Does not include knowledge or content
MO2	Identifying problems or issues	Identifying difficulties related to materials, technologies, process that interfere with progress**	I believe the assignment is 500 words or less so we may need to skimp down a bit. …then I realize that it has scrambled my idea of what I thought I knew.	***If knowledge or content related use EA CODE CA-2.*

MO3	Noting completion of tasks or progress	Comments or questions about tasks/activities completed to support attaining a goal.	I did some research and then typed up the employer section. I looked at what the other teams did in their project.	Look for statements expressed as past tense. These are easy to overlook.
MO4	Evaluating quality	Evaluating the quality of a product, its content or its constituent parts as students work toward completion (.i.e., judging quality)	This information needs to be formatted better for easier reading by the patient.	Must be substantive and provide evidence or explanation. "Great job" or "nice work" are NOT sufficient. May include a list of items to be corrected
M05	Originally called "observing or monitoring during performance and taking corrective action." Removed and replaced by SU4 Making adjustments in strategy.			
MO6	Appraising personal interest, engagement or reaction.	Comments about self or others' engagement, interest, commitment or participation. Also includes personal "reactions" to tasks, materials and activities.	I found that information [in the chapter] all new and a little scary. As I travel extensively for my job, by interaction is a bit sporadic	In this statement, student is monitoring their level of participation. Statement must be related to the completion of the task, not the content of the discussion
MO7	Recognizing learning behaviors of self or group (metacognitive knowledge)	Statements about individual or group's preferences, strengths or weaknesses as learners.	I am more of a "hands on" learner. I am one….who likes to explore new programs and put together an object without reading directions.	Statement must be related to the completion of the task or process. Do not code content of the discussion.
MO8	Advocating effort or focus	Encouraging others to contribute or focus on tasks, materials and activities.	Has everyone contributed their pieces? Please let me know if there are any other ideas. Please refer to the diabetes posting.	Focus is on getting people to contribute versus asking permission to do something
MO9	Noting use of strategies	Statements that illustrate that students are mindful and aware of the strategies that they are using	I was almost hyperventilating, so I decided to stop and think what I would do next in order to make my endeavor to read more productive. I decided to extract concepts from the graphic organizer on page 26 and Google each word to try and make sense how the concepts tie together.	

SU1	Seeking, offering or providing guidance	Requesting, offering, or providing guidance describing efforts to obtain help related to learning materials, tasks, processes or products.	If you need any assistance, please let me know what I can do to help you out.	S1 should only be applied after all other more specific codes have been ruled out.
SU2	Reviewing	Comments noting the need to review or the completion of reviewing content related to the course.	I would need to refer to this chapter in order to review the principles of this philosophy	
SU3	Noting outcome expectations	Statements in which students acknowledge the relevance of current tasks or processes to a future learning outcome	At present, all I know is that grasping the epistemology of inquiry will help me read research in a more informed and holistic way. I think interviewing the dietician will help us deal with his obesity as well as ways to address his mother who thinks he is just "a healthy growing boy."	
SU4	Making adjustment in strategy	Recognizes that current strategy is not working and tries new strategy	I say we paste the whole thing into a word document when we're finished and then paste it back into the wiki after correcting the font.	
Reflection				
RE1	Change in thinking	Statements that indicate a change in thinking as a result of process, product or outcome	I can now understand some of their points and I feel the biggest misconception I had was that outsourcing does not necessarily entail taking jobs out of the country This issue is not as simplistic as I once thought…	
RE2	Causal attribution of results to personal or group performance	Statements in which students credit their results to their performance (i.e., use of forethought/planning, monitoring, strategies)	Any minor technology issues and questions/confusion about the project were easily solved in discussions. At times I felt frustrated… with your support I was able to work around this obstacle.	

