Teaching Competencies in the Context of Disciplines

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Greetings from Charles Fadel

We at the Center for Curriculum Redesign (CCR) are delighted to share with you the first in a series of research reports on the findings of studies conducted with some of our nation's top educators. In these studies, we asked educators to infuse the competencies that comprise our framework for teaching – consisting of 4 dimensions of teaching: Knowledge, Skills, Character, and Meta-Learning – into their academic disciplines.

We worked with educators across 7 traditional disciplines: Mathematics, Science, English Language Arts (native language), Social Studies, Fine Arts, Performing Arts, Physical Education, as well as one modern discipline – Computer Science. The educators with whom we worked infused our 12 competencies and 60 subcompetencies into their learning.

In their words, shared throughout this paper, the educators learned to look at teaching and learning in a new way, teaching skills often referred to as Social/Emotional or 21st century skills through their content, rather than in isolation from it.

At CCR, our entire framework is founded in answering the question, “What should students learn?” This question has never been more important or relevant than today. The work of these educators, digging into complex questions, issues, and content side-by-side with our researchers, has resulted in critical information that will inform the field for years to come.

With warm regards

Charles Fadel

Founder and President, Center for Curriculum Redesign

Charles Fadel is a global education thought leader and futurist, author and inventor, with several active affiliations; his work spans the continuum of Schools, Higher Education, and Workforce Development/Lifelong Learning. As Chair of the education committee at BIAC/OECD, he works with several teams – EDPC, Education 2030, PISA, and CERI.
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EXECUTIVE SUMMARY

Why this Study?

Resilience. Critical Thinking. Metacognition. As we navigate the demands of teaching and learning in today’s world, understanding and utilizing these three competencies is critical to teacher and student success. Times of new challenges demand new approaches. The Center for Curriculum Redesign (CCR) has applied research-based approaches developed by educators for educators to meet the needs of teachers and their students. Teachers are being asked to prepare our students not only in the academic content, but in the skills that they will need to be successful in learning and in life.

“What do students need to be prepared for the 21st century?”. The focus of our work has been solely focused on answering this question, and doing so in ways that are both meaningful and implementable for teachers and students. We have focused on comparing frameworks and standards around the world and extracting the common themes and creating a comprehensive yet compact framework of competencies:

- **Skills**: Creativity, Critical Thinking, Communication, Collaboration
- **Character**: Mindfulness, Curiosity, Courage, Resilience, Ethics, Leadership
- **Meta-Learning**: Metacognition, Growth Mindset

These three areas along with **Knowledge** form the core of what we call the 4-Dimensional Teaching framework. Information on the framework can be found in the following resources, among others on our website. Click on each word below to go to a paper on the research and framework for each of the four dimensions:

**Knowledge**
**Skills**
**Character**
**Meta-Learning**
These competencies are depicted in the Venn diagram provided on the above page, as well in the table linked to in the paragraph above, in which their subcompetencies are also provided.

We have done this through a series of research studies, all of which have included educators in our work. The graphic below summarizes those studies.

A critical step in this research process has been to include educators in two rounds of intensive studies designed to test our hypothesis: that teachers can teach these competencies through their academic disciplines rather than in isolation. If teachers can successfully do this, we would be contributing to a teaching framework in which teachers and students would learn social/emotional and meta-learning skills as an integral part of their content knowledge, requiring less time and more meaningful application of these skills in real-life situations.

This report shares the findings of part one of a two-part study in which we asked expert educators how they would go about teaching each of these competencies through their discipline. We worked with educators for almost twelve months, first in training them in the competencies and their subcompetencies, and then working with them to determine how these could be infused into their disciplines.

**Study Methodology**

We worked with educators in the following eight disciplines: Computer Science, English Language Arts, Fine Arts, Mathematics, Performing Arts, Physical Education, Sciences, and Social Studies. This paper reports our findings from all of these disciplines except Computer Science. Computer Science started the study while we were halfway through the first cadre and used a slightly different methodology.
The educators in the study were drawn from recognized pools of educators including County, State or National Teachers of the Year, National Board-Certified Teachers, Presidential Awardees in Excellence in Math or Science Teaching, and other teacher recognition programs.

Teachers were trained in the competencies and subcompetencies, were introduced to a methodology for designing lessons that infused subcompetencies into their content lessons, and were introduced to a rubric used to score their lessons.

**Lessons Learned**

We learned a great deal about the teaching of the competencies and subcompetencies, the ways in which educators processed them, and how we could introduce them to educators more efficiently.

1. We asked teachers, both collectively and by discipline, to rank the top four most easily infused competencies and the bottom four more difficult to infuse competencies into their teaching. These survey activities resulted in the following findings, across all seven disciplines, showing the competencies ranked highest, middle, and lowest in terms of ease of infusing into content disciplines:

   Interestingly, while teachers thought that some competencies, e.g. Metacognition, were among the most difficult to teach, they actually submitted the highest number of lessons for Metacognition, and those lessons scored quite well as demonstrated in the table below, which summarizes findings showing a composite score of quantity and quality of answers.
2. We learned that educators did not often have a solid understanding of what social/emotional or meta-learning skills were until they had the opportunity to spend extensive time with them and to unpack them in detail. Here is one educator’s thinking: "Teaching the competencies is more tied to how the teacher performs in the classroom than what the teacher teaches."

3. We learned that there is tremendous value in providing educators with time with their peers in which to unpack new learnings and to process them as a team. Many educators told us that this time together was among the most valuable professional learning that they had ever experienced.

Here is one quote from an educator in the study that speaks to this: "Having a lens through which to see/view other awesome science teacher’s classrooms and to hear their thinking about what they do and why. I loved our very purposeful conversations about awesome teaching and doing great things with kids (whether science content related or not)."

In this paper, we provide our conclusions for the first round of each discipline and each competency based on the quantity and quality of the teacher answers, as well as their subjective experience coming up with ideas.

In many places, teacher perceptions aligned with their scores, but there were notable exceptions of both over- and underestimation by different disciplines with different competencies. We conclude with the lessons learned and how these were carried into part two of the study.
INTRODUCTION

The Center for Curriculum Redesign (CCR) is an organization dedicated to addressing the fundamental question of "WHAT should students learn for the 21st century?" Through our work, we have identified that in addition to Knowledge, there are 12 key competencies for success in the 21st Century: Creativity, Critical Thinking, Communication, Collaboration, Mindfulness, Curiosity, Courage, Resilience, Ethics, Leadership, Metacognition, and Growth Mindset. Each competency is comprised of a set of subcompetencies. To read more about these competencies and their subcompetencies, refer to our 4D website here.

The Venn diagram illustrates how the four dimensions work together. Knowledge is what we know and understand, and thus must remain an important part of any curriculum. Skills are how we use what we know, taking Knowledge a step further. Character is how we behave and engage in the world, and Meta-Learning is how we reflect and adapt. Each of these will be explored later in this paper.

CCR’s 4D Education Framework was developed through extensive research and synthesis from frameworks around the world. We have since identified 60 subcompetencies, divided those subcompetencies into progressions, and conducted emergent coding of subcompetencies. The framework is a living document and evolves based on our research.

