

Integrating 21st Century Skills in a CTE Setting

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Abstract

This paper examines the professional development of high school teachers on how to integrate 21st Century Skills within their Career and Technical Education (CTE) classes at a skills center in eastern Washington. The entire project entailed the creation of a Professional Learning Community (PLC) that worked to understand 21st Century Skills and the need to explicitly teach them to CTE students. It also involved the development of rubrics for use by students and teachers in assessing 21st Century Skills. Lastly, the teachers in the PLC utilized the rubrics in their teaching. While aspects of the rubric development and implementation will enter the discussion, the focus of this paper will be the perceptions of the teacher leader of the PLC (the facilitator) and the process of preparing CTE teachers to effectively teach 21st Century Skills through a PLC.

Introduction

21st Century Skills and College and Career Readiness have become major buzzwords in education. 21st Century Skills describe the “skills, knowledge, and expertise students must master to succeed in work and life” (Partnership for 21st Century Skills, 2009a, para. 1). The Common Core State Standards (CCSS) anchor K-12 academic standards which includes Career and Technical Education (CTE) courses. The expectations of CTE is to “ensure students are prepared for today’s entry-level careers, freshman-level college courses, and workforce training programs” (CCSS, 2019, para. 2). However, while 21st Century Skills are considered by many to be the foundation of CTE, some teachers may consider them to be a separate curriculum. This creates potential problems with teachers not knowing how to integrate them within their own content area, and measure the effectiveness of the implementation.

The Importance of 21st Century Skills

With 65% of students today anticipated to end up in careers that do not even exist yet (World Economic Forum, 2016, p. 32) it is imperative to find ways to both support teachers in their CTE classroom practice as well as inform superintendents, building leaders, parents, and community members that we are doing everything we can to ensure that the students leaving our CTE schools and programs have the tools to be successful in the future.

In the CTE world, teachers often understand assessment relative to their content area, specifically when they are measuring proficiency around a certain task. However, they just expect students to *get it* when it comes to 21st Century Skills like communication, collaboration, and problem solving. The Partnership for 21st Century Skills (P21) advocates adoption of local, state, and federal policies that support explicit integration of 21st Century Skills into instruction for all students (Battelle for Kids, 2019).

Understanding the foundation and purpose of teaching and assessing students on 21st Century Skills led to research with a small group of teachers who wanted to explore this further. As the research and feedback described in this paper will show, teachers need to know more so they can do more to help their students be better prepared to be successful in a globally competitive economy.

Another factor is that in Washington state, there are various levels of certification candidates can go through to become a CTE instructor: Probationary, Conditional, Initial, and Continuing. The Initial certificate is for educators that have completed an approved CTE teacher training program based on either their degree in a CTE specific content area (i.e., Family Consumer Science) or on 6000+ hours of required experience in business/industry (Office of Superintendent of Public Instruction (OSPI), 2019). The current requirements for receiving the Initial CTE certification for educators coming from business or industry is much more limited than traditional teacher preparation programs for teachers taking the university route in a CTE related field or core content. At the skill center, 82% of its CTE classroom teachers come from business and industry and received the Initial certification. Though their expertise in their CTE fields is extensive, the skill center's teachers' levels of exposure to traditional and current pedagogical practices can be limited.

The inspiration for this study continued to present itself after school leadership consistently received feedback from the various advisory committees at the skill center in regards to the lack of the necessary employability skills recent graduates have for the 21st century. Although there was familiarity of the term 21st Century Skills, there was a lack of consistency among teachers at the skill center when exploring both the definition and concepts of 21st Century Skills implementation in their courses. Understanding the foundation and purpose of teaching and assessing students on 21st Century Skills led to research with a small group of teachers who wanted to explore the implementation of CTE training further.

The anecdotal information from skills center advisory committees aligned with data from the Partnership for 21st Century Skills in its 2007 and 2008 reports. The message became clear: employers cared less about the technical skills of their new employees, believing those skills are teachable once hired. Instead, students needed to understand the requirements associated with basic employability, which was what their most recent hires were lacking. The teachers had also noticed an increase in their students' lack of problem solving and analytical skills. Students also did not seem to understand the meaning of producing quality work for customers, and time management - including attendance.

This project is significant because part of the foundation of CTE, especially at a skills center, is to provide students with both academic and technical skills that will make them successful in their future careers. While there were resources from the Partnership of 21st Century Skills (P21) to help with understanding and defining 21st Century Skills, it was important to come up with strategies that teachers could work with and use in the CTE setting.

Using one of the school's Professional Learning Communities (PLC) as the method of training, it was determined teachers would benefit from professional development focused on 21st Century Skills.

The purpose of this study was to reflect on the process of training CTE teachers to incorporate the various components of 21st Century Skills in their courses. Using qualitative methods of data collection and analysis, the researcher conducted professional development training over a six-month period (October - April). The PLC met bimonthly with data collection through training documents, meeting notes, and the researcher's reflective journal.

