

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Educational Administration: Theses,  
Dissertations, and Student Research

Educational Administration, Department of

---

11-2019

## The Perceived Role of Online STEM Dual Credit in Rural Nebraska High Schools

Trentee Bush

University of Nebraska - Lincoln, trenteebush@gmail.com

Follow this and additional works at: <https://digitalcommons.unl.edu/cehsedaddiss>



Part of the [Community College Education Administration Commons](#), [Elementary and Middle and Secondary Education Administration Commons](#), and the [Higher Education Administration Commons](#)

---

Bush, Trentee, "The Perceived Role of Online STEM Dual Credit in Rural Nebraska High Schools" (2019). *Educational Administration: Theses, Dissertations, and Student Research*. 308. <https://digitalcommons.unl.edu/cehsedaddiss/308>

This Article is brought to you for free and open access by the Educational Administration, Department of at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Educational Administration: Theses, Dissertations, and Student Research by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

THE PERCEIVED ROLE OF ONLINE STEM DUAL CREDIT IN RURAL NEBRASKA  
HIGH SCHOOLS

by

Trentee Bush

A DISSERTATION

Presented to the Faculty of

The Graduate College of the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Doctor of Philosophy

Major: Educational Studies

(Educational Leadership and Higher Education)

Under the Supervision of Professor Marilyn L. Grady

Lincoln, Nebraska

November 2019

# THE PERCEIVED ROLE OF ONLINE STEM DUAL CREDIT IN RURAL NEBRASKA HIGH SCHOOLS

Trentee Bush, Ph.D.

University of Nebraska, 2019

Advisor: Marilyn L. Grady

This exploratory study was based on interviews with twelve participants, four community college dual credit coordinators and eight high school administrators (principals and guidance counselors). The purpose was to understand the role of dual credit STEM courses in rural Nebraska high schools and the impact these courses had on the institution. The interview process revealed the lack of uniformity in dual credit processes throughout the state.

The concept of dual credit is widely discussed. The potential benefits and challenges of these courses and programs are vast. Without national legislation, each state can make determinations and decisions about state-wide policies related to dual credit. This study was designed to understand how the policies in Nebraska impacted the institutions and the students.

The impact of dual credit courses, both in-house and online, were discussed by all the individuals who were interviewed. The impacts are presented as the themes that were revealed through the interview process. The impact themes were institutional, financial, student-based, and academic implications as well as the need for greater marketing of the courses and programs. Not all dual credit coordinators or guidance counselors were supporters of dual credit courses and programs. Although all saw the potential benefits for students, some admitted that this was not a “best fit” for all students or situations.

## DEDICATION

This study is dedicated to every educator who has ever touched my life in the classroom or as a peer. I would not have found the motivation to continue without every educator who believed in my potential or those who served as obstacles to my success. Each one of you served a role in this project either directly or indirectly.

I also dedicate this project to my family, especially to my parents who worked so diligently to enforce that higher education was a vital piece of my future. Their unwavering support of all my educational goals is not only inspiring but honorable. Additionally, I want to thank Brian Larrington, who tolerated many discussions on this topic to help me develop my own understanding of the complex issues; and, who kept me grounded at all stages of this process. He was truly my most dedicated cheerleader.

## THE PERCEIVED ROLE OF ONLINE STEM DUAL CREDIT IN RURAL NEBRASKA

## HIGH SCHOOLS

## TABLE OF CONTENTS

List of Figures .....	vii
List of Appendices .....	viii
CHAPTER 1 Introduction.....	9
Statement of the Problem .....	9
Purpose of the Study .....	10
Definitions .....	11
CHAPTER 2 Review of the Literature .....	12
History of Dual Credit in the U.S.....	12
Defining Dual Credit.....	13
Types of Dual Credit Delivery .....	14
Dual Credit Student Populations .....	15
Eligibility.....	16
Partnerships .....	17
Student-Based Benefits of Dual Credit .....	18
Transition.....	18
Access.....	19
Motivations.....	19

Persistence .....	20
Dual Credit Challenges for Institutions.....	22
Dual Credit Challenges for Students.....	25
Online Courses .....	26
Online vs. Face-to-Face Delivery Formats .....	27
STEM Courses .....	28
The Teaching of Online STEM Dual Credit Courses .....	29
Challenges to Rural High Schools in Nebraska .....	29
CHAPTER 3 Methodology.....	31
Methodological Design .....	31
Data Sources.....	31
Sampling Technique.....	32
Data Collection.....	33
Data Analysis .....	34
CHAPTER 4 Findings and Discussion.....	36
Institutional Implications.....	36
Eligibility.....	36
Technology .....	38
Scheduling and Competition .....	39
Challenges with Providing STEM Courses.....	40

Family Education Rights and Privacy Act (FERPA) .....	41
Financial Implications .....	43
Instructor Pay.....	43
Student Finances.....	44
Student-Based Implications.....	46
Interpersonal Skills .....	46
College Transition and Exposure to College.....	48
Academic Implications.....	49
Increased Curricular Offerings .....	49
Exposure to STEM Fields and Careers .....	51
Transcripts .....	51
Rigor and Expectations.....	52
Marketing of Dual Credit Courses .....	55
CHAPTER 5 Conclusion .....	58
Implications for Future Research .....	58
Limitations .....	59
Conclusion.....	60
References.....	61

## List of Figures

Figure 1 Total Number of Each Letter Grade Earned in ACE Scholarship Data 2018 .....	53
Figure 2 Number of STEM Scholarships to Total Number of ACE Scholarships 2018 .....	57
Figure 3 Percent of ACE Scholarships to STEM 2018.....	57

List of Appendices

Appendix A Official Approval letter for IRB Project # 19241 .....74

Appendix B Participant Email Contact Script .....76

Appendix C Qualtrics Institutional Demographic Survey .....77

Appendix D Informed Consent.....78

Appendix E Semi-Structured Interview Questions.....82

## CHAPTER 1

### **Introduction**

Dual credit courses are frequently used across the United States for a variety of issues including solutions to curricular challenges, financial solutions for students and institutions alike, and to boost partnerships between community colleges and local high schools. This has led to the booming growth of dual credit during the past decades. Despite this growth, dual credit programs and courses suffer from a variety of problems that affect the outcomes of this model.

Nebraska, considered a state with many rural schools, uses dual credit to help students earn college credit while they are still in high school. However, Nebraska has little research on the dual credit programs offered within the state. This research project aims at understanding the role of a distinct group of courses, online STEM dual credit courses, from the point of view of both the community college dual credit coordinators and the high school superintendents. This group of courses helps expand the curriculum in rural Nebraska high schools where STEM instructors are difficult to find, hire, and retain. This population of participants provides perspectives of those who either provide or receive the dual credit courses. These individuals provide insight into how and why dual credit decisions are made.

### **Statement of the Problem**

Rural high schools often rely on dual credit courses as a way to increase both Career and Technical Education (CTE) and general education curricular offerings for students (Barnett & Stamm, 2010; Hoffman et al., 2009; McCarthy, 1999; Young Jr. et al., 2014). Rural high schools in Nebraska are those schools that are more than 50 miles from a higher education institution. These schools often resort to online delivery methods of courses from their local community

college or university. More than ten years ago, 70% of school districts were reporting at least one student taking an online course (Barnett & Stamm, 2010). Although new data related to this statistic is not available, it is likely that online course growth has increased due to affordability, efficiency, and flexibility.

STEM courses, those in science, technology, engineering, and math, make up a portion of all required general education electives as part of an associate degree program. High schools also have minimum requirements in these areas. Many community colleges provide some form of dual credit STEM courses to satisfy the needs of college and high school students alike. However, STEM courses are fraught with challenges such as high attrition rates and interactive lab components that can be costly or cumbersome.

In this study, online STEM dual credit courses in rural Nebraska high schools were examined. This unique combination of variables is necessary for rural Nebraska students to have access to advanced curricular opportunities and, it is necessary for community colleges to help provide pathways for their future students' success. The level of success these courses achieve is important from the perspective of the stakeholders who drive and provide these courses. Although student opinions matter, this study sought the responses from the adult stakeholders who play a role in the development and delivery of the online STEM dual credit offerings.

### **Purpose of the Study**

The purpose of this qualitative study was to understand how administrators, at both community colleges and high schools, perceive the role of online STEM dual credit courses that are delivered to rural high schools. An understanding of how these courses function (or do not function) for high school students will help administrators navigate future decisions concerning

the implementation of dual credit programs or individual courses. The following questions guided the study:

- What is the role of online STEM dual credit courses in rural Nebraska schools?
- How do online STEM dual credit courses impact the institution?

### **Definitions**

For the purpose of this study, the following terms have been defined. For further explanation of the terms, see the literature review section of this study.

- *Dual credit* – courses a high school student takes during high school that allows them to earn both high school and college credit by using a college syllabus and curriculum
- *Online course* – a course having at least 80% of the content delivered through an online course delivery system
- *STEM* – science, technology, engineering, and math
- *Rural high schools* – high schools that are more than 50 miles from an urbanized area and/or their local community college or four-year institution

## CHAPTER 2

### **Review of the Literature**

#### **History of Dual Credit in the U.S.**

Dual credit was designed to help high-achieving students access a challenging curriculum while taking advantage of their senior year of high school and advancing their college agenda (Barnett & Stamm, 2010; Weisberg, Hughes, & Edwards, 2011). At the inception of dual credit, the goals also included reducing costs for families (and the state), bolstering partnerships between high schools and colleges, enhancing academic efficiency of the K-12 curriculum, reducing college remediation, and increasing college access (Young Jr., Slate, Moore, & Barnes, 2014). The first dual credit program was Syracuse University's Project Advance in 1973 (Greenberg, 1989) but, this system looked more like 2019 Advanced Placement courses in which students complete a test at the end of a two-semester course of study. In 1976, California began adopting state legislation that guided the dual credit effort (Mohker, & McLendon, 2009). During the next 14 years, dual credit had a slow start. Only 17 states adopted dual credit policies by 1990 (Mohker & McLendon, 2009). In 1985, Minnesota followed suit and passed comprehensive legislation in support of dual credit that allowed secondary students to earn a postsecondary education through dual credit courses (McCarthy, 1999). As of 2016, there were currently only two states, Alaska and New York, that had yet to adopt statewide policies for dual credit in their education programs, even though dual credit is offered and accepted by colleges within both states (Zinth, 2016).