This paper documents a study conducted to contribute to the framework, in particular, the way in which it would be implemented. Because its origins are in standards and policy, it is crucial that we make sure we know how teachers would actually implement it. We began to tackle this question by examining the scholarship that already exists in this area, analyzing professional articles, assessments, and expert recommendations to determine what research says about how to teach and develop...
each of the 12 CCR competencies. We found that scholarship on how to teach competencies through knowledge disciplines is largely limited in this space, and it is restricted almost entirely to standalone interventions, not how to weave competencies into more traditional disciplinary instruction. Although some teachers may be able to take some time away to do a “creativity exercise” there are two main problems:

1. Since this is time on top of the curriculum, it is by definition extremely limited, and will be the first to get cut if something doesn’t go as planned;

2. Even if students successfully learn about a competency during one of these interventions, there is not documentation on how best to “follow through”, continuing to reinforce the learning through spaced repetition and in different contexts.

The second one is particularly worrisome given the extensive research on how difficult it is to teach for transfer. That is, if students learned how to be creative in one context, it does not mean they will be able to transfer that learning to any other without explicit practice.

So, we turned to practitioners in the field to seek insights from their experience and their imagination. The group of practitioners were all teachers who have been recognized not only for their excellence in the classroom, but for their thought leadership as well. They worked with us to determine how – or in some cases, if – they do teach or could teach these competencies and their subcompetencies through their content discipline (e.g., how do we teach curiosity through the teaching of Physical Education?) – and not in isolation.

This report presents the findings from our first study, systematically compiling expert teacher views on the best pedagogical approaches for teaching the 12 CCR competencies within seven disciplines. It begins to work toward answering the following three research questions:

1. Which disciplines are best suited for each competency?

2. Which competencies are best suited for each discipline?

3. Are there any overarching strategies in how expert teachers approach teaching competencies through their disciplines across the groups?
METHODS

We conducted a two-phase study over a period of two years. In this paper, we are reporting on the first of these studies.

Our Sample

From September of 2018 through January of 2019, we worked with 7 teams comprising a total of 33 teachers to study the teaching of “21st Century Skills” through the lens of traditional academic disciplines.

We recruited our team of expert educators from a group of educators who had been previously recognized for their expertise in practice through programs such as the State Teacher of the Year Program, National Teacher of the Year Program, Milken Educator Program, Presidential Award for Excellence in Math and Science, National Board Certification, and others. We also intentionally selected for diversity across attributes such as discipline, geography, race/ethnicity, school setting, and developmental level of students taught.

The 7 teams, each comprised of 4-5 expert educators represented the following disciplines:

1. English Language Arts
2. Fine Arts
3. Mathematics
4. Performing Arts
5. Physical Education
6. Science
7. Social Studies

Each team was representative in terms of grade levels taught, gender, race/ethnicity, geographic location, and school setting (rural, urban, suburban). For demographic details on the sample, please see Appendix 1.
Data Collection

The primary vehicle for data collection was a Google Docs "Playbook" that each teacher expert received. Each week we added a "worksheet" (or, question set) to the playbook for teachers’ completion. The expectation was that each week, teachers would complete an “instructional strategy brainstorm” that covers two of the twelve CCR competencies and additionally comment and provide feedback on their peers’ playbooks. Given the time-intensive nature of this work and teacher feedback, we quickly pivoted to covering only 1 competency per week.

Each discipline had a Team Lead who was responsible for coordinating with team members to be certain that progress was being made in addition to facilitating three, 90-minute virtual discussions via Zoom. Prior to each call, the Team Lead examined their team members’ playbooks to complete a “Guidebook” and focus group protocol, pulling in examples, key takeaways, and noting areas where there were struggles.

The intention of the small group calls was to create a space to discuss themes that emerged in the playbooks, flesh out particularly innovative and popular strategies, and reflect more generally on this process. In addition to the Team Leads checking the playbooks, the three researchers read the playbooks, making notes and posing clarifying questions. All calls were recorded and analyzed subsequently as well.

For each competency and sub-competency, the playbook asked teachers to answer the following questions:

1. How would you teach [specific sub-competency]? Please reference ideas for specific instructional strategies and activities using as much detail as possible.
2. Reflecting on this strategy, how might you assess it? In other words, what information would you collect to determine whether or not students had mastered this sub-competency? Please be sure to address why you believe this assessment would work and reference any specifics that suggest so (e.g., personal experience, student feedback, or academic research).
3. On a scale from 0 (not difficult at all) to 10 (extremely difficult) how would you rate the ease of teaching [Competency] in [Discipline]?
4. Is there another discipline or subject area (e.g., math, science, geography, history, language, arts, engineering, psychology, law, business, physical education, etc.) besides
the one that you are addressing in which you could see [Competency] being easily taught? Please explain why you believe that this would be a good subject area in which to teach [Competency].

Teachers were provided with a definition of each of the 12 CCR competencies, which breaks the competencies down into its various sub-competencies. These were synthesized out of 111 papers representing 75 sources.

**FINDINGS**

Our findings comprise what teachers told us informally in meetings and emails and formally through a post-study survey and by applying a rubric to the lesson plans submitted by the teachers.

**Post Study Survey**

All 33 expert teachers in the study responded to the survey, which asked them to reflect on which competencies were easiest and most difficult for their discipline, and why. In this section, we provide a snapshot of the summary data that we collected via the survey, across disciplines.

Across all seven disciplines, teachers ranked the top four easiest competencies to teach through their disciplines as shown in the chart below:

**What 4 competencies do you feel are the best fit?**

![Chart showing the four easiest competencies to teach across disciplines.](image)
A breakdown of the responses is provided in Appendix 2, with 1 being the best fit of the top four selected and 4 being fourth of the top four selected. The mean and number of responses for each competency are also provided.

Some notable findings include:

- 28 teachers across disciplines selected Critical Thinking as one of their top four responses, the highest of the selections, followed closely by Collaboration with 22 educators selecting this as one of their top four.

- Teachers then selected Creativity (18), Communication (15), and Curiosity (13) as being in their top four competencies that are easiest to teach through their disciplines.

- Mindfulness was not selected by any educator as being easy to teach through the discipline.

We asked teachers to tell us why the competencies that they selected in their top four were a good fit – was it because of content, pedagogical strategies, or both? The responses to this question are summarized below:

In most cases, teachers told us that it was a combination of both content and pedagogical strategies that made a specific competency a good fit. This seems to align with what we heard from the teachers informally through our conversations and email communications.
We then asked teachers which four competencies were the most difficult to teach through their discipline. The results across disciplines are provided below:

Again, we are providing here the breakdown of responses with 1 being the choice selected as most difficult to teach and 4 being the fourth most difficult to teach. As the table above shows, Ethics, Metacognition, and Mindfulness were tied for the first choice of the four most difficult to teach. Leadership and Courage were then tied for the next most difficult to teach.

In thinking about these findings, Ethics and Metacognition were two areas in which our conversations with the teachers revealed a lack of exposure to learning about how to teach these two competencies in their teacher training programs, professional learning experiences, or other avenues of learning. It is difficult to teach what we do not know, so it is unsurprising that these two were rated as most difficult.