Literature Review

21st Century Skills

The term 21st Century Skills refers to a broad set of knowledge, skills, work habits, and character traits that are believed—by educators, school reformers, college professors, employers, and others—to be critically important to success in today's world, particularly in collegiate programs and contemporary careers and workplaces" (Glossary for Education Reform, 2016). While different researchers' verbiage varies when describing 21st Century Skills, all still shared the same common idea that these skills encompass critical thinking, problem solving, collaboration and teamwork, and creativity.

For example, Trilling and Fadel (2009) articulated four domains they believe young people need to succeed as individuals, citizens, and workers in the 21st century: Traditional Core Subjects & Skills domain, Career & Life Skills domain, Digital Literacy Skills domain, and Learning and Innovation Skills domain. The questions posed by Trilling and Fadel (2009), affirmed the framework P21 (now partnered with Battelle for Kids) devised to encourage and guide educators in developing curriculum. In addition, 21st Century Skills continue to be revised based on economic need and educational achievement. The current framework describes the “skills, knowledge, and expertise students must master to succeed in work and life; it is a blend of content knowledge, specific skills, expertise, and literacies” distinctly identifying key elements as fully interconnected components to 21st century teaching and learning (P21, 2010, p. 8).

P21 helped break down these key subjects and 21st century themes using a graphic representation (Appendix A) that calls for mastery of key subjects as well as global awareness, financial literacy, civic literacy, health literacy, environmental literacy, and learning and innovation skills (2010). While promoting understanding of those key subjects, the framework is asking educators to also look at the elements of the identified 21st Century Skills and weave them into the key subjects. These overarching skills are: (a) learning and innovation skills; (b) information, media, and technology skills; and (c) life and career skills.

The Battelle for Kids/P21 framework (2019), also examined the necessary innovation skills that “separate students who are prepared for increasingly complex life and work environments in today’s world, and those who are not” (2019, p. 4). These types of skills include creativity, communication, collaboration, and critical thinking, information, media, and technology. Skills focus not necessarily on the ability to be tech-savvy, but rather “exhibit a range of functional and critical thinking skills related to information, media, and technology” (2019, p. 5). Life and career skills ask students to develop their ability to adapt and be flexible, manage goals and time, and act responsibly (2019, pp. 6-8).

Similar to the P21 frameworks, Wagner (2008) identified seven skills students need to succeed as both employees and citizens: (a) critical thinking and problem solving; (b) collaboration and leadership, (c) ability and adaptability; (d) initiative and entrepreneurialism; (e) effective oral and written communication; (f) accessing and analyzing information; and (g) curiosity and imagination.

Greenstein (2012) also provides a version of what is required for 21st Century Skills. These include thinking skills (critical thinking, problem solving, creativity, and metacognition), actions (communication, collaboration, and digital and technological literacy), and living skills (citizenship, global understanding, leadership, and college and career readiness) She also explains to teachers how to assess them.

Implementation and Integration Into the Classroom

The skills that students need to be successful after high-school, what we now call 21st Century Skills, is not a new concept. Critical thinking, problem solving, communication, information literacy and basic employability skills have been important - especially when considering preparing our youth to being global citizens. Educators must start with the basics - direct instruction, interactive lecture, demonstration, reflection, vocabulary, quizzes, among others to help define and develop these skills (Crawford, 2003; Jacobson-Lundeberg, 2016; Marzano, 2012). It is essential that 21st Century Skills not be dealt with in isolation, as some teachers in the study initially tried, but rather be integrated into current practices. Integration creates meaning and authenticity within the curriculum.

Rotherham and Willingham conclude that “devising a 21st Century Skills curriculum requires more than paying lip service to content knowledge...we must plan to teach skills in the context of particular content knowledge and to treat both as equally important” (2010, p. 19). They also argue that while many students are taught 21st Century Skills through highly-effective schools or from great teachers who are incorporating them, it’s often a matter of chance rather than deliberate design when it comes to implementation, and that needs to change. The core skills are not new, and teachers need to teach these skills as they would any core subject - intentionally, effectively, and deliberately.

Authentic learning, as described by Lombardi (2007), often focuses on complex problems, typically deemed more “real-world” and uses activities that focus on problem solving, participation, leadership, communication, and flexibility - in essence, 21st Century Skills. To achieve this concept, Lombardi suggests teachers “introduce authentic content [by] replacing textbooks with historical documents...design problem-based activities to replace lectures, [and] expect students to collaborate with one another” (2007, p. 2).

By transitioning a classroom or unit of instruction to the authentic learning concept, the learning becomes student-centered, promoting their interpersonal skills, motivation, and self-efficacy (Huang et al., 2010).

