

Twenty-first Century Skills: Preparing High School Graduates for Success  
Through a Senior Project

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### **ABSTRACT**

Twenty-first century skills are important for secondary students to experience during school. The purpose of this qualitative study was to gauge the perception of senior students regarding their exposure to the Virginia 5C's (5C's) and the 21st century skills through a senior project experience. The central research question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills? According to the Virginia Board of Education, the 5C's (critical thinking, creative thinking, collaboration, communication, and citizenship) are essential for every public high school student to learn. The 5C's have been incorporated into all public high schools in Virginia, beginning with the freshmen class of 2018-2019. Information was gathered to identify improvements that could be made to a senior project at a public secondary school to determine if 21st century skills and the 5C's were exposed. The senior project coursework included an introduction to 21st century skills and the 5C's, resume workshop, interview training, and an actual interview. Seniors worked 30 minutes each day with an instructor that totaled 2 hours for the senior project experience. After completion of the senior project, 22 students voluntarily completed an electronic survey that contained 12 questions. Results were analyzed and four specific findings were evident. Participants agreed that the senior project exposed them to the 21st century skills and the 5C's. Although the researcher could not prove that the students are better prepared for post-graduation because of the senior project,

participants agreed to the survey question that the senior project helped better prepare them for post-graduation. Also the participants agreed that they enjoyed the senior project overall. The results of this study could support leaders with implementing a senior project if the desired outcome is for students to gain knowledge of the 5C's and 21st century skills.

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### **GENERAL AUDIENCE ABSTRACT**

Twenty-first century skills are important for secondary students to experience during school. The purpose of this qualitative study was to gauge the perception of senior students regarding their exposure to the Virginia 5C's (5C's) and the 21st century skills through a senior project experience. The central research question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills? According to the Virginia Board of Education, the 5C's (critical thinking, creative thinking, collaboration, communication, and citizenship) are essential for every public high school student to learn. The 5C's have been incorporated into all public high schools in Virginia, beginning with the freshmen class of 2018-2019. Information was gathered to identify improvements that could be made to a senior project at a public secondary school in the western portion of Virginia to determine if 21st century skills and the 5C's were successfully addressed. After completion of the senior project, 22 students voluntarily completed an electronic survey that contained 12 questions. Results were analyzed and it was found that the overall senior project experience exposed students to the 5C's and 21st century skills. Although the researcher could not prove that the students are better prepared for post-graduation because of the senior project, participants agreed to the survey question that the senior project helped better prepare them for post-graduation. Also the participants agreed that they enjoyed the senior project overall.

## **Dedication**

I dedicate this paper to my wonderful wife Sarah and the four amazing children we are blessed to raise in this world- Adelyn, Case, Crew, and Wells.

I also dedicate this paper to my late father and my mother, James and Brenda Nycum, and to my amazing grandparents, Donald and Betty Allanson.

## Acknowledgements

I am grateful to my wife, Sarah, and our children for the love and support they have shown over the past three years to make this work possible. Adelyn, Case, Crew, and Wells all have amazing talents and as your parents we cannot wait to see how each of you grow and mature into fine adults to contribute to our society. Thank you for allowing me to miss your little league games, practices, and school events to work on this study. The last time I told my children that I was going to finish my paper, that I have been working on for three years, they responded, “Good grief, what have you been doing dad?” I had to smile.

To my mother- thank you for always pushing me to go further with my education and supporting me along the way. Your love and support will never be forgotten, and you were an inspiration leading the way with education in our family. Dad, I bet you never thought I would take education so serious and now completing a doctorate degree. I hope you are smiling down on us all and are proud.

My grandparents, you both agreed to help me get started with this journey and continued to support me along the way with encouragement. Your love to each other and your entire family is an inspiration to all of your grandchildren/great-grandchildren. We all hope to be as supporting and loving to our families as you have been to all of us. Thank you.

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## Table of Contents

ABSTRACT.....	ii
GENERAL AUDIENCE ABSTRACT.....	iv
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
LIST OF TABLES.....	xi
LIST OF FIGURES.....	xii
Chapter 1: Introduction to the Study.....	1
Overview of the Study.....	1
Statement of the Problem.....	2
Significance of the Study.....	2
Purpose of the Study.....	4
Research Question.....	4
Definitions of Terms.....	4
Limitations.....	5
Organization of the Study.....	5
Summary.....	6
Chapter 2: Review of the Literature.....	7
Introduction.....	7
Literature Search and Review Process.....	8
Synthesis of Literature.....	8
Importance of 21st Century Skills.....	8

<i>Profile of a Virginia Graduate</i> .....	14
The 5C's of <i>The Profile of a Virginia Graduate</i> .....	19
Correlating the 5C's and 21st Century Skills with <i>The Profile</i> .....	22
Summary .....	29
Chapter 3: Methodology .....	30
Introduction.....	30
Research Design.....	31
Research Design Justification .....	35
Research Question .....	36
Study Setting.....	36
Selection of Participants .....	36
Data Collection Procedures.....	37
Study Approval Process and Timeline.....	37
Instrument Design and Validation .....	38
Data Treatment and Management.....	40
Data Analysis .....	41
Summary .....	41
Chapter 4: Data Analysis and Findings .....	43
Introduction.....	43
Analysis of Survey Questions.....	43
Research Question Summary.....	64
Chapter 5: Findings, Implications, and Conclusion.....	66
Introduction.....	66

Overview of Findings .....	66
Discussion of the Findings.....	66
Practitioner Implications.....	73
Policy Implications .....	75
Conclusion .....	75
Recommendations for Future Research.....	75
Researcher Reflections.....	76
References.....	79
Appendices.....	85
A: Table of Sources .....	85
B: Survey Question Sources .....	97
C: CITI Program Certificate .....	99
D: Permission Letter .....	100
E: Survey Protocol .....	102
F: IRB Approval Letter.....	104

**List of Tables**

Table 1: Electronic Survey Protocol.....	39
Table 2: Survey Question 3.....	45
Table 3: Survey Question 4.....	47
Table 4: Survey Question 5.....	49
Table 5: Survey Question 6.....	51
Table 6: Survey Question 7.....	53
Table 7: Survey Question 8.....	55
Table 8: Survey Question 9.....	57
Table 9: Survey Question 10.....	59
Table 10: Survey Question 11.....	61
Table 11: Survey Question 12.....	63

## List of Figures

Figure 1: *Framework for 21st -century learning definitions*. (Battelle for Kids, 2019).  
<https://www.battelleforkids.org/networks/p21/frameworks-resources>. Permission granted informally from the Battelle for Kids office to use Figure 1 image for educational purposes .....14

Figure 2: *The four domains in K-12 Education*. (VDOE, 2016). Permission granted informally from the office of the VDOE to use Figure 2 image.....17

Figure 3: *The four domains of The Profile of a Virginia Graduate*. (VDOE, 2016). Permission granted informally from the office of the VDOE to use Figure 3 image.....18

## Chapter 1: Introduction to the Study

### Overview of the Study

This study focused on 21st century skills, Virginia 5C's (5C's), *The Profile of a Virginia Graduate (The Profile)*, and the perception of students who participated in a senior project at a rural secondary public school in Virginia. The central research question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills? In 2018, a statewide policy required all teachers in K-12 public schools to teach 21st century skills (VBOE, 2017). After receiving feedback from various stakeholders, the VBOE provided four skills that were deemed particularly relevant to K-12 education in Virginia: critical thinking, communication, collaboration, and creativity. Later, the VBOE added "citizenship" as a fifth skill necessary for success in an evolving Virginia economy, which led to the initiative being called the 5C's (Naff, 2016). According to *The Glossary of Education Reform* (2016), specific character traits are commonly associated with 21st century skills: critical thinking, creativity, oral and written communication, and leadership/teamwork/collaboration.

This study could be extended beyond the school site, as the findings could be useful to other secondary administrators and educators considering the implementation of a senior project. The purpose behind the senior project was to expose students to 21st century skills and the 5C's so that they would have a better understanding of the VDOE requirements before graduating high school and entering the workforce, enrolling in higher education, or enlisting in the military. This study could also contribute to the literature around 21st century skills, the 5C's, and *The Profile* while evaluating the senior project. It is the hope that this study will have a local, state-wide, and national influence as it offers tangible strategies to improve the secondary education

experience for students, as well as a project that exposed students to the 5C's and 21st century skills.

### **Statement of the Problem**

Secondary schools need to embed 21st century skills into the core curriculum and the order in which these skills are taught does matter (VDOE, 2016). For instance, communication is foundational for developing the higher sophisticated, complex soft skills like problem-solving, critical thinking, risk-taking, and stress management (Jacobson-Lundeberg, 2016; Rios et al., 2020). *The Glossary of Education Reform* (2016) states that “21st century skills can be applied in all subject areas, and in all educational, career, and civic settings throughout a student’s life” (p. 1). Indeed, 21st century skills are applicable across all fields; in all educational, professional, and community settings; and across the life span, from childhood to adulthood. It is essential that students learn to communicate, to collaborate, and to think creatively and critically.

### **Significance of the Study**

*The Profile* and the 5C's are recommendations from the Virginia Department of Education (VDOE), and both recommendations have recently increased their emphasis on 21st century skills. Today's employers expect young adults to be equipped with 21st century skills, career-readiness, and citizenship skills (Davis, 2016). Considering the demands of the modern workforce, it is imperative that schools adapt and improve their methods of preparing students for life beyond high school. Regardless of the pathway that students choose—workforce, military, or higher education—the responsibility falls on schools to prepare students for post-secondary success. With the new *Profile* and the 5C's legislation, educational leaders now have a more specific framework and expectations for equipping students with 21st century skills, rather than having a singular focus on content-oriented learning.

According to Wagner (2008), with so many jobs being either automated or “off-shored,” students should be prepared with a different set of skills and competencies to meet employer’s demands. The reality that Wagner found in 2008 was that even in high-performing schools in well-resourced suburban districts; the learning being offered there was not keeping pace with evolving employer demands. A key finding was that business leaders and employers are less concerned with mastery of discrete academic content and are more interested in employees who excel at tasks that require higher order thinking skills like communication, collaboration, and critical thinking (Wagner, 2008).

To better prepare students to meet the demands of the evolving job market, public secondary schools need to embed 21st century skills into the core curriculum and the order in which these skills are taught does matter (VDOE, 2016). Effective communication is essential for another foundational skill which is collaboration. The collaboration process is highly complex, requiring individuals to exchange ideas and reach a shared understanding to progress towards the completion of shared goals, which is essential for productivity (Jacobson-Lundeberg, 2016; Kent & Cukurova, 2020). Indeed, collaboration and teamwork are essential skills for inventing and improving modern tools, services and products, and for tackling the complex challenges that the 21st century poses.

State-wide, educational goals and policies have undergone changes to emphasize the skills highlighted above. This is shown through the identification of the 5C’s: critical thinking, creative thinking, collaboration, communication, and citizenship (Beck, 2020; VBOE, 2017; VDOE, 2016, 2020). The Virginia Board of Education (VBOE) also emphasizes these skills in their comprehensive plan (VBOE, 2016). In 2014, the General Assembly of Virginia created the Standards of Learning Innovation Committee (SOLIC) and used it to assist with issues brought

forth by employers (Beck, 2020). This committee composed of various education stakeholders including corporate leaders, members of various school boards, school administrators, and teachers. In light of the changing workforce, the committee developed a skills profile with dispositions that all Virginia graduates would need for a successful post-secondary transition, which became known as *The Profile of a Graduate* (VBOE, 2016).

### **Purpose of the Study**

The purpose of this qualitative study was to gauge the perception of senior students regarding their exposure to the Virginia 5C's (5C's) and the 21st century skills through a senior project experience. The Virginia Department of Education created *The Profile* draft work in 2016 and *The Profile* went into effect for freshman entering public high schools in the fall of 2018, or the graduation class of 2022. The reason that the senior project was established was to have all senior students exposed to the 5C's within *The Profile*. There is such a strong correlation with the 5C's and the 21st century skills that the researcher wanted to include these as well. As a practitioner, the researcher believes that students are not being exposed to 21st century skills and the 5C's so the senior project was established. The researcher wanted the perceptions of the participants to determine if they were exposed to the 5Cs and the 21st century skills.

### **Research Question**

The research question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills?

### **Definitions of Terms**

The 21st century skills, the 5C's, and *The Profile* may be understood as distinct entities. However, their components overlap and include inextricably related concepts.

*Twenty-first century skills* refer to a set of knowledge, skills, work habits, and character traits that are believed by school reformers, educators, employers, and others to be important to success in today's world, particularly in new careers, and the workplaces (*The Glossary of Education Reform*, 2016).

The *5C's*, critical thinking, creative thinking, collaboration, communication, and citizenship are the Virginia Board of Education's original version of the *5C's* (VBOE, 2016).

*The Profile* describes the knowledge, skills, experiences, and attributes that students must attain to be successful in college and/or the workforce and be "life ready" (VDOE, 2020).

### **Limitations**

This study is limited to one public secondary school in Virginia. It captures the perspectives of seniors who participated in a senior project during the fall of the 2021-2022 school year and not the views of any other stakeholders such as teachers. The senior project consisted of a four-day program that focused on eight to eleven seniors weekly over 17 weeks. The time requirement was 30 minutes each day, totaling two hours, with the instruction being delivered from a business teacher. Details of the senior project can be found in the research design section of chapter three of this paper.

Another limitation is that the researcher is currently serving as head principal of the school where the study was conducted. In order to reduce bias, an anonymous, voluntary electronic survey was used for the student to decide whether to participate without an obligation.

### **Organization of the Study**

Chapter one describes the overall purpose and reason for this study. Chapter two provides a review of relevant literature regarding 21st century skills, the *5C's*, and *The Profile*. While this review is comprehensive, it is not exhaustive, especially considering the limited research on the

correlation across the three initiatives. Chapter three outlines the methodology of the study including data collection procedures, participants, setting, and data analysis. Chapter four gives a detailed overview of the findings of the study. Bar graph charts as well as descriptive statistic percentages were used from Qualtrics to give visuals to readers. Chapter five explains the findings of this study and includes recommendations for future studies.

### **Summary**

In conclusion, the study focused on whether 21st century skills, the 5C's, and *The Profile* initiatives were implemented through a senior project at a public high school in Virginia. Regardless of the pathway that students choose—workforce, military, or higher education—it is the schools' responsibility to prepare students for post-secondary experiences. Results from this study could provide valuable information for school divisions, administrators, or other professionals in the education field searching for initiatives to further include the 21st century skills, the 5C's, and *The Profile* platform.

## Chapter 2: Review of the Literature

### Introduction

In light of the researcher's aims, it is essential to understand the history and rationale for the 21st century skills, the Virginia 5C's (5C's), and *The Profile of a Virginia Graduate (The Profile)* initiatives, specifically in the context of public education in Virginia. The purpose of this literature review was to indicate an overlap between 21st century skills, the 5C's, and the Virginia Department of Education's (VDOE) recommended high school graduate initiative, *The Profile*. Based on the literature, the 5C's and 21st century skills' framework for education in Virginia schools is anticipated to equip students with relevant skills for career development and post high school success. The following research question guided this literature review, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills?

Throughout the 21st century, there has been a steady transition from commodity-oriented to human capital-centered development. Van Laar et al. (2020) noted that while multiple factors have been responsible for expanding production, an emphasis on human capital has led to the most significant gains in productivity. Arguably more important than increasing workforce productivity, this shift provided numerous career development opportunities and directly benefited employees (Van Laar et al., 2020). Working professionals are now incentivized to continually improve their profiles in order to increase their competitiveness and achieve career growth (Van Laar et al., 2020). Another notable change in the career landscape is the rapid emergence of technology which has revolutionized the workforce across all sectors: Instead of

prioritizing manual labor, which has historically been the dominant means of production, employees are now incentivized to cultivate other skills (Fletcher & Tyson, 2017).

### **Literature Search and Review Process**

This literature search was completed between September 2020 and January 2022 using the Virginia Tech Online Library. From searching the phrase *21st and twenty-first century skills* on EBSCOhost, there were 2,139 results. The search terms *High school* and *secondary education* yielded 941 results. Four VDOE sources were reviewed on *The Profile* as well as for the expectations set for K-12 public schools across the Commonwealth. The main source was the 2016 proposal from the VBOE on *The Profile of a Virginia Graduate* and the 5C's. This review includes 26 peer-reviewed sources about *21st century skills*, which were collectively obtained from the databases EBSCOhost, ProQuest, and Google Scholar. An additional 20 sources (Internet reports, organizations, dissertations, etc.) enhanced the researcher's understanding of *21st century skills*, preparation for the workforce after graduation, project-based learning, and employer perspectives. A total of 46 sources were used for this literature review.