Appendix M
Coding protocol for student interviews

Concept	Code	Definition	Example
Sharing responsibility and risks	Sharing responsibility and risk for team's performance	Describing situations where the individuals see themselves as collectively accountable for the team's success or failure.	8:43 You fail together or you pass together.
	Meeting deadlines and commitments	Describing completion of tasks or efforts to meet due dates or other requirements.	6:11 We met all our deadlines…
	Contributing one's fair share	Articulating desire to spread work of team evenly taking into consideration the needs of each team member.	12:59 We are definitely all pulling our own weight.
	Preparing for the worst	Recounting prior bad experiences with team projects, anecdotes or expressing skepticism or concerns.	8:4 This is something I was kind of dreading…
	Taking up slack for others	Indicating their willingness to step in and do the work of others if certain team members do not contribute their fair share.	10:55 But the project has to get done whether one person does the whole entire project or four people do the project. It doesn't matter, it has to get done.
	Not really knowing team members	Describing the usefulness of knowing team members skills and backgrounds.	6:66 Especially if you don't really have a relationship with your team member, other than the classroom. And you're limited on what you actually know about that individual.
	Trusting others on team	Believing in the ability and commitment of other team members to perform at their highest level.	6:65 … Like putting trust into your team members that they're going to provide quality work.
	Providing mutual support	Describing the need for or providing mutual assistance to other students.	6:31 … if we were still confused, we would be there for one another on our discussion board, we're all going to check the discussion board daily, so if any of us feel unsure or we need help, then we're all going to look at the board each day to be sure we support one another.

Adapting to unfamiliar expectations	Understanding the project	Describing efforts to understand the requirements for the final team project	12:18 So like the discussions are purely like: “What are the actually instructions?”
	Recognizing instructor as facilitator and monitor	Statements where students understand that that the instructor is following their progress and provides guidance	14:7 I think the professor overseeing our discussion and kind of guiding us in the right direction....that's a big help.
	Making sense of the instructor’s expectations for creativity	Describing efforts to understand what the instructor's meaning of "creative" in the final team project	23:13 I think there was a little bit, a little confusion about how we were going to present it, especially when we realized that the professor wanted it to be on a creative way and not just [an academic APA] paper…
	Dealing with ambiguity	Statements or actions in students acknowledge, propose or undertake constructive actions to reduce ambiguity or uncertainty associated with their team project	17:11 I think all of us had a little bit of uncertainty about are we going in the right direction of what, of what she was looking for?
	Wanting project guidelines and models	Expressing personal discomfort with a perceived lack of instructor provided direction or lack of models or sample projects.	25:13 Maybe if the teacher had made bullet points to what she wanted in the final project. If she provided examples…
Learning as individuals	Learning as an individual	Describing learning as the result of one's own cognitive efforts.	10:10 I'm learning a lot and I'm learning a lot more on my own. You know … everything that you look up or research makes you want to explore even more…
	Compiling individual contributions	Referring to learning as each teach member contributing their own information.	14:29 I didn't mind kind of putting all the pieces together in the end.
Emphasizing expedience	Getting things “done”	Making goal-oriented statements that focus on the completion or the end results of tasks.	26:15 I think we all just did what we were supposed to do and ... everyone kind of looked back for each other.
	Noting lack of progress	Expressing anger or experiencing a sense of futility when trying to move the team forward toward a decision or action.	10:49 But I just felt like the first two weeks were a waste of time because nobody knew where we were going.

Sharing leadership and decision-making	Informal or rotating leadership	Describing the need or preference for sharing leadership.	28:58 We had discussed kind of taking leadership over certain aspects of the project and it turned out that didn't really need to happen at all.
	Sharing decision-making	Describing how the team relied on each other's input to make decisions.	25:20 [Learning as part of a team is…] just making decisions with other people, making compromises, working together towards a goal.
	Taking initiative	Assuming responsibility for being the first to begin a task or action.	9:13 I think I kind of took the initiative to start that one ... to start the contract. And then one-by-one everybody else kind of added things in.
	Recognizing leaders	Describing team members who have shown initiative by provided the team with direction or action	25:34 That was Fern. She came up with the template and I kind of just posted my stuff down on the template first and then everyone else just started kind of like putting their information onto the template.
Having ambivalent views of conflict	Seeing conflicts as negative	Expressing discomfort with conflict or confronting others with a disagreement.	24:12 And you know, we talked and everyone was able to agree. It was never argument, never any dispute. And it worked really well compared to how I thought it would work.
	Seeing the value of multiple perspectives	Describing the benefits of other points of view and perspectives that come from other team members.	11:15 You might have experiences I don't have. I might have experiences you don't have, so we can all learn from each other.
	Dealing with conflict	Where students propose or undertake constructive actions to reduce conflict within their team.	7:31 …If [there is a] conflict you really have to go back and look at it [the team contract] and say ... you know...This is what we said.
	Recognizing conflict is inevitable in the work place	References to the work environment where disagreements are expected and resolved.	12:49 I mean there are more disagreements at work than within the group so far.