Lack of systematic implementation can be seen as a result of limited knowledge or basic understanding of the importance of 21st Century Skills by educators (Fox, 2011; Lendis, 2014). The chances that students will achieve proficiency in 21st Century Skills can depend significantly on the providence of teachers modeling 21st Century Skills themselves, as well as engaging with performance assessments, influencing their own understanding of the standards, and also their students' abilities in achieving them (Darling-Hammond & Falk, 2013; Urbani, Roshendel, Michaels, & Truesdell, 2017).

Based on the research stated throughout this section, there are similar ideas of what 21st Century Skills entail, as well as a consensus that implementation through problem or project-based learning can often be the best way to learn and practice these skills. Detailed rubrics that outline expectations can be a key component to helping students understand what the indicators are of 21st Century Skills and also a great way to monitor growth and progress.

PLCs and Teaching Strategies

Many Career and Technical Education (CTE) teachers struggle with pedagogical strategies for teaching academic content. Therefore, it is of extreme importance CTE teachers engage in professional development opportunities that would best serve them (Bottoms, Egelson, Sass, & Uhn, 2013; Brown, 2002; Kerna, 2012). The teachers in this study had varying degrees of teaching experience, but all came from an industry background where the expectation is that their "employees" already know what 21st Century Skills are. Knowing from feedback that students do not possess adequate 21st Century Skills, the focus of teaching came to be very intentional. The strategies used to encourage professional practices in the classroom were intended to take students to a deeper level of understanding.

Cooperative learning, design-based instruction, inquiry-based teaching, problem-based learning, as well as project-based learning, are major components of the teaching strategies proven effective for implementing 21st Century Skills into the curriculum (Barron & Darling-Hammond, 2008; Huang et al., 2010; Kivunja, 2015; Lombardi, 2007). Teachers who are transitioning to these modes of instruction and facilitation for 21st Century Skill alignment, need to first build a culture of thinking where every student has a voice. It's also essential they determine the standards and align to them, manage the activities students are doing, use multiple forms of assessment, and engage and coach students using questioning and reflection (Boss & Larmer, 2018; Perkins, 2008). To transition to this model of teaching, teachers need time and a community of support to help organize and sustain the work they are doing (Barron & Darling-Hammond, 2008; Rotherham & Willingham, 2010). This is where the Professional Learning Community (PLC) became essential to the project.

The PLC model is a way for teachers to come together to focus on the learning that is done in the classroom rather than the teaching. "Educators who are building a professional learning community recognize that they must work together to achieve their collective purpose of learning for all. Therefore, they create structures to promote a collaborative culture...judging their effectiveness on the basis of results" (DuFour, 2004, pp. 6-11).

PLCs are a popular way that schools encourage teacher collaboration where educators can focus on student learning rather than just focusing on their teaching practice (DuFour, 2004). Such collaboration sessions focus on three essential questions that DuFour suggests drive an effective PLC: What do we want each student to learn? How will we know when each student has learned it? and How will we respond when a student experiences difficulty in learning? (2004). PLCs focus on ways to improve student learning and are intended to increase student achievement through teacher knowledge rather than focus solely on teaching and teaching practices. PLC meetings are designed to help teachers develop skills through collaboration and provide them with the opportunity to discuss, evaluate, and plan instruction for students around data and feedback (Blank, 2013; DuFour, 2004; Munoz & Branham, 2016). Consultancy Protocol and ATLAS Protocol are both tools to help facilitate discussion around problem solving and data that help give participants a voice and allow them to see beyond the dilemma, collaborate, and examine probabilities for future work (Buchovecky, E., 2017; Dunne, Evans, & Thompson-Grove, 2017).

The Partnership for 21st Century Skills (P21) worked to develop a guide for education programs and new teachers to help them learn to fuse academic and 21st century knowledge and skills together in the classroom.

The principles for this model center around leadership, program design (curriculum, instructional models, assessment), learning environments, partnerships, and continuous improvement (Greenhill, 2010). Using the guide that P21 had already developed along with elements of student-centered learning practices, the PLC model was used to work with teachers from varying backgrounds and experience levels to learn about teaching 21st Century Skills and integrating them in their curriculum.

Educators need to make a concentrated effort to truly understand the elements of 21st Century Skills so they can implement them in their classrooms. PLCs are an accepted way to encourage teachers to collaborate, share ideas, and come up with strategies that would best work for the students they serve to help them be successful in the future.

Methods

At the school where the study took place, the overall consensus by the administrative staff was that teachers assumed students already understood the soft skills needed to keep a job once they got it. Teachers spent the majority of their time teaching the hard, content-related skills they felt the students needed in their selected industry. While some students understood the soft skills that contribute to 21st Century Skills, that was not the case for all or even most students. Therefore, it was important that teachers embed those skills into their course work, teaching them with intent and using rubrics to guide both the students and themselves to evaluate performance. This section lays out the perspective of the facilitator and the process followed to improve the teaching of 21st Century Skills by a small group of teachers.

