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# Efficacy Beliefs and Outcomes: Socio-Cognitive Perspectives on a Faculty-Led coP

John Muraski
*University of Wisconsin Oshkosh*, muraskij@uwosh.edu

Donald Heath
*University of Wisconsin Oshkosh*, heathd@uwosh.edu

Michael Eierman
*University of Wisconsin Oshkosh*, eierman@uwosh.edu

Michael Patton
*University of Wisconsin Oshkosh*, pattonm@uwosh.edu

# EFFICACY BELIEFS AND OUTCOMES: SOCIO-COGNITIVE PERSPECTIVES ON A FACULTY-LED COP

John Michael Muraski[1]
muraskij@uwosh.edu

Donald H. Heath[1]
heathd@uwosh.edu

Michael A. Eierman[1]
eierman@uwosh.edu

Michael Patton[1]
pattonm@uwosh.edu
[1]University of Wisconsin Oshkosh

**Abstract:**

This study documents the redesign of an introductory information systems course at a US University. Dual lenses of Communities of Practice [CoP] and Social Cognitive Theory are used to explore the impact on course improvement and the self-efficacy beliefs of members. The methodological approach involved participatory action approach and relied on semi-structured interviews, field notes, and student assessments as data sources to examine how participants' self-efficacy beliefs evolved through the course redesign and the impact of the work on course quality. This paper contributes to the existing literature by identifying faculty participation in CoP to enhance instructors' efficacy beliefs, bridging the sociocultural and social cognitive perspectives. Our study contributes a deeper understanding of the sources of self-efficacy within a CoP among well-trained and experienced instructors, each with significant mastery experience, and how vicarious experience and verbal persuasion within the CoP positively impacted their beliefs and motivations.

**Keywords:** Community of Practice, Self-Efficacy, Course Redesign

## I. INTRODUCTION

Introductory courses can be critical in the growth and success of academic departments and the colleges where they reside. They provide students with the foundational knowledge of a specific discipline and often serve as a source of information to non-majors regarding offerings and degree programs. Therefore, academic departments must put their best foot forward. We must design and teach introductory courses effectively to fulfill the dual goals of teaching and recruitment. However, challenges can obstruct the achievement of these goals.

Many of these survey courses prioritize topical breadth over depth. Various faculty often teach these courses in multiple sections. Consequently, new faculty, instructional staff, or adjuncts frequently assume teaching responsibilities. While this is a common staffing strategy, it invites more variability in the quality of instruction. Departments may require that all instructors use a prescribed textbook and follow a single syllabus. However, this is often the extent of the coordination among instructors, with little collaboration regarding topical focus and appropriate depth of coverage, the rigor of assignments and grading, delivery methods, or other pedagogical concerns [Bosman and Voglewede, 2019]. As used here, instructors refer to all faculty and instructional staff within an academic unit. Lack of coordination among instructors can pose challenges to course quality and consistency.

Instructors within an academic department possess the deep content knowledge, teaching, and technical expertise needed to develop genuinely effective introductory courses - lessons, lectures, lab exercises, vignettes, stories, thought experiments, assessments, or other tools

honed over time through experience. However, formal or informal mechanisms often need to be included for identifying, sharing, evaluating, and cross-pollinating this knowledge and experience. How can this expertise be harnessed to improve course quality and teaching efficacy among those teaching these courses?

In this paper, we adopt dual lenses of Communities of Practice [Lave and Wenger, 1991] and Social Cognitive Theories (SCT) [Bandura, 1993] to investigate an instructor-created community of practice (CoP) in the Information Systems Department organized around the redesign of an introductory "Essentials of Information Systems" course and its impact on the beliefs and practices of individual instructors. Our investigation aims to understand 1) *How did the work of the CoP impact course quality,* and 2) *How did participation impact the self-efficacy beliefs of CoP members?* The CoP perspective frames our analysis of socially situated learning within the community. SCT extends our analysis of understanding how participation in the CoP impacts participants' self-efficacy beliefs and their subsequent willingness to enact what they have learned.

The methodological approach taken is one of participatory action research [Sharma and McShane, 2008], where the authors of this paper are also members of the CoP. The research makes several contributions. It extends the existing literature by considering the social cognitive perspectives in the formation of self-efficacy beliefs of instructors. Second, it describes how instructor-organized CoP can serve as a vehicle for group training and professional development while fomenting greater consistency in courses taught by multiple instructors in multiple sections.

## II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The aim of our analysis is to explore how the collaborative redesign of an introductory “Essentials of Information Systems” [EIS] impacted the collective and individual efficacy beliefs of participating instructors and their willingness to implement that which had been negotiated within the group. Therefore, SCT and CoP were chosen as appropriate theoretical lenses.

Wenger, et.al. [2011] define CoP as a “learning partnership among people who find it useful to learn from and with each other about a particular domain. They use each other’s experience of practice as a learning resource” [p. 9]. This definition is well-aligned with the collaborative engagement which is the focus of this study and provides a useful framework with which to analyze group interaction. SCT has been used extensively by researchers to understand individual human development, motivation, and change. SCT provides a useful analytical lens with which to understand the willingness of individual instructors to implement that which is negotiated within the CoP. We begin the section that follows with a brief review of each of these theories and how they have been used by researchers in the context of higher education

### COMMUNITIES OF PRACTICE

The CoP perspective put forth by Lave and Wenger [1991] is rooted in social constructivist theory [Vygotsky, 1978], which recognizes the social environment as an inextricable part of individuals’ identities and understandings, emphasizing the relational interdependency of agent and world, activity, meaning, cognition, learning, and knowing [Lave, 1991]. Individual and environment are mutually constitutive. Considerable researcher attention has been given to CoP as a vehicle for socially situated learning and collaboration where members participate and contribute to the growth and development of all partners [Bosman and Voglewede, 2019; de Carvalho-Filho et al., 2020; Green et al., 2013; McDonald and Star, 2008; Mullen and Schunk, 2010; Por and Scholar, 2014; Sánchez-Cardona et al., 2012; Takahashi, 2011]. The CoP perspective provides insight into learning and sharing processes that take place in the context of shared work activities and collaboration by a community of practitioners around a common interest. Wenger et al. [2002, p.4] describe CoPs as collectives who share a common concern, a set of problems, or are passionate about a topic, and who deepen their knowledge and expertise within their shared focal area on an ongoing basis.