Although early dual credit programs were aimed at high achieving students (Lichtenberger, Witt, Blankenberger, & Franklin, 2014), over time, dual credit was expanded to

include underserved populations such as low-achieving, low-income, and first-generation students, as well as students of color (An, 2013a, 2013b; Bailey & Karp, 2003; Community College Research Center, 2012; M. Kanny, 2014; Tobolowsky & Allen, 2016). Since the early 2000's, dual credit has been used to help students transition from secondary to post-secondary education by offering a more seamless K-16 process as was called for by the Consortium for Policy Research in Education (2000). In 2019, community colleges embrace dual credit as part of their mission to provide community education (Cohen, Brawer, & Kisker, 2014; Jones, 2017), and these institutions are responsible for the majority of dual credit programs available to students (Hoffman, Vargas, & Santos, 2009; Jones, 2017).

### **Defining Dual Credit**

Dual credit, a growing part of the community college mission, is defined as courses a high school student takes during high school that allows them to earn both high school and college credit by using a college syllabus and curriculum (Hoffman et al., 2009; Kleiner, Lewis, & Greene, 2005). In order to earn dual credit, students do not have to take a standardized test at the conclusion of the course (Tobolowsky & Allen, 2016) and, additionally, the college course is substituted for the required high school course (Hoffman et al., 2009).

The terminology for dual credit courses can be confusing. Tobolowsky & Allen (2016) make a point of stating that dual credit is often referred to as credit-based transition program for high school students entering college (Bailey & Karp, 2003) or an accelerated learning option (Anderson et al., 2006; Hoffman et al., 2009). Other terms associated with dual credit include *concurrent enrollment* or *joint enrollment*, and *dual enrollment*. Concurrent enrollment will not be a term used in this study, as concurrent enrollment refers to those courses in which high school students participate in college-level courses and earn only college-level credit (Andrews,

2001). More than 100 dual credit-type terms were found by the Higher Learning Commission in a study of state practices (Borden, Taylor, Park, & Seiler, 2013). This study did not include advanced placement (AP) or international baccalaureate (IB) courses as these courses follow a different format.

This study focused on rural high schools. According to the National Center for Education Statistics (2018), remote rural schools are defined as "...more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster" (p. 338). For the purpose of this study, rural high schools were defined as being more than 50 miles from an urbanized area and/or their local community college or four-year institution.

### **Types of Dual Credit Delivery**

Only 34 states have regulations on course offerings (Taylor, Borden, & Park, 2015). Many schools offer core courses, those considered to meet General Education requirements (Purnell, 2014) to help students make progress toward their first-year college credits. Career and Technical Education (CTE) is another area that dual credit programs focus on for the purpose of providing technical skills to help students directly enter the workforce or continue their technical education (Karp & Hughes, 2008). In 2013, approximately three-quarters of high schools were reporting dual credit students taking courses with an academic focus (General Education) while approximately half of the schools reported students taking a CTE-type course (Thomas, Marken, Gray, & Lewis, 2013). Approximately 600,000 students were enrolled in CTE courses in 2010-2011 (Thomas et al., 2013). States also allow the offering of remedial courses (Zinth, 2016) since this is considered part of the community college mission (Cohen et al., 2014). In terms of access, remediation through dual credit is seen as a way for high schools and community colleges to be flexible in overcoming barriers (Lieber, 2009). Regardless of the types of dual credit courses a

student takes, the programs offer flexibility through the multiple options available. Students with all academic skill levels can find an option that serves as a best fit for their future career needs.

### **Dual Credit Student Populations**

Dual credit is being used in education as a way to help students transition from high school to community college and as a way to give greater access to academically underrepresented students (Giani, Alexander, & Reyes, 2014). Dual credit can be used to educate various populations which makes it a useful tool in the advancement of students' college pathways. Through creative partnerships, more and more student populations have been targeted and reached through dual credit. Dual credit programs are now widely accessible. In 2010-2011, there were nearly 1.4 million students taking a dual credit course (Thomas et al., 2013).

Rural populations tend to have lower college attendance and completion rates (Alliance for Excellent Education, 2010). These rural and low-income school districts benefit from dual credit programs by having courses available to students that are not typically offered by the high school (Barnett & Stamm, 2010; Hoffman et al., 2009; McCarthy, 1999; Young Jr. et al., 2014). In fact, rural high schools are more likely to offer dual credit courses when compared to urban schools (Waits, Setzer, & Lewis, 2005). Many rural high schools in the state of Nebraska (and nation-wide) struggle to support upper-level courses in math and science, yet dual credit programs allow high school juniors and seniors to take advantage of these types of courses offered through their local community college dual credit partnerships (Alliance for Excellent Education, 2010).

As stated, dual credit was created with the purpose of helping high achieving students with challenging coursework and their ability to begin their college transition. Many programs

still focus on serving high achieving students by creating high eligibility requirements such as minimum GPA's or performance on college readiness tests (Jones, 2017; Zinth, 2016).

Although dual credit was intended to help high-achieving students transition to college, the agenda has shifted. Career and Technical Education (CTE) courses are now offered through dual credit options to students considered low achieving, low income, or at high risk for not earning college credentials (Tobolowsky & Allen, 2016). Many dual credit programs are targeted at these populations in order to promote the idea of going to college (Bailey & Karp, 2003; Bailey, Hughes, & Karp, 2002; Barnett & Hughes, 2010; Edwards & Hughes, 2011). At-risk students seemed motivated by the relevance and rigor of dual credit courses in CTE offered in the state of Louisiana (Reese, 2008); and in addition, students who struggle with high school success have been noted to receive a higher GPA through dual credit course enrollments than traditional high school students (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007).

### **Eligibility**

In 2015, only 37 states had student eligibility requirements (Taylor et al., 2015). Eligibility can include GPA, class rank, grade level, standardized test scores, and college placement exams (Kleiner et al., 2005; Zinth, 2016). For instance, Kansas students are assessed on their eligibility for dual credit using standardized high school test (Kansas State Assessment) scores (Kingston & Anderson, 2013). In addition, students may be asked to provide a letter of recommendation, parental approval, or meet course prerequisites (Marken, Gray, & Lewis, 2013; Zinth, 2016). Many colleges are moving toward requiring dual credit students to meet the same eligibility requirements as regularly-admitted college students (Kleiner et al., 2005; Marken et al., 2013). However, in some states, there has been movement away from GPA requirements to

allow greater access for students who are not considered high-achieving (Tobolowsky & Allen, 2016; Zinth, 2016).

### **Partnerships**

The dual credit process is seen by Karp (2015) as a structural reform between secondary and post-secondary institutions. This leads to partnerships between high schools and colleges or universities in order to create student opportunities through dual credit programs (Borden et al., 2013). Partnerships between a community college and the high school district are vital to student success and, they can serve as a remedy to the educational crisis related to low high school graduation rates and low college enrollment rates across the nation noted in an editorial on the educational crisis in America (Padron, 2009). In these partnerships, there are considerations such as funding, recruitment, improved educational outcomes, community/business resources and futures, and out-migration (D. Allen, 2010; Howley, Howley, Howley, & Duncan, 2013). Dual credit enables colleges to boost enrollment (generally part-time) through these students (Hiesterman, 2013). These factors play a significant role for institutions, educators, and students who need to bridge the gap between high school and college which allows dual credit to play that role. Padron (2009) calls for support of these community college – high school partnerships as they allow students to experience higher-level learning and to transition with experiences of success rather than academic failure.

Post-secondary institutions can benefit from offering dual credit programs. At Kennesaw State University in Georgia, the institution found that dual credit provided an increase in program quality, program productivity, and program viability (Kinnick, 2012). Program quality was impacted through recruitment of high-quality students, enhanced classroom environment, and a positive impact on the image of the university (Kinnick, 2012). Program productivity

contributed to college access and persistence by allowing students to come closer to earning the recommended 20 credit hours prior to the end of their first year at college (Adelman, 2006).

Program vitality was measured by the financial stability and demand for the program (Kinnick, 2012). In addition, colleges may attract and retain students to full-time enrollment and eventual degree completion due to the granting of college credits while students were still in high school (Allen, 2010).

Successful dual credit programs depend on a number of factors, one of these factors is partnerships with the community. For instance, a geology course taught in Arizona took advantage of dual enrollment through a local community college. While there are a number of benefits listed for the various stakeholders, there are three critical needs described by Lukes (2014) that are required to make dual enrollment successful. Those three needs include advanced planning (including a strong understanding of the financial implications), community support, and a consistent instructor pool (both at the high school and college level) (Lukes, 2014).

One key piece of the partnership puzzle is the need for student support systems. Academic support, such as tutoring (Edwards & Hughes, 2011), course sequence reconfiguration that makes sense to the high school student, mentoring, college preparatory programs, and career exploration opportunities are all suggested by (Barnett & Stamm, 2010). Communication and collaboration between institutions and the faculty at each institution is also an important piece of the support system (Edwards & Hughes, 2011; Karp & Hughes, 2008).

### **Student-Based Benefits of Dual Credit**

**Transition.** Dual credit students find that the exposure to college life provided through dual credit courses helps with the transition into the postsecondary world (Edwards & Hughes,

2011) by understanding the expectations and norms (Anderson, 2010; Kanny, 2015; Karp, 2012). College readiness is sometimes seen to be greater in students who have former dual or articulated credit which helps with student retention over time (Kim & Bragg, 2008). This college readiness helps students make and maintain their transition to college as seen by the increased retention. However, Borden et al. (2013) caution that dual credit may not give an “authentic” college experience and the transition between high school and college might not be seamless.

**Access.** Dual credit has been marketed as a program that allows underachieving and low socioeconomic students the benefit of attaining college credits, and ideally a college degree. In many cases, dual credit courses have free or discounted tuition rates. According to An (2013), parental education is the biggest influence on dual credit attainment. High school students in New York, enrolled in College Now (a dual credit program) at CUNY, reduced their time to degree by earning credits prior to high school graduation and also by increasing the number of courses taken once enrolled in college (Allen & Dadgar, 2012). A higher college GPA was also achieved by New York students (Allen & Dadgar, 2012).

In terms of college access, an increase in the diversity of courses available to high school students is seen as one of the benefits as well as lowering the cost of college (Borden et al., 2013). Equally as important, a reduction in the need for remedial coursework (Bailey, Hughes, & Karp, 2003; Edwards & Hughes, 2011; McCauley, 2007) can help students who might otherwise stall out or be too intimidated to pursue higher education due to remedial needs. These three considerations make accessibility to a college degree much more prevalent through dual credit programs.