	Needing consensus	Referring to team contract provision that required all team members to agree on a decision.	6:14 And we're all communicating in discussion board okay, and we're coming to a consensus, like people throw out ideas and then we all take a vote, kind of like, a majority kind of vote.
	Negotiating different understandings	Attempting to seek understanding of others' viewpoints with the goal of working toward shared meaning.	9:43 We kind of just worked together to figure out what we're supposed to do. Each person said "I think we were supposed to do this" or "I think we're supposed to do that."
	Editing and peer feedback as a source of conflict	Comments about reviewing and/or modifying the work of other students as a source of disagreement.	28:37 I'm just like...instead of just like, jumping to say something, that's not how I would do it or I don't think we need these, I kind of just let it be for a bit and see where it went
Making sense of online project tools	Assessing one's technology skills	Describing self or other's ability to use computer software and systems to accomplish academic tasks.	10:11 I have three other students [on my team], they're much younger and they're very.... very knowledgeable as far as computers go.
	Feeling lost	Expressing concerns about navigating between the course modules, communications tools and the wiki.	10:8 And you know, just navigating the system is difficult.
	Lack of face-to-face contact	Concerns raised by students who are unsettled by the prospect doing a group project online and not being able to communicate F2F.	25:8, I wasn't really sure what was expected and working in a group online, you know, there's al-there's already a lack of communication because you're online, you're not face to face.
	Using chat productively	Describing the intentional uses of the chat feature for a specific purpose or to complete a task.	24:22 Those [chats] were very helpful because they were in real time and you could ask questions right then
	Using discussions productively	Describes the intentional use of discussion areas for a specific purpose or to complete a task.	28:13 The discussions were good to make sure we did keep touching things and to keep each other within the deadlines of the project.
	Coping with learning to use the wiki	Comments about uncertainty about using the Moodle Rooms wiki	12: 5 Like some our discussions are purely like "what the heck is going on?"

Appendix N

Coding Protocol for Student Self- and Team Assessments

Category	Code	Definition	Example
Using Communications and Technology	Lack of face-to-face communications creates problems	Indicating that online communications can result in misunderstandings and other related issues.	SA 7:19 This is especially true in an online team project since ideas can be misinterpreted very easily when communicated through words and not face to face communication.
	Chats and discussions were useful for making decisions and sharing ideas	Describing how these project tools enhanced team processes related to conveying their ideas and coordinating decision-making.	**SA 7:13** This was very helpful to the progress of the group project because meeting in the chat rooms provides the best way to clarify ideas and come up with solutions.
	Wiki was challenging to learn to use	Indicating difficulties mastering the features of the team wiki.	SA 7:25 My weakness would include my unfamiliarity with the Wiki space therefore having a slow start to the group project.
	Differing levels of computer skills can cause problems	Acknowledging a range of different technology skills within the team and the difficulties that result	FC 5:4 Lack of computer skills was a weakness as it was a time waster with formatting the brochure.
Understanding the Project	Project instructions were confusing	Encountering problems understanding the requirements for their final project	SS 8:6 In the beginning of the project, the team was a bit confused as to what the directions for the project were and what it entailed.
	Instructor provided helpful guidance and clarification	Describing how the instructor rectified this problem of understanding	SS 8:7 Through discussion and clarification with the professor, we came to understand what the project was about.
Working with Others	Teamwork is not easy	Acknowledging that team projects require more effort than working alone	SS 8:1 Working in a group or team can sometimes be challenging, but it is necessary for personal and professional growth.
	Establishing real time meetings difficult because of our different schedules	Describing need for real time meetings and the negative impact of time constraints	TB 9:7 I understand that the module allowed for real time chat but everyone's schedule or lives didn't allow for conversations at real time.