### **Syntheses of Literature**

Researching *The Profile* led to an in-depth search of the 5C's. According to the VDOE (2016) and *The Profile*, the 5C's are *critical thinking, creative thinking, collaboration, communication, and citizenship*. The 5C's and *The Profile* terms were chosen to be searched to help determine the extent to which public schools prepare students for the present era through three key initiatives: the *21st century skills*, 5C's, and *The Profile*. The literature was synthesized and related to these initiatives through a Table of Sources (see Appendix A).

### **Importance of 21st Century Skills**

Technology and globalization have abounded in the 21st century. In the past two decades, production has shifted from labor-intensive to technology-oriented manufacturing (Van Laar, et al., 2020). However, production is still reliant on human beings harnessing and applying the emerging technology. Students today are no longer the population of people that our educational system was designed to teach. Current primary and secondary students represent the first generations to grow up and be actively involved with the new digital technologies (Sahin, 2009). Globalization has also triggered the influx of people seeking improved educational and career opportunities. With the shifting landscape of the workforce, employees must be equipped with the necessary skills to meet demands of the changing landscape. The employee preparation should emphasize 21st century skills, and this preparation for diverse workplaces and surroundings needs to start in high school.

In 2018, a statewide policy required all teachers in K-12 public schools to teach 21st century skills (VBOE, 2017). After receiving feedback from various stakeholders, the VBOE provided four skills that were deemed particularly relevant to K-12 education in Virginia: critical thinking, communication, collaboration, and creativity. Later, the VBOE added “citizenship” as a fifth skill necessary for success in an evolving Virginia economy, which led to the initiative being called the 5C’s (Naff, 2016).

The 21st century critical thinking, communication, and collaboration are distinct in relation to the work skills emphasized in the 20th century. In a speech given to the US Hispanic Chamber of Commerce in 2009, President Obama highlighted this shift, saying:

I am calling on our nation’s governors and state education chiefs to develop standards and assessments that don’t simply measure whether students can fill in a bubble on a test,

but whether they possess 21st century skills like problem-solving and critical thinking, entrepreneurship, and creativity. (CBS, 2009)

The term 21st century skills refers to a broad set of knowledge, technological skills, soft skills, character traits, and work habits that are critically important to succeed in today's world (Davis, 2016; Jacobson-Lundeberg, 2016; Rios et al., 2020; Trilling & Hood, 1999; Wagner, 2008). With regards to this, The Partnership for 21st Century Skills (P21, 2017) is a joint government-corporate partnership that emphasizes the importance of three types of skills: 1) learning skills which include innovation and creativity; 2) critical thinking and problem-solving; communication and collaboration, and literacy skills, which include information literacy, media literacy, and information and communications technology literacy; and 3) life skills, which is a broad umbrella of skills including flexibility, initiative, cross-cultural skills, productivity, accountability, and leadership. P21 has defined 21st century skills as the knowledge, skills, and expertise students should master to succeed in work and life in the present century (Battelle for Kids, 2019). This review explored the extent to which public schools are preparing students successfully in relation to the P21's conceptualization of 21st century skills.

There is a launch to prioritize these skills, which is typically motivated by the belief that all students should be equipped with the knowledge, skills, work habits, and character traits they will need to pursue continued education and careers after graduation (Davis, 2016; Rios et al., 2020). *The Glossary of Education Reform* (2016) states: "21st century skills can be applied in all subject areas, and in all educational, career, and civic settings throughout a student's life" (p. 1). In other words, 21st century skills can be applied in all branches of knowledge and in all instructive, professional and community settings across the lifespan.

Though relatively recently defined, the 21st century skills can certainly be taught and embedded in the core curriculum. Incorporating 21st century skills such as communication and collaboration is necessary and timely. According to Jacobson-Lundeberg (2016), students correlate their personal experiences with 21st century skills to an increase in confidence, self-efficacy, and credibility. The context for Jacobsen-Lundeberg's (2016) study was a program called Business United in Investing, Lending, and Developing, or BUILD, that was designed to provide both academic and personal skills for a specific population. This intervention program targeted socioeconomically disadvantaged (SED) subgroups beginning in a 9th grade entrepreneurship course. In grades 10-12, the intervention setting transitioned to an afterschool program with an emphasis on entrepreneurship, 21st century skills, and academic achievement with a strong college focus. Jacobson-Lundeberg (2016) observed this personal development education (PDE) program, gathered student voices and perceptions about PDE, and analyzed the findings. Participants shared their stories of personal transformation through 24 informal interviews and four focus groups with questions drawing out the impact of the learning experience on them. The interview data emphasized the value, effect, outcomes, and issues surrounding PDE (Jacobson-Lundeberg, 2016). This qualitative inquiry demonstrated the impact of intentionally teaching 21st century skills like communication and collaboration.

Communication is a skill that enables the acquisition of other 21st century skills including critical thinking, problem-solving, stress management, and risk-taking (Jacobson-Lundeberg, 2016; Rios et al., 2020). Communication is powerful and holds immense power in the development of successful human relations (Jacobson-Lundeberg, 2016; Trilling & Hood, 1999). Competent 21st century employees need to have effective oral and written communication skills, including communications through various media resources targeting

diverse audiences. In most instances, for communication to be effective, collaboration is a key factor as well.

Collaboration is about interacting with others to apply knowledge and reach a shared understanding. Although it is challenging to grasp initially, it is foundational for other 21st century skills (Jacobson-Lundeberg, 2016; Kent & Cukurova, 2020). On the other hand, teamwork and pooling multiple talents are essential for success: they are often the only choice for solving complex problems or creating complex tools, services, and products to solve these problems. To function interdependently, employees need a clear understanding of their own roles and those of their collaborators (Van Laar et al., 2020). In a qualitative study, Wagner (2008) found that business leaders and employers are less concerned with academic content than they are with critical thinking, communication skills, and collaboration. Insights about employer expectations came from several hundred leaders in business, nonprofit, philanthropic, and education settings. With a clearer picture of the skills young people need to satisfy employer demands, the author then set out to learn whether United States schools are teaching and testing those high-demand skills. Through observations of highly regarded suburban schools, Wagner (2008) found that even the top schools in the United States have room for growth in terms of teaching 21st century skills.

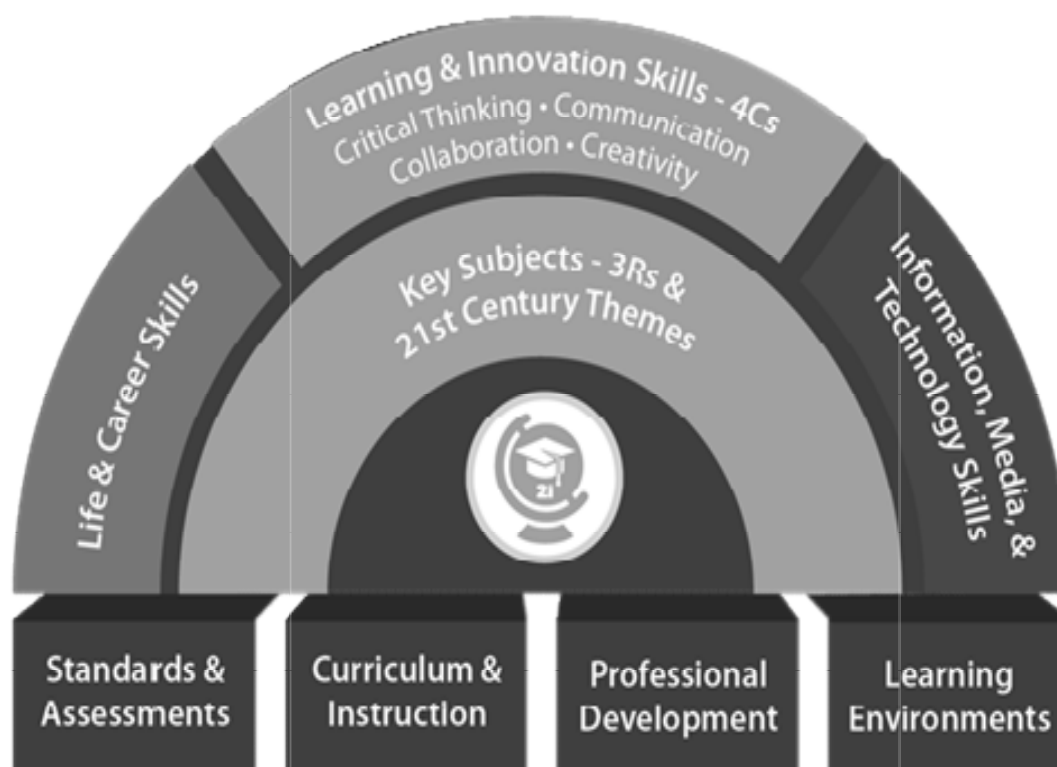
The students' learning 21st century skills is a must to promote an overall effective workforce with preparedness (Darling-Hammond & Adamson, 2010; Davis, 2016; Wagner, 2008; Zhao, 2015). The time is long past that educators should only focus their instruction on individuals who plan to work on assembly lines and other routine jobs which required only basic and standardized knowledge and skills (Zhao, 2015). According to Davis (2016), modern employers demand that today's young adults are equipped with 21st century skills because they

are linked to both productivity and citizenship. Students need to be able to find, evaluate, synthesize, and use knowledge in new contexts, frame and solve novel problems, and produce research findings and solutions (Darling-Hammond & Adamson, 2010).

Rios et al. (2020) ranked 21st century skills by importance from the employer's perspective, including perspectives from across the United Kingdom, the United States, and Europe. The authors found that communication skills, problem solving skills, and collaboration were in wide demand across geographically diverse business employers. The researchers' analysis of 142,000 job advertisements yielded two research contributions. First, this study was one of the first to rank order skills by demand. By doing this, it was clear that written and oral communication, problem solving, and collaboration skills were in high demand by employers, with an emphasis on the pairing of written and oral communication. Also, this study examined whether or not the 21st century skills demand varied by actual job characteristics, which was found to be true with differences in both the education level and the degree field requirements. These results were from a sample of roughly 120,000 job advertisements collected for one year from initial data collection. The findings supported decades of research done by both academics and employers prior to the 21st century, indicating that these skills are important for workplace success.

Figure 1 below shows how P21's Framework for 21st Century Learning was developed with input from educators, training specialists, and business pioneers. The framework goal was to characterize and represent the abilities and information needed to prevail in work and life as well as the emotionally supportive networks that are important for 21st century learning results. Twenty-first century skills have been utilized by a large number of instructors and many schools in the United States are now starting to put these skills at the focal point of learning.

Figure 1

*Framework for 21st -Century Learning Definitions*

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***Profile of a Virginia Graduate***

Without 21st century skills, students may not be fully prepared for college or the workforce. Education should focus on the transmission of content knowledge and on the 21st century skills (Beck, 2020; VBOE, 2017; VDOE, 2016, 2020). These are the same skills the VBOE (2017) emphasizes in its comprehensive plan.

It was in this regard the Standards of Learning Innovation Committee (SOLIC) was formed in 2014. This committee composed of various education stakeholders including corporate leaders, members of various school boards, school administrators, and teachers. The committee

developed a skills profile including dispositions that all Virginia graduates would need to transition from secondary school to post-secondary opportunities, in light of the evolving needs of the workforce (VBOE, 2016). The findings of this committee became known as *The Profile of a Virginia Graduate*.

The General Assembly passed section 22.1-253.13:4 of the Code of Virginia in 2016. This required the VBOE to create *The Profile*. *The Profile* identifies the skills and knowledge that all students should master during their high school career in order to be successful contributors to the economy of the Commonwealth, giving consideration to the 5C's (VBOE, 2017). In developing *The Profile*, the VDOE (2016) acknowledged the challenges of making significant changes in the delivery of education across Virginia. Nevertheless, the VBOE (VBOE, 2016) felt *The Profile* would be necessary to promote holistic student development, and to foster excellence beyond the classroom.

Importantly, the VDOE envisioned that *The Profile* would not be static but dynamic. Indeed, *The Profile* was created with the intention of that it would be regularly refined to match the prevailing job market's expectations. *The Profile* describes the skills, knowledge, experiences and competencies that students should attain during their K-12 education in order to make them "life ready", not only for post-secondary opportunities, but also for success across their lifetime.

According to the House and Senate Bills, public schools across the Commonwealth of Virginia should embrace the new framework and implement *The Profile* since it was adopted as legislation "to redefine the expectations of high school graduates in the Commonwealth" (p. 3). *The Profile* also considers "the 5C's; the development of core skills sets in the early years of high school; and provision for multiple paths toward college and career readiness, with opportunities for internships, externships, and credentialing" (VDOE, 2016, p. 3). These re-

defined high school graduation requirements were to be ready by 2018 for all Virginia public schools.

Based on current estimates from the VDOE (2016), by 2021, about 500,000 new jobs will be created in Virginia. Many of these will be in scientific, technical, or healthcare areas. After discussion with the military and businesses about work-ready skills and knowledge, the VDOE generated lists that included interpersonal skills, communication, responsibility, innovation, and problem-solving as areas that needed focus (2016). The 2016, *The Profile*, mandate is ultimately consistent with Virginia's desire to align educational and academic priorities with the needs of all employers to supply students with skills they will need to thrive in a more diverse 21st century economy (VBOE, 2017).

After meeting with stakeholders, the VDOE (2016) decided that each Virginia high school graduate should be able to:

Achieve and apply appropriate academic knowledge; align knowledge, skills, and personal interests with career opportunities; attain and demonstrate productive workplace skills, qualities, and behaviors; value and build connections with diverse communities; and understand personal and civic responsibility (p. 2).

Upon discussion, the 5C's were officially implemented. The VDOE's (2016) *The Profile* draft presented descriptions of the competencies that every high school graduate should obtain during their four years of high school: workplace skills, content knowledge, community engagement, career exploration, and civic responsibility. In addition to the VBOE, the SOLIC provided support for the development of *The Profile*. SOLIC then suggested that the VBOE consider the 5C's which are needed for success in the new Virginia economy (VDOE, 2016).

According to the VBOE (VDOE, 2016), the key domains in K-12 education are content knowledge, workplace skills, community and civic responsibility, and career planning. Figure 2 demonstrates these four domains, with the overlapping circles showing the interconnectedness of all four domains.

Figure 2

*Profile of a Virginia Graduate*

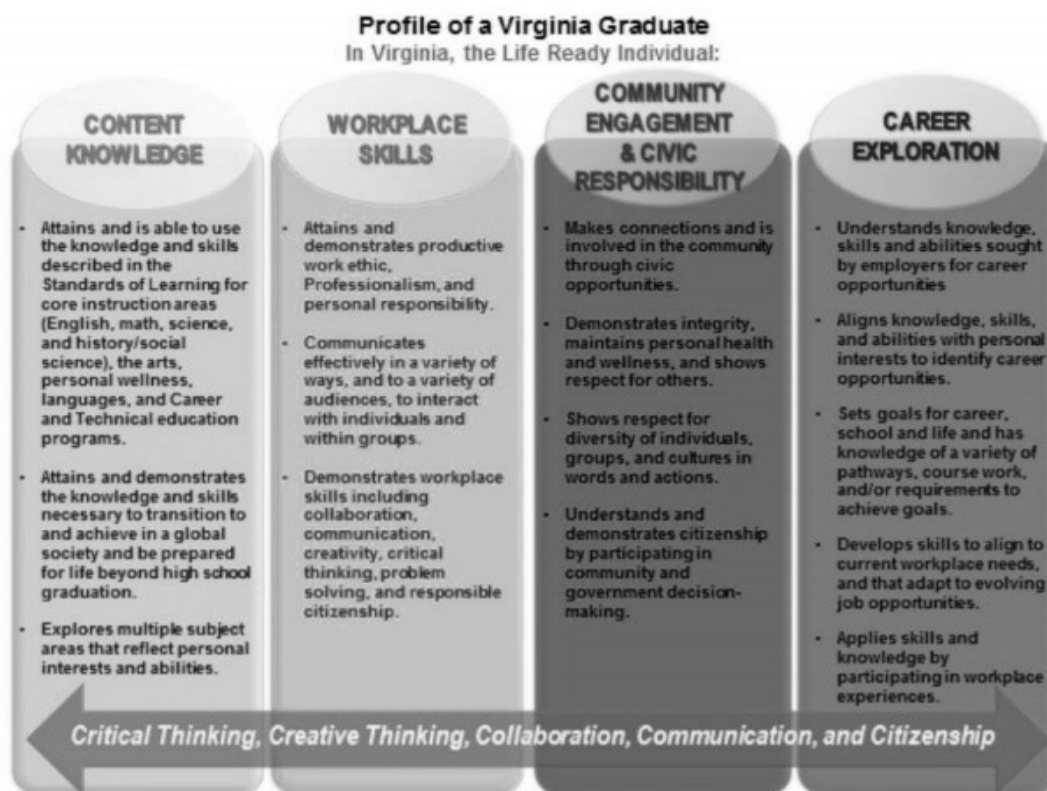


Permission granted informally from the office of the VDOE (2016).