Wenger et al. [2011] describe several concepts that are foundational to the CoP perspective. CoPs involve three requisite elements: a common domain of knowledge, a community of people invested in this domain who can create the social structure necessary for learning, and shared practice developed by the community which is responsive to its needs. Wenger [2004] describes the domain of knowledge as "the area of knowledge that brings the community together, gives it its identity, and defines the key issues that members need to address". It is the locus of engagement. The community, in his view, is comprised of "the group of people for whom the domain is relevant, the quality of the relationships among members, and the definition of the boundary between the inside and the outside" [*ibid*]. Members of the community co-engage on ideas or topics within their domain of interest to share and learn. Wenger [2004] defines practice as "the body of knowledge, methods, tools, stories, cases, documents, which members share and develop together" to address recurring problems in their specific contexts".

Individuals' engagement in a CoP always entails negotiation of meaning. Learning in the CoP is a social process, where individuals, interacting with one another and their environment, negotiating meaning through participation in social communities and the reification of tools and procedures relevant to their focal activities [Wenger, 1998]. Participation and reification are complementary aspects of the production of meaning. Identity, for individual members, is not simply a product of reification via social discourse between the self and of social categories but is also produced in lived experience through participation in specific communities. "What narratives, categories, roles, and positions come to mean as an experience of participation is something that must be worked out in practice. Identity is "a layering of events of participation and reification by which our experience and its social interpretation inform each other" [Wenger, 1998 p. 151].

Wenger et al. [2011] argue value creation within a CoP can be cast into five categories: immediate value; potential value, applied value; realized value; and reframed value. Immediate value involves learning that can be applied immediately to solve a problem. Potential value involves accrual of shared skills and knowledge that may have future benefit. Applied value concerns appropriation of shared skills and knowledge to new contexts. Realized value is that which, in the view of CoP participants, impacted their ability to achieve important goals. Finally, reframed value concerns the identification and definition of new criteria for success.

Learning within a CoP generally follows an apprenticeship model, where practice in the community enables the apprentice to move from peripheral to full participation [McDonald and Star, 2008]. Every member can serve as an apprentice or full participant depending on their familiarity with the ideas or content being discussed. The value-add is the generation and circulation of knowledge, productive capabilities, and in fostering innovation [Por and Scholar, 2014]. CoPs encourage active participation and collaborative decision-making by individuals, as opposed to decision-making by an "authority" figure. Hierarchical, authoritarian management is replaced by self-management and collective ownership of the work [Collier and Esteban, 2000]. Decision-making is a participatory and collaborative process [Johnson 2001]. Members can assume different roles, and hierarchical authoritarian management is replaced by self-management and ownership of work [McDonald and Star, 2008]. Participants generate knowledge as they interact, share information, experience, insight and advice and help each other solve problems. "Over time, this combination of action and discourse eventually represents communal approaches to understanding and solving problems, and the process of reification transforms this shared knowledge into the tools and artifacts that embody a CoP's regime of competence" [Smith et al., 2017, p.213].

Regarding research on CoP in academia, one study by Green et al. [2013] investigated a faculty-based CoP situated in a large, multi-disciplinary, multi-campus faculty. The aim of the study was to understand its potential to promote continuing professional learning among members. The authors found CoPs in their study could meet the needs of members in ways that formally structured programs could not. Similarly, a study by Sanchez-Cardona et al. [2012] examines a CoP involving the library system of a higher education institution in Puerto Rico, finding learning and collaboration among members was the principal benefit, with promotion of new practices which may contribute to the improvement of library services constituted an additional benefit.

A study by McDonald and Star [2008] focused on a CoP dedicated to redevelopment of a first-year course taught by first year course leaders in a business faculty. As is the case with this study, the CoP arose from collaboration between instructors and their plan to share ideas to regenerate the course with others. The case involved the collaborative redesign of an existing undergraduate business course to "embed graduate attributes, scaffold constructivist learning activities, and address student retention and progression issues" [p.6]. The authors found the CoP "increased domain knowledge, intense discussion, reflection on and in practice of teaching first year students, which have supported changed teaching practice, and a strong sense of community that provides professional support for members".

Takahashi [2011] offers one of the few studies that seeks to explore the role of CoP in the formation of individual self-efficacy beliefs. The focus of the research is on the evidence-based decision-making practices of junior high school teachers cast through the lens of CoP. The findings support the relevance of a communities of practice perspective in making sense of how teachers' participation in their social surroundings may shape their efficacy beliefs. The author calls for future research to "better understand how teachers co-construct efficacy beliefs, and how "information" is understood and used in this process" [p.740].

Widely subscribed learning theories such as social cognitive theory [Bandura, 1977], and sociocultural theory [Vygotsky, 1978], hold that there is a fundamental difference between acquiring new knowledge and skills and putting them into practice. Individual motivation is a key driver of behavioral change. "A full understanding of human adaptation and change requires an integrative causal structure in which socio-structural influences operate through mechanisms of the self-system to produce behavioral effects" [Bandura,1997].

In this research, we operationalize the CoP perspective to analyze the collaborative activities associated with the EIS redesign that is the focus of this research. Responding to Takahashi's [2011] call, we extend our analytical frame to include SCT and investigate how participation in a CoP impacts self-efficacy belief formation and practice consequent to participation in the CoP.