	It is difficult to work with people you don't know very well	Acknowledging the challenges of collaborating with unfamiliar team members.	FC 5:13 Often you may find yourself involved with team members you don't even know.
	Teams need to make decisions together	Indicating a preference for shared decision making within their team.	CT 3:17 Although we delegated team leaders during the project segments, I found we continued to operate as a team and make decisions as a whole.
	Conflict is uncomfortable	Describing student unease with confronting or acknowledging conflict within their team.	DB 4:4 Thankfully the group I worked with we did not encounter any conflicts which I thought was great, and it helped the project flow smoothly.
Meeting Project Expectations	Contract was useful because it made clear our expectations for each other	Indicating that the value of the contract provisions in clarifying team responsibilities.	CT3:2 By establishing a contract we all agreed upon, we were able set the foundation for the expectations each of us were to accomplish.
	Everyone on the team is expected to meet the terms of our contract	Indicating expectations for all team members to comply with all contract provisions.	SP 6:7 We all stuck to the team contract as it was outline…
	Teams need deadlines and goals	Stating the value of deadlines and goals to the team's success.	CT 3:5 Setting project deadlines alleviated any misunderstandings…
Meeting Interpersonal Expectations	Team members should contribute equally	Affirming that all team members are required to do their assigned portion of project work.	SS 8:3 By writing out the contract, we all agreed on equal participation in the project…
	Team members should be respectful of others	Noting examples where team members have demonstrated respect.	CT 3:8 No member of our team made a derogatory comment or displayed any evidence of disrespect.
	Team members should be open minded	Describing the importance of being open to the ideas and thinking of others	CT 3:13 When faced with this new challenge, I decided to be open and have a positive attitude toward this new experience.
	Team members should contribute their best efforts	Acknowledging the value of team members who try their hardest related to project activities.	SP 6:1 I think that my team as a whole worked to the best of all of our abilities, with keeping in mind we all work different days and hours.

	Team members should be reliable and meet their deadlines and commitments	Noting the importance of being dependable when meeting team obligations	AW 1:8 We all respected the contract and submitted our assignments on time.
	Teamwork requires focusing on patient needs	Stating that effective collaboration also takes into account the needs of the patient.	FC 5:11 As nurses we need to collaborate for the good of the patient.
Acknowledging Leadership	Sharing leadership	Acknowledging a preference for distributing responsibility for leading project tasks	SS 8:5 We agreed to each take on the leadership role in the project however we realized that we didn't need to have anyone really lead…
	Leaders demonstrate initiative	Noting that demonstrations of initiative among team members is valued	AW 1:13 I tried to take the initiative to get things done or would take on the role of the leader if I felt that a certain part of the project needed a leader.
	Leaders solve problems	Describing how team members demonstrate initiative resolve issues of concern to the team	SA 7:18 This was very helpful because she kept the team on track by submitting the team contract as well as reaching out to the one group member who could not attend the chats.
	Leaders keep the team on track	Describing how team members demonstrate initiative to remove obstacles that impede the team's progress.	SA 7:18 This team member kept the project moving with the input of all the team members.
Recognizing positive outcomes	Positive experience	Acknowledging that this team experience has been an affirming one.	TB 9:1 I can say that I was pleasantly surprised that all worked well together.
	Growing trust	Noting that one's belief in the dependability and credence of one's peers has increased since the start of the project.	SS 8:9 Our discussions showed respect and trust in each other's abilities to complete the work required.
	More comfortable giving feedback	Describing how team members became more relaxed providing direct feedback.	SS 8:10 We were also able to give feedback on each other's work and build upon it to create a well thought out care plan for the patient.
	Greater ease in editing each other's work	Describing how team members became less worried about editing each other's contributions.	AW 1:10 From my perspective, we were comfortable amending, editing, and making corrections to each other's work and respected each other as colleague.
	Learning from each other	Acknowledging the value of working with peers to expand one's understanding	DB 4:10 I absolutely learned a lot from the course as well as the other students.