Figure 3 below, expands on the four domains of *The Profile*. A combination of content knowledge, workplace skills, community engagement/civic responsibility, and career exploration are the four domains that all students must engage with, and the 5C's run across the bottom of the model to indicate their interwovenness in *The Profile*. The 5C's have been incorporated into all public high schools in Virginia, beginning with the freshmen class of 2018-2019 or the graduating class of 2022. School divisions were asked in 2016, after the House and Senate Bills through the Virginia General Assembly, to give due consideration of the 5C's, which fall directly in line with the four domains of *The Profile* (VDOE, 2016).

Figure 3

*The Four Domains of The Profile of a Virginia Graduate*



Permission granted informally from the office of the VDOE (2016).

*The Profile* underscores the importance of the 5C's – critical thinking, creative thinking, collaboration, communication, and citizenship which will be further expounded upon in the next section.

### **The 5C's of *The Profile of a Virginia Graduate***

There is a connection between 21st century skills and the 5C's from *The Profile*. In the next section, the 5C's that the VDOE (2016) proposed to be included in *The Profile* are explored through ten different scholarly sources. By preparing critical thinkers, embracing creative thinking, practicing communication skills, encouraging collaboration, and developing citizenship skills, students are enriched by experiences that prepare them for life beyond high school (Reed et al., 2021a, 2021b).

**Critical Thinking** empowers students to discover the truth in assertions, especially when separating fact from opinion. One of the most valuable skills in life and learning is the ability to think critically (Reed et al., 2021a, 2021b). In order for students to think critically they have to be able to retain and gain background knowledge with multiple domains. These traits are also essential for students to solve problems and make decision. According to a study by Wagner (2008), business executives repeatedly reported that the heart of critical thinking and problem solving is the ability to ask the right questions.

A strand of critical thinking has evolved within the field of education, but is nothing new (Beck, 2020; Rotherham & Willingham, 2010). *The Partnership for 21st Century Skills* (2007) suggested that the ability to reason critically is important to be able to think independently. In a wide variety of situations, critical thinking often involves inductive and deductive reasoning skills that must be applied. Bandyopadhyay and Szostek (2019) noted that inductive and deductive reasoning were founded on four principles that allowed students to make appropriate

decisions to achieve their desired outcomes. Critical thinking is aligned to problem-solving significantly because the former is used to identify suitable solutions.

The first step of critical thinking entails problem identification (Bandyopadhyay & Szostek, 2019). Students attending Virginia public schools should be equipped with relevant environmental scanning skills to identify problems in their surroundings. They should also be prepared to gather information regarding the identified problems as well. VDOE (2016) identified critical thinking as an essential skill that will affect students' well-being beyond high school education, as working professionals themselves often face problems at work and are expected to formulate effective solutions. Due to this, critical thinking should be developed from an early stage and should be refined as students' progress in their educational and career development.

*Creative thinking* will allow students to embrace their strengths, from big-picture planning to meticulous organization around their work. When students learn about their creativity, they also learn how to express it in healthy and productive ways. According to Reed (2021), creative thinkers need to be pushed beyond surface understandings to experience a deeper learning of content knowledge.

As important, students will then also become motivated enough to share that creativity with others. In order for someone to think in a creative manner, they must have the ability to analyze all problems, form opinions, and (most importantly) be able to view it with an open mind (Beck, 2020). Brainstorming and collaborating with other people to cultivate ideas is a way to encompass various thinking techniques according to *The Partnership for 21st Century Skills* (2007).

**Collaboration** is the practice of working together to achieve a common goal (Beck, 2020; *The Partnership for 21st Century Skills*, 2007; Wagner, 2008). Problem solving through collaboration is complex but an organized process that combines a set of distinct sub-skills in accordance with current need (Beck, 2020). Since collaboration necessitates numerous individuals' needing to work together for a common goal, this is complicated if no active communication is taking place. In a study performed by Wagner (2008), Christi Pedra- the former CEO of Siemens- explained how teamwork and collaboration do not just happen in the same workplace as in the past. This is because technology has allowed virtual teams across the world to collaborate and work together on large projects regularly. *The Partnership for 21st Century Skills* (2007) has accepted the fact that collaboration is an intentional attempt that shares a common understanding and results in common goals.

**Communication** is the common exchange of information that improves an understanding between participating parties and is ultimately the first element necessary for any form of collaboration. According to an interview study conducted by Wagner (2008), Mike Summers-a former vice president of Global Talent Management at Dell-stated that he was surprised at the number of youth who struggle with basic written and oral communication skills which makes it difficult for them to be clear and concise while presenting. Communication is also vital in fostering collaboration and is aligned to both the 5C's and 21st century skills. High school teachers are responsible for instilling proficient collaborative skills among their students to foster professional excellence, as provided by the VDOE recommendations.

Communication also teaches students how to convey ideas efficiently. According to Beck (2020), communication, verbal or non-verbal, is a socialization tool that always relies on a two-way process that will transfer information from the communicator to the listener. The

communicator selects a medium from which to send a message to the listener who then will decode the processed information and will send the feedback to the communicator. Students must have opportunities to participate in activities that help develop communication skills such as learning how to listen, articulate, evaluate, and respond appropriately (Reed et al., 2021a, 2021b).

*Citizenship* is important in education so that students begin to understand their surrounding communities and put efforts at becoming successful citizens. Students are not necessarily born good citizens, as they need to learn how to become one. Students need to be exposed to different opportunities such as civic duty, trustworthiness, respect, fairness, responsibility, and caring to help with this (Reed et al., 2021a, 2021b). Many secondary programs in the United States require service learning as requirement for graduation to assist. This learning outside the classroom approach prepares students for life after graduation, both as citizens of the world and as potential university students, where service learning is well grounded (Moylan, 2008).

According to Beck (2020), citizenship in the 21st century will demand more than just individuals who obey all of the social norms. Bennion and Laughlin (2018) highlighted a drastic decline in young people's participation in civic and community development programs. The authors noted that youths' disinterest in civic matters undermined democracy and indicated their unpreparedness for future leadership. Denda and Hunter (2016) observed that the decline in participation in civic responsibilities among youths might be attributed to their inadequate communication and collaboration skills. The integration of the 5C's in Virginia's educational curriculum is important in equipping students with essentials skills for citizenship.

**Correlating the 5C's and 21st Century Skills with *The Profile***

The 5C's, *The Profile*, and 21st century skills may be analyzed separately, but their elements overlap significantly. For example, all three areas highlight the significance of communication and collaboration in fostering students' future professional prosperity (Kenny et al., 2016; VDOE, 2016). Additionally, the elements provide a framework for addressing Virginia's workforce demands which were expected to rise to 500,000 new jobs by 2021. Consequently, the section below addresses how the 5C's and 21st century skills align with *The Profile* developed by the VDOE (2016).

***Achieving and Applying Academic Knowledge.*** Before VDOE proposed developing *The Profile*, a significant portion of schools relied on pedagogical teaching. Teachers instruct students who, in return, are expected to receive and retain the delivered knowledge. Traditional pedagogical learning was associated with passive students that limited their knowledge retention and ability to affect their environment (Kokotsaki et al., 2016). In an effort to counter this affect, a significant emphasis has been placed on modified learning methods that are student-centered.

The provisions by the VDOE regarding *The Profile* have prompted a shift from the traditional pedagogical instruction to student-centered learning. Project-based learning (PBL) is an innovative approach to learning that uses strategies such as working collaboratively on projects that are critical for success in the 21st century (Bell, 2010). Even though most PBL pedagogies, strategies, and tools are presently investigated more at the secondary level, students in elementary school can benefit and learn from PBL because of their natural curiosity with learning actively (Reed et al., 2021a, 2021b).

In a review of PBL at the elementary school level, Reed et al., referenced the strong correlation between PBL, 21st century skills, and the 5C's. Curriculum in a PBL model is created and organized around problems instead of disciplines. The problems created for PBL

allows students to develop flexible knowledge, effective problem-solving and collaborative skills, self-directed learning skills, and intrinsic motivation. With the development of these skills and the 5C's, PBL has the potential at furthering state-level goals and impacting student achievement (Reed et al., 2021a, 2021b).

Learner-oriented instruction fostered students to make sense of the delivered knowledge and relate it to their surroundings. Kokotsaki, Menzies, and Wiggins (2016) highlighted that teachers should consider teaching strategies such as PBL to foster knowledge acquisition and critical thinking skills. The teaching strategy facilitates teacher-student collaborations that allow instructors to guide learners on problem-solving and critical thinking. Critical thinking has been proposed as an effective strategy in promoting students' ability to apply their academic knowledge. The VDOE emphasized that critical thinking was essential in promoting students' abilities to solve real-world problems in their surroundings. They would gain the skill to be able to modify their knowledge and match it with their situations and surroundings.

***Preparing Students for the Workplace Environment.*** Elementary and secondary school education is perceived as a building block for a smooth transition into the professional sector. Both employment and entrepreneurship require similar fundamental skills for excellence. Fletcher and Tyson (2017) noted that high school education provided an essential phase for preparing students for their careers. Often, education curricula are focused on technical knowledge and overlook the significance of developing students' soft skills. In developing *The Profile*, VDOE (2016) highlighted the significance of equipping students with the 5C's and 21st century skills to foster their proficiency in the workplace.

Skills such as problem-solving and critical thinking are addressed first in the VDOE objectives regarding students' ability to apply their academic knowledge in real-world situations.

However, students must also possess significant collaboration and communication skills to be successful in the workplace. Kenny et al. (2016) noted that communication skills were an essential trait in pursuing successful careers. However, the author observed that many students and graduates struggled to balance social and professional communication. It seemed that the students picked up communication skills after they entered their workplace. This shows how co-workers usually have social relationships due to the time spent together at the workplace. Unfortunately, even here, the line between social and professional communication may be blurred, posing potential unethical practices. For example, employees should use formal language during company meetings regardless of their acquaintanceship with the present audience (Kenny et al., 2016).

Technology has been associated with significant challenges regarding collaboration. Chalkiadaki (2018) highlights that digital literacy ranks highest than all other skills in researchers and education stakeholders' interest. Safarini (2019) illustrates that the 21st century workplace has posed dynamic challenges because of technology interventions. The author noted that technological advancements had led to remote working that required advanced collaboration to fulfill workplace tasks. Unlike traditional office setups, tele-working may comprise members who are located across the globe. This means working with more people from different cultures as well. In this regard, students should be prepared to apply proficient communication, collaboration, and accountability skills (Van Laar et al., 2020). The inclusion of collaborative skills is relevant to the 5C's, 21st century skills, and the VDOE (2016) provisions regarding *The Profile*.

***Civic Education and Community Engagement.*** Graduates have an essential responsibility concerning community building and engagement. Based on the VDOE's (2016)

*The Profile*, students should be prepared to impart change in their communities. Like other attributes, community engagement cannot be developed in isolation. Denda and Hunter (2016) noted that students' ability to engage in positive community building was dependent on their civic education. In this regard, the curriculum for civic education should be designed in a way so as to impart the significance of community engagement amongst the students. Bennion and Laughlin (2018) highlighted that there had been a declining trend in youths' interests in civic matters. While young voters (ages 18–19) were the only age group to vote at higher rates in 2016 than 2012, despite the increasing turnout amongst young voters, the total turnout of young voters was still less than that of older voters, all of whom decreased their numbers at the polls. The authors noted that young people were continually withdrawing from public participation- including voting- which was detrimental to the United States' democracy.

Given this grave situation, it is becoming more imperative than ever that educational institutions incorporate civic education in their curricula to foster their students' community engagement. Denda and Hunter (2016) noted that teachers should include communication and collaboration skills among their students to foster community engagement. The VDOE provisions, 5C's, and 21st century skills all include community engagement as a vital skill. Civic education fosters improving students' awareness regarding community development. Students are more inclined to volunteer through technology resources as Bennion and Laughlin (2018) reported that young people avoided face-to-face volunteerism. Volunteering within a local community is an important part of community development; not only for the community but also to build social communication skills for the younger generation.

In more recent legislation, January 2022, from the General Assembly of Virginia, a proposal for House Bill NO. 781 was enacted by the Code of Virginia which added a section

numbered 22.1-208.03. Section B of this bill pertains specifically to student citizenship skills portion of the 5C's in *The Profile*, stating that the board of education is required that each student demonstrate an understanding of:

1. The fundamental moral, political, and intellectual foundations of the American experiment in self-government, as well as the history, qualities, traditions, and features of civic engagement in the United States;
2. The structure, function, and processes of government institutions at the federal, state, and local levels; and
3. The founding documents of the United States, including the Declaration of Independence, the United States Constitution, the Federalist Papers, including Essays 10 and 51, excerpts from Alexis de Tocqueville's *Democracy in America*, the first debate between Abraham Lincoln and Frederick Douglass, and the writings of the Founding Fathers of the United States. (House Bill NO. 7)

Communication and collaboration are essential elements of community engagement. Communication skills foster students' confidence regarding expressing their public concerns and recommendations. Additionally, community development projects and civic duties involve collaboration to achieve a common goal. Collaboration is one of the 5C's and is identified as a 21st century skill to prepare students for post-education life. Teaching students active listening skills enhances collaborative ability as well as creativity (Bell, 2010). VDOE (2016) also identified collaboration as an essential skill relevant to multiple facets of life. In this regard, teachers should incorporate collaboration in civic education to promote their students' civic responsibility.

***Preparing Students for Career Development.*** According to VDOE (2016), an essential component of *The Profile* includes career development. Career development was selected because of the significance of workplace skills in the 21st century. Albay and Serbes (2017) noted that careers were previously static which meant that people remained in the same profession until their retirement or only sought career opportunities within their sectors. Employees now have been prompted to have multiple professional skills to increase their eligibility and competitiveness. This also allows employees to seek more opportunities in diverse sectors based on their professional skills.

Students' ability to formulate effective career plans and take charge of their professional development relies on the 5C's identified by VDOE (2020). Bandyopadhyay and Szostek (2019) identified critical thinking as an essential skill in career planning and development. The authors noted that critical thinking was hinged on four principles that included issue identification, information gathering, generating alternatives, and final decision-making. Concerning personal professional development, students should be prepared to identify career opportunities, gather information regarding the gaps, evaluate alternatives, and make informed decisions about their desired trajectory. For these reasons, the VDOE's inclusion of critical thinking in learning curricula is to ensure effective student development.

The 21st century skills and the 5C's, specifically collaboration and communication, are significantly aligned to career development. Van Laar et al. (2020) conducted a systematic review that identified the 21st century skills as essential pre-requisites for career development. As a result, the authors identified information technology and management, communication, collaboration, and critical thinking as fundamental 21st century skills as well. Needless to say, these skills significantly overlap with the ones mentioned in the 5C's and *The Profile*. This was

one more reason for the VDOE (2020) to recommend the integration of 21st century skills and 5C's with the learning curriculum. Moreover, these are skills that go through continuous development and may provide a flexible, robust framework for career planning and development.

### **Summary**

The literature review conducted for this study indicates a significant overlap between the 5C's, 21st century skills, and VDOE's recommended graduate *Profile*. A significant portion of the scholarly articles indicated that they shared a common goal of preparing students for success in their careers.

The 21st century skills, 5C's, and *The Profile* were developed based on the expected challenges professionals would face in their workplaces. For example, VDOE identified a gap regarding 21st century-prepared students who would be required to fill up to 500,000 jobs created by 2021. Additionally, the board identified a significant mismatch between employees' skills and employers' expectations. To tackle this issue, the VDOE recommended integrating the 5C's and 21st century skills to develop holistic students who can excel in diverse environments. Based on the literature, the 5C's and 21st century skills' framework for education in Virginia schools is anticipated to equip students with relevant skills for career development and post high school success.