Mindfulness is an area that is not touched on frequently in teacher learning experiences either, but it was more surprising given how much of Mindfulness, as defined by CCR, seems intuitive to teaching.

Resilience was the next most difficult with a larger gap following between the others. Only one teacher listed as difficult to teach and that educator listed it as their fourth choice.

Again, we asked teachers to think about whether or not these competencies were difficult to teach because of content, pedagogical strategies, or both. Those results are provided below:
Once again, we find that most teachers chose ‘both’ as the reason for difficulty, although, interestingly, that changes for Ethics, where the content was listed as the highest reason for difficulty. Again, this makes sense as Ethics emerged as a competency that was highly unfamiliar to teachers in terms of how to teach it.
We then asked teachers to tell us about the top challenges that they faced in teaching the competencies through the disciplines, we found the following results:

The top challenges encompassed lack of time for professional learning about the competencies, connecting the competencies to content, experience in teaching the competencies, and pressures of standardized testing. We assume the latter to mean that teachers have so much pressure to get done the work that will be measured on standardized tests that they cannot focus on much else.

We then asked the study participants to think back on their experience over the past few months and share with us what they thought they learned, realized, or experienced a change of
mind or perspective on? Below is a graphic that shows the most commonly used words in answering this question:

Some of the words that emerge in the graphic beyond the expected ‘competencies’ and ‘teaching’ are science, lessons, creativity, intentional, assess, articulate, group, and perspective. The educators’ full responses to this question can be found in Appendix 3. Some of the key responses that we would like to highlight are, however:

"I realized that I actually do a lot of this work in my art classroom without purposefully planning to do so. And that if I took the time to sit and actually plan experiences and discussions around the interconnected work of the competencies and my content area- the learning could come alive in a meaningful way for my students."

There was a distinct difference in which competencies seemed to fit life science classes (like biology or ecology) compared to physical sciences like physics. For example, many of the life science classes lend themselves to the ethics competency. Ideas like cloning, spread of disease, environmental stewardship offer easy opportunities to discuss right/wrong decision making. The same is not easily
done while calculating the amount of friction in a system or the rate of heat exchange between items.”

Next, in the survey, we asked educators, “What would you consider the highlight of your experience in this study?” While their full responses are found in Appendix 4, below is a graphic compilation of their most commonly used words in responding to this question.

Some of the words that jump out besides the expected ‘teachers’ and ‘competencies’ are other, ideas, opportunity, conversations, amazing, content, hearing, and experience. A few responses that we would like to highlight are:

“Connecting with amazing educators who are constantly looking to be even better. I grew as an educator because of the interaction and collaboration with the other participants. I also codified what I do in my classroom to address these competencies.”

"I have been thrilled to contribute to this work, laying the foundation for very many more teachers to think intentionally about including these competencies in our daily instruction. But the highlight has been my own personal growth. The thrill of investing in other teachers was super-ceded by how this experience has opened my eyes to my own practice. I am..."
exponentially more intentional now about blending the competencies. On top of that, I am finally landing on some of the ideas for how to assess them.”

“The conference calls gave me the opportunity to think aloud with educators in different places but within the same content discipline. Teaching well is impossibly hard. I enjoyed hearing perspectives on how these competencies are viewed and employed by master educators.”

We also asked the educators to define for us what was the most difficult part of the study. A graphic depiction of their responses is below:

Overwhelmingly, the educators cited time as the key difficulty. This was, in large part, our fault. We had underestimated the amount of time that the study would take in terms of educators thinking about their practice, where they were or could teach to the competencies through their daily work, and how they might assess this. This was one of our key learnings for moving forward.

We then asked them, if they chose to do so, to elaborate on the difficulties that they encountered. A sampling of their responses is provided here:

“There was a lot more content then I originally expected and then I wanted to write so much but I had limited time. It took me a while to wrap my brain around how to think of Social Studies in these competencies, but now that I have figured it out, we are done.”

“My team, brilliant though they all are, were often very behind on their work or had not done a really thorough job of thinking through their answers. This made calls challenging... especially when we couldn't seem to get the whole team on them.”
“There was a LOT of work - a lot of competencies and subcompetencies, many of which felt like they overlapped. And the phone calls always happened at really inconvenient times for me, so I either struggled to be engaged on them or had to miss them and feel guilty.”

“The challenges around time and amount of content were related. I could have justifiably chosen either one.”

“Some weeks had more sub-competencies to reflect on than others, and this required more time. -- LET ME BE CLEAR THOUGH, this was not a weighty challenge. On a 1 - 10 scale, it was probably a 3. Our team leads did an exceptional job of helping us to pace and push through it all, and although it was time consuming, it was simultaneously exciting and enlightening.”

“This took a lot more reflective time than I realized it would. I’m glad I spent the time doing the deep thinking I did, but it was just more than I anticipated. I also found some feedback from researchers challenging. I sometimes felt like I was being told my thoughts and perspectives were wrong because they didn’t fit the researcher’s preconceived ideas. I struggled with trying to be understanding of their “research” point of view while at the same time asserting that I know best about how/why something does or doesn’t play out a certain way in my classroom with kids.”

Survey Findings: Discipline-Specific Data

In our survey, in addition to looking across the disciplines, we also asked teachers within each discipline to rank order the top four easiest and most difficult competencies to teach in their particular discipline. These results are provided in this section. We will then look at how their responses were scored by our Research Assistants and how those scores compared to the teacher rankings.
Mathematics

The five Math teachers in our study ranked Critical Thinking as the easiest competency to teach, followed by Communication and Growth Mindset (3 each) and Creativity, Curiosity, and Resilience (2 each). Ethics, Leadership, and Mindfulness were not selected by any of the teachers in the study.

This makes it unsurprising that the Math teachers chose Mindfulness and Ethics as the most difficult to teach, followed by Leadership (4) and Courage (3).

“...For example, I have always had my students annotate the text they’re reading. But when it came to the creativity competency, I had to rethink how I could do something that I have been doing for the past six years. Then, I was able to bring that reflection to the group...”
Some of the comments shared by the Math teachers in the open-ended response section included these:

"My perspective was changed on my ability to incorporate various competencies into my content area. There was a wonderful discussion amongst all of the teachers on every competency - it was valuable to see where my own competencies fell short and emerged in my teaching."

And, "I learned how different elementary school is from secondary education. Many of the competencies are taught in elementary school, because we teach character education in all contents due to the students' ages."

**English Language Arts**

Our five English Language Arts (ELA) teachers provided us with some similarities and some differences in comparison with their Math colleagues in regards to their responses. They were also quite consistent as a team in their rankings. All five team members chose Creativity and Critical Thinking as their top choice in terms of easiest to incorporate into teaching content, closely followed by four team members selecting Communication and Collaboration. One team member chose Metacognition and Growth Mindset each. No team members chose Mindfulness, Curiosity, Courage, Resilience, Ethics, or Leadership as part of their top four.