## SELF-EFFICACY BELIEFS OF THE INDIVIDUAL

Social cognitive theory [Bandura, 1977] serves as the foundation for much of the research on teacher education and professional development. SCT posits that learning occurs in a social context consequent to dynamic and reciprocal interaction between the person, the environment, and behaviors. Behaviors are shaped by external and internal social reinforcement. Grounded in the principle of reciprocal determinism, SCT holds an individual's past experiences, influences, reinforcements, expectations, and expectancies, all shape whether a person will engage in a specific behavior and help explain why a person engages in that behavior.

Bandura [1993] observes much of human behavior is purposive -- regulated by forethought involving cognized goals, and that personal goal setting is influenced by self-appraisal of one's capabilities. The stronger one's perceived self-efficacy, the higher the goals one might set for themselves. Self-efficacy is the product of a cognitive process in which people construct beliefs about their capacity to perform at a given level of attainment. These beliefs influence how much effort they are willing to put forth, how long they will persist in the face of obstacles, how resilient they are in dealing with failures, and how much stress or depression they experience in coping with demanding situations [Tschannen-Moran and Hoy, 2007].

As it relates to teaching, Bandura observes "the task of creating environments conducive to learning rests heavily on the talents and self-efficacy of teachers" [1993, p.140]. Teachers' self-efficacy beliefs have shown themselves to be critical to the improvement of teaching and student learning [Maddux and Lewis, 1995; McKeachie, 1991; Takahashi, 2011; Tschannen-Moran and Hoy, 2007; Usher and Pajares, 2008]. Self-efficacy affects their choice of activities, effort, persistence, achievement [Bandura, 2006].

Four principal sources of information help inform self-efficacy beliefs of the individual; "performance accomplishments, vicarious experience, verbal persuasion, and physiological states." [Bandura, 1997]. *Mastery experiences*, which for teachers come from actual teaching accomplishments with students, is believed to be the most influential. Perceived self-efficacy

increases when a teacher perceives her or his teaching performance to be a success, which then cascades to future performances. Similarly, the inverse is true in the case of a bad performance. *Verbal persuasion* concerns the feedback a teacher receives regarding their performance from important others, such as administrators, faculty colleagues, parents, and students. *Vicarious experiences* are realized through the modeling of an activity by colleagues or relevant others. The impact of vicarious experiences on the observer's efficacy beliefs depends on the degree to which the observer identifies with and respects the modeler. *Psychological and emotional arousal* also impact perceptions of self-efficacy. When working alone in the classroom, self-efficacy beliefs shape their courage and performative motivations of teachers to adopt new behaviors. Several researchers have called for additional research into the antecedents of teachers' self-efficacy beliefs as well as the sources of efficacy information that would tap the relative weight of vicarious experiences, verbal persuasion, mastery experiences, physiological arousal and contextual factors [Takahashi, 2011; Tschannen-Moran and Hoy, 2007].

In one such study, Tschannen-Moran and McMaster [2009] examined four professional development interventions grounded in Bandura's sources of self-efficacy, each with increasing levels of self-efficacy-relevant input. All interventions generated modest increases in perceived self-efficacy, however mastery experiences were deemed the most effective. Despite this finding, the authors found there was no impact on implementation behavior, suggesting there may not have been confidence in the material to be implemented.

Goddard et al. [2004] found teacher self-efficacy was positively impacted when participants had input into curricular decisions. Sehgal et al. [2017] found the link between perceived self-efficacy and teacher effectiveness was strengthened by collaboration among teachers and academic leadership.

In some studies, Bandura's sources of self-efficacy information are augmented by other factors, particularly those related to the teaching environment. Tschannen-Moran and Hoy [2007] examined the impact of contextual factors such as available teaching resources and interpersonal support, finding they were much more salient in the self-efficacy beliefs of novice teachers. Among experienced teachers with an abundance of mastery experience to draw on, contextual factors were far less important.

Williams [2009] finds there is an emotional component of self-efficacy tied to personal accomplishment. The subjects in their study were teachers who earned an advanced degree while working as teachers. "The teachers' feelings about themselves, their pride and satisfaction from gaining the degree, their confidence, the knowledge gained, and their consequent sense of personal self-efficacy contributed to enthusiasm about and, indirectly, reported changes to their practice". This suggests accomplishments achieved throughout support/intervention sessions may be useful in creating a self-reinforcing mechanism to promote perceived self-efficacy based on emotion.

Recognizing the causal link between self-efficacy beliefs and behaviors, we recognize there is a fundamental difference between acquiring new knowledge and skills in a CoP and enacting them in the classroom. Individual motivation is a key driver of behavioral change. "A full understanding of human adaptation and change requires an integrative causal structure in which socio-structural influences operate through mechanisms of the self-system to produce behavioral effects" [Bandura,1997]. In this study, we seek to complement the research on CoP by considering the socio-cognitive perspective and self-efficacy beliefs of individual instructors.

## III. METHODOLOGY

### CONTEXT OF THE STUDY

One of the courses taught by the Information Systems department in the College of Business at the University of Wisconsin Oshkosh is an Essentials of Information Systems course [EIS]. This course is not unlike those offered in other departments and colleges. In our case, the EIS was taught by a variety of instructors. The department refreshed the EIS course periodically, reviewing new textbooks and seeking those believed to best reflect the ever-changing technical landscape

and imparting the right balance of technical and managerial coverage. However, available textbooks were often viewed as too heavily focused on management concepts. Others were more technical but often too esoteric.

Teaching responsibility for the EIS most often falls to new faculty, instructional staff, or adjuncts. While this is a common staffing strategy, this strategy invited greater variability in the quality of instruction. While we required that all instructors use the prescribed textbook and follow a single syllabus, this was the extent of the coordination among instructors, with little collaboration regarding topical focus and appropriate depth of coverage, rigor of assignments and grading, methods of delivery, or other pedagogical concerns. Over time, each instructor would slowly add their own content, topics, and activities grounded in their own specific interests, knowledge, and experience. The consequence of this was a high degree of variability in students' experience across sections.