## Chapter 3: Methodology

### Introduction

The purpose of this qualitative study was to gauge the perception of senior students regarding their exposure to the Virginia 5C's (5C's) and the 21st century skills through a senior project experience. Furthermore, information was gathered to identify improvements that could be made in a senior project at a public secondary school in Virginia to determine if 21st century skills and the 5C's were successfully addressed.

With the Virginia Department of Education (VDOE) accreditation requirements passing legislation at the state level and with the state of Virginia's focus on *The Profile*, implementing the 5C's, and 21st century skills, the senior project was aligned with the state initiatives. The senior project involved senior students who completed four 30 minute work sessions during the fall of 2021. This project addressed 21st century skills, the 5C's interviewing techniques, and resume production, all prior to their graduation date. The researcher conducted a qualitative study on students involved in the senior project to determine if the senior project exposed high school students to the 5C's and 21st century skills.

The vision behind the senior project compared to the vision at the public secondary school that is stated in their school mission statement:

The mission of \_\_\_\_\_ is to prepare students to graduate with the necessary knowledge, integrity, and responsibility to be active learners, productive workers, and contributing members of their communities.

To begin, in 2018 a reform initiative spread across the Commonwealth of Virginia when policymakers required all teachers in K-12 public schools to teach 21st century skills. After receiving feedback from various stakeholders, the Virginia Board of Education (VBOE) identified four skills that were deemed particularly relevant to K-12 education in Virginia: critical thinking, communication, collaboration, and creativity (the “four C’s”). The VBOE added “citizenship” as a fifth skill necessary for success in an evolving Virginia economy (Naff, 2016). The 5C’s then began to become established in curriculums across the Commonwealth; encouraging students to develop a new and relevant skills set. Furthermore, in order to achieve success with students, the development of critical thinking, creative thinking, collaboration, communication, and citizenship should occur in a classroom and school environment (Reed et al., 2021a, 2021b).

An additional focus of this study was to identify improvements that could be made in the senior project to determine if 21st century skills and the 5C’s were addressed. Through preparing critical thinkers, embracing creative thinking, practicing communication skills, encouraging collaboration, and developing citizenship skills, Virginia’s students are provided with experiences that prepare them for life beyond high school (Reed et al., 2021a, 2021b). These 21st century skills are important as students can build future successes upon.

### **Research Design**

The members of the class of 2022, who were current seniors, were the participants. The study followed these students during the fall semester of their senior year (2021–2022) from the time they completed the senior project until they participated in the researcher’s voluntary electronic survey. Twenty-two participants voluntarily completed a Qualtrics electronic survey upon completion of the senior project. Through the survey data, results showed the degree to

which the senior project exposed the students to 21st century skills and the 5C's. The researcher used coding to analyze survey data and transcriptions from each participant's responses. Participants were not identified by name or number. The researcher reviewed the survey responses and analyzed the data through Qualtrics.

Data were collected from the electronic survey and these procedures were followed (Creswell, 2018):

1. Read through text, make margin notes, and form initial codes to read and memo emerging ideas.
2. Described the case and its context to describe and classify codes into themes.
3. Use categorical aggregation to establish themes or patterns to develop and assess interpretations.
4. Use direct interpretation and develop naturalistic generalizations of what was learned to represent and visualize the data.

The senior project consisted of a four-day program that focused on eight to eleven seniors weekly over 17 weeks. The teacher who led instruction during the senior project used practical approaches which included interviewing techniques, resume building, and addressing 21st century skills.

The schedule was:

*Day 1.* The 5C's and 21st century skills: Students were asked to join Google Classroom and to start watching this video named, "What is 21st century education?" found at <https://www.youtube.com/watch?v=Ax5cNlutAys> (EF Explore America, 2012). The teacher asked the students before showing the video, "Do you all know what career you want to do when you leave high school? We are going to watch the video and see what some of those possibilities

are for you.” This two minute video was a brief summary of what 21st century education is.

While this video is dated, the instructor believed it was still relevant.

A second video from YouTube was shown to the students explaining the 4C’s. Critical thinking, creativity, collaboration, and communication were described in detail. “What Are the 4C’s of 21<sup>st</sup> Century Skills?” can be found at <https://www.youtube.com/watch?v=TwMvsuj3gU8> (21st Century Classroom, 2019). After this video was shown, the additional C-citizenship from the VDOE was explained and what the Virginia 5C’s were.

Following the explanation of why 21st century skills and the Virginia 5C’s are important, the students were asked to view sample resumes and to choose which one they would like to use.

The three resume examples are listed below:

- [https://docs.google.com/document/d/1\\_eo51ebgpnu6CC0PWZQXDb6gbffOQUrlZCJzWx400Jo/edit#heading=h.x8fm1uorkbaw](https://docs.google.com/document/d/1_eo51ebgpnu6CC0PWZQXDb6gbffOQUrlZCJzWx400Jo/edit#heading=h.x8fm1uorkbaw). Adapted from: <https://www.thebalance.com/part-time-job-resume-example-for-a-teen-2063248>
- [https://docs.google.com/document/d/158L\\_5\\_K-JtUyNTgIcvhmlKOqNmKgRnGDfCHAbvhchTs/edit](https://docs.google.com/document/d/158L_5_K-JtUyNTgIcvhmlKOqNmKgRnGDfCHAbvhchTs/edit). Adapted from <http://www.aie.org/find-a-job/write-your-resume/sample-resumes-and-templates/Resume-Sample-High-School-Student-Volunteer.cfm#>
- [https://docs.google.com/document/d/1kBh2LiOTSFanbTRR4OK2vz9o0fwmCPEFTYMgE8qb\\_Co/edit](https://docs.google.com/document/d/1kBh2LiOTSFanbTRR4OK2vz9o0fwmCPEFTYMgE8qb_Co/edit). Adapted from: [http://www.readwritethink.org/files/resources/30847\\_sample.pdf](http://www.readwritethink.org/files/resources/30847_sample.pdf)

*Day 2. Resume and 21st century skills:* The students were asked to view the YouTube video, <https://www.youtube.com/watch?v=5aUKd5CDgto> (Indeed, 2017). This was a short 30

second video showing students how to begin writing a resume and then the teacher discussed with the students about what a resume is. An explanation of how the resume was the first piece of information that an employer would review and may be a deciding factor on hiring the individual or not, was further discussed. The importance of a resume was expressed with the question in mind from the employer, “Do I want this individual to work for me?”

After the video, this presentation on Google slides was displayed for students to view explaining what to include and what not to include in a resume:

[https://docs.google.com/presentation/d/15Rtzd0Q8SyzcmCVUAswkwUVnxAFLoYO\\_5AY5JDUrz5c/edit#slide=id.p18](https://docs.google.com/presentation/d/15Rtzd0Q8SyzcmCVUAswkwUVnxAFLoYO_5AY5JDUrz5c/edit#slide=id.p18). The instructor stated that it is important to make sure the resume does not have any spelling or grammatical errors, that it contains only information pertinent to the job you are applying for, and that it includes only data that will help the individual receive an interview.

The next section of the resume, which included the personal information, was addressed. The teacher stressed the importance of making social media accounts private because employers review social media for “red flags” before hiring. Following the social media warnings, the instructor explained how to list references and the appropriate way to ask someone to be a reference. This was stated, “You should ask individuals if they are willing to be a reference prior to adding them to your resume.”

After the students viewed the resume Google slideshow, they watched another YouTube video describing the difference between hard and soft skills. Once the video was completed, the teacher led the conversation with the difference between hard and soft skills and stated, “How important it is to practice soft skills in everyday life, and most of you probably already do this without knowing.” The teacher then stated how important it is to have a hard skill that would

make them employable such as: A trade, a degree, and skill. The YouTube video can be found at <https://www.youtube.com/watch?v=0FFLFCB9xfQ> (GCFLearnFree.org, 2018). After watching this short video, the students were given more time to work on their resumes.

*Day 3. Interview skill training:* The following Google slideshow was used to review interview questions:

[https://docs.google.com/presentation/d/1w6MSz71k\\_SJDgWdI908aeJXcj24iCTT64-mVSScn5b0/edit#slide=id.g5423915f22\\_0\\_162](https://docs.google.com/presentation/d/1w6MSz71k_SJDgWdI908aeJXcj24iCTT64-mVSScn5b0/edit#slide=id.g5423915f22_0_162). After review, the teacher asked students how they would answer each question and provided insight such as “Talk about your leadership experience during this time” or “Why don’t you talk about your job experience”. The instructor explained to students that if they do not know an answer to a question they can be honest and reminded them to take their time to generate an accurate response. After this presentation, students printed their created resumes and watched this final YouTube video on interviewing: <https://www.youtube.com/watch?v=HG68Ymazo18> (Indeed, 2020). After this video, the instructor discussed proper interview etiquette, specifically highlighting where to place your hands, how to sit up straight, and how to dress for an official interview.

*Day 4. Informal interview:* The final day of the senior project ended with an informal interview with various professionals. School counselors, career coaches, and teachers were used as the interviewers. During this time, the above mentioned professionals would ask students the same interview questions that were reviewed with the instructor the day before. The various professionals would critique each student informally on their resume and interview, giving them feedback on each. Discussion points were: Things that the student could improve upon on their resume and how they could have better answered certain interview questions.

## **Research Design Justification**

The methodology used for this study on the evaluation of a senior project should add to the literature surrounding the use of school based projects implementing 21st century skills and the 5C's. A potential influence from this study could extend beyond the school site, as the findings could be useful to other secondary administrators, practitioners, and educators considering the implementation of a senior project. The vision of the senior project was to marry the 21st century skills and the 5C's to better equip students for post-graduation success. Additionally, this union is hopeful to provide students with the necessary skills to thrive in the adult world.

### **Research Question**

One research question guided this study. The question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills?

### **Study Setting**

The selected school for this study was located in a rural school division in the western portion of Virginia. The surrounding community includes large manufacturing facilities as well as a large area for agriculture production. A majority of the local population of adults work in the manufacturing factories that include shift work schedules. The factory work typically includes work in the evenings, nights, and early morning shifts.

The public high school is one of five high schools in a school division that serves around 10,000 students Pre-Kindergarten through 12th grade. The chosen school has approximately 700 students in grades 9-12 with many of the parents working in the local industries. The researcher was employed by the school division as the principal of the school during the duration of the study.

### **Selection of Participants**

All senior students who completed the senior project were provided an email from the researcher upon completion of the senior project. Of the 173 seniors who completed the senior project, 22 voluntarily completed the electronic survey through Qualtrics. Moreover, participants were notified in the first question that this study will not affect, in any manner, their position as a student at the high school in which the researcher served as principal.

### **Data Collection Procedures**

Data collection for this study occurred through the use of an electronic survey by Qualtrics. This allowed the researcher to understand participants' experiences and identify strengths and weakness of the senior project study. The survey questions used were closed-ended that required minimum effort and saved time for the participants. There was one open-ended question that allowed for a deeper response from the participants' that expressed their experience and perspective of the senior project. The questions allowed for quick responses to express whether the participant agreed or disagreed with neutral statements, and one section that gave participants an opportunity to share their experience about the senior project. This aided the researcher in the development of the project for future senior students.

### **Study Approval Process and Timeline**

1. The researcher completed the Virginia Tech Institutional Review Board (IRB) training through coursework prior to conducting the study. CITI training on Social and Behavioral Research had been completed as well (see Appendix C).
2. The researcher completed the IRB Research Protocol and obtained permission to conduct the study from the Virginia Tech Institutional Review Board which followed approval of the prospectus defense (see Appendix F).

3. A meeting was held with the division superintendent to request permission to conduct the study at the selected school after the successful completion of the prospectus defense. A follow-up letter was submitted to the division superintendent that described the purpose of the study and data collection process (see Appendix D).

### **Instrument Design and Validation**

Validity, according to Creswell and Poth (2018), is one of the strengths of qualitative research. Creswell also explained that qualitative validity means that the researcher has checked for the accuracy of findings by employing certain procedures. Creswell and Poth followed these procedures that the researcher followed during this study:

1. Determine interview questions that will be answered by the participant.
  - a. Survey questions were chosen based on the relationship between the questions and the review of literature. The survey questions were carefully selected to show relevance from the research performed and to exhibit the importance of the question.
2. Identify participants who can best address these.
  - a. Senior students who completed the senior project were identified to participate in the study.
3. Distinguish the type of interview by determining what mode is practical and what interactions will net the most useful information to address research questions.
  - a. An electronic survey through Qualtrics was determined to be the most practical mode and was used by the researcher.
4. Collect data by using adequate recording procedures when conducting one-on-one or focus group interviews.
  - a. An electronic survey platform was used to collect the data.

5. Design and use an interview protocol or interview guide.
  - a. The same pre-determined survey questions were used in every survey and to all participants in the same order for consistency in the results.
6. Locate a distraction-free place for conducting the interview.
  - a. All students had the ability to complete the electronic survey at their convenience in a distraction free environment.
7. Obtain consent from all participants by signing the researcher's approved consent form.
  - a. All participants were asked for consent to participate in the survey on the first question.
8. Follow appropriate interview procedures.
  - a. All participants were told that this was a voluntary electronic survey that could be completed at their convenience.

To maintain uniform procedure, the following electronic survey questions were used for the study. The electronic survey should not have lasted longer than 15 minutes; however participants could not be asked how long it took them because of the anonymous response.

In Table 1 below, the electronic survey questions were carefully selected to show relevance from the research performed and to exhibit the importance of the questions.

**Table 1**

*Electronic Survey Protocol*

<ol style="list-style-type: none"> <li>1. Do we have your permission to participate in this survey? There will be no penalty if you refuse to participate. Yes or No.</li> <li>2. Did you complete the senior project at _____? Yes or No.</li> <li>3. Did the senior project help you become more familiar with the Virginia 5C's?</li> </ol>
--

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

4. Twenty-first century skills were addressed during the senior project.  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

5. Are you better prepared with the Virginia 5C's because of this project?  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

5. Critical thinking  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

6. Creative thinking  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

7. Collaboration  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

8. Communication  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

9. Citizenship  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

10. The senior project helped better prepare me for post-graduation.  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

11. I enjoyed the senior project.  
(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

12. What was your main take away from the senior project.  
Please type response.

### **Data Treatment and Management**

Data from the electronic survey were gathered through an analysis format on Qualtrics. The researcher recognized common themes with the close-ended questions and tracked keywords with the one open-ended question. Data were collected to determine areas of strengths and weaknesses within the senior project. The data helped determine if the senior project exposed seniors to the 21st century skills and the 5C's during the senior project. All collected data were

managed and secured on a password protected desktop computer issued by the researcher's school division.

### **Data Analysis**

Analyzing data identifies themes and explains relationships among the data. The researcher utilized the following process to organize and manage the data, found common threads with survey responses, and developed descriptions of the participants' perceptions and experiences. The close-ended questions were analyzed with descriptive statistics to identify the responses using bar graphs and percentage tables being used for a visual perspective. Analysis of the survey data provided the researcher with the participants' views based on their experiences which allowed the researcher to identify common themes and synthesize the data to answer the research question of this study. The following illustrated the steps of the data analysis procedure that the researcher used:

The researcher:

- Read through survey responses
- Created bar graphs and a descriptive statistic chart with percentages
- Reviewed experiences of one open-ended question
- Developed significant statements & grouped into common threads

### **Summary**

Chapter three is an overview of the research design and justification, study setting and participants, limitations, procedures for collecting, storing, and analyzing data, and a timeline for completion. By conducting this study, the researcher was able to identify whether 21st century skills and the 5C's were exposed to students in a public secondary school through a senior project. Furthermore, information was gathered to identify improvements that could be made

within the senior project. The electronic participant survey provided the researcher with data that assisted in determining if the senior project was effective. The data fostered a better understanding of the program identifying the strengths and weaknesses.

## Chapter 4: Data Analysis and Findings

### Introduction

The purpose of this qualitative study was to gauge the perception of senior students regarding their exposure to the Virginia 5C's (5C's) and the 21st century skills through a senior project experience. The study examined improvements that could be made in the senior project at a public secondary school to determine if 21st century skills and the 5C's were successfully addressed. Analysis of the students' experiences and perceptions can help education leaders determine whether specific projects are beneficial to public secondary school students.

The study examined senior students during the fall semester of 2021–2022, from the time they completed the senior project until they were offered the opportunity to participate in a voluntary electronic survey. The instructional practice that was used during the senior project included review of the 5C's, 21st century skills, interviewing techniques, and creating a resume.

After the completion of the senior project, students were provided an email from the researcher that offered the opportunity for them to participate in an electronic survey. Participants then chose to voluntarily complete the Qualtrics electronic survey. The researcher investigated the results to determine if 21st century skills and the 5C's were successfully addressed during the senior project. The findings of the study could benefit policymakers in the education sector to formulate practical policies that can improve the readiness of high school learners to cultivate the skills needed in the 21st century including the 5C's.