Appendix O
Analytical Protocol for Team Contracts

Use pattern matching to determine the extent to which team contract provisions support the epistemic or regulative dimensions of SEA.

Epistemic Dimensions are knowledge-related and are focused on the development, refinement and advancement of concepts and ideas as the building blocks of knowledge construction:

- Awareness of lack of knowledge
- Identifying knowledge-related problems
- Examining specific sources
- Collecting information from sources
- Sharing ideas and knowledge
- Structuring ideas and concepts
- Discussing misunderstandings
- Producing or negotiating new ideas
- Refining or revising ideas

Source: Adapted from the Damşa et al. (2010) and Epistemic Actions coding scheme.

Regulative Dimensions are process-related to steering, organize and coordinate the team's process of knowledge production

- Goal setting
- Planning
- Delegating tasks
- Monitoring
- Identifying issues or problems
- Evaluating quality
- Inclusion of strategies
- Providing help
- Review
- Reflection

Source: Adapted from Damşa et al. (2010) and Learning Presence coding scheme

Appendix P
Analytical Protocol for Instructor Interaction

Examine instructor's course announcement or discussion posting to classify its purpose as supporting the team in advancing their decisions related to the epistemic or regulative dimensions of SEA.

Epistemic Dimensions are knowledge-related and are focused on the development, refinement and advancement of concepts and ideas as the building blocks of knowledge construction:

- Awareness of lack of knowledge
- Identifying knowledge-related problems
- Examining specific sources
- Collecting information from sources
- Sharing ideas and knowledge
- Structuring ideas and concepts
- Discussing misunderstandings
- Producing or negotiating new ideas
- Refining or revising ideas
- Using feedback productively

Source: Adapted from the Damşa et al. (2010) and Epistemic Actions coding scheme.

Regulative Dimensions are process-related to steering, organize and coordinate the team's process of knowledge production

- Goal setting
- Planning
- Delegating tasks
- Monitoring
- Identifying issues or problems
- Evaluating quality
- Inclusion of strategies
- Providing help
- Review
- Reflection

Source: Learning Presence coding scheme (Shea et al., 2012; Shea et al., 2013).

Appendix Q
Analytical Protocol for Shared Knowledge Objects

This protocol provides a standardized approach to examining each team's shared knowledge objects, including transitional object.

1. Team wiki

Examine the three main pages which were established prior to the start of the course and check the revision history of each:

- Team contract
- Project planning area
- Plan of care work area

Examine all files uploaded to file sharing in area

2. Generate report from LMS to determine, by team, which students access the wiki instructions.

Appendix R
Team B Chronology

Week 8	10/28	Students notified of team assignment
Week 9	11/4	Discussion about contract begins
Week 10	11/10	Contract signed and submitted
	11/10	Team agrees to dates for three chats 11/25, 12/2, 12/9
	11/16	Discussion about interviews begins
	11/16	RN interview on cultural competency posted by Tess
Week 11	11/22	Respiratory Therapist interview posted by Fern
	11/22	Physician Assistant interview posted by Fern
	11/22	Physical Therapist interview posted by Sarah
	11/22	Emergency Dept. Physician interview posted by Denise
	11/23	Nutritionist interview posted by Molly
Week 12	11/25	Team Chat (All but Tess present) o ADPIE selected as organizing framework for care plan o Research on assigned aspects of congestive heart failure due on 12/6 o Team agrees to identify 5 CHF nursing diagnoses and provide 4 or 5 interventions o Two references to be provided for each section o Agree to locate relevant images to include
	11/26	Team learns that Tess has accepted new job and cannot participate in scheduled chats. Fern will convey information between team and absent student
	11/28	Tess who cannot attend chat submits goals, interventions and rationale and evaluation for patient for team to review.
	11/29	Tess student posts summary of research on culture, African American women and heart disease in discussion
Week 13	12/2	Instructor makes a series of discussion posts: o Reminding students she is looking for interprofessional plan of care that focuses on health promotion. o Tells students to post this information in the wiki. o All specialist interviews must be incorporated and that focus on nursing diagnoses is insufficient. o Reiterates this is not an academic paper, and suggests using multimedia, images, graphs etc. to convey health promotion information. o Instructor asks students to consider insurance and finance on family
	12/2	Team Chat (All but Tess present) o Several on team are confused by instructor's post so the team reviews this posting together.