These concerns, and our desire to build a better and more consistent course, motivated the Information Systems department to strategize on how to collaborate and create a course that would deliver a more consistent student experience and more predictable student outcomes. Since the time to engage in a significant course redesign did not exist during the semester, the instructors agreed to work together over the summer to undertake this project. An agreement was made to meet in person 2-3 times per month.

Early conversations revisited learning objectives for the course and asked what content would be most appropriate to teach the intended knowledge, skills, and abilities [KSA] to students. This was an important part of the revision process as it encouraged instructors to elaborate their visions of the purpose for the course. What emerged from these initial sessions was a set of ten key learning questions which would serve as a scaffolding for the course. They are as follows:

1. What are information systems?
2. How will technology impact my career and business?
3. How can I use IT to make business processes better?
4. How do I match business needs with IT solutions?
5. How can I determine whether to buy, build, or lease software?
6. How do I successfully manage projects?
7. What do I need to know about the Internet and networks?
8. How do I turn data into answers to business questions?
9. How can I protect my company, customer, and employee data?
10. How do ethics impact IT-related changes and decisions?

Once these questions were agreed upon, content leaders for each of the questions were nominated [or self-nominated] to build the initial shared content for their assigned sections. Members of the team each had significant experience teaching courses in the information systems discipline ranging from ten to thirty years, and multiple years of experience teaching this course. Three of the five also had significant prior industry experience in the areas of their specialization. Selection was based on instructors' industry experience, teaching experience, and areas of research.

Dividing the effort, each "subject matter expert" [SME] assumed responsibility for 2-3 areas of the course content. See table 1 for participating instructors. In subsequent meetings, the SMEs would train others while receiving feedback and improvement ideas.

Table 1: Participating Instructors

| **Instructor** | **Rank** | **Specialization** |
|---|---|---|
| S1 | Full professor | software development, analysis and design |

| | | |
|---|---|---|
| S2 | Associate professor | database, data analytics, strategy |
| S3 | Assistant professor | project management, ERP |
| S4 | Assistant professor | programming, IT infrastructure, web development |
| S5 | Instructor | networking, security, IT ethics |

Each instructor agreed to develop assigned modules which included all the materials necessary to teach and assess their given topic. The course was developed within a Learning Management System [LMS]. Initial ideas were shared via slide presentations which covered the content related to the relevant learning question. The activities and assessments were presented as well. All content, including the presentations, were vetted by the other instructors and recommendations and changes were determined by the group. Adjustments were made iteratively and sometimes involved multiple presentations.

Once the content was stable, responsible instructors recorded their presentation for use across multiple sections. Additional reading and video links were provided along with supporting resources and information. Additionally, instructors developed specific hands-on activities where appropriate that utilized relevant technologies. Activities were focused on the intended learning, with step-by-step instructions provided by the instructors. Assessments were provided for each key question to measure student learning. Once all sections were complete, SME's contributed questions to be used in development of midterm and final exams.

**METHODS**

Our approach in this study is one of participatory action research [PAR] [Sharma andMcShane, 2008]. Accordingly, the authors of this paper are also members of the CoP involved in the course redesign. The fundamental contention of the action research is that complex social processes can be studied best by introducing changes into these processes and observing the effects of these changes. Baskerville [1999] observes there are three unavoidable effects of the action research paradigm; adoption of an interpretivist viewpoint, adoption of an idiographic viewpoint, and acceptance of qualitative data and analyses. The interpretivist viewpoint follows from the allowance for social intervention by the researcher who, through their intervention, becomes part of the study. Action research therefore includes the observer's values and a priori knowledge. The social meaning of action is shared between researcher-subject and other subjects, and forms part of the experimental data. The idiographic viewpoint follows from the acceptance that each social setting involves a unique set of interacting human subjects. Action research operationalizes an idiographic method by incorporating the subjects into their research as collaborators and always involves a team that includes researchers and subjects as co-participants in the enquiry and change experiences. Being interpretive and idiographic in nature, action research must also adopt qualitative data as a medium to be analyzed.

Following the approach of Green et al. [2013], data was collected from participating members where each was invited to tell their own story about their experience in the CoP in individual, in-depth, loosely structured interviews, each lasting between 60 and 90 minutes. Prompted by their interviewer, each interviewee reflected on the community's impact on themselves, their courses, and their co-members. Each author conducted roughly equal numbers of these interviews. We saw these loosely structured interviews as an apt way to capture and facilitate reflective practice, and to make implicit aspects of learning about teaching visible for interrogation and analysis. Creswell notes that qualitative research is "an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. It builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting"[1998, p.18]. Qualitative analysis relies on methods such as interviews, observation of individuals, and controlled subjectivity to build an understanding of the meaning of events, situations, or actions as reflected by participants in the study. A small amount of quantitative data was collected in the form of pre- and post-assessment scores to help in the evaluation of course quality consequent to the CoP's redesign activities.

We drew on the theories of SCT and CoP to inform our exploration of academics' experience in a faculty-based teaching community of practice to which we, the authors of this paper, are members. Semi-structured interviews were recorded, transcribed, and analyzed first by each of us separately and then again collaboratively to allow triangulation and validation of the findings. These were augmented within the group with discussions on peer observations and member stories. Though informed by the themes of our referent theoretical frames, our approach was to the analysis was inductive and iterative; moving recursively back and forth between the transcripts, theory, and emerging themes until consensus about the 'best fit' was achieved [Polkinghorne, 1995, p. 12]. All interviewees were invited to give feedback on the emerging analysis.