### Analysis of Survey Questions

Survey Question 1. *Do we have your permission to participate in this survey? There will be no penalty if you refuse to participate.*

All of the respondents to the electronic survey chose "Yes" to question 1, which gave consent to participate. Participants agreed to take part in the data collection without being coerced or intimidated. Another aspect of ethical research that aligned with this aspect is informed consent, which gives permission to engage participants in a study.

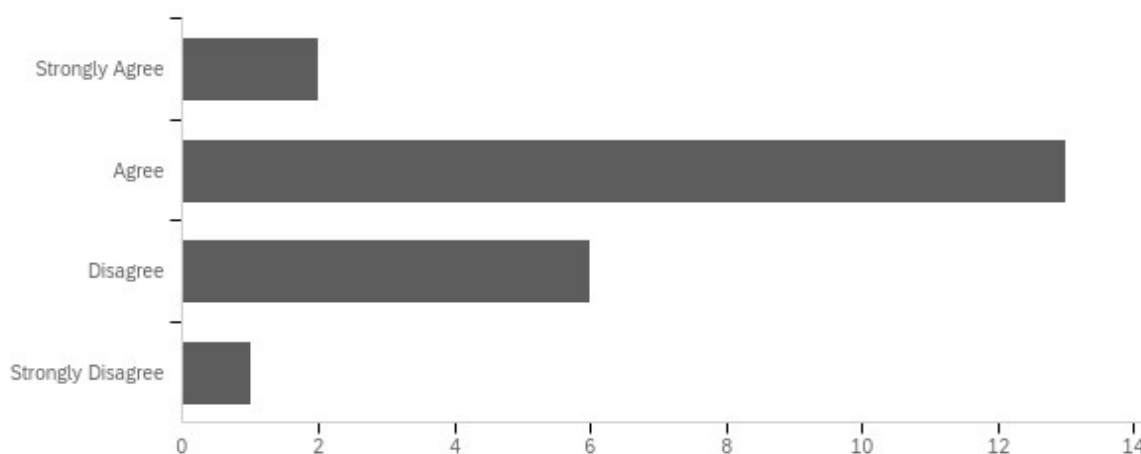
Survey Question 2. *Did you complete the senior project at \_\_\_\_\_?*

All respondents, except for one, answered "Yes" to this question. The student who answered "No" could have missed a day of the senior project and not completed it. The researcher was unable to see if the student answered the remaining questions to the survey or stopped at the end of this question. This may skew the data depending on whether the student completed the survey without completing the senior project. In this case, relying on participants' responses without verifying their accuracy can affect the validity of findings. Although only one student indicated they had not taken part in the senior project, the researcher had no way of verifying the correctness or the honesty of those responding that they had completed the project.

Survey Question 3. *Did the senior project help you become more familiar with the Virginia 5C's?*

**Table 2**

*Survey Question 3 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question #3. Example: 13 students selected “Agree” when answering survey question #3.

*Survey Question 3 Results*

#	Answer	%	Count
1	Strongly Agree	9.09%	2
2	Agree	59.09%	13
3	Disagree	27.27%	6
4	Strongly Disagree	4.55%	1
	Total	100%	22

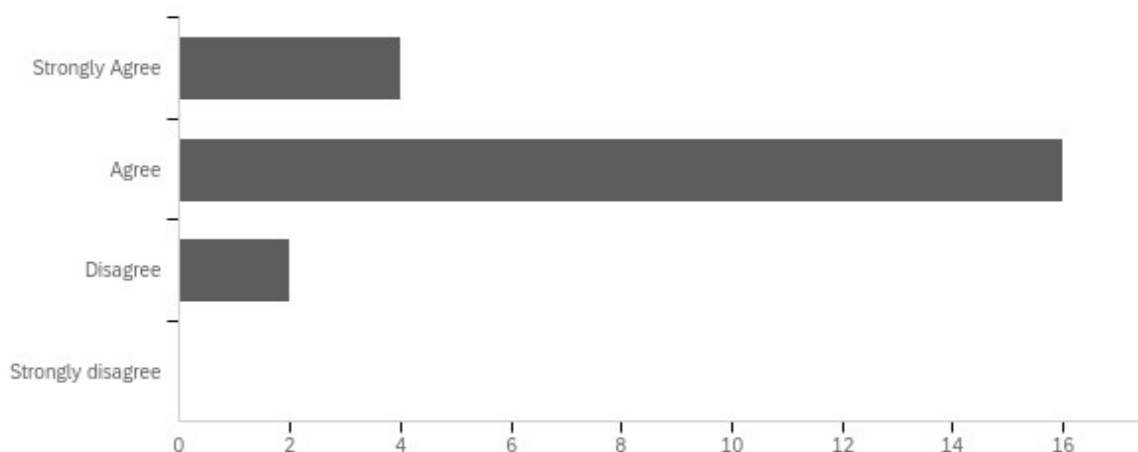
The primary objective of this question was to gather information regarding the extent to which students perceived the senior project as beneficial to their understanding of the Virginia 5C's. A total of 22 students provided feedback. The patterned theme that emerged from survey

question #3 was that most "Agree" that the senior project helped them become more familiar with the 5C's. In total, 15 agreed that the project improved their understanding of the 5C's, which represents about 68% of all participants. The second highest percentage was "Disagree" that the senior project did not help these students become more familiar with the Virginia 5C's. The difference between those who agreed and those who did not agree was 8 students, (36.36%). The outliers were "Strongly Agree" and "Strongly Disagree," with low percentages in each category. A fundamental question in these observations relates to the cause of extremes. Although most participants agreed that they understood the 5C's more as a result of completing the senior project, there is a significant percentage that disagreed. Perhaps those who disagreed were not adequately prepared to take part in the project or had not been sufficiently briefed about the benefits of this project.

Survey Question 4. *Twenty-first century skills were addressed during the senior project?*

**Table 3**

*Survey Question 4 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 4. Example: 16 students selected “Agree” when answering survey question #4.

*Survey Question 4 Results*

#	Answer	%	Count
1	Strongly Agree	18.18%	4
2	Agree	72.73%	16
3	Disagree	9.09%	2
4	Strongly disagree	0.00%	0
	Total	100%	22

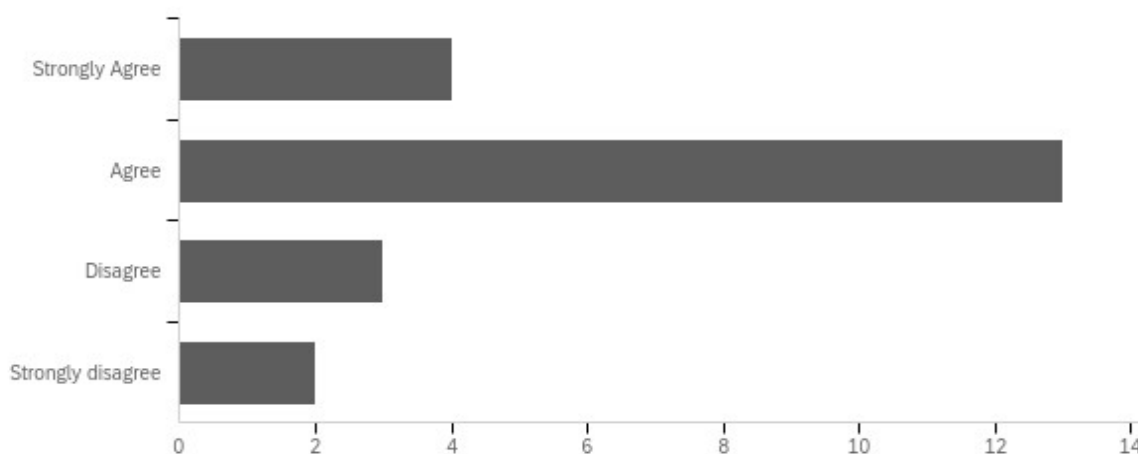
The common theme in question #4 was that most "Agree" that the senior project addressed 21st century skills. There were no students who "Strongly Disagree" with the question, and 9.09% who completed the survey chose "Disagree" that 21st century skills were addressed during the senior project. “Strongly Agree” was the second highest answer chosen with an

18.18%. Based on the transformations that have occurred in the education sector, particularly the use of advanced technology, no student was expected to express doubt the effect of the senior project on imparting the 21st century skills to high school learners. However, most respondents (72.73%) “Agree”, but not strongly, that the project enabled them to gain 21st century skills. Not to “Strongly Agree” might have suggested that participants were not fully aware of how their completion of the senior project would lead them to acquiring the 21st century skills, but they could associate the project with the new skills they acquired if they agreed the project addressed skills.

Survey Question 5. *Are you better prepared with the following Virginia 5C's because of this project?*

**Table 4**

*Survey Question 5 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 5. Example: 13 students selected “Agree” when answering survey question #5.

*Survey Question 5 Results*

#	Answer	%	Count
1	Strongly Agree	18.18%	4
2	Agree	59.09%	13
3	Disagree	13.64%	3
4	Strongly disagree	9.09%	2
	Total	100%	22

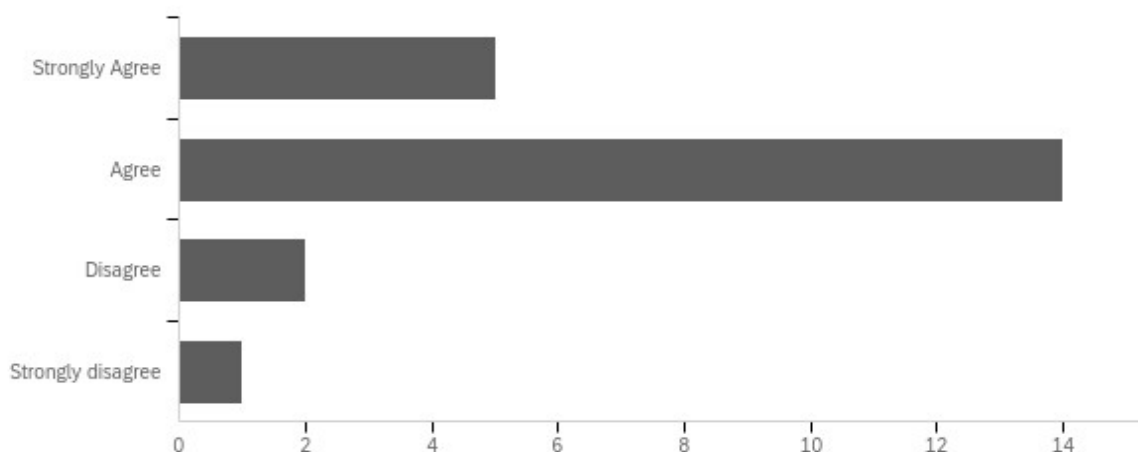
The design of the senior project was to enhance students' understanding of Virginia 5C's as well as equipping them with the 21st century skills. Thus, it was important to ask the respondents whether they were in a better position in terms of their understanding of Virginia 5C's after they completed the senior project. Out of 22 participants, 13 agreed that the project

boosted their understanding of Virginia 5C's, reflecting 59.09%. Thus, it can be concluded that most students who participated in this survey thought that their understanding of Virginia 5C's had improved, a change that was attributed to the senior project. The theme of question #5 was that most of the students who participated in the survey "Agree" that they are better prepared with the 5C's. More students "Strongly Agree" with this question like the previous question with a percentage of 18.18%. Despite most students agreeing that they have a better understanding of Virginia 5C's as a result of having completed the senior project, there was still a significant portion of respondents who indicated that the senior project did not influence their understanding of Virginia 5C's (22.73%).

Survey Question 6. *Critical Thinking?*

**Table 5**

*Survey Question 6 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 6. Example: 14 students selected “Agree” when answering survey question #6.

*Survey Question 6 Results*

#	Answer	%	Count
1	Strongly Agree	22.73%	5
2	Agree	63.64%	14
3	Disagree	9.09%	2
4	Strongly disagree	4.55%	1
	Total	100%	22

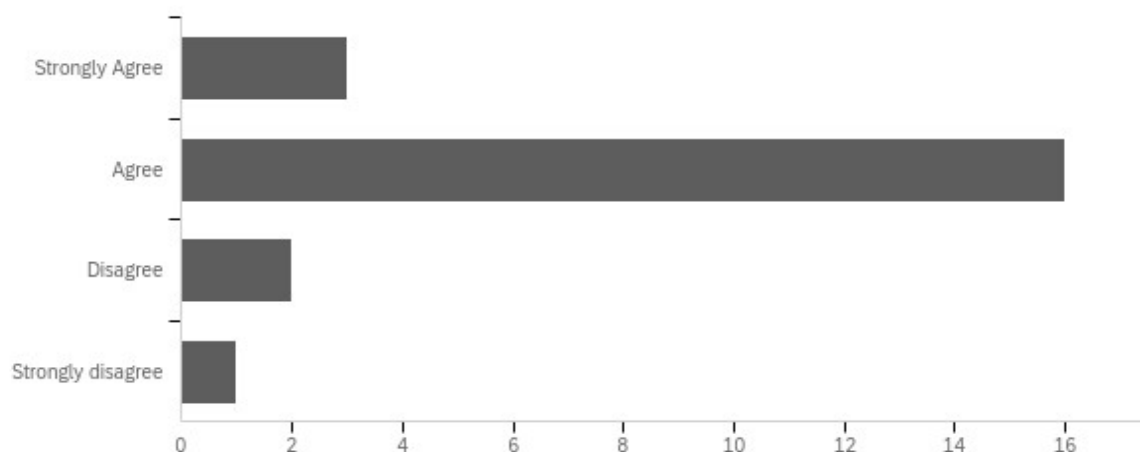
Most of the students answered that they "Agree" that the senior project did help better prepare them with knowledge of critical thinking as it pertains to the Virginia 5C's. Although 86.36% “Agree” or “Strongly Agree” that the senior project enhanced their critical thinking skills, it is important to note that cognitive capability does not develop overnight. For this reason,

students must be provided with an environment that allows them to flex their critical thinking. One of the most valuable skills in life and learning is the ability to think critically (Reed et al., 2021a, 2021b).

Survey Question 7. *Creative Thinking?*

**Table 6**

*Survey Question 7 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 7. Example: 16 students selected “Agree” when answering survey question #7.

*Survey Question 7 Results*

#	Answer	%	Count
1	Strongly Agree	13.64%	3
2	Agree	72.73%	16
3	Disagree	9.09%	2
4	Strongly disagree	4.55%	1
	Total	100%	22

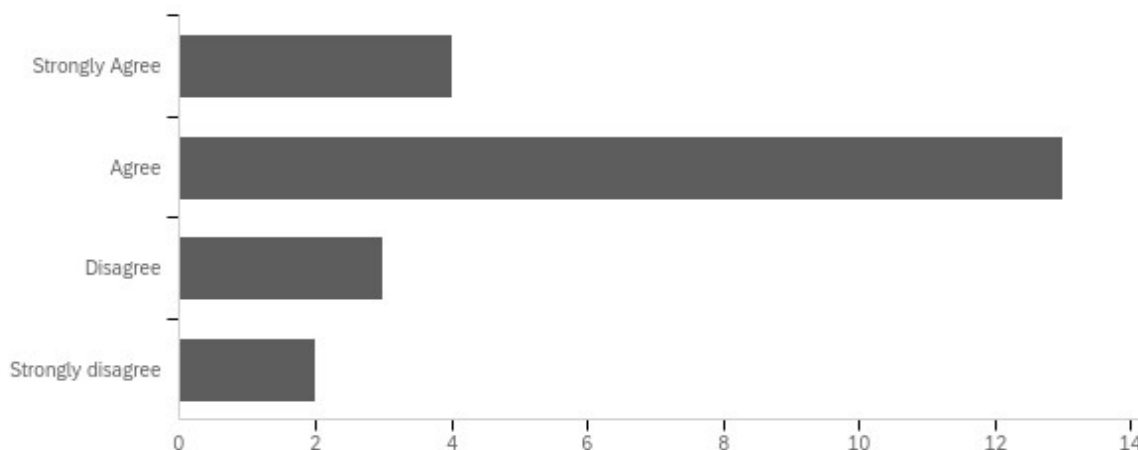
Of the 22 participants, 19 agreed (86.4%) that creative thinking was reviewed during the senior project. Most of the students "Agree" that the senior project did help better prepare them with knowledge of creative thinking as it pertains to the Virginia 5C's. Creativity is the driver of innovation and prosperity. Brainstorming and collaborating with other people to cultivate ideas is

a way to encompass various thinking techniques according to *The Partnership for 21st Century Skills* (2007). Thus, the project's effect on students' creative power implied that it prepared them to come together in the future and developed innovative solutions for complex challenges. Moreover, the fact that most respondents agreed that the project was beneficial in terms of boosting their creative ability, implied that the senior project prepared them to face difficult situations in future workplaces. Organizations of the 21st century are facing relatively complex challenges due to evolving consumer demands and a business environment.