Researcher Stance

The facilitator was a teacher leader earning her principal certification and master's degree in education. The facilitator was originally prepared in college as a teacher, and taught English at a small rural high school in eastern Washington. Because the school was small, she was the only English teacher teaching all 9th - 12th-grade students who attended, as well as participating in school-related activities that reached beyond the school day. After two years, she decided to take a break from the teaching profession. For the next several years, the facilitator worked in various roles in the hospitality industry. She returned to the world of education teaching Career and Technical Education (CTE) at the local skills center. The facilitator, after being in the workforce and hiring employees, had an appreciation and understanding of the skills students required to be successful in the workplace – many which relied on 21st Century Skills. She returned to the classroom to help students and give them the tools they would need to be successful on their post-secondary journeys.

During six years back in the classroom, the facilitator came to recognize that just as technical skills need to be taught, so do the soft-skills that employers expect out of their employees. By using detailed rubrics to clarify the indicators of various 21st Century Skills, along with lesson integration and collaborative feedback, the goal of teachers participating in this study was to create more prepared students for success after high school.

The PLC

The study was performed with a small group of six teachers from a CTE skill center in the eastern Washington using the Professional Learning Community (PLC) format. The teachers had anywhere from three to ten years of teaching experience. The rationale for selecting the teacher participants and their corresponding classes was based on teachers' interest in the project at the start of the school year. The teachers taught students in the 11th or 12th grades the following classes: Graphic Design, Dental Assisting, and Cosmetology. According to the building's Office of Civil Rights (OCR) data, approximately 25% of the students these teachers worked with received special education services, 25% were male, 75% female, 8% had limited English proficiency, 90% were classified as White, 5% Hispanic or Latino, 2% Black, and 3% were in two or more race categories.

The purpose of this study was to examine the process used by the PLC to pilot the integration of 21st Century Skills into CTE courses at the school.

The Process

Many factors were considered when putting this project together. A leading factor was the personal experience of the facilitator moving from teaching English in a comprehensive high school setting to working in the private sector, then to teaching in a skill center.

This experience created an awareness of the need for 21st Century Skills which grew when teachers started getting consistent feedback from the school's General Advisory Committee (GAC) that the young people coming to work for them were not ready or did not have the employability skills they needed to keep the jobs for which they were hired. Even the school's own teachers were getting more vocal about the lack of professional behavior in their classes. They were noticing an increase in their students' lack of problem solving and analytical skills. Students also didn't seem to understand the meaning of producing quality work for customers, and time management - including attendance.

A teacher coming from a traditional teaching background and having worked in a comprehensive high school, might expect teachers getting together to discuss policy, curriculum, student growth, lesson plans, and the like, but at the skill center there were not opportunities in the day for such activities, nor was there really a desire to make the time. Teachers did not see the need as they do not share students, and their content areas (with the exception of a few) were very different from each other. The administrative team strongly felt that this mindset was because the majority of the staff comes from an industry background instead of a teaching background. As such, the teachers sometimes have a hard time seeing that they still speak a common language.

To help their teaching practice and encourage student growth, the skills center leadership implemented PLCs. Before the school year began, each school leader created a PLC based on educational issues the team felt were important for both the growth of its teachers as well as its students. The teachers could then choose which one they wanted to be a part of, and it was from this process that the 21st Century Skills PLC was born.

In order to create a strong PLC and help guide its teachers, its leader needed a strong foundation of what PLCs are, as well as knowledge of the benefits and importance of teaching 21st Century Skills to high school students. Once the administrative team had the PLCs organized, the team decided how to best outline what 21st Century Skills needed assessing and developed clear rubrics that the teachers and students could understand and utilize in their classes.

The teachers also had familiarity with the Marzano framework used in Washington's Teacher/Principal Evaluation Program (TPEP), *Teaching & Assessing 21st Century Skills: The Classroom Strategies Series* (Marzano & Heflebower, 2012), which provided a resource in outlining teaching strategies. Information provided by the Partnership for 21st Century Skills (P21) (2007, 2008, 2009b) and Battelle for Kids (2019) along with information around building rubrics for quality assessment (Chowdhury, 2019; Wolf & Stevens, 2007) helped in creating the documents that became the focal point in working with teachers in the PLC.

An Action Plan

The research on PLCs first provided the foundation needed to help facilitate the PLC group. In order to help them implement the program, detailed rubrics were determined by the leadership team to be the best way to outline the expectations surrounding 21st Century Skills. Over the summer, school leaders worked to create the rubrics teachers and their students would use for assessment. To create the rubrics, the 21st Century Skills framework outlined by P21 were utilized. After a rough draft was prepared, it was shared with the school's General Advisory Council (GAC) for feedback. Feedback was solicited regarding what they were personally seeing from recent hires, and also what feedback they were receiving from their human resources departments and other members of management they worked with. The school's apprenticeship coordinator also reviewed the draft and shared what she was learning with the business partners who were actually working with the school's students in the field.

