Original Paper

Innovation and Teaching: Barriers and Opportunities

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Abstract

This study explores the role of professional learning communities (PLCs) in mitigating barriers to innovative instruction. Using a cross-sectional survey with selected and open-response items, data were collected from educators participating in either a cohort-based immersive PLC training or a regional network train-the-trainer model. Both groups agreed on the definition and implementation of innovative instructional strategies. External barriers identified include limited resources and students' resistance to alternative learning methods, which may reflect internal barriers such as reduced teacher efficacy. While survey responses suggest that professional development in innovative teaching is perceived as beneficial, many educators do not view innovative strategies as integral to their practice. A significant difference emerged between the two groups regarding the perceived impact of PLCs, with the cohort reporting a greater influence on their instructional strategies than the regional network. Although PLCs fostered collaboration and peer learning, evidence of widespread implementation of innovative strategies in classroom practice was insufficient. These findings suggest that while PLCs raise awareness of innovative teaching methods, persistent barriers hinder their execution. The report concludes with a discussion of these results, their implications, and recommendations for future research to enhance the integration of innovative instruction.

Keywords

teacher professional learning community, instructional innovation, teacher change, teacher learning, collaboration, psychological safety

1. Introduction

We were interested in documenting the relationship between teachers' engagement in innovative teaching and their participation in professional learning communities. The teachers may perceive barriers that limit their engagement in innovative teaching practices, or external barriers may include psychological safety or peers. As Tschannen-Moran and Barr (2004) point out, schools are intertwined
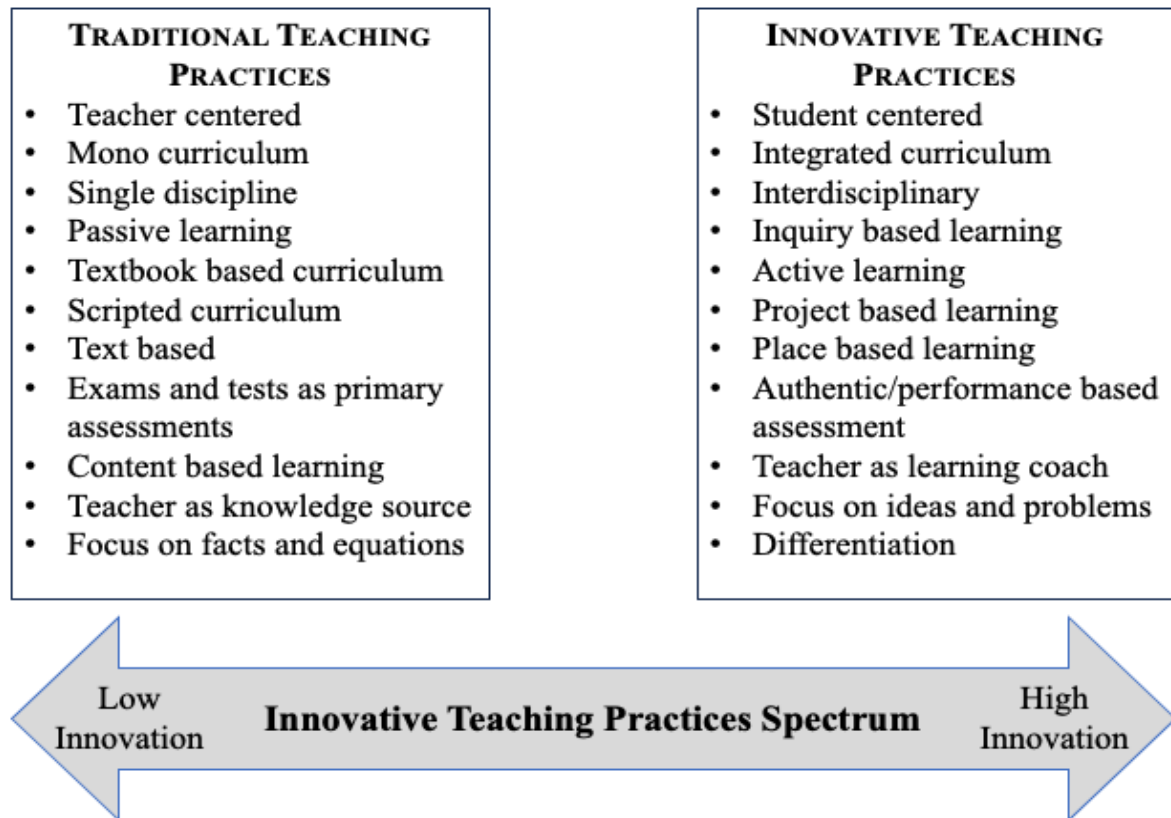
with the individual teacher's efficacy and the building's collective efficacy. Innovative teachers develop a student focus on problem-solving and skills to use in life that is immersive of the content. Hattie (2023), via meta-analysis, reports that collective teacher efficacy is the most effective process for positively influencing student success. Coupling John Hattie's finding of the impact of collective efficacy and psychologically safe models, does the PLC at Work process establish the culture and environment to change teachers' perceptions that inhibit their innovative teaching and for collective efficacy to flourish?

2. Review of Literature

2.1 Innovative Teaching

We begin our exploration of innovative teaching with a definition of the construct. Similar to Nadelson et al. (2016), we consider innovative teaching can be considered through multiple lenses. We recognize that innovative teaching can be defined as a partial or complete amalgamation of student-centered learning (Lee & Hannafin, 2016), authentic inquiry (Nadelson, 2009), project-based learning (Surmilasari & Usman, 2022), place-based learning (Gruenewald & Smith, 2014; Nadelson et al., 2016), application of knowledge (Dole et al., 2015), integrated curriculum (Nadelson & Seifert, 2017), and authentic assessment (Huntington, 2021). Some may argue that our definition of innovative teaching is reflective of high-impact teaching practices. Yet, we maintain that the combination and engagement in the practices are outside of traditional educational practices, justifying the consideration of the combination of practices as innovative. Thus, the most effective way to consider innovative teaching is on a spectrum. The innovative teaching spectrum spans from one end of traditional teaching practices to innovative ones (see Figure 1).

Our model reflects our perception that innovative teaching can occur on a spectrum ranging from traditional teaching practices at one end to innovative teaching practices at the other. Most teachers are likely between the two ends of the spectrum, moving between traditional and innovative teaching approaches. We are interested in the potential influence of teacher engagement in professional learning communities on their engagement in innovative teaching practices.

TRADITIONAL TEACHING PRACTICES
- Teacher centered
- Mono curriculum
- Single discipline
- Passive learning
- Textbook based curriculum
- Scripted curriculum
- Text based
- Exams and tests as primary assessments
- Content based learning
- Teacher as knowledge source
- Focus on facts and equations

INNOVATIVE TEACHING PRACTICES
- Student centered
- Integrated curriculum
- Interdisciplinary
- Inquiry based learning
- Active learning
- Project based learning
- Place based learning
- Authentic/performance based assessment
- Teacher as learning coach
- Focus on ideas and problems
- Differentiation

Low Innovation ← **Innovative Teaching Practices Spectrum** → High Innovation

Figure 1. A Model of Innovative Teaching Practices

The potential shifts in educational innovations require changing teaching and learning mindsets. Thus, collective exploration of ideas, experiences, challenges, and solutions in professional learning communities may be critical to the culture change needed to shift toward innovative educational practices. Professional learning communities may be the ideal structure for fostering a culture of change and exploring new innovative approaches to teaching and learning. Thus, there is value in empirically documenting teacher engagement in professional learning communities and their consideration and engagement in innovative educational practices by possibly reducing the external and internal barriers within the teacher or teaching team.

2.2 Barriers to Innovative Teaching

As we study innovative teaching practices, just as in other industries, some barriers interfere with and reduce the creativity and innovation of the workforce. We are asking what barriers prohibit innovative teaching. Internal barriers may include teacher efficacy; external barriers may include a lack of psychological safety, colleagues, and leadership.