In terms of their choices for the four most difficult to teach within the discipline, the ELA team was less consistent. Four team members chose Mindfulness and Courage as most difficult to teach through the discipline with three each choosing Ethics and Metacognition. As one would
expect, no one of the five chose the top four selected as easiest to teach. Interestingly, none chose Curiosity, just as none chose it in the top four easiest to teach.

Some of the comments in the open-ended responses from the ELA team included:

"The biggest thing I've realized is that there are a whole lot of things that I try to do and know are important, but that I need to be doing a lot more to be systemic and persistent about my approach. These skills are not the kind that can be learned during a one-day lesson, or that will stick without being built month after month and year after year."

And "It helped me think more deeply about how I assess various skills and competencies in my class, since I had to try to clearly articulate the ways in which I assess less tangible things like "Leadership" (rather than just talk about how I incorporate it)."

**Fine Arts**

The five Fine Arts team members were in agreement on the top choice in terms of easiest competency to teach through their discipline – Creativity – but were a bit more split after that. Four members chose Critical Thinking as one of their top four easiest to teach, three chose Growth Mindset, and two each chose Communication and Curiosity. Mindfulness, Ethics, and Leadership were not selected by any member.
In terms of the top four most difficult to teach, the team was more collected with all five choosing Ethics and four choosing Leadership and Metacognition each. Two team members each chose Collaboration and Courage as in their top four most difficult to teach. No one chose Creativity, Curiosity, Resilience, or Growth Mindset as being difficult to teach through the Fine Arts.

Some of the responses that these teachers gave in the open-ended questions included:

"I had that "ah-ha" moment where I realized that truly amazing teachers really do bring the competencies into their classrooms. The competencies are like that 4th dimension of teaching that is the backbone that creates great long lasting learning, but often is not seen."
“I realized that I actually do a lot of this work in my art classroom without purposefully planning to do so.”

“Although it took the time to sit and actually plan experiences and discussions around the interconnected work of the competencies and my content area- the learning could come alive in a meaningful way for my students.”

“It really helped me reflect on my own practice. I loved learning what my colleagues are doing within same content, and also made me question what I do not include. Although all the competencies, happen I had not thought about creating lessons specific to all of them. I also do not have the time with my students to address them all in depth.”

Performing Arts

The five members of the Performing Arts team were unanimous in selection Collaboration as the Easiest of the competencies to teach through their discipline. This was followed by four members selecting Creativity and Critical Thinking and three members choosing Growth Mindset as easiest to teach through the Performing Arts.

“In addition, it was beneficial to see how the team approaches these competencies as well. I know that I had a difficult time separating the curriculum out. I do not directly teach each sub competency but they are intertwined into what we do each and every day. For example, I teach Automotive Technology so we do not have a unit on ethics but it’s very important to treat customers and your team/classmates ethically.”
In terms of which competencies were most difficult to teach through the Performing Arts, four team members chose Mindfulness and Ethics with three choosing Metacognition and Resilience. Communication received no vote for most difficult to teach and none for easiest, interestingly.
Some of this team’s comments to the open-ended questions included:

“I learned, realized, changed my mind and perspective on being even more intentional regarding the competencies. I am so accustomed to rolling along, implementing differentiated instruction, and addressing the needs of my students as they arise. I now will plan more intentionally to highlight some of the competencies over the period of the semester and school year. I would just need to figure out how to keep it natural and flowing.”

And, “What I learned during this process is that many of us share the same techniques or thought processes even though we teach different content areas across the Fine Arts spectrum. For example, many of us use improv techniques to teach creativity, which surprised me. Improv games were something I thought may be more specific to only certain subjects.”

This last comment was particularly interesting given the diverse content taught by this team. The team consisted of teachers of Theater, Dance, Engineering, Filmmaking, and Music. Listening to their conversations was fascinating as they discovered that, although teaching diverse content, they had so many pedagogical strategies in common.

**Physical Education**

Our Physical Education team had four members including one who taught at the pre-service level. They were a very tightly connected team so it is not surprising that their responses were so similar. Four chose Collaboration and Leadership as easiest to teach through the Physical Education discipline. In our conversations, there was much discussion about the team format of teaching Physical Education and the need for teams to select leaders or for teachers to nominate leaders. And so much of the content is collaborative given that so much is done in teams.

Three members chose Growth Mindset and two chose Communication. No team member chose Mindfulness, Curiosity, Resilience, or Ethics. This last was somewhat surprising given that conversations often centered on ‘rules’ and issues of fairness. ‘rules ‘and issues of fairness. on ‘. and issues of fairness.
Again, we see that closeness in terms of choosing the four competencies most difficult to teach. All four members chose Curiosity, Ethics, and Metacognition. Two members chose Mindfulness and Resilience.

Some of the comments from this team included:

"I learned that I do use quite a few of these instructional strategies on a daily basis. Creativity and collaboration are a huge part of my PE/Dance program and I was able to really analyze what we do on a daily basis."

And, "My highlight of this experience was diving into the competencies and really analyzing both my curriculum and the curriculum of others. Communicating with others during the analysis period was crucial to common understanding of what each competency looks like in Physical Education."
Sciences

The Science team had five members representing Elementary, Middle, and Secondary (Biology, Physics, and Chemistry). It was a very diverse team in terms of content taught. Many of our conversations included discussions of the difficulty of separating out Science on its own from other disciplines at the elementary level as content there is so intertwined. The middle and secondary teachers were fascinated by what they learned from their elementary counterpart.

The team was unanimous in choosing Critical Thinking and Curiosity as the top two easiest competencies to teach through Science. Four team members chose Collaboration, and indeed, many of our conversations included discussion of group activities in the Science classroom. Two team members chose Communication. None selected Mindfulness, Courage, Leadership, or Metacognition.

"I learned to think of my lessons in a whole new way. Very often we focus on the content we are teaching but now I can recognize that there is so much more going on in our lessons and in our classrooms."

In terms of the bottom four, the team was not unanimous in selecting any of the four most difficult to teach competencies. Four team members selected Courage and Metacognition, three chose Mindfulness and Leadership. Interestingly, one team member had chosen Ethics as a top four easiest to teach and two chose it as most difficult.
The Science team members had some interesting thoughts to share in the open-ended survey questions. These included:

“One of the highlights for me was being respected as a Science Teacher. Elementary teachers are so often not cast in this light. It was powerful to articulate with Science teachers up and down the grade levels. There are universal ways we can build on one another in subjects from K-12.”

And, "I realized that I address more of these competencies in my day to day teaching than I originally thought. Some of that is because of content, but more of it was about classroom culture and pedagogy. My beliefs about what “good teaching” looks like was reinforced through the group conversations we had. Many times, I found myself wondering how replicable my classroom experiences, and those of the others in my group, in environments or with teachers who don’t share my/our vision of certain foundational aspects of good teaching are (student relationships, classroom culture, etc.). I also think the education community has a long way to go in regards to effectively assessing these competencies and convincing the “average educator” that they can be assessed in an authentic way (For example, I see people claim to assess some of these skills through one & done activities, but it’s way more nuanced than that).”

Social Studies

The Social Studies team had four members. They represented Elementary, Middle, and Secondary levels. The team was unanimous in selecting Critical Thinking as its top choice in terms of easiest competency to teach through the Social Studies.