## DATA COLLECTION

### Student Data

Data relating to student performance in the course was gathered from a pre-existing pre-test and post-test administered in each section of the course. The test includes 25 standard questions. Test questions are mapped to course objectives. A test is administered on the first day of class and again on the last day of class. Fall 2018 data was not included as this first semester of new content did not have a new post-test developed at time of offering. Spring 2019 data was not included given the COVID transition to emergency lock-down that occurred. All 25 questions are multiple-choice and required to be completed by students.

### Faculty Data

Faculty were interviewed following the development and release of the course and were asked open-ended questions about their experience. These questions included:

1. Talk about the genesis of the project.
2. How did we approach updating the course?
3. Explain how the 10 big questions were developed.
4. Describe the process we followed over the course of the summer.
5. How did we decide who developed each section?
6. Is it your sense that the people with the most expertise were assigned to the right topics?
7. How was your experience teaching the course to colleagues?
8. How was your experience learning course material from other colleagues?
9. Talk about the group dynamic throughout the process?
10. Was there any conflict during the process?
11. What impact did these sessions have on your confidence in teaching the material?
12. Were there topics presented that did not match your teaching experience?
13. Could you identify specific areas where, of those 10 questions, you feel like the work changed your confidence and areas where it didn't?
14. Are there any lessons from the group that you're still not comfortable presenting
15. Were there topics you changed or altered when you taught them the following semester?
16. Do you think the CoP mechanism was effective and do you think it improved the course and its delivery?

## IV. RESULTS AND FINDINGS

In this study, we explored how collaboration in a self-organized CoP around the redesign of an introductory course in information systems impacted course quality and the individual self-efficacy beliefs of participating members*?* The findings highlight the value of communities of practice as a vehicle for ground-up professional development where, through collaborative engagement, instructors developed a shared perspective toward the course and a deeper understanding of one another's content and pedagogy. The findings also demonstrate the value of the CoP perspective in making sense of how socially situated learning may shape the self-efficacy beliefs of participants.

In the section which follows, we argue the collective negotiation of meaning was one mechanism by which faculty developed beliefs regarding their own efficacy, supporting the elevated role of active participation in one's social surroundings and highlighting the limitations of a purely social cognitive perspective on the development of instructors' self-efficacy beliefs. The findings also support the positive impact of the CoP on course consistency across multiple sections and instructors and better per- and post-assessments.

**COURSE QUALITY**

The first research question raised in this study asks: *How did the work product of the CoP impact course quality?* One approach taken by this department to evaluate course quality is through assessment using a pre- and post-test which measures overall mastery of course content and its application. In table 2, the average results of the pre- and post-tests are shown over eight semesters, four of which are before the redesign and four after. Note, the pre-post exam was not conducted in Fall 2018 or Spring 2020. The expectation of the college is that student scores must exceed 60% on individual questions. Additionally, the expectation is that the pre- and post-test delta will provide sufficient evidence that satisfactory learning has occurred.

Table 2: Pre and Post Test Results

| | F16 | S17 | F17 | S18 | S19 | F19 | F20 | S21 |
|---|---|---|---|---|---|---|---|---|
| >60% Individual Questions Pre | 11.98% | 18.39% | 14.80% | 17.44% | 2.54% | 3.40% | 4.11% | 1.79% |
| >60% Individual Questions Post | 68.56% | 58.52% | 61.34% | 61.46% | 59.30% | 74.75% | 84.62% | 83.93% |
| >60% Individual Questions delta | 56.58% | 40.13% | 46.54% | 44.02% | 56.76% | 71.35% | 80.51% | 82.14% |
| Pre-Average | 41.89% | 46.18% | 44.39% | 42.12% | 37.42% | 36.82% | 38.08% | 37.93% |
| Post- Average | 64.21% | 61.24% | 61.66% | 61.25% | 61.91% | 64.93% | 72.68% | 71.57% |
| Average delta | 22.32% | 15.06% | 17.27% | 19.13% | 24.49% | 28.11% | 34.60% | 33.64% |
| N | 194 | 176 | 194 | 192 | 199 | 202 | 117 | 112 |

There are clear trends in the data that support better student performance on the individual questions in the pre and post-test as well as gains in the pre- and post-test delta after the redesign. The average delta post-revision is higher than before the redesign and has improved each semester since the launch. Similarly, correct responses to individual questions rose from the mid-40s prior to the redesign to 70+ post-implementation.

While there are numerous confounding variables which might help account for this steady increase, students are performing better on the assessment deemed important to this department. This supports their notion of better student outcomes.

A second finding regarding course quality was greater course consistency. The content and pedagogy negotiated within the CoP was adopted by all instructors and a master course was created from which all instructors downloaded the same material. One instructor commented, “I filled in for ‘instructor x’ today when they were away at conference. It was amazing. I walked into the class and knew exactly where he was in the content and the intended work for that day!” All interviewees indicated course consistency was a huge benefit that positively impacted the quality of the course.

The third finding regarding course quality was the consensus among members of the CoP that the course content and pedagogy was superior to that of the prior course and more closely aligned with the learning outcomes intended for by the department.

## FACULTY EXPERIENCE WITH REDESIGN

The Second research question asks: *How did participation impact instructor self-efficacy beliefs?* The remainder of this section outlines the findings relevant to the analysis of this question.

Traditionally, instructors teaching a common course across multiple sections standardize around a textbook and core learning objectives. The content and depth of coverage is left to the instructors to format, deliver, and assess. Over the last several years, this department involved in this case flirted with several different textbooks. Some were deemed to be overly focused on business topics while others over-emphasized technology. The department was unable to identify a textbook believed to provide the right balance and depth. As one instructor commented:

> We all agreed that the current book wasn't what we wanted. We were sort of dissatisfied, not only with that book but, that it was our second or third book in a few years, so we started looking at existing textbooks and decided none of them were quite what we had in mind. They were either too technical... this is an intro to IS book that you would give to future IS majors... or they were more of a business book that wasn't technical and taught business theory.