An internal barrier to teacher efficacy is an obstacle to innovative teaching practices. Teacher efficacy is the belief that teachers can instruct and influence student learning regardless of the student's situation (Cantrell & Callaway, 2008; Carmeli & Schaubroeck, 2007). Notably, research has shown that teachers with high self-efficacy predict innovative behaviors (Hsiao et al., 2011). The more confident the educator

54

feels about their abilities to teach, the more it has been found that their behavior will be that of an innovative teacher (Gkontelos et al., 2023). We know that a necessary condition of innovative instruction is the teacher's attitude and understanding of pushing their students further, which requires confidence and efficacy (Hasanefendic et al., 2017).

Edmondson and Lei (2014) developed a model for establishing psychological safety in the workplace, illustrating a leader who is a model to the organization of ongoing study and growth/development. Team development is essential for establishing trust and transparency, leading to curiosity and innovation (McManus, 2006). Clark (2020) describes the four stages of psychological safety in the workplace: inclusion, learner, contributor, and challenger. Clark describes the team as reaching an innovative threshold between contributor and challenger safety stages. The challenger safety stage allows participants to challenge protocol safely and thinking within the organization. Both models include transparency and trust among the participants to achieve improvement and innovation.

2.3 Influences on Adopting Innovation

In addition to barriers to innovation, several potential influences may positively catalyze as well as impede or repress engagement in innovative teaching. For example, a school culture in which risk-taking is anticipated and supported may lead to higher exploration or engagement in innovative teaching practices (Beghetto, 2018). However, if the school culture is more aligned with maintaining traditional approaches and is risk-averse, then there would likely be no support for exploring and engaging in innovative teaching (Fuad et al., 2022). Similarly, the consideration and adoption of innovative teaching practices may be associated with teacher preparation (Williams et al., 2009), administrative philosophy (Feldner, 2003), teacher mindsets (Nadelson et al., 2015), available resources (Chatterji, 2018), and the teachers' communities of practice (Cai & Tang, 2021).

Of interest to us is the potential association between engagement in a long-term professional learning community and teacher perceptions and engagement in innovative teaching. Given the potential for learning communities to be associated with shifts in teacher practices (Andrews & Lewis, 2007), there is justification to empirically determine if the shifts are toward more innovative teaching practices.

2.4 Teacher Engagement in Innovative Teaching

Teacher engagement in innovative teaching would likely involve teachers shifting from a didactic or teacher-centered instructional approach to methods that apply dialectic or Socratic exchange and student-centered learning. Thus, innovative teaching requires shifts in teachers' perception of their role, from delivering content to inspiring and facilitating students to seek meaning in ideas and phenomena (Dovey & Fisher, 2014; Fisher, 2021; Hattie, 2012; James & McCormick, 2009).

When instruction is didactic, students are passively engaged, leading to disinterest in the content and lethargy toward learning (Fullan & Langworthy, 2013; George et al., 2000; Lord, 1999; Secker, 2002). In contrast, when instruction shifts from teacher-centered to student-centered problem or project-based learning, students experience and display increased interest and engagement in learning (Barron & Darling-Hammond, 2008; Bell, 2010; Dole et al., 2015; Thomas, 2000). Due to increased engagement in

learning, student-centered teaching leads to higher student achievement (Barron & Darling-Hammond, 2008; Thomas, 2000). It is important to note that innovation instruction may be observed at differing levels of implementation (Lambriex-Schmitz et al., 2020).

The evolution of teacher consideration, adoption, and implementation of innovative instruction progresses through multiple stages, from awareness to complete integration (De Jong & Den Hartog, 2008; Fullan, 2015; West & Farr, 1989). Teacher consideration of innovative instruction begins with the recognition of a problem, such as dissatisfaction with teaching (Cai & Tang, 2022) using traditional approaches, lackluster student engagement in learning, and mediocre levels of student achievement (De Jong & Den Hartog, 2008; Fullan, 2015; West & Farr, 1989). If the dissatisfaction is sufficient, teachers are likely to begin to explore more innovative instructional approaches such as project-based learning, collaborative learning, and curriculum integration. The successful initial implementation of innovative instruction may initiate a positive feedback loop, further motivating and solidifying continued innovative instructional practices (De Jong & Den Hartog, 2008; Fullan, 2015; West & Farr, 1989). However, the perceived barriers to the adoption of innovation may be considered to be too overwhelming, motivating the teachers to resist the risk-taking required to explore new instructional approaches.

Of interest to us is how teacher engagement in long-term school-wide professional learning communities influences their perceptions, understanding, consideration, and implementation of innovative teaching practices. The lack of empirical documentation of the association between engagement in professional learning communities and innovative teaching provides motivation and justification for our research on the phenomenon.

2.5 Innovative Teaching and Professional Learning Communities

At the heart of the teacher-professional learning community is collaboration. This collaboration between teachers is the idea of an increasing emphasis on student achievement and elevating the expertise of the educator (Bradbeer, 2021; Fullan & Langworthy, 2014; Goddard et al., 2007; Hattie, 2023; Stoll et al., 2006). As teachers collaborate and increase their self-efficacy, these attitudes should be fostered and maintained, as research has indicated that after a given amount of time, these methods and beliefs are left behind and return to commonplace or traditional methods of instruction (Verloop et al., 2001). Goddard, Hoy, & Hoy (2004, p. 8), "The sense of collective efficacy in a school can affect teachers' self-referent thoughts and, hence, their teaching performance and student learning." This is further evidence of the meshing and molding of educators within their team and school climate, who must have a sense that there can be an increase in student achievement regardless of the outside dynamics that may affect the student (Eells, 2011).

Given the evidence that teacher self-efficacy is positively associated with innovative work behavior (Cai & Tang, 2021; Gkontelos et al., 2023) and high-performing professional learning communities predict higher levels of collective teacher efficacy (Voelkel & Chrispeels, 2017), there is justification for predicting PLCs would motivate teachers to adopt innovative instructional practices. To document the

potential for this phenomenon, we explored the relationship between teacher PLC engagement and their perceptions, knowledge, and engagement in innovative teaching.

3. Methods

3.1 Research Question

Our overarching research question was, what are teachers' levels of innovative practices, and how are they influenced by engagement in professional learning communities? To answer this question, we developed the following subset of guiding research questions:

1) How do teachers define innovative teaching practices?
2) What external barriers do teachers perceive limiting their engagement in innovative teaching practices?
3) What teacher perceptions or knowledge limits their engagement in innovative teaching practices?
4) How does engagement in professional learning communities influence innovative teaching practices?

3.2 Participants

Our participants were K-12 teachers participating in two different configurations of professional learning communities and, on average, had been working in the learning communities for three years. We had 79 participants from the "network" configuration and 93 participants from the "cohort" configuration complete at least 90 percent of our survey items. The average age of the participants was 43.65 years ($SD = 11.67$). The teachers had been teaching an average of 15.57 years ($SD = 10.20$). There identified as 131 females, 38 males, two as Other, and one participant preferred not to answer. Of the 172 participants, 27 had a bachelor's degree, 29 had a bachelor's degree with some graduate coursework, 72 had a master's degree, 33 had a master's degree with some postgraduate coursework, 10 had an education specialist degree, and one had a doctorate. A slight majority of the participants worked in rural communities (50.6%), while 32.6% indicated working in suburban settings, 15.7% indicated they worked in urban settings, and 1.2% taught all online. Almost half of the participants taught in high schools (47.7%), with 26.2% teaching in middle schools, 14.5% teaching in elementary/primary schools, and the remaining 11.6% of the participants teaching in some other school configuration, such as grade K-12 schools, grade 6-12 schools, or grade K-8 schools.

3.3 PLC Configurations

Our sample was drawn from two groups of teachers participating in one of two PLC configurations: the cohort or network configuration. The cohort configuration of PLC schools began in August 2017. A cohort school is awarded fifty-two onsite training sessions yearly from the professional development company associates for three consecutive years. The associates include a literacy coach, a math coach, an assessment coach, a monthly PLC coach, a PLC leadership academy year 1, an assessment leadership academy year 2, and an RTI leadership academy year 3 (Walley, 2023).

The PLC regional network configuration began in August 2021. A regional network school is partnered with an Arkansas Practitioner who either participated in the PLC Project or led a school through the PLC processes. The professional development associate facilitates in-depth learning by guiding coalitions and administrative teams over three years. The first year is Laying the Foundation, year two is Assessment training, and year three is structuring Response to Intervention (Walley, 2023).