**Motivations.** High achieving students who participate in dual credit often do so for a limited number of motivations. Those motivations involve the desire to learn and find academic

challenges, the desire to plan ahead, the desire to network with other intelligent peers, and to feel a sense of self-fulfillment (Dare, Dare, & Nowicki, 2017). Senior-level students may feel motivated to challenge themselves academically as basic requirements for high school graduation are essentially completed in grade 11; and, students are seeking electives to fill their schedule (Andrews, 2004; DiPuma, 2002). Also, many general education courses are duplicated during the first two years of college which can be seen as a waste of resources by students (Greenberg, 1989). So, there may be a desire to accomplish those courses while still in high school. McCauley (2007) found that urban minority students who voluntarily participated in STEM dual credit courses were found to have motivation (both intrinsic and extrinsic), self-knowledge, career planning, and school engagement in their top reasons for taking dual credit courses (Medvide & Blustein, 2010).

**Persistence.** College persistence is one of the challenges faced by community colleges as many students stop and start their college education. Dual credit students in Washington participate in a program called “Running Start”. According to Cowan & Goldhaber (2015), the Running Start students are more likely to attend college, but less likely to attend any four-year university. The likelihood to enter college was greater in the state of Nebraska for students formerly enrolled in dual credit courses as stated by (Dash, 2017). A study by An (2003) also found that dual credit courses increase college degree attainment; but, that a larger gain was achieved by students who took at least two courses in the program. Dual credit students were stated to be 34% more likely to enroll in college, and 22% were more likely to complete college when compared to non-dual credit students (Taylor, 2015). Slightly different statistics were found for students of color as they were 26% more likely to enroll in college and 14% more likely to complete college, while low-income students were 30% more likely to enroll in college

and 16% more likely to complete college than those who did not participate in dual credit (Taylor, 2015). In another study, students were found to persist at a four-year institution more readily if they had previously taken dual credit courses (Jones, 2014) and were more likely to graduate within six years from a four-year university compared to non-dual credit enrollees (McCauley, 2007). Students also earned a higher GPA if they had dual credit completions prior to college (Sullivan-Ham, 2010; Young Jr., Joyner, & Slate, 2013).

Students who take dual credit courses can benefit from academic momentum, as described by Wang, Chan, Phelps, & Washbon (2015). The academic momentum is made up of several factors including attempted credits, first-year GPA, and reducing delayed entry into college. Giani, Alexander, & Reyes, (2014) found that dual credit course completion led to a cumulative effect for the student on all postsecondary outcomes measured in the study. The taking of core academic courses as dual credit, including science and math, appeared to increase the likelihood that students would enroll in a postsecondary institution (Giani et al., 2014). Smith (2007) examined rural high schools in Kansas and found that educational aspirations were positively affected by enrollment in dual credit programs, and while grades and parent education level were also variables, they had a lesser impact than dual enrollment.

Educational aspirations appear to increase for students who take dual credit courses in an on-campus setting rather than staying in their high school (Smith, 2007). Tobolowsky & Allen (2016) stated that dual credit courses offered on campus help with the transition by providing a more realistic college experience. However, another study in West Virginia showed students in a math course performed better at their own high school than their peers did by attending an on-campus version of the same course (Pyzdrowski, Butler, Walker, Pyzdrowski, & Mays, 2011). A potential suggestion for this difference in performance was the involvement of high school

facilitators in the one-on-one needs of students as suggested by the authors (Pyzdrowski et al., 2011).

In a study by An (2014), dual credit students were shown to have higher academic motivation. Students also appear to have a higher success rate of persistence into their second year and ultimately completion if they are able to complete 20 credit hours in the first year (Adelman, 2006; Swanson, 2008). Dual credit boosts this potential by allowing students to earn credit hours toward that first year of college. Adelman (2006) stated that a minimum of 6 credit hours of dual credit helps while 12 credit hours are “guaranteed momentum”. Dual credit students seem to have a leg up on students who participate in traditional high school pathways. Swanson (2008) found that dual credit students were 11% more likely to persist through their second year of college and 12% more likely to enroll in college within seven months of graduating from high school when compared to non-dual credit students.

### **Dual Credit Challenges for Institutions**

Funding can be a challenge for all institutions offering dual credit programs as tuition is often offered at discounted prices or waived (Edwards & Hughes, 2011; Hoffman et al., 2009; Marken et al., 2013). This model typically creates a deficit for the institution (Karp, Bailey, Hughes, & Fermin, 2004), however, some institutions use dual credit students to increase their headcount which, in turn, increases state funding per student (Kinnick, 2012). However, in states that receive funding for both high school and college enrollments, there tends to be some confusion about how the student should be counted, secondary or post-secondary, and which institution should be receiving the funding (Kronholz, 2011).

Controlling the quality and rigor of dual credit courses often comes under fire (Speroni, 2011). Taylor et al. (2015) reported that only 37 states have policies in place to regulate instructor eligibility and only 32 states have some form of quality assurance for their dual credit programs. However, the National Alliance of Concurrent Enrollment Partnerships (NACEP) is an organization from whom high schools and colleges can voluntarily seek accreditation status. As of May 2018, there were 107 institutions accredited across 23 states (NACEP, 2018). As part of this accreditation process, program approval is achieved with periodic program reviews, student outcomes are analyzed, regular collegial meetings are offered, courses are approved, partnership MOUs are reviewed, and data is collected through annual reporting (Lowe, 2010).

The rigor of dual credit courses has long been debated and continues to be a challenge (McCarthy, 1999; Tobolowsky & Allen, 2016). Students also can suffer negative effects toward their high school and college GPA if a dual credit course goes awry (Jones, 2014; Karp & Hughes, 2008) and often struggle to navigate the college support systems that may or may not be available to high school students enrolled in dual credit courses (Kanny, 2015). Students in high school are noted as having a gap between their high school academic skills and those needed in the college classroom which can cause a slight drag in rigor if the instructor does not have a pedagogical plan (Hughes & Edwards, 2012). High school students may require different pedagogical strategies and additional support that is not offered to traditional college students for the same course (Hughes, 2010). A strong set of eligibility requirements and transparent admission policies can also help maintain the standards of each individual partnership between colleges and high schools which in turn will help maintain rigor in each course offered (Krueger, 2006).

When faculty perceptions of rigor and quality were tested Ferguson, Baker, & Burnett (2015) found that the dual credit courses were at least as rigorous as the college-level general education courses taught to standard community college students. However, they found that the dual credit student behaved with much less maturity and was found to be much less “college-ready”. Other students also found the dual credit high school students’ maturity to be an issue in decreasing the quality of the course, especially, those considered non-dual credit, traditional college students (Hiesterman, 2013). This shows that while rigor may often come under fire, and may occasionally be a true concern, the college readiness of some students may be causing issues with curriculum quality (Bailey et al., 2002).

Instructor eligibility is an issue of accreditation for the community college. In Nebraska, dual credit instructors must have a Masters's degree or 18 graduate hours in the field in which they are teaching dual credit (Higher Learning Commission, 2014) and this practice is generally accepted nationally (Zinth, 2016). In most cases, the teachers of dual credit courses are employees of the community college in order to assure college policies and procedures are practiced (Young Jr. et al., 2014).

Statewide legislative policies on dual enrollment vary greatly in the areas of funding, eligibility, teaching credentials, transferability, and quality. A recent publication the Education Commission of the States in 2016 compared the policies of all 50 states and found wide variation (Zinth, 2016). This can cause confusion for students attending secondary and post-secondary institutions in different states.

## Dual Credit Challenges for Students

Funding can be a challenge when the students are responsible for the entire cost of the course (Pretlow & Patteson, 2015; Tobolowsky & Ozuna Allen, 2016). In the end, these dual credit courses help the student with reduced college expenses by shortening the time to graduation (Bailey, Hughes, & Karp, 2003). Scholarships are available in some states and can assist families with tuition, as well as supplemental costs such as transportation and textbook costs (Barnett & Stamm, 2010; Edwards & Hughes, 2011). In summary, funding continues to be an issue for states, colleges, and high schools to consider in relation to the needs of the dual credit students (Lieber, 2009).

Taylor et al. (2015) found that the transferability of dual credit courses was a challenge. They found that only about half the states they studied had any transferability policy in place. Transferability seems, primarily, to be a challenge for four-year institutions in relation to acceptance of credits from community colleges. In some cases, the issue is the expectation that the students understand transferability policies while they are in high school (Borden et al., 2013). The lack of transferability may be the result of a perception of low rigor among dual credit coursework, and in some cases, instructor credentials. (Allen, 2010; McCarthy, 1999).

Students may struggle with dual credit courses as the college-level course may come with new challenges. As a college-level course, students may experience larger class sizes, decreased meeting time, voluntary attendance and homework, and fewer assignments to ensure mastery of the material (Klopfenstein & Lively, 2012). These challenges can be overwhelming and require the student to perform on a level they have not previously encountered.

Although dual credit offers opportunities, it comes with a set of challenges as described in this section. With all the factors that can affect dual credit such as, placement of courses (on campus or at the high school), course delivery (online, hybrid, face-to-face), the faculty who deliver the courses, accessibility, and funding, it is important to define the specific setting for this. For this study, online-only STEM dual credit courses will be addressed as the subject of interest.

### **Online Courses**

Dual credit courses are often offered through online formats. An online course is defined as having at least 80% of the content delivered through an online course delivery system (Allen & Seaman, 2016). In the 2007-2008 academic year, 70% of school districts reported they had at least one student taking an online course (Barnett & Stamm, 2010). In an era where online learning has continuously grown, it is vital to understand the accessibility of online learning for high school students. Coursera and edX have even partnered with four-year institutions to offer dual credit Massive Open Online Courses (MOOCs) (Davis, 2013).

Higher education is offering online courses at exceedingly higher rates, which in turn, is impacting dual credit offerings. In 2014, higher education institutions reported that 3.9% of their students took at least one online course and in the fall semester of that year, 2.85 million students were taking all of those courses at a distance (Allen & Seaman, 2016). Community colleges most strongly support online learning with over 97% of them offering online courses in 2008 (Jaggars, Edgecombe, & Stacey, 2013). About three-quarters of administrators of these institutions believe that the online distance courses were vital to the long term strategies of their institutions (Allen & Seaman, 2016).