Over time, as instructors met in the hallways between classes and discussed the course, they grew frustrated and dissatisfied with the current course. One of the instructors noted, “we have all these content experts in our hallways, what if we each developed a section of the course. What would that look like? What would the modules be? What key questions should they address? What should students know after taking the course?”

At the end of the semester, the instructors decided to redesign the course themselves absent any textbook. They determined the redesign would take place after the final exams. The strategy chosen was to build the course around key learning objectives expressed in the language of business.

> I think I came up with the initial dozen questions, and then we met as a team, and we went, OK... we don't like that one... let’s reword that one... how about this one, and we bantered them around, until we ended up with 10

Responsibility for the questions and their underlying content were divided among the group. At first, self-selected experts voluntarily selected questions. The group discussed who would serve as the expert for the last few. There was an agreement to meet over the summer to listen to each of the 10 presentations. Each instructor was asked to provide the material that would be used for the class, including slide decks, content in our LMS, in-class activities, and assessments.

### Community of Practice

As work began on the redesign, instructors described how they worked collaboratively with a common focus within a common domain of knowledge – a key tenet in the CoP perspective. Each member had a depth of knowledge regarding information systems on each of the 10 big questions. As a group, they had significant work experience in the discipline and/or significant research and publications. Dividing up the work and having the shared experience clearly motivated the department. One member noted, “It was great to share the responsibility of course development. In the past, I had always been responsible for developing content on my own. It was exciting to share my experience and knowledge and trust others to complete their sections.”

In dividing up the work, it was noted, “I really saw each SME as the expert. I trusted them and took the approach that I would adopt their presentation and accept their expertise on the subject matter.” Simultaneously, there was a desire to be involved in influencing the final product: “We recognized the SME as the content owner and content expert, but we also wanted to tailor and shape what was being presented to ensure a quality product for our students.”

The collaborative engagement and topical focus of the instructors fostered the emergence of a natural social structure where teaching and learning within the group could occur. This is as expected within a CoP. Members agreed **t**he community enabled collective learning and the development of shared practice. One member noted, “I felt like a student in the process. Except unlike how our students feel sometimes, I had a great team.” Similarly, “through this process, I felt like I was able to contribute to each of the big questions. While I owned three of them, I was still an active participant and contributor to the development of all 10 big questions.” One member highlighted the cohesive nature of the process, “we certainly are more cohesive and then probably you could make the case as a department we are a little more cohesive because we know where everybody's at.” In fact, members noted that they would feel confident working through issues once the material was finalized and being delivered as a class:

> “The material is being developed by people who are literally across the hall from me if I run into a situation where like “that did not go the way I thought it would,” I can walk over and talk to them and say, “here is what happened what I miss?” There is a safety net so that even if I drop the ball on the trapeze...it’s OK... they can coach me, and I can go up and do it again.”

Collectively and over time shared practices evolved regarding course content and pedagogy. Wenger [2011] argues the establishment of a group perspective and shared practices responsive to the needs of members. One member noted that the experience "bonded us tighter” and that "all of us would feel confident talking to anyone of the other instructor’s students and saying this is what is going on in your class.” One SME presented a topic that generated much feedback and discussion. The approach seemed unconventional to the community. After discussion and feedback, the community agreed to the approach. One of the members commented:

> “I wasn't an expert in the topic, but I've performed the role in my career. I was somewhat confused by the approach the SME took. It's such a big topic and could have been approached in many ways. I trusted his approach as the expert.”

The SME stated:

> “Deciding what to cover in an introductory class for an entire profession and approach to managing projects was challenging. I ended up providing an overview of the topic and a few basic skills that I felt every student in the College of business should use and understand.”

Similarly, one SME gave a presentation that was designed to be covered over two weeks. One of the members felt the content was too deep for the targeted audience. After much discussion and consideration, the SME agreed to update their presentation. One of the instructors noted:

> “I was really enthralled with the content that was presented. My concern was that the depth of coverage was just too much for the introductory students. We had a heated exchange about the amount of rigor that should be included in the course. These types of discussions truly contributed to the building of consensus and consistency across all sections.”

The SME stated:

> “Initially I felt very strongly about the depth of coverage that I created. It is my belief that the students needed to know all the information that I was presenting. As we discussed the topic as a group, I came to see the value of a lighter touch. Ultimately, we are trying to encourage these students to join our discipline and there was risk by being too technical during this foundational Essentials class.

Within the group, there was often intense discussion. There were several examples of this. One of the first presentations involved a presentation that did not match the expectations of the group:

> This was the first time the group came together to hear a presentation from the assigned expert. We didn't have a standard way of presenting the material or agreement on the depth of coverage. He wasn't quite booed off the stage, but we did have a considerable discussion on depth and format and asked the SME to take another stab at it."

Another instructor noted that "we did butt heads a couple of times, sometimes significantly." In discussing that incident, a different member of the department noted, "I think those conflicts we're in the interest of getting the best thing and it's not like either one of them threw up their hands after the fact and said I'm just going to do it the way I want to do it."

By the end of summer, the department had presented or attended all ten presentations. Taking turns as SMEs across the topics allowed each member to prepare part of the class and teach others based on our expertise and knowledge. Similarly, each took part in all the presentations. This enabled members to learn about each module and see how the content owner presented their material.

Foundational elements of CoP a common domain of knowledge, a community of people invested in this domain who can create the social structure necessary for learning, and finally, a shared practice developed by the community which is responsive to its needs.

This approach allowed the CoP to coalesce around a common perspective toward the course. Each of the members of the department was invested in the redesign process and its outcome. Members built a shared practice and created a consistent course which could be delivered across multiple sections each semester. Participation also impacted individual members. As one participant noted, "It's one thing to know the content and another to see the way other people present it. It's another thing also to have the courage to present it yourself."