4. Methodology

To answer our research questions, we selected to use a cross-sectional survey research methodology. We selected this methodology due to the large sample size, the desire to gather data from a widely distributed sample, and the goal of gathering both quantitative and qualitative data. We also determined that the exploratory nature of our research necessitated establishing a baseline of understanding of how engaging in professional learning communities may influence how teachers embrace and implement innovative teaching practices.

4.1 Survey Development

Given the unique focus of our research, we could not locate a survey that directly aligned with our study questions. Thus, we determined it was necessary to develop a survey specific to our research focus. To develop the survey, we adapted and modified items from three extant surveys (Edmondson, 2019; Gkontelos et al., 2023; Lambriex-Schmitz et al., 2020; Tschannen-Moran & Hoy, 2001). We modified the items based on considering each of our guiding research questions. To meet our goal of gathering both quantitative and qualitative data, we developed or adapted at least five selected response items and one free-response item for each of our guiding research questions.

Once we completed an initial survey draft, we engaged a panel of experts to establish our instrument's face, content, and construct validity. Following the review, we made some minor adjustments to the survey. Our final survey contained 21 selected response prompts and five free-response prompts. The selected response items contained positively and negatively phrased prompts such as, "The PLC experience has enhanced my teaching of an integrated curriculum" and "I am not encouraged to take risks in my teaching." These were to be answered using a standard five-point Likert scale. The reliability was calculated to have a .81 Cronbach alpha.

The free-response items included prompts such as, "Please provide your definition of innovative teaching practices" and "What are the barriers you encounter when using innovative teaching?" The participants were provided with unlimited space to answer these prompts.

The final version of the survey also contained several demographic items. We ported the survey to an internet-based online survey site to distribute and archive the survey data.

4.2 Data Collection

Our participants included secondary educators employed by schools that are part of the Arkansas Regional Network or Cohorts 1-6 of the Professional Learning Communities grant. The teachers' email addresses were collected from school website listings. One thousand five hundred eighty-one surveys

58

were distributed via email and sent to the Regional Network Secondary Schools, and seventy-nine surveys were completed. Two thousand one hundred thirty-six surveys were distributed via email to the Cohort 1-6 secondary schools, and ninety-three surveys were completed.

4.3 Data Conditioning

We began our data conditioning by removing all participants who had not completed most of the selected response items. We retained all participant responses in which at least 90% of the selected response items were answered. For the occasional missed or skipped item, we replace it with the value of the series mean using the SPSS routine. We then reverse-coded all negatively stated items to analyze the reliability and report consistency. We then coded all selected responses for analysis, adding labels associated with the response values.

To condition our qualitative data, we exported the values to a spreadsheet, created a tab for each item, and then included the associated participants' responses in the first column of the sheet. We had five tabs in our spreadsheet, each containing one of the responses to the open-ended prompts. We then populated the first row of the sheet with our a priori and emergent codes for analysis.

4.4 Data Analysis

4.4.1 Qualitative Data

To analyze the data, we used a combination of deductive and inductive coding. We generated a set of a priori codes for our deductive coding based on the literature, experience working with teachers, and knowledge of the associated professional learning community goals (see Table 1). We also remained open through inductive coding to emergent codes, which we added to our analysis as we proceeded in our coding. As we added the codes, we re-reviewed our coded data to determine if our emergent codes were present in the data from the previous codes. Note that the coding frequency was based on the presence of the coded-related responses from the survey.

Table 1. Research Question Themes and the Aligned A Priori and Emergent Codes

Theme	A Priori Codes	Emergent Codes
Definition of Innovative Teaching	Student-Centered, Active Learning, Inquiry Based Learning, Focus on Ideas and Problems, Differentiation, Project Based Learning, Authentic/Performance Based Assessment Integrated Curriculum, Place-Based Learning, Teacher as Learning Coach, Interdisciplinary, Teacher Risk Taking, Evidence-Based, Alternative Assessment, Culturally Appropriate	Altering Instructional Approach, Using Technology, Application of Knowledge, Collaboration, Student Choice, Sharing

Definition of Student Center Teaching	Student Choice, Differentiation by Ability, Student Collaboration, Problem-Based Learning, Culturally Responsive, Alternative Assessments	Active Learning, Teaching as a Learning Coach, Life Skill Development, Direct Instruction
Barriers of Innovative Teaching	Time, Lack of Materials/Resources, Lack of Comfort, Fear of Failure, Need to Cover Content, High Student Needs, Limited Autonomy, Classroom Management Challenges, Unsupportive Leadership	Lack of Culture of Innovation, Lack of Student Knowledge, Student Resistance, Lack of Student Motivation, No Barriers, Class Size, Highly Individualized Instructional Needs, Lack of Personal Knowledge or Creativity, Student Absentee
Benefits of Innovative Teaching	Professional Growth, Positive Impact on Students, Sense of Achievement, Evidence of Success, Empowerment, Greater Autonomy, Administrative Support, Peer Support, Parental Support	Increased Student Engagement/Motivation, More Enjoyment in Teaching, Collaboration with Colleagues, Cross Curricular Success, A Culture of Innovation, Positive Impact on Future Teachers, Increased Reflective Practice, Better Use of Instructional Time, Inclusive Teaching/Differentiation, Examples of Innovative Teaching
PLC Influence on Innovative Teaching	Collaboration, Peer Learning, Peer Support, No Impact, Risk Taking, Action Research, Reflective Practice, Comfort with Change, Student Focused, Administrative Support, Increased Autonomy	New Strategies/Instruction, Data Sharing, Student Growth, Facilitated Communication, Cross-Curricular Integration, Professional Growth

4.4.2 Quantitative Data

We analyzed our quantitative data descriptively. We began our analysis with a pairwise comparison of the responses to our selected response items. We only found two prompts where the two sample groups had significant differences. The first prompt we found to be significantly different was, "I am encouraged to take risks in my teaching" $t(170) = 2.03$, $p = .04$, with the cohort group scoring lower ($M = 2.02$, $SD = .93$) and the network group scoring higher ($M = 2.32$, $SD = .97$). The second prompt in which we found a significant difference was "The PLC encourages innovative teaching" $t(170) = 2.70$, $p < .01$ with the cohort group ($M = 3.56$, $SD = 1.21$) scoring significantly higher than the network group ($M = 3.11$, $SD = .95$).

We reported all others collectively and descriptively because we only found the two significant differences between the groups in their responses. We did report the means of both groups for transparency, but we did not compare the responses to each other due to the lack of significant differences for the remaining items.

4.4.3 Trustworthiness

We satisfied the trustworthiness of our research in multiple ways. First, we created a survey with input from a panel of experts directly aligned with our research questions. The survey enhances the opportunity for replication of the data collection, which contributes to both the credibility, transferability, and dependability of our research. Second, we developed and shared a coding scheme to allow others to replicate our qualitative data analysis, which enhanced the confirmability of our project. Third, we established a Cohen's Kappa above .91, which can be interpreted as nearly perfect consistency in coding, thus establishing intercoder reliability and contributing to dependability.