## **Online vs Face-to-Face Delivery Formats**

In traditional college courses, students often have the choice to take the course online or face-to-face. With all factors being held constant; same instructor as well as same material and evaluations, Driscoll, Jicha, Hunt, Tichavsky, & Thompson (2012) found that in a sociology course, online education can be equally as effective as face-to-face education. The determining factor appears to be the appropriate pedagogy for online course delivery (Driscoll et al., 2012). Selection effect, the fact that higher-achieving students tend to enroll in face-to-face courses likely accounted for the variation seen in evaluation scores (Driscoll et al., 2012). In fact, students with prior online learning opportunities tend to view online classes as more equivalent in content and knowledge gains, as well as in higher perceived interaction with the instructor (Platt, Raile, & Yu, 2014). Administrators of higher education institutions that offer online distance education tend to believe that online courses offer equal or superior learning outcomes compared to face-to-face courses (Allen & Seaman, 2016). These views may impact the way that dual credit programs are offered to high schools with large numbers of courses moving to an online format.

When given the choice of taking online or face-to-face courses, many students felt that they would have a better learning outcome in the face-to-face option (O'Neill & Sai, 2014). This held true for Helms (2014) when it was found that online students in a psychology course earned significantly lower grades than their counterparts in face-to-face courses. In a study of traditional college students across Virginia community colleges, students were less likely to persist after taking an online course than a face-to-face course; and, those who took remedial math courses online were less likely to advance through other math courses (Jaggars & Xu, 2010). Although this study did not look specifically at online dual credit courses, it does give some indication of

the challenges online courses pose for students. In general, students are more likely to fail or withdraw from an online course than a face-to-face course and might have 3 to 6 percentage points lower on their end of semester grade than their face-to-face peers (Jaggars et al., 2013).

Online learning seems to come with very mixed results and mixed reviews. When students had former dual credit enrollment, they had higher rates of persistence in online courses upon attending college (Jaggars & Xu, 2010). According to Kirby, Barbour, & Sharpe (2012) university students show the same levels of self-regulatory learning behaviors regardless of high school online course experiences. In summary, online courses, especially online dual credit courses can have various outcomes; and, those outcomes need to be monitored and assessed regularly by both institutions to understand the implications on long-term learning.

### **STEM Courses**

Science, technology, engineering, and math, also known as STEM, courses serve as not only electives for most undergraduate students but, might also be the base courses for students with STEM majors. Although STEM courses are often at the bottom of enrollment lists for dual credit students, some dual credit programs have been developed to specifically target the needs of STEM education (Young Jr. et al., 2014). Community colleges in Nebraska have accomplished this by providing the regular STEM courses, such as the basic sciences and maths required of all students, but also some online agricultural courses as part of their major.

The effects of STEM dual credit courses are rarely published. In a dual credit versus traditional college chemistry class, the dual credit students consistently outscored the traditional college students on the American Chemical Society (ACS) standardized test, proving that dual credit students can “keep up” with their college counterparts (Zuidema & Eames, 2014).

## **The Teaching of Online STEM Dual Credit Courses**

Online STEM courses tend to be underrepresented when compared to humanities courses offered at community colleges (Jaggars & Xu, 2010); so, it is likely that dual credit courses follow the same model. Online courses are difficult to complete with online drop-out rates ranging from 30-40% (Tyler-Smith, 2006). Attrition rates for online STEM courses seem to be significantly higher than for other types of courses (Wladis, Hachey, & Conway, 2015). Keeping students in online STEM courses appears to be a continuing challenge for community colleges.

One major challenge that often dissuades the offering of online STEM courses is the interactive laboratory component (Wladis, Hachey, & Conway, 2013). The laboratory aspect of most STEM classes is considered vital to the learning process. Many different methods of providing this lab component have been used including virtual simulations and computer-based or remote data acquisition systems (Brinson, 2015). The effectiveness of these virtual labs is debated, however, the costs of these labs are often much less than traditional laboratory supplies and activities (Brinson, 2015). Therefore, the onus lies on the instructor to have a strong pedagogical approach in an online STEM course and to learn to think alternatively about what science-based education should look like for the learner (DeHaan, 2005).

## **Challenges to Rural High Schools in Nebraska**

For this study, rural high schools were defined as those being more than 50 miles from an urbanized area and/or their local community college or four-year institution. In 2007, almost 20% of the nation's children attended school in communities of less than 2,500 people and in total, the number of rural students was nearly 10 million (Johnson & Strange, 2007). In Nebraska, nearly 45% of the schools are considered rural, accounting for about 30% of the

student population in the state (Johnson & Strange, 2007; Provasnik et al., 2007). The majority of rural high schools have fewer than 400 students (Irvin, Hannum, de la Varre, & Farmer, 2010). Rural high schools suffer from a number of barriers that are challenging to students who attend them. Irvin et al. (2010) listed barriers that included geographic isolation and lack of interaction with instructors.

Dual credit programs in rural areas have unique challenges to overcome. The Alliance for Excellent Education published a report in 2010 that stated 25% of students failed to graduate from rural high schools. According to the report, approximately 17% of adults over the age of 25 have completed college in rural communities (Alliance for Excellent Education, 2010). This outcome negatively impacts the longevity and vigor of rural communities as economic growth is stymied by the lack of rural higher education (Alliance for Excellent Education, 2010).

Rural schools are reported to have difficulties in attracting and retaining high-quality teachers due to low salaries. Nebraska is included on the list (Johnson & Strange, 2007). The dearth of teachers has been one barrier that has led rural schools to seek distance education, often online courses, to offer to their students (Alliance for Excellent Education, 2010; Irvin et al., 2010). This personnel problem also affects a scheduling problem which leads to schools seeking asynchronous formats for distance learning, such as online courses to meet their needs (Irvin et al., 2010).

## CHAPTER 3

### **Methodology**

#### **Methodological Design**

This was an exploratory qualitative study based on semi-structured interviews as the means of data collection. This was the first study of online dual credit STEM courses in Nebraska schools, therefore, an exploratory study was the best fit (Maxwell, 2013; Merriam & Tisdell, 2016). At the early stage of research, interviews provide not only stories about what is happening, but also the meaning-making behind the stories using in vivo language from the participants (Maxwell, 2013; Seidman, 2013).

#### **Data Sources**

The participants who provided data for this study were the stakeholders involved in the decision-making for the delivery of the online STEM dual credit courses in rural Nebraska high schools. The sites from which participants were selected included four community colleges in Nebraska who offer STEM dual credit courses in an online format as well as two rural high schools receiving these online STEM dual credit courses from each of the four community colleges. A total of four community colleges and eight rural high schools were used as sites for data collection through purposeful sampling.

At the four community colleges, I sought dual credit coordinators for the semi-structured interviews. These dual credit coordinators guided me to the two high schools that they provided dual credit courses for and who are at least 50 miles from the community college. My initial contact at the high schools was with the superintendents. These superintendents were asked who led the dual credit initiatives in their high school districts and the superintendents directed me to

the participants who were interviewed at the high school level. These participants included one principal and seven guidance counselors.

The participants varied in experience levels, comfort with the dual credit processes, and their understanding of dual credit in general. The participants' time in their current positions ranged from one to twenty-one years. Of the participants, one dual credit coordinator and one principal were male, the remaining ten participants were female.

### **Sampling Technique**

Criterion sampling was used to gain access to participants in a deliberate manner (Yin, 2016). Criterion sampling, a form of purposive sampling (Maxwell, 2013) was used to limit the interviews to those considered dual credit coordinators or persons of decision-making power in the offering of online STEM dual credit courses from the community college or high school perspective (Mertens, 2015). Criterion sampling was also used to determine if participants fit the required roles at each site (Mertens, 2015). This was accomplished using an internet search from each community college website to seek and determine the dual credit coordinators via position descriptions. These dual credit coordinators were then initially contacted via email (Appendix B) to complete the institutional demographic survey. Reminder phone calls were made to encourage participation in the institutional demographic survey which allowed me to pursue the snowball sampling techniques for other administrators (superintendents of high schools) who play a role in the decision to offer online STEM dual credit courses (Merriam & Tisdell, 2016). When participants fit the criteria, they were invited to complete the institutional demographic survey and to set up interviews via email.

## Data Collection

A Qualtrics survey (Mertens, 2015) was conducted via email to gather institutional demographic and program information from each community college and high school interview participant. The survey included numerical data about the dual credit courses provided as well as specific information about online STEM dual credit courses. The institutional demographic survey results were used to triangulate the data (Maxwell, 2013). The data indicated the status of dual credit programs in the schools. The data was also used to identify the online STEM dual credit courses available at each school. The survey questions are included in Appendix C.

Informed participant consent was collected on page one of the Qualtrics survey. The first page of the survey included an informed consent form, on which the participants had to provide an electronic signature to provide consent. If participants did not sign the consent page (Appendix D), skip logic on Qualtrics directed them to the end so they did not participate in the project. If they did complete the consent form, the next page asked them for institutional demographic information. The completion of this survey led directly to me contacting the participant to set up an interview time either via email or phone call.

After participants were chosen using the criteria listed in the sampling technique, the use of semi-structured or informal interviews was conducted using a prewritten interview protocol to help guide the interview (Merriam & Tisdell, 2016; Yin, 2016). The protocol questions are included in Appendix E.

The interviews were conducted in a synchronous online format using Zoom meeting software. The interviews were conducted at an agreed-upon time between myself and the participant and were conducted, by me, in a private, quiet room with a locked door. These Zoom recordings are stored in a private password-protected Dropbox file and the files will be deleted

three years from the completion date of the project. In addition, each interview was also recorded using a digital audio recorder as a back-up method. The audio files will be stored in the same Dropbox file as well as on a flash drive that will be stored in a secure location behind a locked door. These audio files will also be deleted three years from the completion date of this project. Each interview lasted approximately one hour and was recorded in Zoom and then saved to my own private, password-protected Dropbox file. The interviews were recorded and transcribed by the Zoom meeting software with quality and accuracy transcription checks completed by me for more thorough data collection and familiarity with the interviews (Merriam & Tisdell, 2016). Each interview lasted a total of one hour as agreed upon previously by both parties (Seidman, 2013).

All survey records and interview transcripts are stored as deidentified data in a password-protected Dropbox file. Any identifiable information is saved as an encrypted file on a password-protected computer. The participants were asked to choose their own pseudonym during the recorded interview process. Since none of the participants chose their own pseudonyms, I chose to use gender-neutral pronouns and to avoid labeling the high school institutions. The community college institutions are referred to only by letters, A, B, C, and D on two figures in this research.