Then, definitions and criteria suited to the context were created. To assist with this, various components that make up a solid rubric were reviewed to help determine the best strategies for developing rubrics for the project (Chowdhury, 2019, p. 63). It was important that the 21st Century Skill rubrics presented to the PLC were detailed enough that both teachers and students could use them successfully as a form of assessment, as well as laid out in a way that was user-friendly and gave room for evidentiary support.

The rubrics were broken down into four sections that most aligned with both the feedback received and the research: Life and Career Skills that focused on attendance, participation, and overall professionalism, Communication and Collaboration Skills examined how they communicate and work with others in a team. Investigation and Problem Solving Skills addressed their analytical skills, and Quality and Craftsmanship Skills that were important to PLC teachers, whose students produced live work, as they helped students recognize quality products. These four sections each had their own criteria embedded in them that were created based on examples provided by P21, and 21st Century Skill research.

Project implementation in the participating teachers' classrooms was based on the teacher's style and their daily practices. The facilitator encouraged the participating teachers to do their instruction in both whole group and small group settings within their class environments, with analysis being on an individual basis with each student. Students had a chance to consistently assess their own progress and discuss it with the teacher at each grading period.

Data Collection

The facilitator collected data by providing agendas prior to every PLC meeting, then taking notes during meetings. After the meetings the facilitator would draft minutes of the meetings and distribute them to PLC teachers. Additionally, the facilitator kept a detailed journal throughout the project. In it she recorded her impressions, successes, and frustrations along with more details of the study.

Implementation

Initially, the facilitator sat down with the members of the PLC to introduce the topic. First the facilitator explained the elements of a PLC using the DuFour model (2004). The group decided on meeting norms as well as a schedule: the PLC would meet twice per month - the first meeting of the month to discuss the rubrics and corresponding research to the 21st Century Skill of focus. The second meeting would be to review progress and share lesson strategies on how each member was incorporating 21st Century Skills into their content areas (Appendix B is a table of the schedule and agenda) The hope was that teachers would integrate 21st Century Skills daily in their learning targets, but it was left up to teachers to outline what worked best.

To help understand what 21st Century Skills are, the PLC looked at the definitions of 21st Century Skills, the data put together by P21 (2007), and an outline of the framework from the MILE guide with ideas for implementation (Marzano & Heflebower, 2012; P21, 2009). The "Life and Career Skills" section of the rubrics was to be implemented throughout the project, but the PLC decided what other element to make the focus for each month. Data collection between the teacher and students happened each grading period, and teachers shared their data three times: the beginning of the year as a pre-assessment, at semester to check-in, and at the end of April. May's meeting was used to evaluate and reflect upon the process. Teachers also could use this study toward their student growth goal for their Teacher/Principal Evaluation Program (TPEP), the state of Washington's teacher evaluation protocol, as another way to keep them on track and focused on the project.

In October after teachers received notebooks for each student that contained the rubrics, the PLC established that students would assess themselves first using the rubrics in their notebooks, then meet with their teacher to review their status and discuss where they saw themselves according to the rubrics. This led to a discussion around rubrics and how they should be used.

Since the beginning of the school year is primarily focused on establishing class routines and creating a professional learning environment within those classrooms, teachers used the rubrics as examples when establishing classroom norms and used October as the point to collect their students' pre-assessment data. Data collection followed the assessment model: students assessed themselves first, followed by a teacher conference where the teacher examined their self-assessment and offered feedback to finally come to a consensus about where they fell in accordance to the rubric indicators.

In November, PLC meetings examined the pre-assessment data the teachers gathered. Following the Consultancy Protocol (Dunne, Evans, & Thompson-Grove, 2017), a form of questioning and analysis, the PLC delved deeper into the issues teachers were having. The facilitator structured conversations around formative assessment, lessons, and other classroom strategies that teachers were using as well as examples of student responses to those lessons to help give one another ideas to use in their own classes. After working through lesson examples, the PLC decided to focus their efforts on the Communication/Collaboration section of the rubrics. As an activity in the PLC, they looked at the OSPI resource guide and the teachers collaborated to modify a lesson example of their choosing.

In December, the facilitator wanted to emphasize to the teachers that they could integrate 21st Century Skills in their content learning target, or they could have more than one learning target - one that focused on the class curriculum, and one that focused on the 21st Century skill they were working on for the PLC.

After returning from winter break in January, the teachers in the PLC received a data template that they could use for pre-assessment, check-in, and post-assessment scores.

A decision was made that over the next few weeks, the facilitator would conduct individual meetings with the members of the PLC to check in with them and to see if there was anything they wanted observed in particular during end of semester learning walks. Also, the meetings provided an opportunity to see how the process was going in pulling together their mid-year data.

At the start of the new semester, the facilitator reminded teachers to have students reflect on the 21st Century Skills according to the rubric and have check-in conversations to assess their data.