5. Results

5.1 Defining Innovative Practices

Our first guiding research question was, how do teachers define innovative teaching practices? We examined the responses to the related quantitative and qualitative items to answer this question. Our qualitative analysis examined our coded responses from the regional network and cohort survey responses. The results of the quantitative analysis revealed the two sample groups were not significantly different in their responses to our selected response items associated with innovative practices (see Figure 2). Both groups were neutral, agreed with their perceptions of their teaching being out of the ordinary, and nearly agreed on encouraging student risk-taking. These results indicate a tentative perspective of considering the likelihood of their teaching being out of the ordinary and likely to encourage their students to take risks when learning. Overall, these results do not reflect innovative teaching practices.
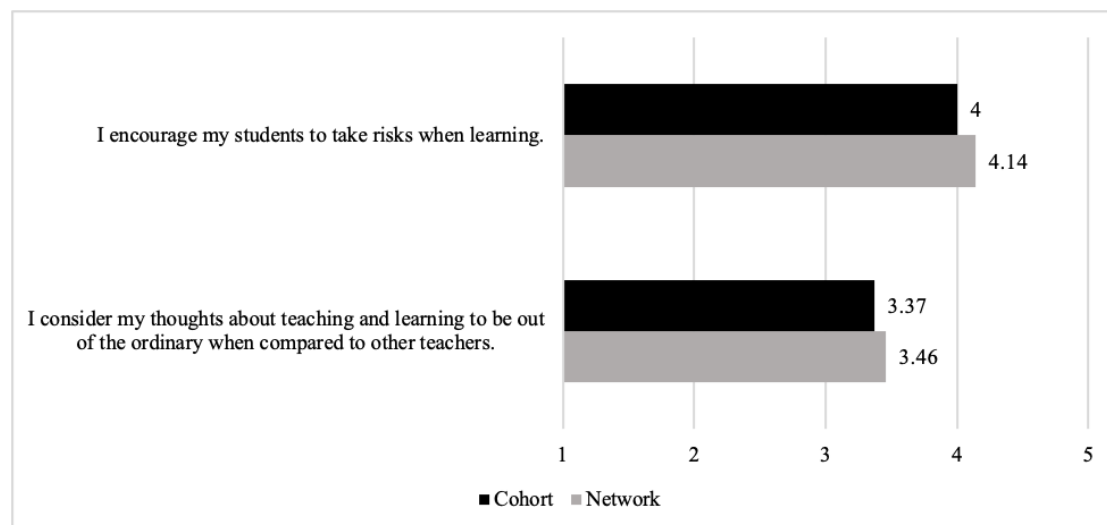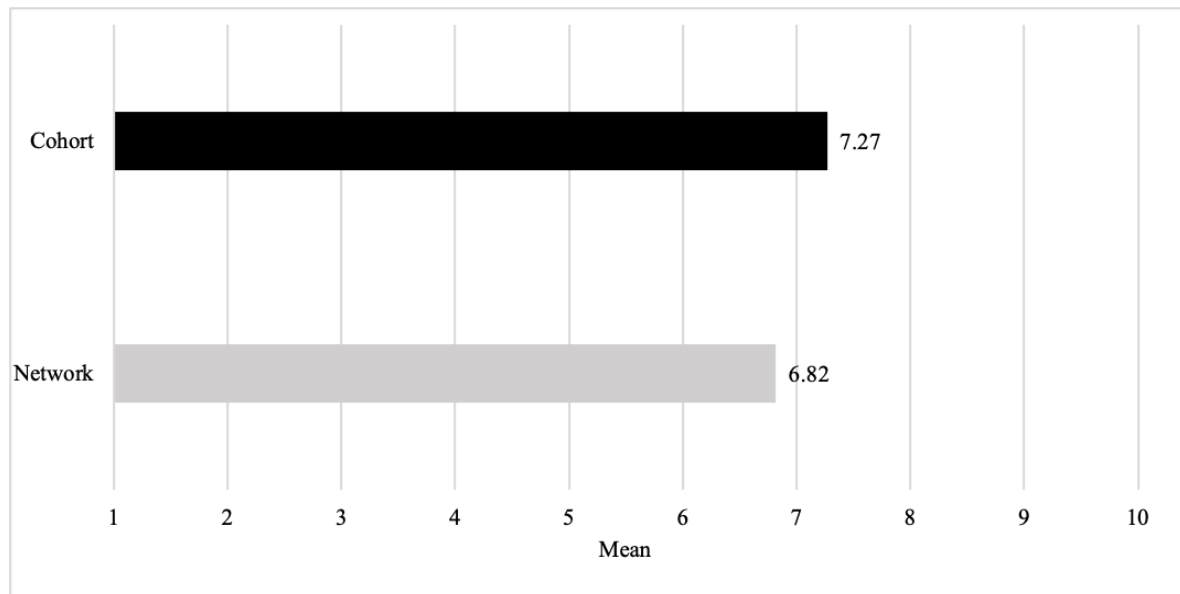

Figure 2. Defining Innovative Teaching Practices by Sample Group

We continued our analysis of the quantitative data by examining the level to which teachers self-report engaging in innovative teaching practices (see Figure 3). We found no significant difference between the responses of the two sample groups ($p > .05$). Collectively, their results indicate an above-average level of engagement in innovative teaching practices. Interpreted, the responses reflect the teacher's self-reports of engaging in teaching practices relatively frequently.

Figure 3. Teacher Engagement in Innovative Teaching Practices by Sample Group (10-Point Scale, 0 No Engagement, 10 Continuous Engagement)

To continue answering this research question, we examined the frequency of the codes for innovative teaching practices for trends (see Table 2). We found the focus on student engagement, such as being student-centered, to be a dominant trend ($N = 86$). Our coding also exposed a trend centered on activities associated with innovative instruction, such as using active learning ($N = 74$), technology ($N = 35$), focusing on ideas and problems ($N = 19$), and authentic or performance-based assessment ($N = 11$). We noted an additional trend in which the participants focused on concepts emphasized in the professional learning community structure and content, such as altering instructional approach ($N = 90$), differentiation ($N = 33$), and collaboration ($N = 23$)

It's important to note that the cohort sample participants provided more in-depth and lengthy responses than the regional network participants, resulting in the cohort group having approximately 3.93 codes per participant compared to 2.65 codes per participant for the regional network participants. When comparing our two sample responses, we found the cohort group had notably more frequent codes for differentiation (cohort = 28.92%, regional network = 12.33%), project-based learning (cohort = 20.48%, regional network = 10.96%), teacher risk-taking (cohort = 21.69%, regional network = 0%), alternative

assessment (cohort = 8.43%, regional network = 0%), and evidence-based (cohort = 7.23%, regional network = 0%).

Table 2. Codes and Frequency by Sample Group and Combined Samples Associated with Defining Innovative Teaching Practices

Code	Combined Samples		Regional Network		Cohort 1-6	
	N	Percent	N	Percent	N	Percent
Altering Instructional Approach	90	57.69%	33	45.21%	57	68.67%
Student Centered	86	55.13%	35	47.95%	51	61.45%
Active Learning	74	47.44%	34	46.58%	40	48.19%
Using Technology	35	22.44%	19	26.03%	16	19.28%
Differentiation	33	21.15%	9	12.33%	24	28.92%
Application of Knowledge	28	17.95%	13	17.81%	15	18.07%
Project Based Learning	25	16.03%	8	10.96%	17	20.48%
Inquiry-Based Learning	24	15.38%	12	16.44%	12	14.46%
Collaboration	23	14.74%	7	9.59%	16	19.28%
Focus on Ideas and Problems	19	12.18%	10	13.70%	9	10.84%
Teacher Risk Taking	18	11.54%	0	0.00%	18	21.69%
Student Choice	14	8.97%	5	6.85%	9	10.84%
Sharing	12	7.69%	3	4.11%	9	10.84%
Authentic/Performance Based	11	7.05%	6	8.22%	5	6.02%
Alternative Assessment	7	4.49%	0	0.00%	7	8.43%
Integrated Curriculum	6	3.85%	2	2.74%	4	4.82%
Evidence Based	6	3.85%	0	0.00%	6	7.23%
Teacher as Learning Coach	5	3.21%	1	1.37%	4	4.82%
Place based Learning	4	2.56%	2	2.74%	2	2.41%
Interdisciplinary	4	2.56%	0	0.00%	4	4.82%
Culturally Appropriate	1	0.64%	0	0.00%	1	1.20%

Additional support for the trend focused on student engagement can be found in the quote from Table 3, in which a cohort participant shared, "address the needs of the new generation of students and meet diverse learners where they are." The response by the cohort participant illuminates the trend for the focus on activities associated with innovative instruction, "A variety of teaching methods incorporates everything from hands-on activities and technology." Our third notable trend is emphasizing the differentiation of instruction for students, which is apparent in a cohort member's quote: "Different and effective teaching strategies to engage students based on their needs."