### **Data Analysis**

After data was collected and all interviews were transcribed the transcriptions were analyzed using Dedoose software. The first cycle of coding was conducted with a “start list” of researcher-generated codes as a form of provisional coding (Saldaña, 2016). The “start list” was generated from the data gathered in the literature review. In vivo codes (those formed from the participants' own words) were also be used to capture any codes missed in the start list that the participants' own language best describes (Saldaña, 2016). Second cycle coding used both focused coding, a

method of selecting the most frequently used codes to create categories, and axial coding, a method of determining which codes are most dominant, seeking redundancies, and finding codes that are best representatives of the data, to help develop the categories and their relationships to each other (Saldaña, 2016). The data then allowed me to explain how, or if, the resulting data best describes the offerings of online STEM dual credit courses at rural Nebraska high schools. This was accomplished by providing quotations from the participants which added value to the findings and discussion. The cross-case analysis was also used to allow me to see if any sites showed a divergence from the others in terms of the data.

## CHAPTER 4

### **Findings and Discussion**

The variability among community college dual credit coordinators and among high school administrators (guidance counselors and principals) was alarming but also predictable in a state that currently has minimal legislation on dual credit. Although there was broad variability in the opinions of educators and in the actual administration and oversight of all dual credit courses, including those considered non-STEM and those offered in formats other than online, many benefits and challenges were brought to light. The following findings and the discussion about those findings will expose many of these variabilities.

### **Institutional Implications**

**Eligibility.** High schools approach eligibility to dual credit individually within each institution. In some cases, even if eligibility requirements are set by the administration, the guidance counselor and/or the principal seems to reserve the right to make final decisions regarding a student's ability to enroll in dual credit courses. Most high schools require their students to be juniors or seniors, although exceptions are made for younger students, some as young as 8<sup>th</sup> grade (with permission from the parent and counselor). Yet, beyond those basic criteria, it became much more open to interpretation. One guidance counselor said, "They cannot be failing in class" and another counselor stated, "...and if they're getting B's and A's, you know, I'm gonna let them give it a chance." Another counselor shared her concerns over the lack of eligibility standards at her high school:

Um, you know, we don't have, we really don't have any. The only, as you know, the standards to take an English class or a math class, there's certain test scores and such that

they have to reach. But as far as, you know, like a psychology, sociology, and the kid takes an animal, animal biology, really, none. Now having said that, there are a couple students that come to mind when I think I wonder what I would have said if Sally would have come to me and said, I want to take an online class because I know for a fact she wouldn't be able to handle it, just based on her cognitive and academic ability so, that's something that I should probably think about for future reference. Because that's probably going to happen to me one day where somebody comes and says I want to take this and really, to be honest, there's nothing that I can do if they want to take it and pay the money, but I would probably have a conversation with the parents and try and dissuade.

In many cases, the eligibility “standards” are set by the community college as students are required to meet the same placement testing and prerequisite standards as traditional college students. However, this typically only pertains to math and English subject matter. In addition, one dual credit coordinator criticized the frequency at which placement cut-off scores were changing. The dual credit coordinators at the community colleges often default to the high school guidance counselor as having the best judgement of a student’s performance. One dual credit coordinator stated:

Our Dean felt that the high school counselor would be able to make a better determination on a student’s success in college than looking at a transcript because there's a lot more that goes into, do you have grades, do you have the motivation, do you have the ability to track your own work and progress, and there's a lot of things that go into taking a college class, (more) than we standing over him making sure assignments are turned in and so they felt like this was maybe a little bit better a better way to handle earlier enrollment, like that.

Some community colleges require the signature of both the parent and the counselor to enroll a student into a dual credit course, although one community college has eliminated this requirement completely in an attempt to revise their eligibility standards within the past year. This may ultimately lead to some financial challenges for the student which will be discussed later.

One shocking outcome was that many of those administrators intimately involved with dual credit wanted these eligibility standards to remain at the current level of legislation rather than to have those requirements standardized across secondary and post-secondary Nebraska institutions. In fact, one dual credit coordinator said, “It might just, that that would create chaos in my mind,” when he was asked about tighter eligibility legislation. Only one counselor had a dissenting opinion. She stated, “Well, it certainly would make my job easier if it were state-mandated . . . .Because it, it could be a difficult conversation. I don't want to, you know, be the downer.”

**Technology.** Online courses are at the mercy of technology. Most high school administrators interviewed stated that their schools were functioning on a one-to-one laptop basis. As such, they did not share many concerns with technology not functioning. No one stated that technology was a prohibiting factor in offering classes online, in fact, many community college dual credit coordinators stated that online classes were the easiest way to get courses to rural communities.

However, some rural schools have intermittent internet outages as their service providers appeared to be unreliable. Additionally, some concerns were raised about high school content filters blocking external links provided in online courses. All high schools were able to remedy that issue with either their in-house or external technology staff member. Another concern

brought forward regarding technology involved the conflicting platforms used by high schools (Google) and higher education institutions (Microsoft). Yet, students seem to navigate these difficulties as fluidly as they navigate the different learning management software such as Canvas, Blackboard, Moodle, etc.

Many rural schools described their alternative forms of receiving dual credit courses. Some mentioned using distance learning (DL) classrooms with synchronous courses, some transport students to the local satellite campus Learning Centers, up to 25 miles away, and others are focusing on the independent online course options. However, despite the advancements in technology and online course offerings, it was clear that the preferred method of receiving dual credit was in-house, using the qualified high school instructors as community college adjuncts. Community college dual credit coordinators and guidance counselors alike felt that the high school instructors understood the life of a high school student to a better degree. One dual credit coordinator said:

We have a lot of college instructors (who) just don't get high school kids, and they keep to kind of defaulting back to, you know, this is a college course, so it has to be college rigor. We agree with that, wholeheartedly. But the life of a high school student is drastically different than the life of a college student.

**Scheduling and Competition.** High school instructors may express some concern about losing students from their own classrooms. One high school guidance counselor refused to participate in the study after contacting me. The counselor stated that their school does not allow online STEM dual credit due to competition with the existing instructors. One community college recognized this issue as well:

We also, in the beginning, and still a little bit, we got a little bit of pushback when we're trying to bring in new programming to our rural schools because when you're talking rural schools, you're sometimes talking 12 students in the senior class. Now I'm bringing this class that's going to pull him out of, you know, an accounting course that the accounting teacher's teaching and so that could be a little bit of a challenge when you're thinking very rural school. In K-12's the competition (is) between the curriculum that they are able to deliver and then the content that community colleges can bring in. .... And so we do see a little bit of push, push back in that regard. Sometimes K-12's aren't super welcoming when they feel like it's going to take their students out of their classes.

Instructors and administrators may also fight scheduling issues in terms of independent study halls pulling students from the classrooms and the need for monitoring/proctoring. Some high schools do not have a full-time staff member available for all the monitoring of online dual credit courses. Lastly, the students use their high school teachers as their "support systems" or tutors for the subject areas in which the teachers are qualified to teach. This can lead to teachers feeling the pressure to help students who are not taking their courses and then tension that may cause.

**Challenges with Providing STEM Courses.** Providing the hands-on portion of many STEM courses can be the biggest deterrent for instructors to offer STEM courses in a dual credit online format. In fact, some counselors felt that the lab portion of STEM classes was prohibitive in their ability to offer online STEM dual credit courses. There was some trepidation about how the labs would be handled or who would be responsible for the content. One counselor expressed this concern:

I do because I think if a student came in to me and said, I want to take this class online. And then they said that it involves some sort of a lab, I would say, like, not that I would discourage them, but I would be like, holy cow. What am I going to do and how do I make this happen? Because that, I mean, you know, like that's a huge part of what we are supposed to be doing is encouraging this, and if I don't have any idea, I don't do it. I don't know what I would do so.

Math courses often depend on interactive instructional technology, which students can use independently and receive immediate feedback. The challenge for many science, engineering, and agriculture courses is the inability of the instructor to duplicate the lab portion of the course for a student at a distance, or online. In some cases, the student may take the lecture portion of the class only, understanding that they will need to take the lab later. In other situations, instructors may record the lab, require the student to buy a lab kit, or require the student to obtain the hands-on portion of the course from an outside source such as a veterinary or medical clinic.

**Family Education Rights and Privacy Act (FERPA).** Dual credit students straddle this line between the high school world where parents have the ability to be intimately involved in their student's life, to know all the information related to grades and disciplinary action, and the college world where parents have no access to that information unless the student signs a FERPA release form allowing their parent access. Among those interviewed there appeared to be wildly different approaches to the translation and interpretation of the FERPA guidelines. Community colleges claim to enforce the FERPA issue. They discuss holding their adjuncts to the same standards as their full-time instructors. Many of them offer the FERPA release form to their dual credit students, many of whom sign it, but these community colleges are not communicating the

existence of the FERPA forms to the high school instructors or guidance counselors unless requested to do so. High school administrators recognize the FERPA guidelines and appear to be making all efforts to abide by them regarding the parents. However, many counselors and principals are asking students to voluntarily show them their dual credit grades or to email screenshots of the college grade as most high schools report dual credit on the high school transcript. One school representative admitted, “I don't know what we would do if ever a student said, ‘I don't have to share that with you’ or if a parent said ‘They don't have to share that grade with you.’ Um, but no, we've, we've not, we've been very lucky to not have any situation happen.”

Parents of dual credit students struggle with the transition into the world of FERPA guidelines. High school dual credit teachers are reminded that they cannot discuss the dual credit portion of any course they teach with a parent; they can only discuss the high school portion with them. Parents also struggle with the idea that the student must self-advocate and that the parent cannot contact the college to drop or add a student to a college course.

To attempt to remedy some of the issues with FERPA in the dual credit world, some community colleges have written up agreements or contracts, often in conjunction with Career Academies or special dual credit programs. As part of these contracts, some community colleges allow grade-sharing with high school transcript offices to ensure that all grades are reported accurately. In other contracts, the community college requires the student to grant the guidance counselor FERPA access.

## **Financial Implications**

The financial impact of dual credit courses affects several entities. The institutions, the instructors who teach the courses, and the students feel the repercussions of dual credit financial outcomes. In all the institutions approached in this study, the institutions had never looked at the direct financial impact of dual credit courses. Sometimes, the dual credit students are so intermingled with the data for part-time students that community colleges do not track them separately. In other cases, there had simply never been a report of the cost-benefit of the dual credit financial outcomes provided.