Three team members selected Collaboration and Curiosity as top choices and Communication and Ethics were selected by two team members. No team member chose Creativity, Mindfulness, Resilience, Metacognition, or Growth Mindset as one of their top four easiest to teach through the discipline.

“I have been thrilled to contribute to this work, laying the foundation for very many more teachers to think intentionally about including these competencies in our daily instruction. But the highlight has been my own personal growth. The thrill of investing in other teachers was super ceded by how this experience has opened my eyes to my own practice. I am exponentially more intentional now about blending the competencies. On top of that, I am finally landing on some of the ideas for how to assess them.”
In terms of competencies most difficult to teach through the Social Studies, all four team members selected Mindfulness ad Growth Mindset with three each choosing Resilience and Metacognition.

Some thoughts from the Social Studies team members in response to open-ended questions include:

"I was forced to reflect on my practice. My wife noted that what I was doing was similar to her NBCT process in regards to reflection."

And, "I rather enjoyed working with the caliber of the educator in this survey. This was a high-level pedagogical conversation of the type I don't often/always get to have in my day-to-day practice."
Scoring Responses

As the teachers completed their lesson plans and submitted them, a group of Research Assistants reviewed the lesson plans and applied a rubric to each plan, resulting in a score. The rubric is provided below:

<table>
<thead>
<tr>
<th>Table 5: Lesson Plan Scoring Rubric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
</tr>
<tr>
<td>Content Specific</td>
</tr>
<tr>
<td>Subcompetency Specific</td>
</tr>
<tr>
<td>Competency Specific</td>
</tr>
<tr>
<td>Fleshed Out</td>
</tr>
<tr>
<td>Theoretically Appropriate</td>
</tr>
<tr>
<td>Uniquely Effective</td>
</tr>
</tbody>
</table>

There was a possible total of seven points for each lesson plan applying the rubric. A score of 4 was considered acceptable by the Research Assistants.

The teachers were aware that their lesson plans would be scored, and, during Round One, the Team Leads and the Researchers were providing feedback through the Playbooks throughout the process. During Round Two, we used Research Assistants as Team Leads instead of teachers, and the Research Assistants facilitated a rubric scoring practice session with their teams, something we learned was needed from our experience in Round One.

In the section that follows, we will provide an overview of how the teachers’ lesson plans were scored by the Research Assistants in Round One.
General Scoring Results

After the researchers scored and coded all of the answers, we were able to see the distribution of scores across competencies. In the following graph, answers are categorized according to their final competency (in 1% of cases, researchers recategorized answers that were mis-categorized by teachers) and ordered by the total number of teacher answers.

Another way to look at the combination of quantity and quality of scores is the heatmap table below. Each table shows a score for each competency and discipline combination. A score of 1 represents the average for that competency and that discipline. Scores above average are coded green and below average are coded yellow. The first table shows results considering Quantity of answers only, the second table shows Quantity of answers only, and the third table shows the combination of the two.

It was important to split these out because there were some instances with uneven scores, and an average would hide that information. For example, Curiosity in Fine Arts was below average in quantity, but the answers that were submitted were on average twice the quality of that which would be expected. Averaging them out the score becomes 0.8, very close to the average score of 1. See the table on the following page.
Scoring Results by Discipline

In compiling scoring results, we collected the number of lesson plans submitted by each team; the number of lesson plans that scored a 4 or greater; the percentage of lesson plans that scored a 4 or greater. These results are found in the table above. Following the table is a brief discussion of what we summarized by discipline from the score data.
Mathematics

The Mathematics team members submitted a total of 375 responses, of which 47 or 13% scored a 4 or higher. The table above shows how the team performed by competency.

The Math team selected Critical Thinking as its top choice for ease of teaching through the discipline. At 25%, this competency was the team’s highest scoring set of lesson plans. They next chose Growth Mindset, with 26 responses and 19.2%, the second-highest percentage of lesson plans scoring a 4 or higher; and Communication, with 69 responses but a very low percentage of 2.9%.

Communication was the competency which had the highest number of responses submitted, which makes sense given that the team chose it as one of the easiest to teach through the discipline. But their scores were not reflective of a good understanding of what it means to teach the competency and subcompetencies. Critical Thinking had the next highest number of responses submitted. Metacognition, not chosen as one of the easiest to teach, had 54 responses and a 16.7% of responses scoring 4 or higher.

English Language Arts

The ELA team submitted a total of 494 responses, of which 132 or 27% scored a 4 or higher. The table above shows how their scores broke out by competency.

The ELA team chose Creativity, Critical Thinking, Communication, and Collaboration, in that order, as being the best fit to teach through their discipline. Communication had the highest number of responses at 88 and 20.5% scoring a 4 or higher. Creativity was the third highest number of responses with 20% scoring a 4 or higher. Critical Thinking had the 6th largest number of lessons submitted with a percentage of 33.3% scoring a 4 or higher. Collaboration had the 7th highest number of lessons submitted with a percentage of 16.7 scoring a 4 or higher.

Metacognition, which was only chosen by one person as being in the top four of easiest to teach, had the second highest number of lessons submitted with a 28.6% scoring a 4 or higher. Leadership, chosen by no one as being easy to teach had 60 responses and a 21.7% with a 4 or higher. And Growth Mindset, chosen by only one team member as being easy to teach had 41 responses and a percentage of 31.7% with a score of 4 or higher.
This is very interesting data. Metacognition and Growth Mindset were actually among the highest scoring percentages although not viewed by the majority of the team as being easy to teach. Critical Thinking, unanimously chosen by the team as being in the top four scored the highest and Communication and Creativity scored respectably, although both were outscored by Metacognition and Growth Mindset.

**Fine Arts**

The Fine Arts team submitted a total of 504 lessons plans with 192 or 38% scoring a 4 or higher. The table above shows how their scores broke out by competency.

This team had the highest number of lessons submitted and tied for the highest percentage of lessons scoring a 4 or higher.

This team had selected Creativity unanimously as its top choice for ease of teaching through the discipline. This was their fourth largest area for number of submissions but their highest percentage of scores at a 4 or higher with 54.1%. They had selected Critical Thinking second with four team members choosing this; they only had 26 lesson plans submitted for this though but 50% of those scored a 4 or better. They chose Growth Mindset third (3 team members); this tied for their second most submissions with 34.3% scoring a 4 or higher. They chose Communication and Curiosity (2 team members) as their fourth top ease of teaching through the discipline. Communication had the highest number of submissions with 81 but only 20 of these scored a 4 or higher. Curiosity was actually one of their lowest submission areas with 16 but of these 12, or 75% scored a 4 or higher.

Metacognition is a competency that only one person chose as a top four but it tied for second highest number of responses at 67 with 23 of those or 34.3% scoring a 4 or higher. It seems that they know more about metacognition than they thought they did. While they submitted 48 lessons for Leadership, only 12.5% of those scored a 4 or higher. Ethics which had no ‘votes’ for top four had 42 lesson plans submitted with 35.7% scoring a 4 or higher. Finally, Mindfulness had the lowest number of lesson plans submitted at 13 but of those 61.5% scored a 4 or higher.
Performing Arts

The Performing Arts team had 386 lesson plans submitted with 94 of these or 24% scoring at a 4 or better. The table above shows how their scores broke out by competency.