Table 3. Representative Responses (Code) for the Trends Associated with Defining Innovative Teaching

Trend	Representative Responses
Student Engagement	Teaching practices that defy the "norms" of teaching from previous generations. These practices may seem counter-intuitive or not traditionally appropriate for the classroom. They seek to address the needs of the new generation of students and meet diverse learners where they are. (Student-Centered)
Activities Associated with Innovative Instruction	Innovative teaching strategies are instructional approaches that involve the use of technology, hands-on activities, and other materials to help students learn in a meaningful way. (Active Learning)
	A variety of teaching methods incorporates everything from hands-on activities and technology use to chunking and micro-lectures but it all comes together to be most effective for each student's best style of learning. (Using Technology)
Differentiation of Instruction for Students	The process of using different and effective teaching strategies to engage students based on their needs can be differentiated depending on the student and class culture. (Differentiation)
	Being willing to try new ways of teaching content to students, as well as new ways of checking for understanding. Whatever it takes for students to succeed. (Altering Instructional Approach code)

In our analysis of the qualitative responses, we found trend data defining student-centered learning focused on students taking an active role in their learning (see Table 4). This is observed by the combined responses coded for student choice ($N = 116$), active learning ($N = 96$), student collaboration ($N = 35$), and teacher as learning coach ($N = 49$) and consequently as the lesser response of direct instruction ($N = 2$). This trend is also supported by consistency in responses between the two sample groups: student choice (cohort 71.08%, regional network 78.08%) and teacher as learning coach (cohort 31.33%, regional network 31.51%).

It's important to note that the cohort sample participants provided more in-depth and lengthy responses than the regional network participants, resulting in the cohort group having approximately 2.8 codes per participant compared to 2.38 codes per participant for the regional network participants. When comparing our two sample responses, we found the cohort group had notably more frequent codes for active learning (cohort = 78.31%, regional network = 42.47%) and differentiation by ability (cohort 32.53%, regional network = 19.18%).

Table 4. How Do You Define Student-centered Learning?

Code	Combined Samples		Regional Network		Cohort 1-6	
	N	Percent	N	Percent	N	Percent
Student Choice	116	74.36%	57	78.08%	59	71.08%
Active Learning	96	61.54%	31	42.47%	65	78.31%
Teacher as Learning Coach	49	31.41%	23	31.51%	26	31.33%
Differentiation by Ability	41	26.28%	14	19.18%	27	32.53%
Student Collaboration	35	22.44%	14	19.18%	21	25.30%
Problem-Based Learning	37	23.72%	14	19.18%	23	27.71%
Culturally Responsive	15	9.62%	9	12.33%	6	7.23%
Alternative Assessments	12	7.69%	6	8.22%	6	7.23%
Life Skill Development	4	2.56%	4	5.48%	0	0.00%
Direct Instruction	2	1.28%	2	2.74%	0	0.00%

Additional support for the trend focused on students taking an active role in their learning can be found in the quote from Table 5, in which a regional network participant shared, "Students have choices and a voice, are scaffolded, and have teachers who facilitate and challenge them. Constant progress monitoring also occurs."

Table 5. Representative Responses (Code) for the Trends Associated with Defining Student-Centered Learning

Trend	Representative Responses
Students Taking an Active Role in Their Learning	Student-centered refers to learning that is introduced to promote student curiosity and activities that will support the goals of the learning. Students are highly engaged, asking questions, making inferences, and supporting their own learning processes. (Active Learning)
	Student-centered learning is teaching to the whole child. It's learning focused on ensuring student success by considering their behavior, learning styles, emotional needs, physical needs, and socioeconomic status. Students have choices and a voice, are scaffolded, and have teachers who facilitate and challenge them. Constant progress monitoring also occurs. (Teacher as Learning Coach)

5.2 External Barriers Teachers Perceive Limiting Engagement

Our second guiding research question was, what external barriers do teachers perceive limiting their engagement in innovative teaching practices? We analyzed the responses representing the quantitative and qualitative response items to the distributed survey. Do note that we reverse-coded the negatively phrased items; thus, the level to which they agreed to statements such as "I am not encouraged to take risks in my teaching" is due to the coding being reversed for analysis and consistency.

Our quantitative analysis revealed the mean of the participants' responses were nearly agree in their perceptions associated with barriers, or the lack of barriers, to engage in innovative teaching (see Figure 4). Interpreted the participants' responses reflect a feeling of safety for them to make mistakes and learn from them, colleagues being supportive of trying new approaches, and encouraged to take risks in their instruction (see Figure 4). Similarly, the participants essentially agreed their administrators did not expect traditional teaching approaches, and they had the flexibility to engage their students in project-based learning. These results indicate that potential external barriers of leadership, colleagues, and school culture were not perceived as influences on their propensity to engage in innovative teaching practices.
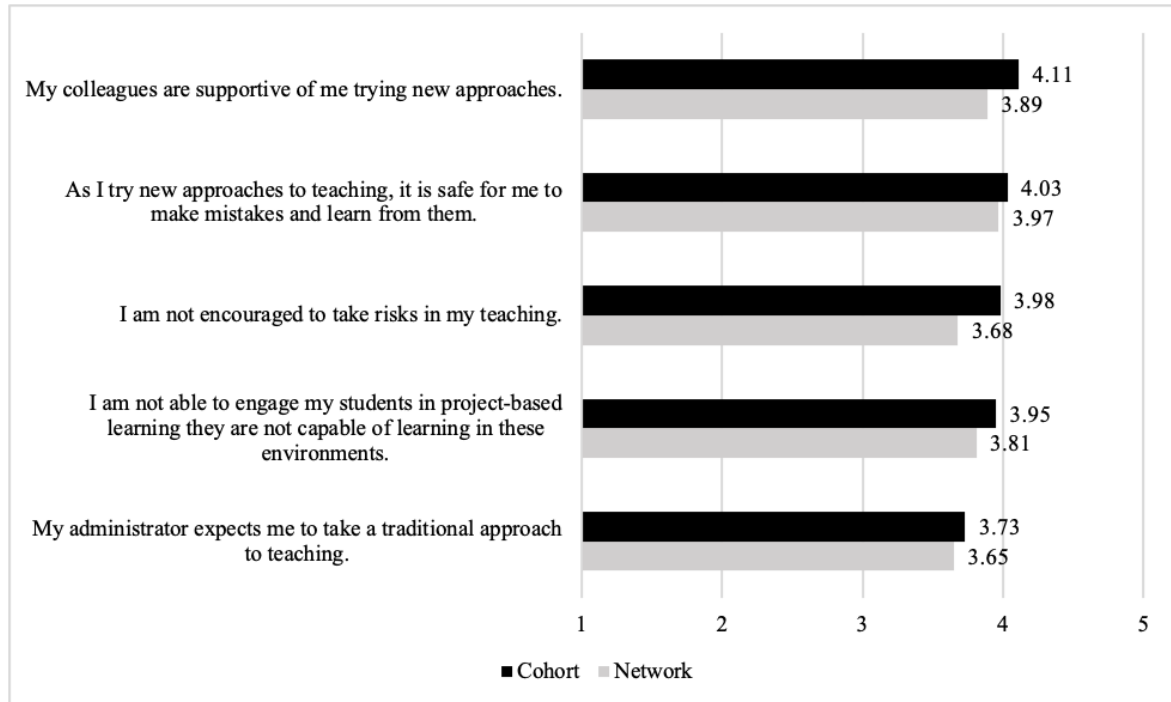
Figure 4. Mean by Sample Group for External Barriers Teachers Perceive Limiting Engagement

The qualitative analyses consisted of a priori codes and the emergent themes from the open response items. To determine the barriers teachers, encounter when using innovative teaching, we also examined the frequency of the associated codes and determined the relative trends (see Table 6). We found the need for more resources to be a dominant trend. The resources included time ($N = 47$) and materials ($N = 28$). We also found a trend that indicated barriers associated with the students' openness to alternative forms of learning, as indicated by the recognition of the lack of student knowledge ($N = 25$) and student resistance ($N = 24$).

Note that the cohort sample participants provided similar responses to the regional network participants, resulting in both samples having approximately 1.98 codes per participant. While comparing the sample data, we found the cohort group had notably more frequent codes for unsupportive leadership (cohort = 15%, regional network = 2.82%).

Table 6. What Are the Barriers You Encounter When Teaching Using Innovative Teaching?