When the PLC got together at the beginning of March they used the ATLAS Protocol (Buchovecky, 2017) to examine their mid-year data. This protocol was used because it allowed the group members to analyze and reflect on the data as it belonged to them. After looking through the data, the PLC decided to make a continued effort to integrate Life and Career skills, as well as, focus on Investigation and Problem Solving as sections of the 21st Century Skills rubric considered essential for continued growth. They decided on Life and Career Skills because the group felt that as their students were approaching graduation and the end of the year, employability and professionalism were areas that needed to be reinforced.

At the end of April, the facilitator received the final data from the PLC group members, and they began to discuss next steps in regards to the rubrics.

When the PLC met again in May, one of the teachers worked especially hard to analyze the rubrics and put them into a format that she felt would work well for everyone on staff. She sent it out early to the PLC members so they could look it over and add notes to it. The other teachers in the PLC were able to give their input. They came up with a consensus on the elements of the rubric so they could be revised and introduced to the rest of the staff at the beginning of next school year.

Assessment

Overall, student assessment was based on the feedback, reflection, and analysis between teachers and students. The teacher reviewed the rubric and the expectations of each category, the student assessed themselves when the teacher deemed it appropriate. Then the teacher analyzed the student's self-assessment in a conference format, coming up with a consensus of their progress as well as what they needed to focus on for improvement. Formative assessments on each skill category was at each teacher's discretion depending on what was appropriate within their CTE course. Pre-assessment data was taken toward the beginning of the year without any lessons or direction from the teacher to get a true sense of where the students were. Mid-year data was taken at the end of first semester to assess growth after some integration of 21st Century Skills lessons, and final assessment was taken in the spring to see how far the students had come.

Findings

The teachers didn't really have a cohesive idea about what a rubric should entail, thinking the rubrics they had been given had too much detail. When they examined the rubrics within the student notebooks that outlined the indicators for 21st Century Skills, part of the discussion had to be about rubrics themselves. The facilitator was able to reference the research, benefits, and examples of rubrics for the teachers to understand (Brookhart & Chen, 2014; Rusman & Dirkx, 2017). They also focused on developing student growth goals that could potentially align with their Professional Growth Plan for TPEP (the teacher evaluation process).

Early on, teachers seemed to really struggle with planning.. The teachers were focused on translating the rubric the students were using to the gradebook rather than looking at the rubrics as a formative process and tool for learning. To provide models for the teachers, the facilitator showed them examples of lesson plans and together they looked at a resource guide from the Office of Superintendent of Instruction (OSPI) (the State of Washington's department of education) that had lesson plan ideas in it (Oakshott, n.d.). They were then able to take the guide back to their classes and try some ideas out. This was a way for them to get comfortable with trying new ways of delivering information to their students. At the next meeting, the teachers provided feedback and discussed other ways to help with integration. Some came up with ideas on their own, and some used resources.

By December, finding ways to integrate 21st Century Skills remained an area of growth for the teachers. During this process, the lack of experience or understanding of some of the basic teaching fundamentals became clear. Even though the teachers in the PLC had been teaching their respective CTE subjects from three to ten years, it was evident that their teacher training was limited and those limitations had never fully been addressed.

Therefore, it was important to go back to basics in the elements of building a lesson plan and integrating the 21st Century Skills in that lesson plan. Led by the facilitator, the PLC practiced writing learning targets and together came up with a lesson plan based on one of their content areas using the OSPI resource guide utilized the previous month as a way to help them see it all tied together.

After the winter break, the facilitator and teachers reviewed the PLC process and talked about best ways to finish up the semester and meet with the students to review progress before final grades and data were submitted. The teachers seemed to really respond to the data template they could use for pre-assessment, check-in, and post-assessment scores and appreciated a uniform format for them to use so they could better track everything they were assessing.

After much discussion around the research of implementation and providing them with various lesson ideas, the teachers started to understand how to proceed. For example, in one of the PLC meetings the facilitator showed the teachers the video, *Austin's Butterfly* (EL Education, 2012), to help guide them in giving a lesson around Craftsmanship & Quality. After the video the PLC spent quite a bit of time discussing questioning strategies they could use with their students and came up with lesson ideas that could help them integrate the rubrics around "Revising Work" into their programs.

As the year progressed, the facilitator hoped that teaching 21st Century Skills didn't have to be a separate thing that the teachers did, but rather it would become integrated into what they were currently doing in their classes. Based on what they had worked on in November, December, and January with lesson plans, learning targets, and student activities, the facilitator was beginning to see integration of 21st Century Skills into lessons. The graphics teacher, for example, had extra copies of the Presentation rubric from the Communication and Collaboration section for all of her students so they could assess one another during oral presentations, and it became standard practice throughout the year.