The Performing Arts team identified Collaboration as a unanimous choice for top four competencies that were easiest to teach through their discipline. This was followed by Creativity and Critical Thinking (4 each) and Growth Mindset (3). Thirty responses were submitted for Collaboration but only two of these scored at a 4 or better. Sixty responses were submitted for Creativity with 19 scoring at a 4 or better and 33 lesson plans were submitted for Critical Thinking, of which 9 scored a 4 or better. For Growth Mindset, the team submitted twenty lesson plans with 4 scoring a 4 or better.

No team member chose Communication, Ethics, Mindfulness, or Metacognition as being in the top four. Yet, team members submitted 70 lesson plans for Communication, the highest number of responses submitted. Curiosity had the lowest number of lesson plans submitted with 17.

Physical Education

The Physical Education team had 363 lesson plans submitted with 137 of those scoring at a point of 4 or better for a percentage of 38%.

The Physical Education team chose Collaboration and Leadership unanimously for their top four choices of ease of teaching through the discipline. Three team members chose Growth Mindset and two chose Communication. They submitted 47 lesson plans for Collaboration with 18 at a score point of 4 or higher and 49 lesson plans submitted for Leadership with 16 scoring at a 4 or better. For Growth Mindset, the team submitted 31 lesson plans with 11 at a 4 or better and for Communication they submitted 69 lesson plans with 10 at a 4 point or better.

While no team member selected Metacognition as a top four choice, the team submitted the greatest number of lesson plans for this competency at 74 with 31 or 41.9% scoring a 4 or better. Ethics and Resilience were also not selected by any team member and yet both had a moderate number of lesson plans submitted with among the highest percentages of successful scoring at a 4 or better; Resilience had 12 of 31 lesson plans and Ethics 11 out of 23 lesson plans scoring at a 4 or higher.
**Sciences**

The Sciences team submitted 369 lesson plans of which 107 scored at a 4 or better for a percentage of 29%. Their results by competency are in the table above.

The Science team unanimously selected Critical Thinking and Curiosity as its top two of four easiest to teach through the discipline with Collaboration selected by four team members and Communication by two. Communication was the competency with the highest number of lesson plans submitted at 76. Of these, 8 or 10.5% scored a 4 or better. Collaboration had 33 lesson plans submitted with 9 or 27.3% scoring a 4 or better; Critical Thinking had 36 lesson plans submitted with 10 or 27.8% scoring 4 or better, and Curiosity had only 13 lesson plans submitted despite its being selected by all five team members. Of the 13 responses, 4 scored at a 4 or better.

Mindfulness, Courage, Leadership, and Metacognition were selected by no team members. Yet, Metacognition had the second highest number of lesson plans submitted at 49 with 8, or 10.5% scoring at a 4 or better. Leadership had 42 lesson plans submitted with 13 or 33.3% scoring at a 4 or better.

**Social Studies**

The Social Studies team submitted a total of 381 lesson plans of which 95 scored at a 4 point or better for a percentage of 25%. Their scores by competency are shown in the table above.

Social Studies team members were unanimous in selecting Critical Thinking as their top four competency that is easiest to teach through their discipline. Three of four team members then chose Collaboration and Curiosity and two of four chose Communication and Ethics.

Critical Thinking had 42 lesson plans submitted with 17 or 40.5% scoring a 4 or higher. Collaboration had 32 submissions with 8 or 25% scoring 4 or better while Curiosity had 16 submissions with 7 or 43.8% scoring a 4 or better. Communications had the largest number of lesson plans submitted at 86 with 13 or 15.1% scoring a 4 or better. Ethics had 27 submissions with 12 or 44.4% scoring a 4 or better.

No team member chose Creativity, Mindfulness, Resilience, Metacognition, or Growth Mindset. However, Metacognition had the second highest number of submissions at 57 with 15 or 25.4% receiving a score of 4 or better.
WHAT WE LEARNED

During Round One of this study, we learned a great deal. We will break out that learning as follows:

- Content learnings;
- Logistical learnings;
- Technology learnings;

We will also include in this section some of the results of what we learned in terms of what we carried forward into round two of this study.

Content

Our greatest learnings were in terms of the content itself. The fact that teachers chose as their top four competencies that then turned out to not be the ones in which they submitted their strongest work, tells us that teachers are lacking training in the competencies and their subcompetencies, and lacking the space to reflect on their work.

A second thing that we learned was the variety of tactics that teachers used in teaching the competencies through the disciplines. For example, in the two graphs above, you will find the most common tactics that we found used by the teachers by competency and by discipline. Some of these are no-brainers – for example, collaborative activities used in Collaboration.
Others are more interesting, e.g., that visualization is used in Critical Thinking and Metacognition to such a large extent.

Some interesting points include that self-assessment was so widely used across disciplines while 1:1 check-ins was less so.

The full list of the tactics that we identified is found in Appendix D.

We also realized through our work in Round One that more than just competencies and sub-competencies, there were elements of these that we could identify. While we started out with many more, we eventually were able to narrow these elements to twenty. Moving into Round Two, we began thinking about how to utilize the elements to streamline what we were asking of the teachers. This actually led to a new form of data-collection and contributed to the development of a new form of technology for Round Two.
Technology

We utilized a variety of technological tools for our work in Round One of our study. For our meetings, we used Zoom, which worked very well, allowing teachers to see one another, turn off their cameras if they chose to do so, and to see slide decks and other materials that we shared with them. We will continue to use Zoom as our meeting tool moving forward.

The Playbooks were problematic in being a bit clumsy to navigate and asking Team Leads to go through up to five Playbooks was extremely difficult. One thing that worked well with the Playbooks was that teachers were able to see one another’s work within teams. We would like, in future, for teachers to be able to see across teams as there were many questions about how other disciplines were responding to a specific competency as the project moved along.

Finally, in terms of technology, we would like to be able to build a database of lesson plans that is easily navigable, so that we can share lessons both within and across teams and with others as well.

Logistics

In carefully reviewing the comments that we received via the survey, considering the email data that we collected during the study, and reviewing the recordings of our team meetings and our final whole-group meeting, these were our key take-aways regarding logistics:

- Slow down - focus on LESS competencies for MORE time. Do a better job up-front of explaining the expectations of the study participants;
- Keep the time commitment very specific and clear for teachers. Write this into the contract;
- Consider grouping by grade(s) taught -
  Having a session where the middle school teachers are grouped, high school, elementary would have a great dynamic;
- Create “CliffsNotes”: quick/easy reference for definitions of terms and example;
- Provide more explanatory material about the competencies and spend time in the initial whole-group meeting as well as in individual team meetings in discussing the competencies and their sub-competencies. Partway through the first round of our study, we made adjustments to the number of team meetings that we would hold, increasing them as the teachers seemed to find them most valuable. We also adjusted the way in
which we prepared them for the upcoming competencies, and reduced the number of competencies that we asked them to study and provide lesson plans for each week.