	Combined Samples		Regional Network		Cohort 1-6	
Code	N	Percent	N	Percent	N	Percent
Time	47	31.13%	24	33.80%	23	28.75%
Lack of a Culture of Innovation	37	24.50%	16	22.54%	21	26.25%

Lack of Materials / Resources	28	18.54%	14	19.72%	14	17.50%
Lack of Student Knowledge	25	16.56%	14	19.72%	11	13.75%
Student Resistance	24	15.89%	11	15.49%	13	16.25%
Lack of Student Motivation	19	12.58%	11	15.49%	8	10.00%
Lack of Comfort	16	10.60%	9	12.68%	7	8.75%
Limited Autonomy	16	10.60%	5	7.04%	11	13.75%
Unsupportive Leadership	14	9.27%	2	2.82%	12	15.00%
No Barriers	12	7.95%	7	9.86%	5	6.25%
Need to cover content	11	7.28%	6	8.45%	5	6.25%
Lack of Personal Knowledge or Creativity	11	7.28%	4	5.63%	7	8.75%
Fear of Failure	10	6.62%	6	8.45%	4	5.00%
High Student Needs	9	5.96%	5	7.04%	4	5.00%
Classroom Management Challenges	9	5.96%	3	4.23%	6	7.50%
Class Size	5	3.31%	3	4.23%	2	2.50%
Highly Individualized Instructional Needs	5	3.31%	1	1.41%	4	5.00%
Student Absentee	2	1.32%	0	0.00%	2	2.50%

Further support for the trend of lack of materials and resources can be found in representative responses (Table 7), where a cohort participant shared, "Some of the barriers I face when using innovative teaching strategies is time, money, and energy. Innovative lessons do not happen by accident. They are planned and created in advance." Our additional barrier trend was detected due to the student population. An example of this sentiment is reflected by the response from a participant in the cohort sample, "The only barrier I face with true project-based learning is that my students do not have anything before making connections."

Table 7. Representative Responses (Code) for the Trends Associated with Barriers of Innovative Teaching

Trend	Representative Responses
Need for More Resources	"Some of the barriers I face when using innovative teaching strategies is time, money, and energy. Innovative lessons do not happen on accident. They are planned and created in advance. There is the option to buy innovative lessons (from websites like Teachers-Pay-Teachers), but it can get expensive. Lastly, using innovative strategies requires more energy from the teacher. This can be discouraging to a teacher who is already tired and overwhelmed." (Lack of Materials/Resources, Time) "The only barrier I face with true project-based learning is that my students do not have anything prior to making connections." (Sample from cohort response)
Student Resistance	"There is pushback from students due to them not being comfortable with this method because they haven't experienced it in the past." (Sample from regional network response)

5.3 Internal Barriers Teachers Perceive Limiting Engagement

The third guiding research question was, what do teacher perceptions or knowledge limit their engagement in innovative teaching practices? We analyzed the responses representing the quantitative and qualitative items to answer this question. Our qualitative analysis examined our codes from the regional network and cohort survey responses.

The results of the quantitative analysis revealed no significant differences between the cohort and regional network participants in the responses to perception or knowledge of limits of teacher engagement to innovative instruction (see Figure 5). Both groups responded favorably to and agreed with their perceptions that what they teach can be readily applied to solve problems outside the classroom. The sample groups also responded in agreement that they continually think of new ways to teach their students how to apply content to real-world problems. Both samples were in agreement that other innovative practices were not perceived as part of their practice, such as extending learning opportunities and project-based learning as a primary approach, and their dissatisfaction with their teaching motivated them to become more innovative and indicated more frequent use of projects to engage students in learning. The mean to the selected responses of using projects as extended learning opportunities, project-based learning is the primary approach to teaching, and struggling to find creative ways to teach certain

69

subjects indicates a possible traditional approach to teaching indicated a neutral agreement to these indicators of engagement in innovative teaching practices. Overall, these results do not reflect engagement of innovative teaching practices.
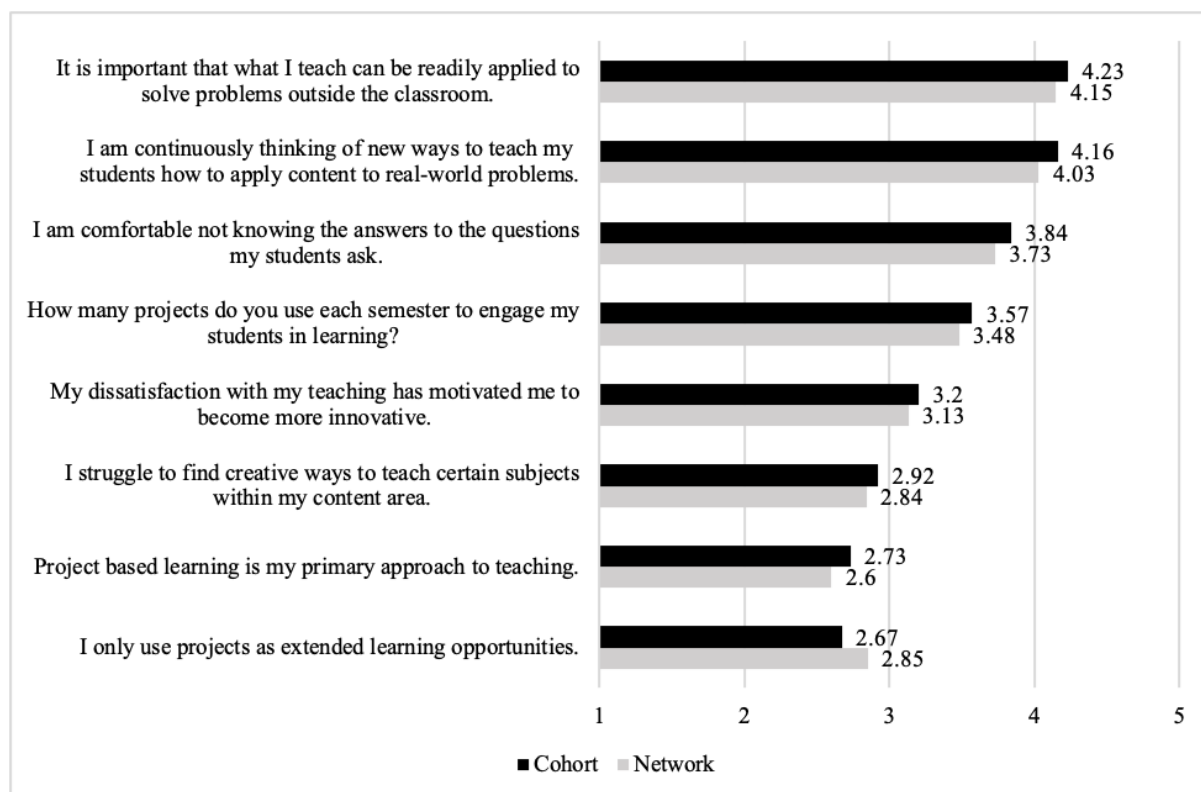
Figure 5. Teacher Engagement in Innovative Teaching Practices by Sample Group

In analyzing what teacher perceptions or knowledge limit their engagement in innovative teaching practices, we studied the frequency of the codes and determined trends (see Table 8). We found two prevalent trends in the coded responses. The first trend was teachers' perception of growth. Specific coding of professional growth ($N = 69$), sense of achievement ($N = 33$), and more enjoyment in teaching ($N = 31$). The second trend noted from the analysis includes the impact on students. The codes that led to this trend were increased student motivation ($N = 47$) and positive impact on students ($N = 42$).

In analyzing the responses to this question, we found the cohort sample participants provided more thorough responses than the regional network participants, resulting in the cohort group having approximately 3.29 codes per participant compared to 1.95 codes per participant for the regional network participants. In comparing the two samples, it is noted that the cohort responses had a higher incidence of coding than the regional network, increased student engagement/motivation (cohort = 42.67%, regional network = 23.44%), sense of achievement (cohort = 33.33%, regional network = 12.50%), empowerment (cohort = 36.00%, regional network = 3.13%) and evidence success (cohort = 26.67%, regional network = 6.25%).

70

Table 8. What Would You Personally Benefit from in Enhancing Your Engagement in Innovative Teaching Practices?