At the end of April, the PLC members turned in the data they had compiled from their students. A detailed analysis of the data is topic for another article. To summarize, however, students did show significant growth in their employment ready skills. In fact, the vast majority of students (85%) finished with Average to Exemplary Employment Skills at the end of the study in all categories. Those who didn't seemed to have experienced issues related to personal matters, - revealing itself specifically in "Attendance & Participation", "Punctuality", and "Preparedness" sections of the Life and Career Skills data.

While the teachers made great progress in 21st Century Skill integration, once they began to focus on how to revise the rubrics for staff members to use in the future, the teachers again focused on the grade the students would get, not the growth or the lasting skills that will take students beyond high school. The facilitator had to spend time redirecting the teachers that the rubrics were a tool to help implement standards and indicators in their existing curriculum. They had not truly embraced that 21st Century Skills are not a stand-alone concept, although it could assist them if they decided to use it as an option for their professionalism grade in their classes. After much discussion, they were able to once again understand the use of rubrics. Although an ongoing process, the teachers demonstrated a growth in understanding of the purpose of implementing 21st Century Skills within the curriculum and using the rubric as a tool.

Discussion

21st Century Skills are an integral part of any CTE framework that is approved by the state, making it imperative that they are taught in Washington. 21st Century learning means that students master content while producing, synthesizing, and evaluating information using things like creativity, communication, and collaboration (P21, 2009b). Considering the importance of students understanding and demonstrating 21st Century Skills, especially in the CTE world, it was both the goal of the school and the facilitator's goal in working with the PLC that by the end of this school year, and therefore this pilot project, they develop a resource guide and clear rubrics that will help teachers schoolwide consciously integrate 21st Century Skills into their specific programs.

Professional learning communities can have a profound impact on the structure and culture of schools (DuFour, 2004). Overall, the teachers in the PLC experienced significant growth during the year. At times, however, helping them to understand, implement and integrate 21st Century Skills was the biggest challenge of the study. They had a hard time disassociating the scores on the rubric from a letter grade in their grade book, and it took quite some time for them to grasp the concept of integrating the 21st Century Skills within their existing assignments and curriculum versus treating them as a separate entity.

Recognizing integration issues in this study is crucial in preparing to expand efforts to teach and integrate 21st Century Skills throughout the school in the near future. Teachers sometimes don't like veering away from their comfort zone or to being challenged to do things differently than what they feel they are already doing well. However, as teachers in the PLC practiced strategies in their own classes, they became more receptive and eager to see the growth in their data, and school leaders were just as eager to see the growth in the participating teachers as educators.

Implications

The cumulative data collected from these teachers, as well as the feedback received from teachers in PLC meetings, will be used to implement a school-wide resource guide for 21st Century Skills that teachers can use in the future to better assess the skills that are integrated in each of their frameworks. A great deal of conversation and work needs to take place to move forward to the next phase. Those who facilitate efforts in the future must be prepared for resistance to efforts to help teachers incorporate changes related to 21st Century Skills. Part of that process must be to spend quality professional development time on rubrics - how to read them, develop them, and use them, not just with the 21st Century Skills, but also have teachers use them more in their everyday practice and assessments.

One important lesson when engaged in a new educational venture is to understand that even though teachers don't look like the students they teach on a normal day, they are still learners and need to be provided any resource available to help them understand the elements of 21st Century Skills and how to integrate them.

Another thing to keep in mind is that the teachers in this study were volunteers who were interested in learning and trying to integrate 21st Century Skills and they still struggled. In future endeavors where teachers are asked, or required, to participate in the process of integrating 21st Century Skills into their content areas, facilitators must help their teachers gain the skills and confidence to effectively prepare their students.

Serious consideration should be given to the appropriate format for efforts moving forward. The PLC model anticipates active participation and collaboration from its members. If the skill level or size of the group does not lend itself to a PLC, those considering an expanded effort may consider a different form of professional development such as a series of workshops led by a trainer experienced in integrating 21st Century Skills into CTE classes.

Conclusion

Using the PLC model, the group was able to practice the integration and assessment of 21st Century Skills in the CTE classroom using detailed rubrics. These rubrics were created using feedback from community members and the Partnership for 21st Century Skills and other research (Battelle for Kids, 2019; P21, 2007; Wagner, 2008; Casner-Lotto et al., 2006; Greenstein, 2012; Bialik & Fadel, 2015; Trilling & Fadel, 2009). The rubrics offered specific points that students and teachers could analyze when examining performance from the beginning of the school year up until the end. While there was significant student growth in these 21st Century Skills, even at the last meeting it was evident that several of the teachers did not fully connect how the lessons in their curricula are the primary vehicles to cultivating 21st Century Skills and learning for their students. Instead, they still fell back on the notion that the two were separate.