Survey Question 8. *Collaboration?*

**Table 7**

*Survey Question 8 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 8. Example: 13 students selected “Agree” when answering survey question #8.

*Survey Question 8 Results*

#	Answer	%	Count
1	Strongly Agree	18.18%	4
2	Agree	59.09%	13
3	Disagree	13.64%	3
4	Strongly disagree	9.09%	2
	Total	100%	22

Most students answered that they "Agree" that the senior project did help better prepare them with knowledge of collaboration as it pertains to the Virginia 5C's. The respondents agreed (77.27%) that their collaborative ability was enhanced by participation in the senior project.

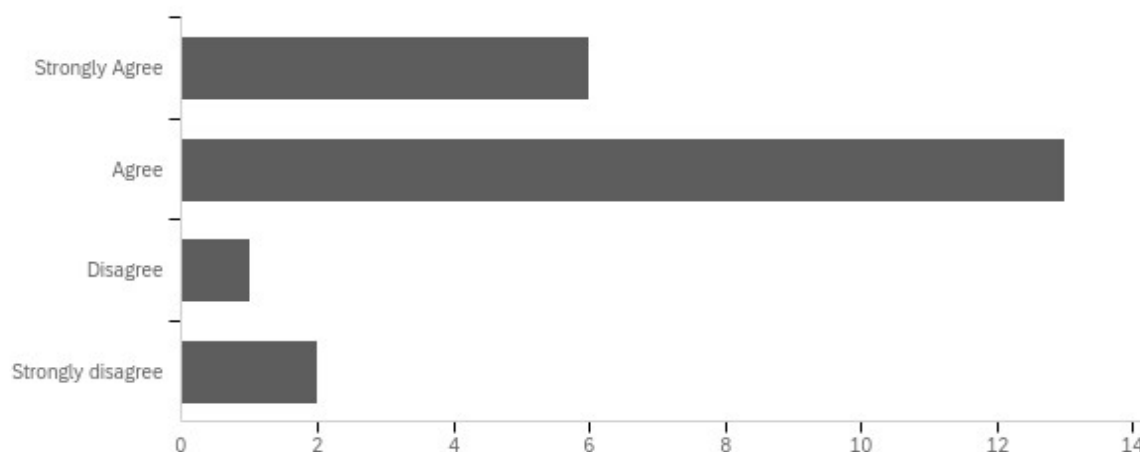
Primarily, collaboration as a Virginia 5C implies that learners can engage each other and, in a

learning environment, this engagement promotes quality academic outcomes. The 21st century society presents new demands that require individuals to work together to provide solutions to specific problems of critical concerns. Problem solving through collaboration is complex but an organized process that combines a set of distinct sub-skills in accordance with current need (Beck, 2020).

Survey Question 9. *Communication?*

**Table 8**

*Survey Question 9 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 9. Example: 13 students selected “Agree” when answering survey question #9.

*Survey Question 9 Results*

#	Answer	%	Count
1	Strongly Agree	27.27%	6
2	Agree	59.09%	13
3	Disagree	4.55%	1
4	Strongly disagree	9.09%	2
	Total	100%	22

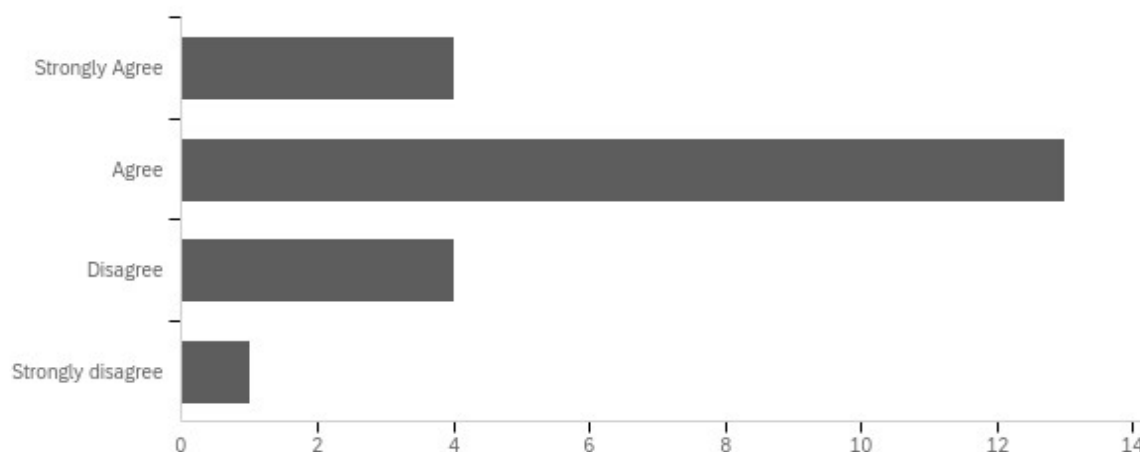
The acquisition of communication skills is integral to surviving in the contemporary globalized and multicultural world. Students must have opportunities to participate in activities that help develop communication skills such as learning how to listen, articulate, evaluate, and respond appropriately (Reed et al., 2021a, 2021b). One of the attributes of communication that

was analyzed in this section was whether the project enabled participants to communicate more effectively in a learning environment. However, the ability to demonstrate effectively is paramount in other spheres of life. Survey question #9 concentrated on communication as a Virginia 5C, and students were asked to express their views concerning whether the senior project influenced their communication skills. Most participants "Agree" (86.35%) that the senior project did help better prepare them with knowledge of critical thinking as this skill pertains to the Virginia 5C's.

Survey Question 10. *Citizenship?*

**Table 9**

*Survey Question 10 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 10. Example: 13 students selected “Agree” when answering survey question #10.

*Survey Question 10 Results*

#	Answer	%	Count
1	Strongly Agree	18.18%	4
2	Agree	59.09%	13
3	Disagree	18.18%	4
4	Strongly disagree	4.55%	1
	Total	100%	22

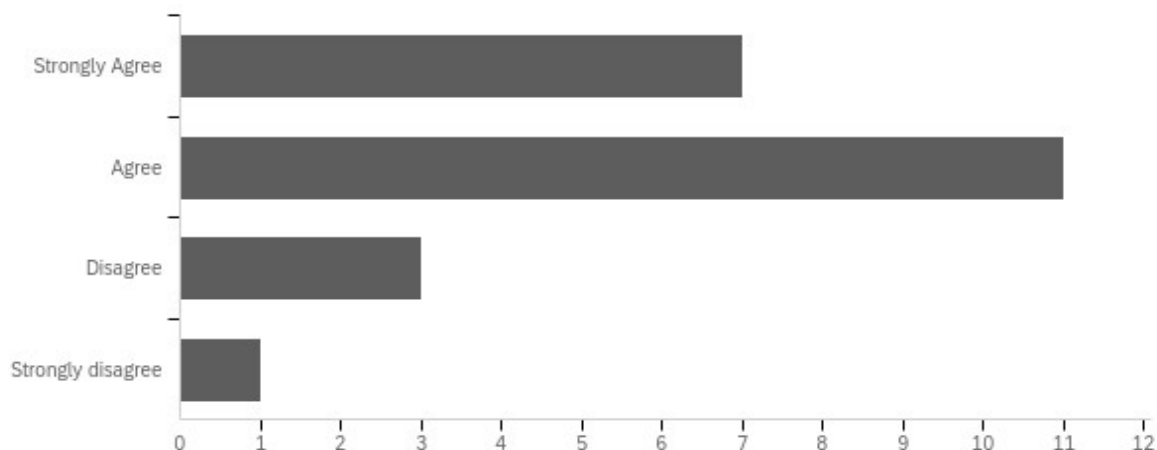
The Virginia Department of Education (VDOE) understands the value of preparing students who qualify to be global citizens. Primarily, this recognition arises from the realization that learners should be able to integrate different perspectives and interact effectively in a

globalized environment. However, to analyze this assertion, students were required to express how the completion of the senior project could influence how they qualify as global citizens. According to Beck (2020), citizenship in the 21st century will demand more than just individuals who obey all of the social norms. Most students agreed (77.27%) that the senior project did help better prepare them with knowledge of citizenship as it pertains to the Virginia 5C's. This observation aligns with the finding that global citizens must be collaborative, creative thinkers who are culturally competent.

Survey Question 11. *The senior project helped better prepare me for post-graduation?*

**Table 10**

*Survey Question 11 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 11. Example: 11 students selected “Agree” when answering survey question #11.

*Survey Question 11 Results*

#	Answer	%	Count
1	Strongly Agree	31.82%	7
2	Agree	50.00%	11
3	Disagree	13.64%	3
4	Strongly disagree	4.55%	1
	Total	100%	22

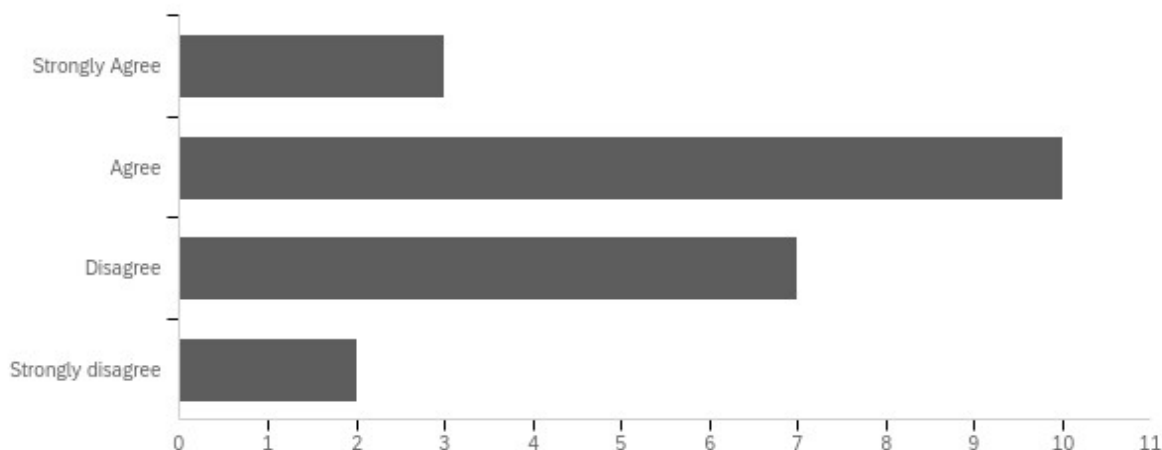
Learning and practicing the 5C’s is a demonstration that an individual can successfully undertake post-graduate studies. In most cases, post-graduate students must think creatively and critically. In addition, these learners should collaborate with other students and their instructors

to gain useful insights into diverse aspects of their courses. Most importantly, these students are often being prepared to work in various organizations where the 5C's must be applied. Thus, it was worth analyzing whether the senior project prepared students to undertake post-graduate studies successfully. Most of the participants agreed (81.82%) that the project was helpful in their endeavor to pursue further learning. The "Agree" response was again evident in most of the data.

Survey Question 12. *I enjoyed the senior project?*

**Table 11**

*Survey Question 12 Results*



The bar graph above is a chart that shows what answer the participants selected for survey question 12. Example: 10 students selected “Agree” when answering survey question #12.

*Survey Question 12 Results*

#	Answer	%	Count
1	Strongly Agree	13.64%	3
2	Agree	45.45%	10
3	Disagree	31.82%	7
4	Strongly disagree	9.09%	2
	Total	100%	22

How participants respond to a survey depends on whether they enjoy and had a meaningful experience with the task given to the group. In this regard, a question was designed to test the extent to which the selected students enjoyed the senior project. Of the 22 participants,

13 participants (59.1%) indicated that they enjoyed the survey. However, a larger percentage (40.9%) of participants disagreed compared to previous questions. Such a response involves reviewing and revisiting the design of participant questions to enhance their satisfaction or design the senior project so that the students will better enjoy the experience.

Survey Question 13. *What was your main take away from the senior project? Please type a response.*

It can be meaningful to collect respondents' views about the lesson learned from their participation in research. Thus, the last survey question, the only open-ended question, provided valuable results. Of the responses, interviewing and communication skills were the common themes. Responses such as "How to properly conduct myself in an interview," "The right way to answer interview questions," and "Basic skills of communication during an interview because an interview is a lot different than a conversation you may have with a friend or family member", were stated. All these findings are evidence that a common theme was that students believed the senior project assisted with interviewing skills and communication. Of the 20 responses to question #13, only two mentioned the resume. Two students expressed displeasure, reporting that "Many job finding tips known by adults are very outdated and interviews are anxiety-inducing" and "It (senior project) was rushed and not worth it." This information can help improve the senior project instruction and research study designs to make findings more valid and reliable.

### **Research Question Summary**

The central research question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills? An electronic survey was administered to 22 participants (senior students). The data analysis generated those senior students at the selected public high school agreed the senior project better prepared them for 21st

century skills and the 5C's. A theme from the open-ended response question was that the interview portion of the senior project helped students prepare for a workforce interview. In summary, the senior project provided exposure to students with 21st century skills and the 5C's. The next section discusses the findings of the study and implications. It highlights the application of these findings to policymakers at different levels. The next section also looks at how the results can be put into practical use through implementation in secondary public schools.

## Chapter 5: Findings, Implications, and Conclusion

### Introduction

The purpose of this qualitative study was to gauge the perception of senior students regarding their exposure to the Virginia 5C's (5C's) and the 21st century skills through a senior project experience. Information was gathered to identify improvements that could be made to the senior project at a public secondary school to determine if 21st century skills and the 5C's were exposed to students. The central research question was, Did the senior project at a rural high school in Virginia expose students to the 5C's and 21st century skills? The aim of the survey was to discover the perceptions of the participants regarding the senior project.

### Overview of Findings

1. Participants agreed that the senior project exposed them to the 5C's.
2. Participants agreed that the exposure of 21st century skills occurred during the senior project.
3. Participants agreed that the senior project helped better prepare them for post-graduation.
4. Participants agreed that they enjoyed the senior project.

### Discussion of the Findings

#### *Participants agreed that the senior project exposed them to the 5C's (Finding 1).*

Education needs to focus not only on the transmission of knowledge but also on the essential skills: critical thinking, creative thinking, collaboration, communication, and citizenship (Beck, 2020; VBOE, 2017; VDOE, 2016, 2020). Participants (17/22 or 77.27%) agreed that the senior project helped them become familiar with the 5C's.

Among the 21st century skills is the ability to communicate, analyze, collaborate, and address issues. Critical thinking skills allow individuals to clarify concepts, seek possibilities, evaluate knowledge, and use logic to solve problems. Since the 21st century presents a myriad of challenges, mainly caused by global development, a fundamental objective of modern learning is to instill critical thinking skills and allow them to develop innovative solutions to these challenges. In regard, this question was designed to evaluate the students' view of how their critical thinking skills changed as a result of completing the senior project. The theme connected with the 5C's to determine if a different project or a modification was needed to improve these skills.

Critical thinking empowers students to discover the truth in assertions, especially when separating fact from opinion. The ability to access background knowledge in multiple domains is essential for students to think creatively, solve problems, and make decisions. According to a study by Wagner (2008), business executives repeatedly reported that the heart of critical thinking and problem solving is the ability to ask the right questions. The survey question about critical thinking resulted in 86.36%, (19/22), of students who agreed that critical thinking skills were addressed during the senior project and seniors are better prepared with critical thinking.

Creative thinking allows students to embrace their strengths, from big-picture planning to meticulous organization around their work. When students learn about their creativity, they also learn how to express it in healthy and productive ways. More importantly, students also become motivated to share that creativity with others. In order to think creatively, one must have the ability to analyze problems, form an opinion, and be open-minded (Beck, 2020). The survey question referring to creative thinking resulted in 86.36% (19/22) of students who agreed that creative thinking skills were addressed during the senior project.

Creative thinking is connected to critical thinking and other related competencies, such as intrapersonal, cognitive, and interpersonal skills. Notably, thinking outside the box is what constitutes creative thinking. It implies that students who have adequately acquired this skill should be able to look at issues from multiple perspectives (Saleh, 2019). For this reason, the study had to assess how the completion of the senior project by high school learners would influence their ability to think creatively. Besides, the challenges in the 21st century necessitate a high deal of creativity.