Code	Combined Samples		Regional Network		Cohort 1-6	
	N	Percent	N	Percent	N	Percent
Professional Growth	69	49.64%	29	45.31%	40	53.33%
Increased Student Engagement / Motivation	47	33.81%	15	23.44%	32	42.67%
Positive Impact on Students	42	30.22%	18	28.13%	24	32.00%
Sense of Achievement	33	23.74%	8	12.50%	25	33.33%
More Enjoyment in Teaching	31	22.30%	10	15.63%	21	28.00%
Examples of Innovative Teaching	30	21.58%	12	18.75%	18	24.00%
Empowerment	29	20.86%	2	3.13%	27	36.00%
A Culture of Innovation	25	17.99%	10	15.63%	15	20.00%
Evidence of Success	24	17.27%	4	6.25%	20	26.67%
Collaboration with Colleagues	17	12.23%	7	10.94%	10	13.33%
Peer Support	6	4.32%	0	0.00%	6	8.00%
Better use of instructional time	5	3.60%	5	7.81%	0	0.00%
Inclusive Teaching/Differentiation	5	3.60%	0	0.00%	5	6.67%
Greater Autonomy	4	2.88%	1	1.56%	3	4.00%
Cross curricular success	2	1.44%	2	3.13%	0	0.00%
Positive Impact on Future Teachers	2	1.44%	1	1.56%	1	1.33%
Increased Reflective Practice	1	0.72%	1	1.56%	0	0.00%
Administrative Support	0	0.00%	0	0.00%	0	0.00%
Parental Support	0	0.00%	0	0.00%	0	0.00%

Further evidence for the trend focused on teachers' professional growth in innovative teaching practices can be found in Table 9. A response from the cohort sampling provided this statement regarding innovative teaching to self, "When all I do is lecture and assign worksheets, I do not feel fulfilled as a teacher. Using innovative teaching strategies gives me more enjoyment and allows me to be more attuned to student needs. It challenges me to make engaging lessons and get students excited to learn. It's hard

71

work, but it's rewarding work." A cohort participant response represents the second trend found in our coding of positive student impact, "Students learn differently nowadays as opposed to yesteryears, and they would benefit from innovative teaching practices with increased retention and higher performances for the world in which they live."

Table 9. Representative Responses (Code) for the Trends Associated Benefits of Engaging in Innovative Teaching

Code	Representative Responses
	"Any time I try new teaching practices, I learn so much about myself as a person, educator, and encourager. I can give examples of my struggles to my students when they need to try new learning methods. My struggles remind me that although I have been teaching for over two decades, I can continually learn new approaches and that it is ok to feel lost at times. These real emotions help me connect with my students when they feel the same things during new learning." (Professional Growth)
Teacher Perception of Growth	"Enhancing engagement in innovative teaching practices can provide numerous personal benefits to educators, which could not only improve the quality of education but also enrich teaching experiences. Some advantages include: professional growth, increased job satisfaction, improved student outcomes, increased student engagement, personal growth and fulfillment. Overall, embracing innovative teaching practices offers a multifaceted set of personal benefits, from professional growth and job satisfaction to the fulfillment of a sense of purpose and mission in education. It can be personally and professionally enriching, leading to a more rewarding and impactful teaching career." (Enjoyment in Teaching, Sense of Achievement, Professional Growth)
Impact on Students	"The growth of my teaching approaches would benefit me tremendously. I would be able to reach all my learners more effectively." (Positive Impact on Students)
	"Students learn differently nowadays as opposed to yesteryears, and they would benefit from innovative teaching practices with increased retention and

Code	Representative Responses
	higher performances for the world in which they live." (Increased Student Engagement/Motivation)

5.4 Professional Learning Communities Influence Innovative Teaching

Our fourth research question was how engagement in professional learning communities influences innovative teaching practices. To answer this question, we examined the responses to the related quantitative items and the coded responses to the associated quantitative prompt.

The results of the quantitative analysis revealed that one selected response found the sample groups to be significantly different in their responses, indicating that the PLC process encourages innovative teaching (p > .035) (see Figure 3.6). Specifically, the cohort group ($M = 3.56$, $SD = 1.21$) scored significantly higher than the network group ($M = 3.11$, $SD = .95$) in the selected response. There was no significant difference between the samples in the responses to items indicating teachers are engaged more in project-based learning, alternative assessment, or enhancing their teaching of an integrated curriculum. The sample groups indicated a near-neutral agreement in their perceptions of innovative teaching endeavors being influenced by the PLC process. Overall, these results do not indicate an influence of engagement in professional learning communities on innovative teaching.
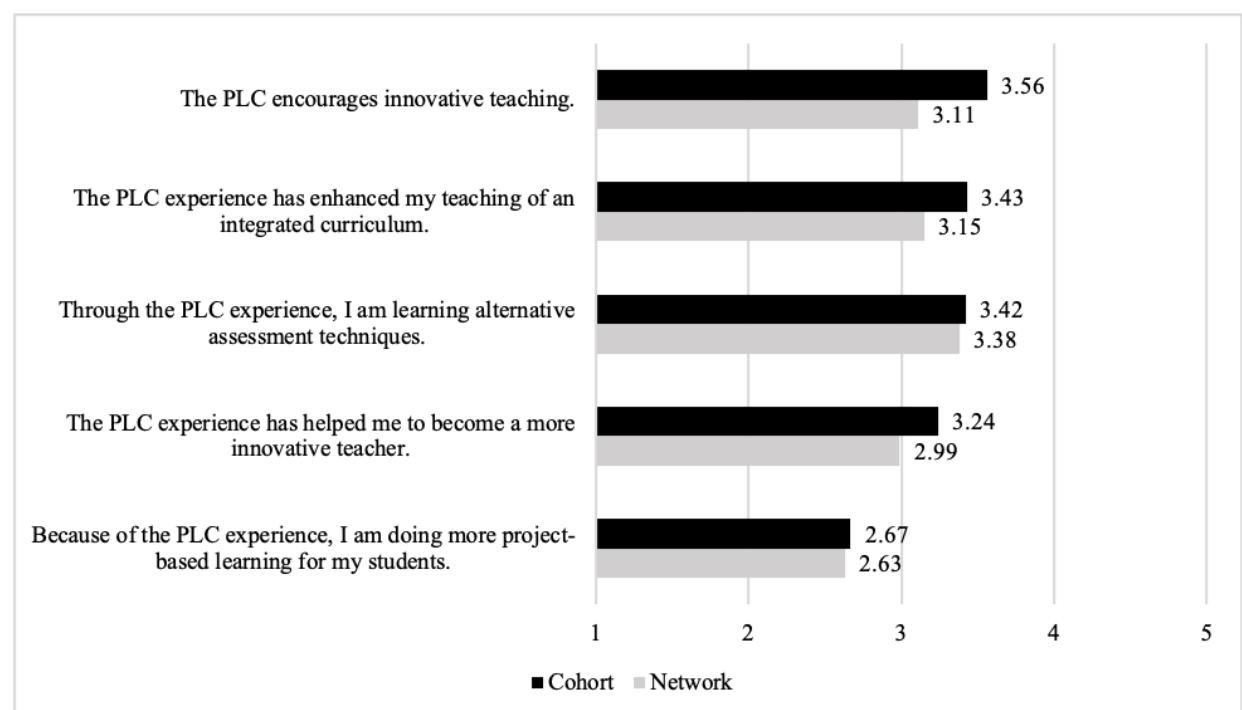

Figure 6. Engagement in Professional Learning Communities by Sample Group

In determining what influence professional learning communities have on innovative teaching practices, we analyzed the frequency of the codes and determined trends (see Table 10). A common trend emerged from the combined coded responses; educators indicated that the PLC process has made them more innovative through collaborative growth. Specific coding of collaborative growth was determined by specific codes of collaboration ($N = 71$), professional growth ($N = 58$), peer learning ($N = 56$), peer support ($N = 52$), and new strategies/instruction ($N = 49$). Contrary to the prominent trend, an additional trend was found in the responses, where the PLC had no impact ($N = 43$) on the teachers' innovative instructional practices. The coded responses from participants indicating that the PLC had no impact on their innovative teaching practices were indicated by 31% of participants.

It's important to note that the cohort sample participants provided more in-depth and lengthy responses than the regional network participants, resulting in the cohort group having approximately 4.13 codes per participant compared to 3.44 codes per participant for the regional network participants. Through the analysis of the two sample populations surveyed, it is noted that the cohort responses had a higher incidence of coding than the regional network, student-focused (cohort 34.67%, regional network 12.70%), reflective practice (cohort 29.33%, regional network 14.29%), student growth (cohort 25.33%, 6.35%), facilitated communication (cohort 16.00%, regional network 4.76%).

Table 10. How Has the PLC Made You a More Innovative Teacher?