Ultimately, the effective instructional practices that help students understand 21st Century Skills fall on the classroom teacher. Their learning environments and program content are where learning opportunities that incorporate the critical skills such as problem solving, critical thinking and collaborating in a relevant context are designed. As the school progresses to full school implementation of 21st Century Skills, perhaps school leadership should investigate what other types of professional development programs - other than a PLC - can be used to educate the school's teachers. Of special interest is helping those teachers who came straight from industry without a traditional teacher preparation program so they can learn the pedagogical skills needed to progress effectively in implementing the 21st Century educational framework within their content areas.

High school students, especially CTE students who are likely to enter the workforce directly, need 21st Century Skills. Unfortunately, many students do not have them, so CTE teachers, whether in skills centers or comprehensive high schools, must make sure their students learn them. The development of rubrics for students and teachers to use in learning and assessing identifiable skills are useful instruments to guide instruction. Teachers responsible for delivering instruction must know how to use the rubrics and integrate the 21st Century Skills into their content courses. In order to do this, teachers need to develop skills of their own.

Educators need to be strong models of the integration of 21st Century Skills, especially in the CTE world because the students they work with are gaining skills for industry certification and potential employment after high school. For school leaders in the Career and Technical Education field, finding the best ways to prepare teachers and communicate 21st Century Skills to them and their students is essential in this growing and changing world. Leaders can bring their teachers along so they can truly buy in to the importance of not just teaching their students 21st Century Skills, but becoming proficient in modeling, practicing and implementing them in their classes, as well.

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Appendix A



The rainbow represents the skills, knowledge and expertise students should master to succeed in work and life in the 21st century. The Partnership for 21st Century Skills has identified five critical support systems that ensure student mastery of 21st Century Skills:

- 21st Century Standards
- Assessment of 21st Century Skills
- 21st Century Curriculum and Instruction
- 21st Century Professional Development
- 21st Century Learning Environment

(Battelle for Kids, 2019)

Appendix B

PLC Schedule

Date	Time	Topics	Teacher Outcomes
10/1/18	3-4 pm	<ul style="list-style-type: none"> ● What is a PLC? ● Review & Discuss article by Rick DuFour ● Evaluation of Current 21st century Skills Curriculum ● Team Growth Goal Set ● Focus on Collaboration & Communication ● Utilize the rubric for pre- and post-assessment 	<p>Become familiar with the purpose and functions of a PLC Create a team SGG Know & use rubrics to assess student understanding and skills</p>
11/5/18	3-4 pm	<ul style="list-style-type: none"> ● Use Consultancy Protocol to share student data and provide teacher feedback ● Read and discuss article from Expeditionary Learning about Descriptive Feedback 	<p>Participate in critical discussion to provide peer feedback Know & use rubrics to assess student understanding and skills</p>
12/3/18	3-4 pm	<ul style="list-style-type: none"> ● Use Consultancy Protocol to share student data and provide teacher feedback ● Read and discuss article: "Community-Based Learning: Engaging Student for Success and Citizenship" 	<p>Participate in critical discussion to provide peer feedback Know & use rubrics to assess student understanding and skills</p>
1/7/19	3-4 pm	<ul style="list-style-type: none"> ● Use Atlas Protocol to review first semester achievement data ● Norm grading as a team 	<p>Debrief new instructional strategies used this semester Revisions to second semester Syllabi as needed Update SGG PLC data & plan</p>

2/4/19	3-4 pm	<ul style="list-style-type: none"> ● Use Consultancy Protocol to share student data and provide teacher feedback ● Feb. focus on Goal Setting <p>Read & discuss article from CETL titled “Authentic Activities, Assessment and Rubrics”</p>	<p>Participate in critical discussion to provide peer feedback</p> <p>Know & use rubrics to assess student understanding and skills</p>
3/4/19	3-4 pm	<ul style="list-style-type: none"> ● Use Consultancy Protocol to share student data and provide teacher feedback ● March focus on Employability Skills ● Read & discuss article from CETL titled “Authentic Activities, Assessment and Rubrics” 	<p>Participate in critical discussion to provide peer feedback</p> <p>Know & use rubrics to assess student understanding and skills</p>
4/8/19	3-4 pm	<ul style="list-style-type: none"> ● Use Consultancy Protocol to share student data and provide teacher feedback ● April focus on Problem Solving & Creative Thinking ● Read & discuss article from Brooking Institute titled “Teaching problem solving Let students get stuck and unstuck” 	<p>Participate in critical discussion to provide peer feedback</p> <p>Know & use rubrics to assess student understanding and skills</p>
5/5/19	3-4 pm	<ul style="list-style-type: none"> ● Use Atlas Protocol to evaluate year-long student growth using rubrics ● Discuss and revise exit targets ● Discuss and revise rubrics ● Read and discuss the article from Expeditionary Learning titled “Celebrations of Learning: Why This Practice Matters”. 	<p>Develop a plan for following school year</p> <p>Finalize rubric revisions for 19-20 school year</p> <p>Develop a plan to Celebrate Student Learning in your class – focus on student voice</p>