**Instructor Pay.** Those who teach dual credit see these financial implications in the form of their pay. For community college instructors, the pay is predetermined to be either part of their course load (full-time instructors), or they are paid at the adjunct rate, which the dual credit coordinators reported is between \$800-\$900 per credit hour for most higher education institutions in Nebraska. If the course does not meet the requirement of 8 students in order to be offered, the adjunct may either teach the course at a prorated amount, or the course is canceled with a full tuition refund to the student. If the dual credit instructor is a full-time high school instructor with adjunct status at a community college, there appear to be three options for payment. In the first option, the teacher is paid as an adjunct with 100% of the salary being paid directly to the teacher, by the college. The second option allows the instructor and the high school to split the pay, typically at a 50-50 or 60-40 split in favor of the high school district. The last option involves the high school teacher foregoing all additional pay under the premise that “Because it's part of her contracted day, the, the money from the College goes to the district and the district pays her, her contract. She doesn't get any additional wages or anything for teaching the dual credit class.” Most schools reported their high school teachers were only teaching one

dual credit course per day as part of their teaching load, coming out to about 15% of their contract.

**Student Finances.** From the student perspective, dual credit creates some complex financial outcomes. Typically, dual credit is noted for saving the average student money. Tuition reduction is offered by most community colleges at a rate of at least a 50% reduction. However, one community college had a different approach:

Tuition reduction for dual credit. Yeah, no, um, and we kind of have the belief that the, the dual credit classes are the same rigor as a normal, traditional student's college class. And so we're not going to discount it, because, that, in my mind, it would be like it's a discounted class. So you're just, you're kind of lessening the, the quality, or the reputation of the classic course.

Students also negate the cost of room and board while taking dual credit courses which saves a substantial amount of money.

Financial savings for dual credit students are available in a number of ways: tuition reduction, Career Academies where high schools pay the tuition costs, the Nebraska Access College Early (ACE) scholarship (Nebraska's Coordinating Commission for Postsecondary Education, 2019), and some high schools pay for textbook costs through education grants or other foundational scholarships. Community colleges also tend to offer payment plans for students, giving the student some degree of freedom in covering the cost of tuition or fees. In addition, one community college also offers a program for free summer courses, up to 9 credit hours, for students enrolled, including dual credit.

As part of the financial complexity, some students, especially those considered first-generation college-goers, may not understand the billing and payment processes associated with higher education. One community college discussed sending more than 30 dual credit students to collections in one semester. It was noted that this could have been the result of miscommunication or a sincere lack of understanding of the college processes by both the students and their parents. Another community college recently implemented a system of placing holds on the dual credit student accounts in addition to sending bills to collections after four notifications.

Also, students may not understand the financial implications of dropping or being forcibly dropped from a course for not participating. If a student fails to participate in a course, they may be forcibly dropped from the course with the refund amount being on a predetermined schedule. If the tuition is not refunded, as is generally the case after week 4 of the semester, this can be a financial burden on students and parents who do not understand that process.

Another major challenge for students in rural high schools offering STEM is the prohibitive cost of textbooks. Although many students can get some or all their tuition paid for through various scholarships or grants, the cost of textbooks is often left to the student. Some high schools discussed having grants or scholarships, in the form of faculty donations, available for textbook costs. Some high schools would purchase the textbook and “rent” it out to students. Included in this textbook category are the access codes for the online textbook material. These are a one-time use code that must be purchased by each user individually so textbook rental negates the cost-savings. In addition, many of these interactive instructional technologies also require an online access account subscription that is individualized per student. For many high school students, these additional costs can be shocking and prohibiting.

## Student-Based Implications

**Interpersonal skills.** Dual credit coordinators, high school principals, and guidance counselors are all perceiving high levels of student interpersonal skill development. Many online student learners need to develop a unique set of interpersonal skills to be successful in online dual credit courses. The following interpersonal skills were mentioned regularly during the interview process.

Students who participated in dual credit of any kind were said to have or be in the process of developing *communication skills*, both digitally and in person. There was acknowledgment that students in this current generation are unfamiliar with face-to-face communication and much preferred to practice digital communication. However, the guidance counselors also discussed their part in helping the students communicate with higher education institutions. This process often involved guided phone calls, guided emails, or simply directions on how to contact the appropriate person or office.

Tied to communication, many dual credit coordinators and guidance counselors referred to students becoming better at *self-advocating*. Most students discovered that the change in rigor and flexibility between the high school and college-level courses required them to speak up, to seek help, and to find the resources they needed in order to be successful. For some students that meant finding a high school teacher willing to help them in the subject area, for other students it may mean reaching out to a college instructor and asking questions or discussing an issue with a grade. One guidance counselor expressed some frustration with the parent wanting to step in on behalf of the student and explaining that the student must be the one to make the contact.

Nearly all participants described what I am referring to as *independent learning*, or the ability to work independently and successfully. Most online dual credit students complete their asynchronous coursework in the library or some other designated area as a study hall or as a scheduled hour for dual credit learning. Although most of the students have a proctor or monitor of some kind, they are responsible for completing their coursework without the guidance of a teacher who is available to them full-time. Many guidance counselors check-in with the student on a regular basis to not only observe their grade, but also to ensure the student is on track.

In addition to that, a student needs to be *self-motivated* and must be successful at *time-management*. Online dual credit students must battle the differences in college and high school calendar schedules, extracurriculars, and the format of the “school day”. These high school students must be able to complete the required online coursework in a timely manner in order to stay caught up. One guidance counselor gave an example of time-management challenges related to technology:

I waited until 10 minutes before this was due, and now my technology wants to run slow. And I can't get this video to upload, and then I have to take a late grade; but, I shouldn't get a late grade because I started it. And if you know it and I, I don't know how many times a semester, I have to say technology failure is not an excuse for late work. You plan your, your time accordingly.

Dual credit students also appear to gain some *self-confidence*. Guidance counselors discussed that students who successfully complete dual credit coursework become more confident in their ability to do more, to go further in their educational journey. However, students who are not successful experience the opposite, a loss of confidence. Rather, those students who

are less successful may be experiencing a healthy dose of *humility*. One guidance counselor described this phenomenon:

... and if they're the valedictorian of the class, and they know that they're the valedictorian of the class and they've always gotten A's and they've always been the good student and a competition of knowing that you're still a small fish in a big pond is there, it's very humbling to, to get that first grade and realize that, oh, I'm really not perfect.

Ultimately, most dual credit students, especially those taking online courses, were said to need a larger dose of *maturity*. In some cases, the students were mature at the beginning of their dual credit course and that may have been one of the reasons they sought out the challenge of dual credit. In other cases, the students developed their maturity alongside all the other interpersonal skills.

All participants discussed that students possess a high degree of *tech-savviness*. These students navigate through online courses with little trouble. They communicate daily through various apps and platforms with relative ease. The community colleges recognize that capitalizing on online education is not only the more efficient but also the most effective when looking at today's student.

**College Transition and Exposure to College.** It was regularly stated by both high school administrators and dual credit coordinators that these courses provided students with early and beneficial exposure to the college classroom or to college in general. This involved the students gaining insight into the rigor of the coursework, the expectation to communicate with the instructor, and the ability to self-advocate for any number of challenges the student might face.

It could be argued that in face-to-face courses, those taught in-house by high school instructors, there was little to no exposure to the college classroom or to college rigor. It could also be argued that students gained little in the way of interpersonal skills as they were not expected to step outside of their comfort zone to communicate with a “college professor”. One guidance counselor used the term “transition”. Bluntly, the counselor stated, “Yeah, it helps them transition easier from high school to college.” Again, how much transition is occurring in the same environment in which the student attends high school?

One high school did offer a solution to this transition problem. The counselor reported teaching a college prep class to all seniors, including those not enrolled in any college-level courses. This course seemed to focus not only on the college-going process but also some specifics that dual credit students might face such as self-accountability, college procedures, and finances.

### **Academic Implications**

**Increased Curricular Offerings.** Some students who actively pursue dual credit opportunities can take great advantage of the higher education system. One community college stated that they have had students complete their Associate's degree prior to completing their high school diploma due to the ability to take dual credit courses. Although few students can take that many dual credit courses, many are achieving one or two semesters of college credit while still enrolled in high school. Guidance counselors shared that students were receiving anywhere from 3 to 24 college credit hours while still in high school. This not only gives the student a great start to academic success and a higher chance of matriculation but also saves the student money through decreased tuition and/or room and board costs.

Curricular offerings, also, can be greatly increased through access to higher education while still in high school. Students can take courses from community colleges that fall under dual credit or regular college credit. In many cases, there may be more than one delivery option. For students close enough to attend the community college campus or those lucky enough to have high school instructors with the credentials to offer courses in-house, they can take college credit courses face-to-face. In rural Nebraska, students often depend on Distance Learning, satellite campuses, or online formats. Regardless of the delivery, the ability to take college credit greatly enhances the curricular offerings outside of the standard high school curriculum.

Participants all claim that dual credit increases curricular offerings that their rural schools are limited in providing due to a limited number of teachers (typically only one per subject area). In some cases, the students may be selecting very career-specific courses such as CNA or engineering courses which rural high schools do not have the capacity, scheduling or manpower, to offer as in-house courses. However, these courses also have the challenge of not having a teacher in the subject field available in the high school to offer curricular support if the student seeks help.

Many rural schools have only one teacher per subject area and that teacher may not hold the credentials to offer dual credit courses as many Nebraska secondary teachers who hold a Masters's degree hold one in Curriculum and Instruction rather than their subject area as noted by more than one guidance counselor. According to the Higher Learning Commission (2014) a dual credit instructor must have a Masters's degree and 18 graduate hours in their subject area in which they teach. High school instructors in Nebraska are not required to have a Masters's degree, only a subject area endorsement. Online dual credit offerings allow high schools to expand curricular offerings. This allows students who have completed all secondary school

requirements to expand their educational opportunities from sources of higher education. In many cases, high schools simply cannot offer specialized STEM courses such as pre-engineering or those courses related to the medical field as part of their regular curriculum scheduling.

**Exposure to STEM Fields and Careers.** One great benefit of online STEM dual credit courses is the general exposure to the STEM career fields it provides. Guidance counselors and dual credit coordinators, alike, discussed that students in very rural areas often felt the stigma of rural Nebraska, that the student was expected to come back to the community after college and continue doing those same jobs as their family members. There was also comment made that the stigma of rural communities is that there are no opportunities present, especially for students interested in STEM career fields. However, the ability to take online or in-house STEM dual credit helped these students view more career pathways and opportunities.