**Self-Efficacy**

An important finding in this study involved the evolution of self-efficacy beliefs within the CoP, rather than the classroom. Mastery experience, as predicted by SCT, was gained by instructors when presenting to their peers. While all members had significant mastery experience prior to their work in the CoP, their comments support their beliefs that this activity increased their sense of mastery. The expectation was high regarding the material and delivery.

> Being the first presenter was a bit of a challenge. I had many more questions and requests for me to make changes than I expected. I see that going through the process resulted in a great presentation on the topic. That back and forth was valuable and really elevated my ability to present the material clearly."

Other instructors hearing the presentation wanted to ensure the focus was on improving content:

> Providing this feedback to the first presenter was awkward. This was our SME on the topic. I want to honor their knowledge and expertise while still providing feedback to make the presentation appropriate for our students.

Other comments centered on confidence gained after delivering the content. It was noted, "presenting the material to the group, I felt very confident I would be able to present this material to students. This was a tough audience."

Instructors were also impacted by verbal persuasion. Co-engaging on the material provided a sense of "camaraderie and encouragement" and helped the presenter believe their content was appropriate and delivered well. One member noted:

> I have great confidence in my colleagues. I look at what they do in the classroom and their presentation to our team and place myself at the bottom of that hierarchy. I trust the feedback they gave me in my presentations and know if they validate my content my material is good.

Verbal persuasion was described multiple times in the interviews as all participants though the group was supportive and provided lots of praise for good work.

There were instances where vicarious experiences were described by instructors which clearly impacted their self-efficacy beliefs and confidence. For example, one member noted “seeing and hearing the presentations and doing the hands-on activities allowed me to feel confident that I could successfully deliver this material in my own class.” Another instructor described the impact of being involved in the session as follows:

> But in cases where other people have more experience, or we believe they have more expertise with the topic...I yield to that every time. When I watched them do it - I think our delivering the lessons to each other in the sessions – watching each other teach the slides that were part of their development work allowed us to hear how they presented the material - how they organized it - how they put it in the minds of the audience - how they reinforced what they wanted the students to learn with examples and stories. That was very important I thought.

One instructor commented, “without hearing some of the stories that were shared I would not have felt comfortable giving this lecture.”

The entire experience was generally seen to boost confidence:

> It wasn't just the content but rather the ideas they shared when they talked about it... the stories and metaphors that were included as they taught us their material. I really felt I would be able to use these when I taught the material. You just can't get that from the slide deck or a textbook.
>
> Watching how the expert presented the material, how they talked about it, and brought the audience along to understand it helped me think about how to present the material. I felt like I could do it.

Another instructor in the department participated and contributed through each session but did not act as a SME for any topic. They stated, “It was good content. Everyone did a great job in preparing an approach to teach each topic. I was comfortable that I could teach all the material without edits.”

Self-efficacy beliefs informed by vicarious experience are a product of observation. In the case of this CoP, they were a product of peer observation within the group, where trusted others presented their entire lectures and materials and took feedback and earned validation from the group. Validation increased confidence in the content and pedagogy.

## V. DISCUSSION

This study offers several important findings. We find evidence to support the value of the CoP as a vehicle for professional and course development where instructors gained a shared perspective toward the course and adopted shared content and pedagogy. Importantly, the CoP also provided a performative stage where instructors could get constructive feedback from their peers and positive reinforcement when the material was deemed sufficient to the group. This was linked to shifts in the self-efficacy beliefs of members. The dual lenses of CoP and SCT provided greater insight into the course and instructor transformations that either theoretic lens would in isolation.

While our study finds support for the social cognitive perspective on faculty efficacy beliefs and their formation, we find the dominant sources of self-efficacy beliefs are different than those identified in other studies. For example, Bandura [1993, 1997] identified mastery experiences as the strongest contributors to self-efficacy beliefs for both beginning and career teachers. This was not the case within the CoP, where all members held strong beliefs in their own mastery prior to joining. Mastery experiences were boosted or reinforced by presenting successfully to expert peers. However, among these ‘experts’, verbal persuasion and vicarious experience played the more dominant role. This is likely attributable to the make-up of the membership. There were no

novice faculty in this group. All had significant training and teaching experience in the domain and mastery experiences on which to draw in forming their own self-efficacy beliefs.

Across multiple sessions, members of the CoP made presentations, observed presentations by their peers, and vigorously negotiated pedagogy and content. Observation of peer presentations within CoP afforded observers vicarious experiences with impacted their own self-efficacy beliefs. The CoP could be understood as an expert panel who observed and critiqued all aspects of each presentation. Once content was settled and presented successfully to the group, observers gained confidence in their own self-efficacy toward the material and their ability to present it. This comports with Wenger's [1998] view that learning in the CoP is a social process, where individuals, interacting with one another and their environment, negotiating meaning through participation in social communities and the reification of tools and procedures relevant to their focal activities [Wenger, 1998].

Verbal persuasion, according to Bandura [1977], concerns the feedback a teacher receives regarding their performance from important others, such as administrators, faculty colleagues, parents, and students. The CoP provided a rich environment for sharing and receiving this feedback. Members' beliefs were strengthened by the affirmations of their peers.

While all participants brought their own mastery experiences to the CoP, activities within the CoP provided new evidence in the form of vicarious, verbal and mastery experiences on which to build new confidence in their own teaching self-efficacy. This suggests self-efficacy beliefs remains fluid, even among faculty with significant training and mastery experience.

A second finding concerns the potential of CoP as a continual improvement strategy for course and instructor development. Albeit subjective, one measure of improved course quality is the instructors' opinion. Participants in the study believed the quality of the course was significantly improved by virtue of instructor collaboration and engagement. Perhaps less subjective was the assessment of student learning. Since the introduction of the standardized content and assessments developed with the CoP, end of semester assessments have shown steady consistent improvement. This may be attributable to the increased familiarity and confidence of the instructors.