Below, is a snapshot of a process that we developed to unpack the upcoming competency on the team meeting calls:

Using the table below in a slide deck, we would ask teachers to brainstorm what they think of when they hear the word ‘Creativity’ for example:

<table>
<thead>
<tr>
<th>Synonyms</th>
<th>Related Constructs</th>
<th>Associated Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>imaginativeness</td>
<td>inspiration</td>
<td>resourcefulness</td>
</tr>
<tr>
<td>imagination</td>
<td>inventiveness</td>
<td>cleverness</td>
</tr>
<tr>
<td>ingenuity</td>
<td>originality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>idea generation</td>
<td></td>
</tr>
</tbody>
</table>

We would capture their responses on a slide like this:

Options or choices: anything goes, make what you want
Variety of outlooks, viewpoints
Different mediums, translating across mediums - books into broadway shows, movies
Remixing, derivativeness, how you combine various thoughts with media, existing things, drawing connections in a hands on way,
Production exercise, making

We would then take these words and paste them into a new slide, asking the teachers to look at the list of subcompetencies and match their suggested words for Creativity, in this case, to a subcompetency. An example is provided below:
This unpacking process went a long way to helping the teachers to dig into the subcompetencies in advance and to begin to brainstorm ideas that they could pull from their classroom experiences.

- Provide more information up-front about the amount of time that it would take for teachers to do this work;
- Add in more meetings – in round two, we went to weekly meetings;
- Tighten up our “end product” so that we are VERY specific and scripted about the information we ask for and are receiving - For example, ask team leads to work with their group to create a final synthesis doc for each competency. This may look similar to our current template, but it would be up to the team lead to work with the team to create it.
- Do the work during vacation/summer when teachers have time to think – however, given the wide variation of when summer vacation occurs across the country, this is difficult;
- Consider having the Team Lead not be a teacher. While this goes against the grain of wanting to use educator expertise, unfortunately, these educators were not experts in the competencies. We are considering using Research Assistants, who are well-versed in the competencies, for Round Two Team Leads.

Sub-Competencies
CRE 1 Imagining, connecting, and/or transferring ideas
CRE 2 Listening inwardly to hone tastes and aesthetics
CRE 3 Being comfortable with risks, uncertainty, and failure
CRE 4 Identifying, clarifying, and organizing information
CRE 5 Realizing ideas while recognizing constraints
CRE 6 Reflecting on processes and outcomes

Our Ideas:
1 Options or choices: anything goes, make what you want
3 Variety of outlooks, viewpoints
1 Different mediums, translating across mediums - books into broadway shows, movies
1,5 Remixing, derivativeness, how you combine various thoughts with media, existing things, drawing connections in a hands-on way,
6 Production exercise, making
CONCLUDING THOUGHTS

The teachers engaged in this study have told us that participating in this work has made a tremendous difference in their own practice and that they are sharing what they have learned with others. One stated: "I had never really thought about metacognition before, let alone taught it. Now, I am looking for articles about it to better understand it and am hungry to learn more. I am striving to incorporate it into teaching of Social Studies and am learning so much about my own practice and my content as a result."

Another shared: "I had barely heard of metacognition, let alone thought that it applied to how I teach Science. This was a real struggle for me, but one that I am glad I experienced. I am now looking at my practice so differently and trying to learn more about metacognition and how teaching it through Science benefits my students."

Some additional comments included: "I felt like my opinion in regards to ELA was valued and appreciated throughout the entirety of the study. As an African American Male educator, sometimes the competency I bring to the table in my teaching falls short in comparison to my ability to manage behavior and foster relationships. And rightfully so. But there are times when I want to be appreciated for my mind as much as my heart. This experience allowed that to happen.” And, "I thoroughly enjoyed this experience. It helped me grow in my own teaching.”

Our final group call with our teachers underscored the professional and collegial value of this study and confirmed our hypothesis that additional framing of metacognition and its subcompetencies upfront would be hugely beneficial to our work and meaningful for teacher participants.

One of the comments that we heard frequently, in different forms, was that the teachers involved in the study wished that their colleagues could have had the same experience. Another was that they had never had the opportunity before to interact in this way with colleagues – to be able to have the gift of time to spend talking together about practice, about mistakes and
successes, and about how to strengthen practice. It is these thoughts that stay with us as we move into Round Two.

While teachers told us repeatedly that this was some of the hardest work that they had ever done, they also told us that it was among the most rewarding. That teachers repeatedly told us this validates our belief that this work is so valuable.
Appendix 1: Demographics of Sample

All data is self-reported and not all educators answered every question.
Appendix 2: Teacher Rankings of Top Four – 1 is the Best Fit 4 is the 4th Best Fit

<table>
<thead>
<tr>
<th>Competency</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Thinking</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Collaboration</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Creativity</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Communication</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Mindfulness</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Curiosity</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Courage</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Resilience</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Ethics</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Leadership</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Metacognition</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Growth Mindset</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>
Appendix 3: Responses to open-ended survey question 1

Thinking back on your experience these past few months, what do you feel like you learned, realized, or changed your mind or perspective on? Please be specific and provide examples and/or reference particular themes, instructional strategies, or conversations that stood out to you as particularly valuable.

I learned to think of my lessons in a whole new way. Very often we focus on the content we are teaching but now I can recognize that there is so much more going on in our lessons and in our classrooms.

The biggest thing I’ve realized is that there are a whole lot of things that I try to do and know are important, but that I need to be doing a lot more to be systemic and persistent about my approach. These skills are not the kind that can be learned during a one-day lesson, or that will stick without being built month after month and year after year.

While most of the competencies are taught in a physical education class, they aren’t overtly addressed as core ideas for lessons or curriculum. However, this process has brought the 21st Century competencies forward as tangible concepts, ideas, and actions to be taught, addressed, assessed and practiced. I have already implemented most of the competencies into my teacher prep materials to have my students focus on these concepts, skills, and behaviors.

One of the highlights for me was being respected as a Science Teacher. Elementary teachers are so often not cast in this light. It was powerful to articulate with Science teachers up and down the grade levels. There are universal ways we can build on one another in subjects from K-12.

It helped me think more deeply about how I assess various skills and competencies in my class, since I had to try to clearly articulate the ways in which I assess fewer tangible things like "Leadership" (rather than just talk about how I incorporate it).

I was reminded of strategies I have used in the past but would like to re-introduce to my instruction and I was inspired to try out some of the great suggestions suggested by others in the group.
It really helped me reflect on my own practice. I loved learning what my colleagues are doing within same content, and also made me question what I do not include. Although all the competencies, happen I had not thought about creating lessons specific to all of them. I also do not have the time with my students to address them all in depth within a semester.

My perspective was changed on my ability to incorporate various competencies into my content area. There was a wonderful discussion amongst all of the teachers on every competency - it was valuable to see where my own competencies fell short and emerged in my teaching.

A heightened interest and intentional focus on teaching the competencies. An awareness of lessons and activities already designed that actually address the competencies was also realized.