**Transcripts.** Dual credit grade reporting for high school students can be a gray area, as stated above. In addition to the challenges of finding an efficient way to report grades on high school transcripts, there are some other less obvious issues. It is notable that many community colleges do not have minus (-) letter grades in their grading scale, yet high schools do, which shifts the grading scale between high school and community college resulting in students having detrimentally lower grades that ultimately affect their high school GPA and could therefore, negatively affect their college admittance or high school GPA. One guidance counselor gave an example:

One other thing that, that we, as a district, have not been able to satisfy and figure out a connection for, a lot of colleges grade scales are different than ours. And so when we transfer, I mean, if you got a 90 that's an A at the college level, but here it's a B and so your high school transcript says independent study with a B and on your college

transcript says, whatever class you're taking with an A. And so we can't come to a consensus on, for sure, how to deal with that, you know.

College transcripts would have the college credit accurately reported. If a student is reporting all college credit earned and all transcripts when applying for college, they should be providing an accurate representation of the student's performance at the college level. However, students who perform poorly on a college-level course may choose to not report transcripts or grades when applying for full-time admissions to another institution of higher education.

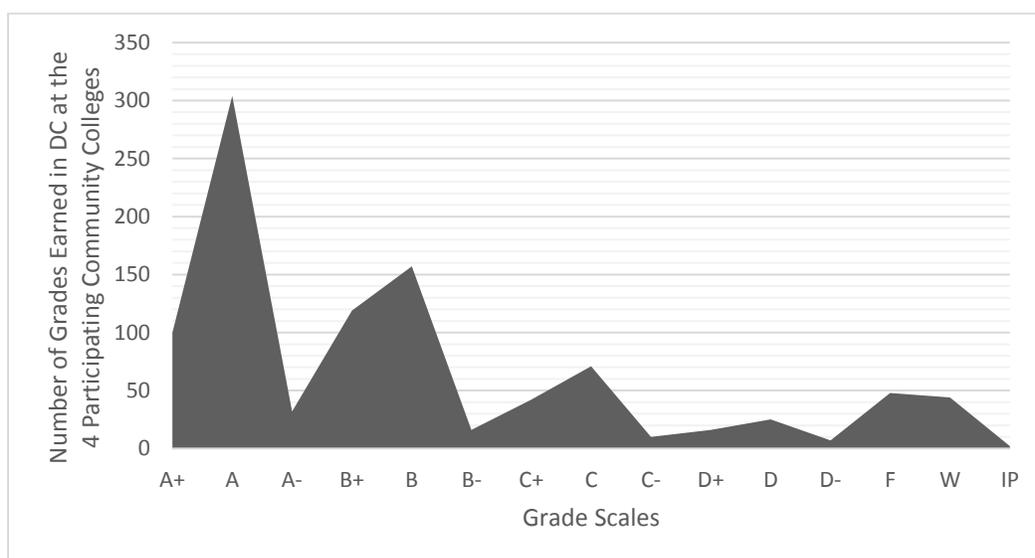
**Rigor and Expectations.** It is not uncommon for high school students to face advanced rigor and expectations in college-level courses. For some students, this may result in lower grades than they experienced in high school level courses. Occasionally, this can be viewed as a barrier, a reason not to continue. In some cases, students may even struggle to earn the placement score they need to take a college-level course. This, too, can lead to frustration for students who completed the high school level coursework but continually test into remedial or entrance level math or English courses.

Likewise, students who fail or perform poorly in a dual credit course can be subjected to entering college on academic probation. This can be a difficult barrier for dual credit students to overcome. One community college stated this was a notable issue with homeschooled kids in rural Nebraska areas.

Most high schools report that dual credit courses are being monitored for student high school athletics eligibility. In some cases, this is not counted toward the student's athletic eligibility while the student is still enrolled in high school. However, college-level transcripts can be prohibitive for student-athletes wanting to play college sports. One community college did

report that students sometimes avoid dual credit courses and the resulting grade scale/performance issues that might negatively affect their ability to play college-level athletics.

One pattern of concern found during the interview process was that at least four high schools stated they had never had a student fail a dual credit course, including STEM and all other subject areas. In addition, according to ACE scholarship data from 2018 (Nebraska's Coordinating Commission for Postsecondary Education, 2019), most students receiving funds through that scholarship are receiving a C or better, see figure 1, as opposed to the traditional college classroom where the majority of grades are likely to fall under something that resembles the normal curve. The data provided should be able to be extrapolated into the population of students not receiving the ACE scholarship. The ACE scholarship eligibility is determined by socioeconomic status rather than by academic achievement. Therefore this data represents a sample of students from all academic achievement levels.



*Figure 1.* Total Number of Each Letter Grade Earned in ACE Scholarship Data 2018 (Nebraska's Coordinating Commission for Postsecondary Education, 2019)

This high passing rate could be explained if the high schools had strong support systems for the students, such as high rates of tutoring from in-house teachers. However, in some high schools, the counselor may leave students to solve their own questions as part of the independent learning strategy. When asked about support systems (tutoring) for the students, one counselor shared:

I can't answer that. I think they would ask. I think they would ask if they needed it. And sometimes, some of them are in the library. And so I'm thinking, I wonder if '*teacher*', if they have a question, she would certainly help them. But, yeah, it's largely on their own. I don't know.

It could also be that high achieving students naturally gravitate to these online dual credit courses as one counselor pointed out:

It seems to me that we don't have a ton of kids that are, especially the online classes that, we don't have a ton of kids that are, you know, like your just, just your average student that want to do it unless it's something super specific. Like I don't, I couldn't see an, you know, mid to average student coming in and saying, 'Hey, I just want to take this Intro to Psych class because then I don't have to take it once I get to college and more.' We've had some students in the past, even prior to me being here, that have taken like a CAD class online. So some more specific classes I could see more students taking but just generally speaking, it's high, pretty high achieving students that are interested in these online classes.

However, some schools have very high rates of dual credit attendance. One high school had many seniors in a STEM dual credit setting. "I have 29 seniors and I have 13 that are taking

a college algebra via online from some institution of some kind,” the principal shared. This high number of students enrolled in a dual credit math course would explain that either half of the senior class was “high achieving” or that a larger range of students is taking dual credit courses.

In addition, it could be that counselors are monitoring the success rate of the students very carefully and withdrawing students in danger of failing a course. “I’ve had kids withdraw and so they’d have to take like a W on their transcript. I’ve had kids, I’ve never had kids fail because I think I caught them in time. So we could do a W instead of an F,” shared one counselor. However, Figure 1 would show that withdrawals are a small fraction, roughly equal to the earned F grades, within the overall ACE outcomes as published in 2017-2018.

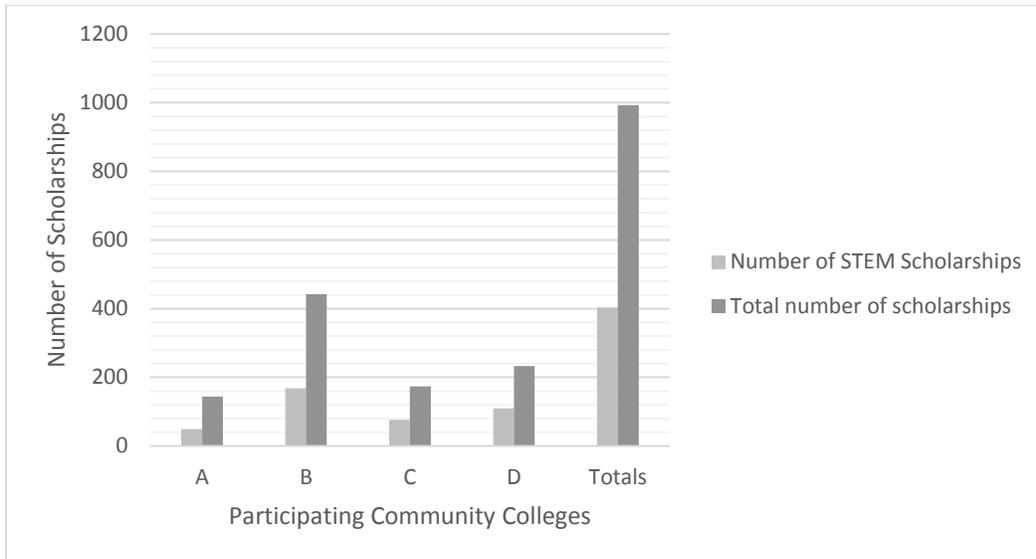
### **Marketing of Dual Credit Courses**

The availability of dual credit courses, especially online STEM courses, can only grow and be successful if students know they have options. When considering expanding their curriculum through dual credit, high schools expressed the need for better student and parental understanding of course offerings and of college procedures. Many rural students are first-generation, in some communities that might be as high as 50% of the population. The students and their parents are not being communicated with in the most effective or efficient manner regarding dual credit courses. This leads not only to confusion with potential course opportunities but also with deadlines, finances, and long-term academic implications for the student.

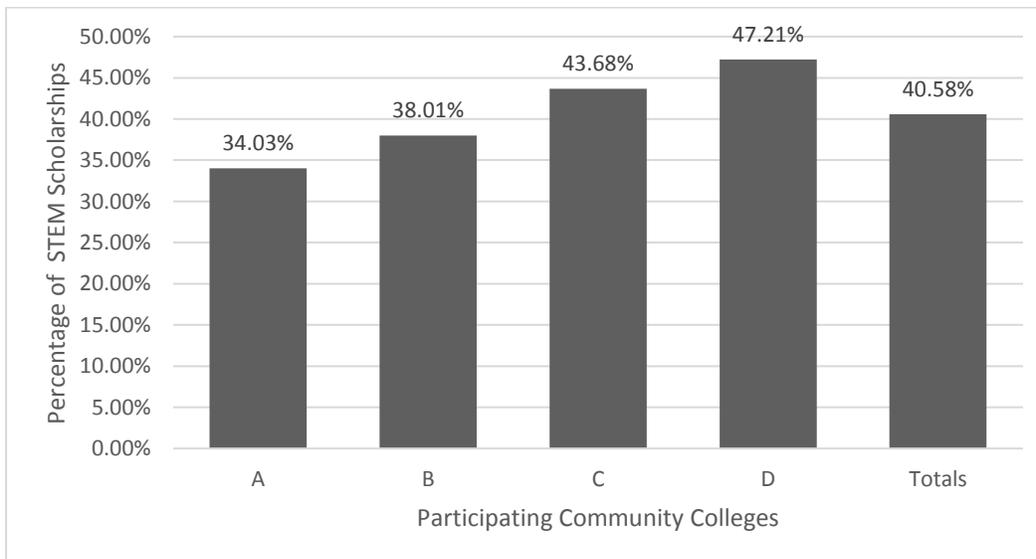
Community colleges expressed the same concerns. It is likely that the understaffing of dual credit at the community college is leading to this inability or lack of marketing material and presentation of that material to the high school and to the student/parent. The community college

staff state they are making the effort to communicate with high schools regularly and to provide information on college processes and procedures, through email and in face-to-face settings, to help students and parents navigate the college-going experience. They expressed they are working to do a better job of advertising the dual credit and college credit course offerings, especially those available online, for high school distribution. Most dual credit coordinators or their Career Academy coordinators shared that they are making regular physical appearances in the high schools to visit with students and counselors and occasionally with parents.