Common professional development activities in academia, such as seminars, conferences, workshops, and mentoring each intend to improve individual teaching efficacy by sharing best practices, competencies, and skills believed to improve teaching. Sharing is typically grounded in "'mastery' philosophies that tacitly aim mentoring at less-experienced peers" [Ponce et al., 2005, p.1159]. A common mentoring strategy is a one-on-one approach where more senior faculty members pass knowledge and advice down to junior faculty [Darwin and Palmer, 2009]. They note this dyadic approach tends to stigmatize junior faculty members and promotes the view that senior faculty do not need mentoring. In rapidly changing fields such as information technology, course content can have a limited shelf life. Colleagues more recently trained, or with more recent industry experience, might have much to share with their more senior colleagues. For example, a recent PhD may be more familiar with recent technical and teaching innovations than their more senior colleagues. Teaching and learning practices often fail to incorporate new and emerging concepts in ever-evolving fields such as information technology. Faculty members struggle to modernize their content and pedagogy. One of the benefits of the CoP that we observed in this study was greater democratization of content and a shift toward newer ideas, topics, and technologies, such as AI and machine learning, each an area of interest to instructors in their own research.

Work within the CoP produced a common set of slides, lesson plans, lab activities, assessments, and content weighting. It is important to note that while all instructors teaching the EIS course adoption of this material uniformly, instructors still exercise freedom to extend the content with their own anecdotes, vignettes, and additional materials that draw on their own mastery experiences. For example, one instructor augments the material on networks to include a discussion of certificate authorities and public key infrastructure. The negotiated content serves as a floor rather than a constraint.

## VI. CONCLUSION

In this study, we have explored the social cognitive perspectives to examine the that takes place within a CoP and the efficacy belief developments of participants. Our study is not unique in that regard, as others have begun to bridge the gap between these two theories as well [Eun, 2019; Takahashi, 2011]. However, in doing so, our study contributes a deeper understanding of the sources of self-efficacy within a CoP among well-trained and experienced instructors, each with significant mastery experience, and how vicarious experience and verbal persuasion within the CoP positively impacted their beliefs and motivations.

We extend the literature on CoP in academia, finding faculty-led CoPs may be an important and underutilized vehicle for professional development among highly skilled educators. Further, we extend the literature on SCT by finding different weightings of the sources of self-efficacy beliefs than suggested in other studies for this category of professionals.

The study also contributes to practice by elaborating a ground-up process for course improvement in team-taught courses which promotes greater consistency in the student experience across multiple sections and instructors and allows for better alignment of pedagogy and content with student assessments. One of the benefits of this approach is the emergence of a shared perspective on the course, the content, and its relative importance which is tightly bound to the intended student learning objectives.

An obvious limitation in this work is that the research involves a limited sample. The participants in this study were highly motivated to craft a better course and committed to working outside the classroom to accomplish this redesign. Ironically, none of us understood at the outset that the CoP would be a vehicle for our own professional development.

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## ABOUT THE AUTHORS

**John Michael Muraski** is an assistant professor of information systems in the University of Wisconsin Oshkosh College of Business. After 20 years of working and consulting in industry, he transitioned into higher education and earned his DBA at the University of Wisconsin Whitewater. Over the last 12 years, he has taught at both the undergraduate and graduate levels and led the development of several new programs, including the ERP and Business Analysis programs. Muraski researches two main areas: (a) the evolution of ecosystems and maturity models centered on regional affiliations and collaboration and (b) challenges and opportunities relating to high school and college student reluctance to explore technology-related educational pathways. John serves on the board of the Association for Information Systems Special Interest Group on Education (SIGED) and is co-chair for the Education Track at the Americas Conference on Information Systems (AMCIS).

**Donald R. Heath** is an Associate Professor and Chair of the Information Systems at the University of Wisconsin Oshkosh. He received his Ph.D. from the University of North Carolina Greensboro. In addition to his role at UW Oshkosh, Dr. Heath is the past president of the Association for Information Systems Special Interest Group on Ontology-Driven Intelligent Systems. His research interests include mobile technologies as vocational tools for people with different abilities, organizational strategy, and curricular design. He has published his work in journals such as Information and Organizations, MIS Quarterly Executive, the Journal of Information, Communications, and Ethics in Society, the Journal of Information Technology in Education: Research, the Assistive Technology Journal, and others. Prior to joining academia, Dr. Heath worked extensively as an applications developer and software architect and has industry experience in a variety of leadership roles.

**Michael A Eierman** is a Professor of Information Systems at the University of Wisconsin Oshkosh. He received his Ph.D. from the University of Minnesota. Dr. Eierman is also the Academic Director for two online collaborative degrees: The BS of Applied Computing and the MS of Information Technology Management. He has published a textbook on IOS and Android Development as well numerous peer reviewed articles in the information systems discipline. Dr. Eierman teaches courses ranging from introductory programming to information systems strategy and management.

**Michael Patton** has over 20 years of private industry experience as an IT leader and consultant. During his career he has managed the networking and cybersecurity needs for multiple nation-wide companies and was the lead consultant on the VDI project for the Army National Guard's Arlington Hall Readiness Center in Arlington, VA. As an educator at UW Oshkosh, Mr. Patton was instrumental in creating the curriculum for the Cybersecurity emphasis within the Information Systems BBA as well as the Cybersecurity Minor and Cybersecurity Certificate for the UW Oshkosh College of Business. In addition to cybersecurity courses, Mr. Patton also teaches courses in Network Communications and Design, ERP systems, IT Ethics, and Strategy and Management at the undergraduate and graduate levels. In addition to his role at UW Oshkosh, he is an instructor and has developed courses for the UW Extended Campus BS in Applied Computing, MS in Cybersecurity, and MS in Information Technology Management.