Primarily, creative thinking is concerned with the ability to see new opportunities, the flexibility to adapt to changing environments, and the capacity to generate new ideas. The demand for creative skills increases as the 21st century's challenges increasingly become complex. Therefore, it was worth testing whether creative thinking skills could be influenced by students' participation in the senior project. With the seventh survey question, the researcher sought to establish any correlation between the senior project and creative thinking by asking participants their view of the project's effect on their creative thinking.

Collaboration is the practice of working together to achieve a common goal (Beck, 2020; Partnership for 21st Century Skills, 2007; Wagner, 2008). Collaborative problem-solving is a complex, organized process that combines a set of distinct sub-skills in accordance with a current need (Beck, 2020). Since collaboration necessitates numerous individuals' need to work together towards a common goal, it cannot be done without active communication. The survey question referring to collaboration resulted in 77.27%, (17/22), students who agreed that collaboration skills were addressed during the senior project and they are familiar with them.

Collaboration has become an essential skill for the 21st century. Primarily, collaboration entails personal lifestyle and interaction philosophy, where people become responsible for their

actions. Collaboration is about interacting with others to apply knowledge and reach a shared understanding. Although it is challenging to grasp initially, it is foundational for other 21st century skills (Jacobson-Lundeberg, 2016; Kent & Cukurova, 2020). The skill involves coordinating with others to solve complex problems. Contemporary society presents new demands that require individuals to work together on solutions to specific problems of critical concerns. In addition, the new environment has led to the shift of emphasis towards group work. For example, in a school setting, collaboration is integral to supporting collaborative learning, which is a core pillar of success.

In learning, collaboration can be described as an educational approach to learning and teaching, which entails a group of students working together towards a solution to a specific issue. In a collaborative learning environment, students are challenged both emotionally and socially as they listen to diverse perspectives, and they must articulate and defend their own views within the context of the classroom (Laal et al., 2012). Collaboration allows learners to develop decision-making, communication, leadership, and conflict management skills, which are essential for dealing with 21st century issues in the workplace and in social life. Moreover, most participants agreed that the project improves their collaborative skills. Because most students have experienced the effect of problems in modern life, collaboration skills can be readily effective in everyday challenges.

Students become actively involved in regular interactions with others through collaborative learning, thereby improving their diverse social skills. However, since modern learning has embraced digital technology that promotes virtual and distant learning, it was justified that 22.72% of the respondents (5/22) disagreed that the senior project improved their collaboration skills. Mostly, these students perceived they did not see the value of collaborative

learning. In the above question, the study was interested in examining the role of collaboration as one of the 5C's, and it found that most students who participated in the senior project agreed to have their collaborative skills improved by the project. The next question participants were required to answer related to communication.

Communication involves the exchange of information or ideas to improve understanding between participants and is the first element necessary for collaboration. Communication also teaches students how to convey ideas efficiently. For example, communication allows students to manage tasks and teamwork successfully. According to Beck (2020), communication, verbal or non-verbal, relies on a two-way process that transfers information from the communicator to the listener. The communicator selects a medium from which to send a message to the listener who then will decode the processed information and will send the feedback to the communicator. The survey question referring to communication resulted in 86.36%, (19/22), students who agreed that communication skills were addressed during the senior project. A considerable number of researchers have identified communication as a key aspect or skill in achieving various life goals.

Regarding question nine, students were required to indicate whether they agree or disagree with the contention that the senior project enhanced their communication skills. Primarily, communication skills are instrumental in social interactions in the 21st century. Individuals communicate to share experiences and ideas as they express their feelings, leading to improved relationships. The modern world is increasingly becoming integrated, creating opportunities for increased socialization. As a result, developing effective communication skills is vital for students to help them engage effectively in the learning environment and in their future workplaces.

Communication is highly connected to the other “C's”. For instance, it is relatively difficult to develop effective collaboration skills without being able to communicate effectively. A classroom that allows learners to listen, reflect, and communicate with teachers and other students contributes significantly to the learner’s ability to communicate effectively. Communication enables learners to listen actively and provide viewpoints and understanding for diversity. Besides, learners are encouraged to visualize and reflect on their thinking. They can explore and assess their strengths and weaknesses of diverse forms of communication, such as virtual, oral, and written communication (Huang et al., 2019). However, two participants “Strongly disagree” that the senior project had a significant positive effect on their communication skills. Probably, these respondents did not view the senior project as a tool for improving their communication skills, or they did not fully understand the project's influence on communication skills.

Citizenship is important in education so that students begin to understand their surrounding communities and take practice at becoming successful citizens. According to Beck (2020), citizenship in the 21st century society demands much more than individuals who obey the social norms. Bennion and Laughlin (2018) highlighted a drastic decline in young people's participation in civic and community development programs. The survey question referring to citizenship resulted in 77.27%, (17/22), of students who agreed that citizenship was addressed during the senior project.

***Participants agreed that the exposure of 21st century skills occurred during the senior project (Finding 2).***

The 21st century skills are the building blocks of 21st century citizenship and learning. Undoubtedly, these skills are crucial for success in the contemporary world, which is

characterized by a constant evolution in diverse aspects. Modern learners are expected to be digitally literate, civically literate, and globally competent to thrive successfully in the 21st century world. These students must be equipped with skills that will enhance their contribution to building society. Thus, since the world is highly globalized, enhanced global awareness and cultural competence are necessary to allow students to interact and collaborate effectively within a globalized learning environment.

The term 21st century skills refers to a broad set of knowledge, technological skills, soft skills, work habits, and character traits that are believed to be critically important to success in today's world (Davis, 2016; Jacobson-Lundeberg, 2016; Rios et al., 2020; Trilling & Hood, 1999; Wagner, 2008). Technology and globalization have abounded in the 21st century. In the past two decades, production has shifted from labor-intensive to technology-oriented manufacturing (Van Laar et al., 2020). Twenty-first century skills can be applied to all branches of knowledge and in all instructive, professional, and community settings across the lifespan. The electronic survey resulted in 90.91%, (20/22), of the participants agreeing that the senior project addressed 21st century skills.

***Participants agreed that the senior project helped better prepare them for post-graduation (Finding 3).***

Business leaders and employers are not concerned with academic content; however, everyone stresses the importance of critical thinking, communication skills, and collaboration. Student development of 21st century skills is needed to promote workforce preparedness (Wagner, 2008; Darling-Hammond & Adamson, 2010; Davis, 2016; Zhao, 2015). The electronic survey resulted in 81.82%, (18/22), of the participants agreeing that the senior project addressed

helped better prepare them for post-graduation. The survey question regarding post-graduation also generated the most “Strongly Agree” with seven in total.

Families, parents, and schools play an incredibly vital role in promoting the development of the 21st century skills and becoming global citizens. Notably, offering students the opportunity to acquire 21st century skills allows them to explore opportunities to grow the knowledge, skills, and mindsets they require to be successful in their lives and careers. For example, the majority of students who participated in the survey “Agree” that their completion of the senior project improved their creative and critical thinking skills, which are instrumental in skills building for innovation and problem-solving. Additionally, the acquisition of the 5C's exposes students to new career opportunities by preparing them to deal with critical issues in their current and future life.

***Participants agreed that they enjoyed the senior project (Finding 4).***

The time is long past that educators should only focus their instruction towards individuals who plan to work on assembly lines and other routine jobs, which require only basic and standardized knowledge and skills (Zhao, 2015). A low majority of students (9/22) “Disagree” that they enjoyed the senior project. The highest number of “Disagree” and “Strongly Disagree” was recorded with this survey question. Agreeing that the senior project was enjoyable with 59.1% of the participants, (13/22), is a demonstration of the value it added to students, particularly in terms of sharpening their 21st century skills. Supposedly, those who disagreed that the completion of the senior project was not enjoyable could have been less aware of its value or did not fully participate in the project.

**Practitioner Implications**

Secondary school principals interested in implementing a senior project that acknowledges the 5C's and 21st century skills should consider the findings of this study upon implementation.

1. **Principals could consider implementing a project focused on the Virginia 5C's and 21st century skills.** This study's findings suggest that the 5C's and 21st century skills were exposed students to skills that could help solve complex issues in their social and career life. For example, collaboration, creative thinking, communication, and critical thinking skills are needed in different spheres of life in the contemporary world. Thus, school principals should be encouraged to embrace training programs that emphasize these skills. There is a need to engage teachers in the design of a syllabus that will align with the 5C's and 21st century skills training to make sure that students are adequately prepared to embrace and utilize these competencies. This implication is associated with Findings 1 and 2.
2. **Principals could consider implementing a project to give students a sense of preparedness for post-graduation success.** Finding 3 suggested that the students who participated in the senior project perceived that they are better prepared for post-graduation. Principals could consider implementing a project if the goal is to prepare students for post-graduation experiences. Creating a professional resume and preparing for an interview were part of the senior project and both are useful tools that can be used after graduating high school.
3. **Principals could consider implementing a project and design that would be enjoyable for students.** Finding 4 exposed that students who participated in the senior project enjoyed the experience. With most learning environments involving

high school students, students are enjoying their experience are retaining information at a higher rate. Making the project enjoyable so that students do not lose interest is important in the overall success of the project.

### **Policy Implications**

Despite several limitations in the research process, the results of this study can be applied to policymaking. The study assessed high school students and the findings show, specifically Findings 1 and 2, that the 5C's and 21st century skills were exposed during the project. The VDOE should consider using a project to integrate the 5C's and 21st century skills in all public high schools. This study's results indicated that when students were provided an opportunity to focus only on the 21st century skills and the 5C's during a project, students perceived that they exposure took place.

### **Conclusion**

This study contributes to the body of research in public education concerning whether student projects are successful at implementing education initiatives. This project was specific to the 21st century skills and the 5C's. However, this could be the basis of other student studies within a class. The students involved in the project were cooperative, and most agreed that the senior project was beneficial to them in learning about 21st century skills and the 5C's. The main purpose of the senior project was to expose students to 21<sup>st</sup> century skills, the 5C's, create a professional resume, and experience an informal interview that would better prepare students for post-graduation success whether the graduate has planned to enter the workforce, military, or a higher education institution. According to the data, this occurred.

### **Recommendations for Future Research**

1. A study on other senior projects throughout the state of Virginia would be another avenue that research and data could be collected. Researching high schools in other school divisions could yield a comparison of senior projects and whether they are beneficial or not. Potential drawbacks will always be the instructor of the project course. Differences in teaching styles will always be a factor when working with human beings. Consistency will be the most difficult measure while implementing student projects.

### **Researcher Reflections**

The researcher of this study has witnessed various changes in educational trends over the past 13 years in public education. When the researcher began their career in the mid-2000s, public education was focused on standardized testing and a “teach to the test” mentality was instilled upon educators. College and career readiness courses were not yet clearly defined by any state department of education, and a focus on preparing students for college was the main goal. In the researcher’s opinion, the focus of the 21st century skills, *The Profile*, and the 5C’s could better prepare high school graduates resulting in better workers, scholars, and citizens without teaching towards a standardized test.

With the researcher of this study being an active secondary school administrator, *The Profile* and the 5C’s legislation has ignited a new sense of urgency in them personally and professionally. For years, the researcher has been an advocate for student choice in classes, schedules, and work placements. The researcher was pleased to see recommendations from the VDOE with initiatives including the focus on 21st century skills. Preparing students for post-graduation opportunities has always been a main priority of education, whether it is preparing for the workforce, military, or college. With *The Profile* and 5C’s legislation, educational leaders

now have a framework that states expectations for educating students based on the importance of the 21st century skills rather than content-oriented assessments.

By conducting this study, the researcher continued research on the 5C's derived mainly from Reed's Virginia-based collaborative studies of how problem-based learning (PBL) instruction contributed to the development of *The Profile* expectations of the 5C's (Reed, 2020; Reed et al., 2021a, 2021b). These studies describe what strategies aided in the skills development of *The Profile*'s expectations of the 5C's. Of the seven findings in Reed's (2020) study, four findings were specific to the 5C's. Participants indicated that working in small groups increased communication and collaboration skills, participants indicated that student-centered learning and student choice aided in the development of creativity and communication skills, participants indicated that PBL instruction increased students' critical thinking skills, and participants also indicated that peer-to-peer relationships aid in the develop of citizenship skills (Reed, 2020; et al., 2021a, 2021b). Building on Reed's research, the researcher of this study wanted to implement a senior project to expose senior students to the 5C's and 21st century skills.

The researcher reflected on practices that would enhance the senior project experience. Leaders should consider more time for a project. A longer timeframe for the actual project would allow for a deeper involvement in introducing and becoming familiar with 21st century skills and the 5C's. A longer (e.g. two-week) timeframe for students to participate in a senior project is the first recommendation. The senior project used for this study had one instructor over a four-day period with only 30 minutes a day to cover the 21st century skills, the 5C's, a professional resume, and an interview process. Overall, this would benefit the population involved by yielding more data and bringing a more accurate understanding of how 21st century skills and the 5C's can be used. The data analysis suggested that the senior project seemed rushed and not

efficient. Besides, due to time limitations, it was not possible to use other data collection methods, such as personal interviews to gather first-hand information.

A recommended, larger sample size could have produced more adequate results and further insight of how 21st century skills and the 5C's can benefit high school students. The researcher is grateful that the students involved in the study recognized the benefit of learning about 21st century skills and the 5C's. Further discussions on the senior project at the public secondary school where this study occurred, will determine placement in a curriculum, length of instructional practice and identify the age group that would benefit from the project.

This study could be altered as the instruction could be embedded into an academic course for a more detailed, in-depth learning requirement. An example would be to use a required academic course, such as English, that all students must enroll in and receive credit for graduation. A recommendation is for the project to be moved to sophomore students, not senior students. Several of the senior students during the interview portion of the project suggested the project would have been more beneficial at the sophomore level as many students begin interviewing for jobs at this age. This study could be altered for researching a project involving an interview process at the sophomore level.

As an education leader with a passion for 21st century skills and the 5C's, this study exhibited the importance of these skills as being presented to students through a senior project. Public education has seen a shift in Virginia from the importance of standardized testing to obtaining lifelong skills used within companies, organizations, and other workplaces upon graduating high school. Based on the results of this study, most students agreed that the senior project exposed them to the 21<sup>st</sup> century skills and the Virginia 5C's.

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### Appendix A: Table of Sources

This section contains the scholarly sources from the literature search and review process in relationship between 21st century skills, *The Profile of a Virginia Graduate*, and the 5C's. Themes were coded based on the correlation between the 21st century skills, *The Profile of a Virginia Graduate*, and the 5C's.