		○ Team agrees abandon academic paper. Team will revise their plan to incorporate 'creative' elements. ○ Team agrees to develop educational pamphlet for patient that will focus on professionals CHF patient will meet with. ○ Diagnoses will align with specialists interviewed. ○ Team agrees to: continue work on individual care plans aligning them with specialist interviews; include patient education on CHF
	12/3	Fern locates an MS Word brochure template. Discussion follows whether the brochure can be presented in wiki. Student offers to try both.
	12/3	Fern shares her revised care plan with team that features interventions and goals aligned with specialist interview. Asks for feedback.
	12/3	Instructor affirms team's new plan.
	12/3	Fern reports on research saying that people are more likely to retain information if they do an interactive task on material learned. Suggests this is an important concept.
	12/4	Tess who has been absent from chats proposes PowerPoint to address handling of cultural issues. No responses from team follow.
	12/6	Denise adds information on different types of heart failure.
Week 14	12/9	Team Chat (Fern, Molly and Sarah present) ○ Team informed that it is not possible to present brochure information in wiki. Team decides to use MS Word template. ○ Each student responsible for their own section of brochure. ○ All agree that contributions will be completed by 12/12 for view and final approval on 12/13.
		Tess posts cultural information as accompanying brochure directed to specialists working with patient.
		Team reviews what items will be submitted to instructor.
	12/14	Sarah volunteers to submit final versions of brochures.
	12/15	Final project submitted one day in advance of deadline.

Appendix S
Team C Chronology

Week 8	10/28	Students notified of team assignments
Week 9	11/4	Discussion about contract begins
	11/9	Discussion about interviews begins
	11/9	Confusion about finding case raised
	11/10	Contract signed and submitted
Week 10	11/12	Case information shared with team
	11/17	Interview w/ medical social worker posted by Pat
Week 11	11/18	Interview(s) w/ pediatric dietician and respiratory therapist posted by Samantha
	11/18	Discussion about plan of care begins
	11/19	Interview(s) w/ family nurse practitioner, nurse practitioners and emergency medicine physician posted by Crystal
	11/20	Interview w/ pulmonary respiratory therapist posted by Althea
	11/20	Team agrees that interviews corroborate each other
	11/20	Team discusses audience for their plan of care noting that both parents and ten-year old have specific needs.
	11/20	Crystal posts extract from education journal describing that the benefits of wikis is in "sharing information, experiences and resources" for collaborative work.
	11/20	Crystal reports problem uploading files to wiki; instructor notified; problem resolved
	11/22	Instructor suggests team consider insurance and financial concerns
	11/23	Pat raises question raised how should plan of care be presented
	11/23	Althea suggests ADPIE framework and posts outline
	11/24	Crystal suggests that each segment of plan of care have its own file which is added to wiki file area
	11/24	Crystal suggests MS PowerPoint format
Week 12	11/29	Samantha posts first content to plan of care area in wiki: image comparing asthmatic and normal bronchioles in lungs
Week 13	12/2	Instructor posts "Thoughts to consider as you develop your plan of care"
	12/8	Althea posts proposed outline of plan of care; Adds text under Assessment; Other students follow immediately with their contributions
	12/8	Instructor suggests addressing "anticipatory care"
	12/8	Students respond to instructor

	12/8	Samantha raises concern about care plan and whether it should include hospital focus
Week 14	12/10	Samantha helps Crystal learn to add content to wiki through chat.
	12/11	Team discusses responsibility for formatting and submitting plan of care
	12/11	Team agrees there is a need for interactive resources targeted to ten year old patient
	12/11	Team decides against holding chat on 2/14
	12/11	Althea raises concern that that more detail is needed in care plan. Suggests that team must translate interview information into actionable interventions and goals.
	12/12	Crystal adds information on medication costs and state funded programs added.
	12/13	Crystal adds action plan for peak flow meter
	12/14	Althea submits project 2 days in advance of due date.