Code	Combine Samples		Regional Network		Cohort 1-6	
	N	Percent	N	Percent	N	Percent
Collaboration	71	51.45%	31	49.21%	40	53.33%
Professional Growth	58	42.03%	20	31.75%	38	50.67%
Peer Learning	56	40.58%	25	39.68%	31	41.33%
Peer Support	52	37.68%	23	36.51%	29	38.67%
New Strategies/ Instruction	49	35.51%	25	39.68%	24	32.00%
No Impact	43	31.16%	19	30.16%	24	32.00%
Student Focused	34	24.64%	8	12.70%	26	34.67%
Risk Taking	32	23.19%	17	26.98%	15	20.00%
Reflective Practice	31	22.46%	9	14.29%	22	29.33%

Action Research	28	20.29%	13	20.63%	15	20.00%
Student Growth	23	16.67%	4	6.35%	19	25.33%
Comfort with Change	18	13.04%	9	14.29%	9	12.00%
Facilitated Communication	15	10.87%	3	4.76%	12	16.00%
Data Sharing	10	7.25%	6	9.52%	4	5.33%
Cross Curricular Integration	3	2.17%	2	3.17%	1	1.33%
Administrative Support	2	1.45%	2	3.17%	0	0.00%
Increased Autonomy	2	1.45%	1	1.59%	1	1.33%

Continued evidence of the trend that the PLC process (see Table 11) has made them more innovative through collaborative growth is observed in the representative responses. A response from the cohort sampling provided this statement regarding innovation and professional growth. The codes of professional growth include collaboration, professional growth, peer learning, peer support, and new strategies. A representative response from cohort samples includes, "By collaborating with my colleagues, I have been able to develop new and creative ways to teach my students." An example response of professional growth from the cohort population's involvement in the PLC process is, "Because we are striving for achievement for ALL students, it has caused me to try new ways of teaching for ALL students. Many students don't learn the way we've always taught the content, or they can't express their mastery the way we've always assessed them. It's important to meet them where they are and ensure everyone is successful." The cohort samples also provide an example of peer learning response, "The PLC experience has pushed me to focus on all my students more than ever with new teaching techniques and what I have learned from other professionals." A continuation of the theme of peer support in responses provided by the regional network included, "In the past, I was able to work for a full day each semester with the electives PLC group in my school. During that time, we were able to discuss new ideas we were trying in our classrooms, and I was able to talk out ways to be innovative in my teaching. We could often adapt new ideas to fit each elective and work out lessons that worked for each teacher's subject area and teaching style." New strategies also emerged as a theme of the influence on innovative teaching from the PLC process. A respondent example from the regional network, "Pushed me outside my comfort zone and created an entirely new mindset shift for myself and the way my students view learning, mistakes, and successes."

Table 11. Representative Responses (Code) for the Trends Associated with the Impact of Professional Learning Communities on Innovative Teaching

Trend	Representative Responses
Collaborative Growth	"By collaborating with my colleagues, I have been able to come up with new and creative ways to teach my students." (Collaboration) "In the past, I was able to work for a full day each semester with the electives PLC group in my school. During that time, we were able to discuss new ideas we were trying in our classrooms and I was able to talk out ways to be innovative in my own teaching. We could often adapt new ideas to fit each elective and work out lessons that worked for each teacher's subject area and teaching style." (Professional Growth, Peer Learning, Peer Support, New Strategies/Instruction)
No Impact	"I can't claim that my PLC experience has made me more innovative. My cohort is made up of more seasoned teachers that tend to be stuck in their ways and I am typically the one bringing new ideas to the table." (No impact) "PLCs are a once-a-week meeting of my department to talk about upcoming events then break up into subject groups and compare test results. We do not share professional experiences." (No impact)

6. Discussion, Implications, and Limitations

6.1 Definitions of Innovative Teaching Practices

In our analysis of the participants' definition of innovative teaching, we found the participants tended to focus on student-centered active learning, the use of technology, problem-solving, and risk-taking. A notable outcome of our research is the lack of connection between innovative teaching and the content of the PLCs. Another notable outcome is the participating teachers tended to convey rather conservative instructional practices but viewed innovative teaching from a more progressive perspective. An important implication of our findings and outcomes is that there is little or no association between PLC engagement and innovative teaching. In other words, the participants' PLC engagement did not foster motivation to adopt and implement innovative teaching practices. An important direction for future research is the exploration of other PLC configurations to determine what content and approaches may enhance teacher propensity to engage in innovative teaching practice.

6.2 External Barriers to Innovation

Our analysis of external barriers revealed the PLC did not foster innovation. The levels of support for innovation varied by sample group. A critical implication for our findings is the potential that engagement in professional learning communities does not lower barriers to teachers engaging in innovative teaching practices. We speculate that the PLC focus on remediation and support for underperforming learners creates conditions in which traditional teaching practices are embraced; and novel teaching practices are not encouraged. It is also possible that the general school culture is based on a foundation of traditional teaching practices that tend to be didactic and teacher-centered rather than innovative and student-centered. As noted in the trends of the external barriers, student resistance was found to be a barrier. This potentially indicates additional evidence for the lack of culture within the school to implement or engage in innovative instruction. Changing such cultures may be unrelated to the work of the PLCs. The change may also require a catalyst such as a visionary, innovative, forward-thinking principal who is actively engaged in motivating change (Clark, 2020; Edmondson, 2019). A possible direction for future research is the study of the role of the leader in establishing a culture of innovation as a critical element of the professional learning community objectives.

6.3 Internal Barriers to Innovation

In our analysis of internal barriers, we found teachers have a desire to grow professionally and their impact on students. Ironically, we also found that the teachers desired to teach in ways that allowed their students to solve problems. The teachers continually thought of new ways to teach their students to apply content to real-world situations. The implication for our finding is that the desire of the teachers to teach in ways that are innovative and engage their students was not reflected in their practice, which means they hold thoughts of innovation but lack the action to engage in innovation. We speculate the internal barrier bridging thought to action is likely reflective of low teacher efficacy, limiting their propensity to take control of their instruction and engage in innovative teaching practices. Thus, a critical direction for future research is a deep examination of innovative teaching practices and teacher efficacy in relationship to engagement in professional learning communities.

6.4 Professional Learning Communities Influence Innovative Teaching

Our analysis of how engagement in professional learning communities influenced innovative teaching practices revealed that the PLC process may support innovative thinking through teacher collaborative growth. The differences in responses likely indicate the duration and configuration of the PLCs influence teachers' thoughts about innovative teaching. However, approximately a third of the participants indicated that the PLCs had no impact on their teaching practices, suggesting that learning communities are not structured to foster innovative teachers. An implication of this finding is the potential loss of an opportunity to enhance innovative teaching and, thereby, student engagement and achievement. Ironically, student engagement and achievement are goals of the PLCs, perpetuating a more traditional approach to education rather than more progressive approaches (DuFour et al., 2016). An important direction for future research is to examine multiple models of PLCs to determine what structures and

77

content are most effective at fostering change in teacher practices toward more innovative, integrated, and student-centered instruction.

6.5 Limitations

The primary limitation of our study was the limited number of teachers who participated in our research and completed our survey. The level of participation is consistent with survey research. However, the limited participation could have led to gathering data that was not necessarily representative of the population of teachers engaged in the two PLC configurations. Additional research or replication of our research is needed to determine if our results are consistent with the larger population.

Our research delimitations include the inability to follow up with participants to clarify their responses, the inability to ensure the representation of all groups in the data set, and the inability to offer clarification of our items if the participants were unsure of our language or expectations. Again, we hope others will build on our research and explore opportunities to address these delimitations further to ensure the data are accurate and representative of the study populations.

7. Conclusion

For our research, we sought to document the influence of PLCs on the external and internal barriers to teachers' engagement in innovative teaching. We found that teachers desire to implement innovative teaching practices to impact student achievement positively; however, barriers still need to be addressed despite engagement in PLCs. Our research provides a rare foundation for documenting teachers' ideas of innovative teaching and barriers that remain, indicating that PLCs do not eliminate internal or external barriers to engagement in innovative instruction. The foundation is critical as we continue to explore the impact of PLC on these barriers and to explore PLC models that would reduce barriers to innovative instruction.

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