Author(s) Year	Research Questions/Purpose	Main Themes:	Methods/Data Sources	Findings/Important Information
Albay and Serbes (2017)	Career development and career planning are very significant in the current age of technology, because current century and global changes have given birth to an atmosphere in which nearly everything is in competition with each other. This case is also valid for educators.	Twenty-first century skills		<p>Career development in education</p> <p>Workplace readiness skills</p> <p>Teachers should be open-minded people, especially concerning innovations and internal or external (self) evaluations.</p> <p>Career development and career planning are very significant in the current age of technology, because technology brings out changes, innovations and newness.</p>

Bandyopadhyay and Szostek	Assessing critical thinking using simulated behavioral exercises	5C's Twenty-first century skills	Students are placed into realistic, work-related assessment center exercises to assess a variety of skills, including critical thinking. Students complete seven time-pressured exercises that involve very different situations. The following are the exercises and tasks involved in each exercise. 94 students were tested during 2013–2014 academic year. The students were administered seven exercises which had to be completed within four hours. All exercises took place in a simulated, realistic work-related environment.	Critical thinking is a skill that potential employers expect all graduates to possess.  We defined critical thinking as a three-step process. First, critical thinking was defined simply as the ability to identify relevant facts, to identify and analyze options, and to reach an appropriate final decision. The second step was to identify specific critical thinking-related behaviors that were amenable to observation in an assessment center setting and to organize them into classifications.
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Beck (2020)	<p>Teacher's perceive that 21st century skills to be very important and more relevant to some content areas success.</p> <p>Study showed that 21st century skills are defined differently.</p>	Twenty-first century skills/ <i>5C's/Profile</i>	<p>Qualitative case study of high school teachers' perceptions- conducted in one high school in NOVA.</p> <p>Two teachers from each content area were used to conduct one-on-one interviews.</p>	<p>A critical thinking strand within the field of education has evolved. Collaboration, communication, citizenship</p> <p>In order to think creatively, one must have the ability to analyze problems, form an opinion, and be open-minded</p> <p>Education needs to focus not only on the transmission of knowledge but also on the essential skills: critical thinking, creative thinking, collaboration, communication, and citizenship</p> <p>Valuable information regarding the perceptions of high school teachers in regard to teaching 21st century skills.</p> <p>In 2014, the General Assembly in Virginia formed the Standards of Learning Innovation Committee (SOLIC) in order to address the growing concerns of employers</p>
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Bennion and Laughlin (2018)	Single paper-length article to get updated on all relevant civic education and engagement articles. Readers can quickly review the basic findings of each article as they consider which interventions to implement or read more about in the journal. This article thus serves as a practical resource for current and future scholars of civic education in political science, letting them know what others have tried, what others have discovered, and where we need to go next.	5C's- Citizenship	A detailed overview of civic engagement articles published in the discipline's only peer-reviewed journal devoted exclusively to teaching and learning. It provides a clear and concise overview of the topics, subfields, interventions, assessment methods, and research findings of civic engagement scholars publishing in the Journal of Political Science Education during the journal's first 12 years. <sup>3</sup>	Drastic decline in young people's participation in civic and community development programs. The authors noted that youths' disinterest in civic matters undermined democracy and indicated their unpreparedness for future leadership. Participation in high-quality political engagement interventions leads to gains in political interest, skills, and participation levels for all students though gaps may persist based on students' initial levels of interest, skill, and participation. Maximize civic involvement among students, educators should reach them during early adulthood, provide social and communal opportunities to engage with peers, and develop student leaders who can engage other students.
CBS (2009)	Purpose: Obama delivered remarks on education reform.	Twenty-first century skills	Interview with US Hispanic Chamber of Commerce	Obama's speech on 21st century learning. Preparing our generation for more than filling in

				<p>bubble sheets. Spoke on different states having different standards. Today's system of 50 different sets of benchmarks for academic success means 4th grade readers in Mississippi are scoring nearly 70 points lower than students in Wyoming -- and they're getting the same grade.</p>
<p>Darling-Hammond, L. &amp; Adamson, F. (2010)</p>	<p>Teaching to the test under NCLB is not working. Practical working skills are not evident on a multiple choice test.</p>	<p>Twenty-first century skills 5C's Performance based assessments</p>	<p>National Survey. NCLB vs. ESEA</p>	<p><i>Twenty-first century skills</i> are needed to promote workforce preparedness</p> <p>Students need to be able to find, evaluate, synthesize, and use knowledge in new contexts, frame and solve non-routine problems, and produce research findings and solutions</p> <p>Standardized testing vs. performance based testing. Examples from different countries and different states. Shows benefits of PBA.</p>
<p>Denda and Hunter (2016)</p>	<p>To better prepare academic libraries with efficient 21st century skills</p>	<p>5C's Twenty-first century skills</p>		<p>Twenty-first century librarians are expected to be comfortable with technology, public</p>

				<p>speaking, and people and also have the ability to collaborate effectively, communicate clearly, think creatively, engage with their audiences, and embed themselves in their communities</p> <p>Noted that teachers should include communication and collaboration skills among their students to foster community engagement.</p>
Fletcher & Tyson (2017)	Explore how technical skills taught and learned in Florida engineering and engineering technology-themed career academies fit technical skills desired by local employers in technology and manufacturing.	Twenty-first century skills	70 students and four teachers from career academies at four high schools and 27 industry leaders from the same geographical region of Florida	The emergence of technology has revolutionized all sectors regardless of their operations. Employers expressed an urgent need for technical skills using appropriate equipment and technologies
Glossary of Education Reform, The. (2016)	Definition of 21st century skills.	Twenty-first century skills	<p>Article explaining the benefits of 21st century skills.</p> <p>Includes arguments that are in support and against 21st century learning</p>	<p>List of 21st century skills</p> <p>These skills which are typically motivated by the belief that all students should be equipped with the knowledge, skills, work habits, and character traits they</p>

				<p>will need to pursue continued education and careers after graduation</p> <p>Twenty-first century skills can be applied in all subject areas, and in all educational, career, and civic settings throughout a student's life"</p>
Jacobson-Lundeberg, V. (2016, March)	<p>Pedagogical Implementation of 21st century skills</p> <p>Explores students' perceptions of how personal development education influenced their ability to communicate more effectively and work collaboratively with a range of peers and others.</p>	Twenty-first century skills 5C's	Examines students' perceptions of how intentionally taught 21st century skills have transformed their lives.	<p>Students' perceptions of how intentionally taught 21st century skills have transformed their lives</p> <p>Collaboration is another gateway skill because producing work with others is a highly challenging skill to acquire</p> <p><i>21st century skills</i> refers to a broad set of knowledge, skills, soft skills, work habits, and character traits that are believed to be critically important to success in today's world</p> <p>Communication skills lead into the more sophisticated, complicated soft skills of critical thinking, problem solving, stress management, and</p>

				<p>risk taking</p> <p><i>21st century skills</i> can easily be taught and embedded into core curriculum</p> <p>Communication is powerful and holds immense power in the development of successful human relations</p>
(Kenny, Bempechat, Minor, Olle, Blustein, & Seltzer (2016)	<p>Young people from low-income backgrounds, who have less education, and who belong to a racial or ethnic minority group are often marginalized from the economic, academic, and social resources needed to compete for the stable and decent work opportunities that do exist</p> <p>The interviews were designed to shed light on the post-high school experiences of urban high school graduates</p>	5C's	<p>A total of 18 low-income racially and ethnically diverse high school graduates (12 females; six males; eight Black, nine Latino, and one White) of Cristo Rey Northeast (a pseudonym) participated in this qualitative study.</p>	<p>Employees should use formal language during company meetings regardless of their acquaintanceship with the present audience</p> <p>Communication</p>
Naff, D. (2016)	<p>David Naff- Ph.D. Assistant Director Of Research And Evaluation, MERC. VCU graduate</p> <p>Purpose of this brief was to give a detailed insight of <i>The Profile</i>, 5C's, and 21st century skills</p>	<p><i>Profile</i> of a VA graduate</p> <p>5C's</p>	<p>Research Brief on <i>The Profile</i>- Gave overview of the entire policy.</p>	<p>Four skills deemed particularly relevant to K-12 education in Virginia: critical thinking, communication, collaboration, and creativity. Added Citizenship as fifth skill and C.</p>

Partnership for 21st century skills. (2007)	<p>Framework behind 21st century skills. No definitive design.</p> <p>Our mission is to realize the power and promise of 21st century learning for every student—in early learning, in school, and beyond school—across the country and around the globe.</p>	Twenty-first century skills		<p>A joint government–corporate organization which lists three types of skills: learning skills (creativity and innovation; critical thinking and problem-solving; communication and collaboration), literacy skills (information literacy; media literacy; ICT literacy), and life skills (flexibility and adaptability; initiative and self-direction; social and cross-cultural skills; productivity and accountability; leadership and responsibility)</p>
Rios, Ling, Pugh, Becker, & Bacall, (2020)	<p>US, UK, and Europe</p> <p>This is one of the first studies to empirically rank-order skill demand. In doing so, it is clear that oral and written communication, collaboration, and problem-solving skills are in high demand by employers, with particular emphasis on the pairing of oral and written</p>	<p>Twenty-first century skills</p> <p>5C’s</p>	<p>Results were replicated with a sample of roughly 120,000 job advertisements collected 1 year from the initial data collection.</p>	<p>Communication and collaboration are sought after for all employees in the workforce.</p> <p><i>Twenty-first century skills</i> refers to a broad set of knowledge, skills, soft skills, work habits, and character traits that are believed to be critically important to success in today’s world</p>

	communication.			<p>Communication skills lead into the more sophisticated, complicated soft skills of critical thinking, problem solving, stress management, and risk taking</p> <p>These skills which are typically motivated by the belief that all students should be equipped with the knowledge, skills, work habits, and character traits they will need to pursue continued education and careers after graduation</p> <p>Communication is powerful and holds immense power in the development of successful human relations</p>
Van Laar, E., Van Deursen, A. J., Van Dijk, J. A., & De Haan, J. (2020)	<p>Study brings attention to the determinants of 21st century skills and 21st century <i>digital</i> skills.</p> <p>Following skills are investigated: technical, information, communication, collaboration, critical thinking, creativity, and problem-solving</p>	<p>Twenty-first century skills</p> <p>5C's</p>	<p>Systematic literature review was conducted to provide a comprehensive overview of empirical studies measuring skill determinants.</p>	<p>Attention to the determinants of 21st century skills and digital 21st century skills</p> <p>To function interdependently, workers need a clear understanding of their own roles and those of their collaborating partners</p>

	skills			
Virginia Department of Education (2016)		Proposal for <i>The Profile</i> and 5C's		Entire proposal for legislature.
Wagner (2008)	In the new global economy, with many jobs being either automated or “off-shored,” what skills will students need to build successful careers? What skills will they need to be good citizens? Are these two education goals in conflict?	Twenty-first century skills 5C's	Interviews with business leaders Conducted. Research beginning with conversations with several hundred business, nonprofit, philanthropic, and education leaders. Then set out to learn whether U.S. schools are teaching and testing the skills that matter most. Observed classrooms in some of the nation's most highly regarded suburban schools to find out whether our “best” was, in fact, good enough for our children's future.	<i>Twenty-first century skills</i> refers to a broad set of knowledge, skills, soft skills, work habits, and character traits that are believed to be critically important to success in today's world  Business executives repeatedly reported that the heart of critical thinking and problem solving is the ability to ask the right questions.  Collaboration is the practice of working together to achieve a common goal. Teamwork and collaboration does not just happen in the same workplace as in the past.  Youth who struggle with basic written and oral communication skills while finding it difficult to be clear and concise while presenting.

**Legend:**

Twenty-first century skills

*The Profile of a VA Graduate*

5C's

## Appendix B: Survey Question Sources

This section shows the relationship between the electronic survey questions and the review of the literature. The electronic survey questions were carefully selected to show relevance from the research performed and to exhibit the importance of the question.

Survey Question	Sources	Relevance
Twenty-first century skills were addressed during the senior project.	Davis (2016), Jacobson-Lundeberg (2016), Rios, Ling, Pugh, Becker, & Bacall, (2020), Trilling & Hood (1999), Wagner (2008)	The term <i>21st century skills</i> refers to a broad set of knowledge, technological skills, soft skills, work habits, and character traits that are believed to be critically important to success in today's world.
Did the senior project help you become more familiar with the Virginia 5C's? a. Critical thinking b. Creative thinking c. Collaboration d. Communication e. Citizenship	Beck (2020), VBOE (2017), VDOE (2016, 2020)	Education needs to focus not only on the transmission of knowledge but also on the essential skills: critical thinking, creative thinking, collaboration, communication, and citizenship.
The senior project helped better prepare me for post-graduation.	Wagner (2008), Darling-Hammond & Adamson (2010), Davis (2016), Zhao (2015)	Business leaders and employers are not concerned with academic content; however, everyone stressed the importance of critical thinking, communication skills, and collaboration.  Student development of 21st century skills is needed to promote workforce preparedness.
I enjoyed the senior project.	Zhao (2015)	The time is long past that educators should only focus their instruction on individuals who plan to work on assembly lines and other routine jobs,

		which required only basic and standardized knowledge and skills.
What was your main take away from the senior project? Please type response.	Davis (2016)	Future employers demand that today's young adults are equipped with 21st century career-readiness and academic-citizenship skills for workforce entrance.

### Appendix C: CITI Program Certificate



Completion Date 04-Feb-2021  
Expiration Date 04-Feb-2024  
Record ID 33268430

This is to certify that:

**James Nycum**

Has completed the following CITI Program course:

**Social & Behavioral Research**  
(Curriculum Group)  
**Social & Behavioral Research**  
(Course Learner Group)  
**1 - Basic Course**  
(Stage)

Under requirements set by:

**Virginia Polytechnic Institute & State University (Virginia Tech)**

Not valid for renewal of certification through CME.



Collaborative Institutional Training Initiative

Verify at [www.citiprogram.org/verify/?w32692c43-7541-409a-8247-e7d40227526e-33268430](http://www.citiprogram.org/verify/?w32692c43-7541-409a-8247-e7d40227526e-33268430)

### Appendix D: Permission Letter

Dear [REDACTED] Superintendent of [REDACTED]:

As you are aware, I am a doctoral candidate in the Educational Leadership and Policy Studies program at Virginia Polytechnic Institute and State University. I am working under the direction of Dr. Carol A. Mullen. I have proposed a research study (IRB# 21-594) that, once completed, will become my doctoral dissertation. This letter is to inform you of the purpose of my study and to request your permission to conduct the research study at [REDACTED]. I am interested in [REDACTED] because of their implementation of a senior project.

The topic of my dissertation study focuses on 21st century skills, Virginia 5C's, The Profile of a Virginia Graduate, and the effectiveness of a senior project at [REDACTED]. The information collected in this study may be useful to other secondary administrators and teachers who wish to implement a senior project as another way to prepare students for the workforce, college enrollment, the military, and equip students with life skills for the adult world. The purpose of this research study is to gain perspective of the senior project at [REDACTED] for post-graduation preparation on 21st century skills, the Virginia 5C's, and The Profile of a Virginia Graduate. The study will include information from senior students who participated in the project during the fall of the 2021-2022 school year. The research study will involve voluntary participation in an electronic survey. All senior students will have the opportunity to participate in hopes that at least ten to twenty-five senior students will participate. The survey will be completed at the student's convenience and will be no more than 15 minutes in length.

Thank you for your consideration of this research to be conducted in a secondary school  
in [REDACTED].

Sincerely,

James F. Nycum, III  
Principal  
Doctoral Candidate, Virginia Tech  
[REDACTED]

## Appendix E: Survey Protocol

Thank you for agreeing to participate in this study to help the researcher collect information regarding the senior project at \_\_\_\_\_ during the fall of the 2021-2022 school year. For the purpose of this study, the senior project is a four day program (30 minutes a day) that all seniors will complete focusing on 21st century skills, Virginia 5C's, and The Profile of a Virginia Graduate. For students who voluntarily participated in the study, the following survey questions were used:

1. Do we have your permission to participate in this survey? There will be no penalty if you refuse to participate.

Yes or No.

2. Did you complete the senior project at \_\_\_\_\_?

Yes or No.

3. Did the senior project help you become more familiar with the Virginia 5C's?

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

4. Twenty-first century skills were addressed during the senior project.

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

5. Are you better prepared with the Virginia 5C's because of this project?

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

6. Critical thinking

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

7. Creative thinking

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

## 7. Collaboration

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

## 8. Communication

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

## 9. Citizenship

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

## 10. The senior project helped better prepare me for post-graduation.

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

## 11. I enjoyed the senior project.

(1) Strongly disagree; (2) Disagree; (3) Agree; (4) Strongly agree.

## 12. What was your main take away from the senior project?

Please type response.

## Appendix F: IRB Approval Letter



Division of Scholarly Integrity and  
Research Compliance  
Institutional Review Board  
North End Center, Suite 4120 (MC 0497)  
300 Turner Street NW  
Blacksburg, Virginia 24061  
540/231-3732  
irb@vt.edu  
<http://www.research.vt.edu/siro/hrpp>

### MEMORANDUM

**DATE:** August 18, 2021  
**TO:** Carol Ann Mullen, James Franklin Nycum  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572)  
**PROTOCOL TITLE:** Twenty-first Century Skills and Preparing High School Graduates for Success Through a Senior Project  
**IRB NUMBER:** 21-594

Effective August 10, 2021, the Virginia Tech Human Research Protection Program (HRPP) determined that this protocol meets the criteria for exemption from IRB review under 45 CFR 46.104(d) category (ies) 2(i).

Ongoing IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities impact the exempt determination, please submit an amendment to the HRPP for a determination.

This exempt determination does not apply to any collaborating institution(s). The Virginia Tech HRPP and IRB cannot provide an exemption that overrides the jurisdiction of a local IRB or other institutional mechanism for determining exemptions.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<https://secure.research.vt.edu/external/irb/responsibilities.htm>

(Please review responsibilities before beginning your research.)

### PROTOCOL INFORMATION:

Determined As: Exempt, under 45 CFR 46.104(d) category(ies) 2(i)  
 Protocol Determination Date: August 10, 2021

### ASSOCIATED FUNDING:

The table on the following page indicates whether grant proposals are related to this protocol, and which of the listed proposals, if any, have been compared to this protocol, if required.

*Invent the Future*