One thing I realized throughout my participation in the study is that it forced me to reflect and be intentional about the different competencies in ways that I had never done throughout my teaching career. I had to ask myself, "why is this a practice in my class?" "Is this most effective in achieving the desired outcome?" And other questions that helped me reflect, discuss, and refine my teaching practices. For example, I have always had my students annotate the text they're reading. But when it came to the creative competency, I had to rethink how I could do something that I have been doing for the past six years. Then, I was able to bring that reflection to the group discussion and hear what other educators thought. Which felt really affirming.

Before doing this study I really hadn't thought about these competencies in my classroom. Yes, I found many ways I teach them, but don't really asses for them or specifically identify them.

One of the recurring challenges for me during my reflections centered around assessing the competencies in my science classes. In many cases I could readily find examples of ways to weave in the competencies embedded with the necessary science content. I had been doing many of them already for years in my classroom. Although, I had never until now even considered "how do I assess for the competencies." For example - I might have been intentional in teaching the students about leadership skills during weekly lab group assignments. But I never assessed whether they retained any of it. I routinely use assessments to ensure that they master
the content, but yet find it so very hard (even still) to decide how best to determine if they grasp the competency. The other theme that stood out for the science group was the disparity in the subjects. There was a distinct difference in which competencies seemed to fit life science classes (like biology or ecology) compared to physical sciences like physics. For example, many of the life science classes lend themselves to the ethics competency. Ideas like cloning, spread of disease, environmental stewardship offer easy opportunities to discuss right/wrong decision making. The same is not easily done while calculating the amount of friction in a system or the rate of heat exchange between items.

The process only confirmed what I thought before the study- that any of these competencies can be taught through a variety of subject areas.

I realized that I address more of these competencies in my day to day teaching than I originally thought. Some of that is because of content, but more of it was about classroom culture and pedagogy. My beliefs about what “good teaching” looks like was reinforced through the group conversations we had. Many times, I found myself wondering how replicable my classroom experiences, and those of the others in my group, in environments or with teachers who don’t share my/our vision of certain foundational aspects of good teaching are (student relationships, classroom culture, etc.). I also think the education community has a long way to go in regards to effectively assessing these competencies and convincing the “average educator” that they can be assessed in an authentic way (For example, I see people claim to assess some of these skills through one & done activities, but it’s way more nuanced than that).

I learned that I do use quite a few of these instructional strategies on a daily basis. Creativity and collaboration are a huge part of my PE/Dance program and I was able to really analyze what we do on a daily basis.

I realized that I actually do a lot of this work in my art classroom without purposefully planning to do so. And that if I took the time to sit and actually plan experiences and discussions around the interconnected work of the competencies and my content area- the learning could come alive in a meaningful way for my students.
I think my perspective on metacognition has changed. I found myself, during the acts of teaching and planning, thinking about how these competencies might be addressed in the work I do with students.

Teaching the competencies is more tied to how the teacher is in the classroom than what the teacher teaches.

I have become more intentional about teaching the competencies. When teaching improv, I might focus on creativity or collaboration.

I was reminded of strategies I have used in the past but would like to reintroduce to my instruction and I was inspired to try out some of the great suggestions suggested by others in the group.
Appendix 4: Responses to open-ended survey question 2

What would you consider the highlight of your experience in this study?

Getting to meet people from different parts of the USA that are teaching Social Studies and having an opportunity to speak to them about their classroom practices and how they teach.

The reflection is facilitated was hugely important. I don't, as a teacher, spend a lot of time really reflecting to this level.

Certainly, learning new ideas, but also learning from such great teachers and professionals from across the country. I loved reviewing their ideas and reading about the way they were implementing and teaching the competencies.

Learning about how highly effective teachers incorporate the competencies into their classroom teaching practices.

The opportunity to reflect on my own practice was nice.

The 3 highlights were: 1. The opportunity to reflect on my practice and be inspired to do a better job of teaching these competencies 2. Reading the great ideas of other master teachers 3. Our discussions.

Connecting with amazing educators who are constantly looking to be even better. I grew as an educator because of the interaction and collaboration with the other participants. I also codified what I do in my classroom to address these competencies.

Our phone conversations.

Working with the other teachers and hearing the strategies they used in their classrooms. It was amazing to hear what was being done on a daily basis in all the math classes!

Learning about the competencies and the collegial dialogue after the playbook work.

The highlight of the entire experience was the group meetings. I was able to "nerd out" with other ELA people and that felt really good and refreshing.
I loved our Zoom meetings with the other physical education teachers. It really made me think differently about some of the ways I teach these competencies.

I have been thrilled to contribute to this work, laying the foundation for very many more teachers to think intentionally about including these competencies in our daily instruction. But the highlight has been my own personal growth. The thrill of investing in other teachers was super ceded by how this experience has opened my eyes to my own practice. I am exponentially more intentional now about blending the competencies. On top of that, I am finally landing on some of the ideas for how to assess them.

I feel that it was very valuable for me to reflect on my teaching and identify ways that I teach, or could teach these competencies. I also enjoyed reading the playbooks of the other members of our team to learn about the ways that they teach the competencies.

Having a lens through which to see/view other awesome science teacher’s classrooms and to hear their thinking about what they do and why. I loved our very purposeful conversations about awesome teaching and doing great things with kids (whether science content related or not).

I really enjoyed doing the online discussions with our group. It was great to listen to others’ thoughts and ideas. The collaboration was very helpful and enlightening.

Spending time in conversation with other passionate and creative teachers in my content area. These conversations helped me process what I was really thinking and challenge my preconceived ideas. In addition, I learned strategies and ideas from them that I would like to take back to my classroom.

The conference calls gave me the opportunity to think aloud with educators in different places but within the same content discipline. Teaching well is impossibly hard. I enjoyed hearing perspectives on how these competencies are viewed and employed by master educators.
Hearing other teachers share their opinions.

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The online meetings were a highlight for me.
## Identified Teaching Tactics from Round One Study

### Building Connections
- Multiple levels of questioning
- Consider applications
- Share multiple perspectives
- Student Resynthesis

### Interdisciplinarity
- Multiple representations
- Elicit background knowledge
- Student-driven categorization

### Communicating Clear Expectations
- Exemplary examples
- Provide a rubric/checklist
- Groupwork roles
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<tr>
<th>Explicitly stated goal</th>
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**Considering Limited Working Memory**

- Contrasting cases
- Review previous relevant classroom learning
- Routine
- Visualization
- Essential questions & concepts

**Enable Active Listening**

- Individual Project
- Gradual release of responsibility
- Role play/simulation
- Iteration
- Collaborative project
- Inquiry
- Debate
- Student-as-teacher
- Productive failure
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<th>Establishing Relevance</th>
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<td>Authentic audience</td>
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<td>Technology</td>
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<td>Student Freedom &amp; Choice</td>
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<td>Real-world phenomenon</td>
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<th>Facilitating Reflection</th>
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<td>Teacher Embodiment</td>
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<td>High expectations</td>
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<td>Vary group size &amp; composition</td>
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<td>Show care</td>
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**Utilizing Low-Level Cognitive Principles**

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<td>Spaced repetition</td>
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<td>Mnemonic</td>
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