Most importantly, this issue of communication and lack of marketing or availability of information is recognized and seems to be being addressed by all the dual credit coordinators who were interviewed. Yet, despite any perceived lack of marketing, STEM dual credit courses are still maintaining a high level of enrollment. The following Figures 2 and 3, adapted from ACE Scholarship 2018 data (Nebraska's Coordinating Commission for Postsecondary Education, 2019) show that STEM dual credit courses are a healthy portion of the overall enrollment at community colleges.



*Figure 2. Number of STEM Scholarships to Total Number of ACE Scholarships 2018*  
(Nebraska's Coordinating Commission for Postsecondary Education, 2019)



*Figure 3. Percent of ACE Scholarships to STEM 2018* (Nebraska's Coordinating Commission for Postsecondary Education, 2019)

## CHAPTER 5

### Conclusion

#### Implications for Future Research

Dual credit is an understudied subject area, especially in the state of Nebraska. This research brought many areas of potential future research to light. One of the biggest areas of intrigue is that of finances connected to dual credit. More research needs to be completed on institutional financial implications. What is the long-term effect on an institution of higher education when tuition is reduced for dual credit? How many of the dual credit students matriculate to the same higher education institution from which they took their dual credit courses? How can we track where and why a student chooses a dual credit institution as well as chooses to complete a higher education degree?

Additionally, more research should be completed on eligibility requirements. The broad array of requirements provides students a vastly different experience in the dual credit classroom. This may be a leading factor in the ultimate success or failure of high school students taking college-level coursework. A deeper look into the apparent lack of students failing dual credit courses should be taken as well. As stated in the discussion, the idea that most dual credit students are earning a C or above in dual credit courses seems out of the ordinary. Why is this happening? Are the support systems for high school students different than those for college students? Are high school students experiencing the same rigor as their college counterparts?

A survey of the types and amount of marketing material for dual credit courses and college courses intended for high school students may also help guide some decision-making

processes on student/parent and high school education regarding these resources. Methods of dissemination and type of marketing materials should be documented.

Finally, the instructor's perceptions of the dual credit experience should be sought. High school teachers with dual credit teaching credentials, as well as college-level instructors with dual credit teaching credentials, should be asked what their opinion of dual credit is. Do high school students belong in college courses? Is the rigor the same for all courses? Do you have to make exceptions for high school students enrolled in college-level courses? Should STEM courses be offered in an online dual credit format? What are the instructor's struggles? What are their perceptions of the system and how it works? The students also should be interviewed. It would be useful to seek students who are at the beginning or the end of their undergraduate degree to discuss their reasons for taking dual credit courses, and their perceptions of how it has helped or hindered them in meeting their educational goals.

### **Limitations**

This study was conducted with several limitations in mind. First, I recognize a personal bias toward dual credit. As a former dual credit/distance learning student and a community college instructor of dual credit, I have preconceived ideas about how well dual credit courses function and the quality and rigor of the courses. Additionally, this study focused on those people who would naturally be "cheerleaders" and supporters of dual credit due to the nature of the jobs and the positions they hold. This factor may have influenced their responses to the questions and discussion around dual credit.

This study is limited by the geographical and demographical features of rural Nebraska. I defined "rural high schools" as those being more than 50 miles from an urbanized area and/or

their local community college or four-year institution. For the purpose of the study, all high schools were at least 45 miles from the nearest higher education institution. Three high schools were slightly under the 50-mile radius but were included due to participant willingness. All eight high schools considered themselves “rural” and were relatively small schools with enrollments of fewer than 200 students in grades 7-12.

### **Conclusion**

Twelve administrators were involved in the dual credit process were interviewed in this exploratory study, four of these participants were community college dual credit coordinators and eight participants were high school administrators (one principal and seven guidance counselors). Although the benefits and challenges of dual credit have been hotly debated in other studies and other states, this study found that online STEM dual credit courses in Nebraska shadow many of these topics including institutional, financial, student-based, and academic implications as well as the need for greater marketing efforts of dual credit courses and programs. More research should be completed in the area of dual credit, both on a state-by-state basis and nationally to ensure the greatest success of those students investing in these courses and programs as part of their educational journey.

## References

- Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. Retrieved from <https://eric.ed.gov/?ID=ED490195>
- Allen, D. (2010). *Dual enrollment: A comprehensive literature review & bibliography* (p. 59). NY: CUNY Collaborative Programs, Office of Academic Affairs.
- Allen, D., & Dadgar, M. (2012). Does dual enrollment increase students' success in college? Evidence from a quasi-experimental analysis of dual enrollment in New York City. *New Directions for Higher Education*, 2012(158), 11–19. <https://doi.org/10.1002/he.20010>
- Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. Retrieved from Babson Survey Research Group website: <https://eric.ed.gov/?id=ED572777>
- Alliance for Excellent Education. (2010). *Current challenges and opportunities in preparing rural high school students for success in college and careers: What federal policymakers need to know*. Retrieved November 17, 2018, from Alliance For Excellent Education website: <https://all4ed.org/reports-factsheets/current-challenges-and-opportunities-in-preparing-rural-high-school-students-for-success-in-college-and-careers-what-federal-policymakers-need-to-know/>
- An, B. P. (2013a). The impact of dual enrollment on college degree attainment: Do low-SES students benefit? *Educational Evaluation and Policy Analysis*, 35(1), 57–75. <https://doi.org/10.3102/0162373712461933>
- An, B. P. (2013b). The influence of dual enrollment on academic performance and college readiness: Differences by socioeconomic status. *Research in Higher Education*, 54(4), 407–432. <https://doi.org/10.1007/s11162-012-9278-z>

- Anderson, A. B., Blanco, C. D., Farkas, S., Immerwahr, J., Michelau, D. K., Myers, J. L., ... Silverstein, J. S. (2006). *Accelerated learning options: Moving the needle on access and success*. Western Interstate Commission for Higher Education. Retrieved November 4, 2018, from <https://www.wiche.edu/pub/12758>
- Anderson, J. J. (2010). *An investigation of student perceptions of dual enrollment at a mid-sized western community college* (Doctoral Dissertation, University of Missouri--Columbia). <https://doi.org/10.32469/10355/8329>
- Andrews, H. A. (2001). *The dual-credit phenomenon! Challenging secondary school students across 50 states*. Stillwater, OK: New Forums Press, Inc.
- Andrews, H. A. (2004). Dual credit research outcomes for students. *Community College Journal of Research and Practice*, 28(5), 415–422. <https://doi.org/10.1080/1066892049044445>
- Bailey, T., & Karp, M. M. (2003). *Promoting college access and success: A review of Credit-Based Transition Programs*. Retrieved from <https://eric.ed.gov/?id=ED482497>
- Bailey, T. R., Hughes, K. L., & Karp, M. M. (2002). *What role can dual enrollment programs play in easing the transition between high school and postsecondary education?* Retrieved from <https://eric.ed.gov/?id=ED465090>
- Bailey, T. R., Hughes, K. L., & Karp, M. M. (2003). *Dual enrollment programs: Easing transitions from high school to college. CCRC Brief*. Retrieved from <https://eric.ed.gov/?id=ED475805>
- Barnett, E., & Hughes, K. (2010). *Issue brief: Community college and high school partnerships*. Retrieved from <https://eric.ed.gov/?id=ED512397>
- Barnett, E., & Stamm, L. (2010). *Dual Enrollment: A Strategy for Educational Advancement of All Students*. <https://doi.org/10.7916/D81G0KNQ>

- Borden, V. M. H., Taylor, J. L., Park, E., & Seiler, D. J. (2013). *Dual credit in US higher education: A study of state policy and quality assurance practices*. Higher Learning Commission.
- Brinson, J. R. (2015). Learning outcome achievement in non-traditional (virtual and remote) versus traditional (hands-on) laboratories: A review of the empirical research. *Computers & Education*, 87, 218–237. <https://doi.org/10.1016/j.compedu.2015.07.003>
- Cohen, A. M., Brawer, F. B., & Kisker, C. B. (2014). *The American community college* (6th ed.). San Francisco, CA: Jossey-Bass.
- Community College Research Center. (2012). *What we know about dual enrollment* (p. 8). Retrieved from Columbia University, Teachers College, Community College Research Center website: <http://ccrc.tc.columbia.edu/publications/what-we-know-about-dual-enrollment.html>
- Consortium for Policy Research in Education. (2000). *Bridging the K-12/postsecondary divide with a coherent K-16 system* [Data set]. <https://doi.org/10.1037/e384002004-001>
- Dare, A., Dare, L., & Nowicki, E. (2017). Concurrent enrollment: Comparing how educators and students categorize students' motivations. *Social Psychology of Education*, 20(1), 195–213. <https://doi.org/10.1007/s11218-016-9364-8>
- Dash, K. (2017). *An evaluation of the impact of dual credit and dual enrollment on college-going in Nebraska* (p. 35). Nebraska Department of Education. Retrieved from [https://www.education.ne.gov/wp-content/uploads/2017/07/Dual\\_Enrollment\\_and-Credit\\_Study.pdf](https://www.education.ne.gov/wp-content/uploads/2017/07/Dual_Enrollment_and-Credit_Study.pdf)
- Davis, M. R. (2013). “MOOC” plan could address dual-enrollment. *Education Week*. Retrieved from <https://www.edweek.org/ew/articles/2013/06/12/35moocs.h32.html>

- DeHaan, R. L. (2005). The impending revolution in undergraduate science education. *Journal of Science Education and Technology, 14*(2), 253–269. <https://doi.org/10.1007/s10956-005-4425-3>
- DiPuma, F. J. (2002). *Dual-enrolled student success in an open enrollment community college* (Doctoral Dissertation, University of Nevada, Las Vegas). Retrieved from <https://digitalscholarship.unlv.edu/rtds/2500/>
- Driscoll, A., Jicha, K., Hunt, A. N., Tichavsky, L., & Thompson, G. (2012). Can online courses deliver in-class results?: A comparison of student performance and satisfaction in an online versus a face-to-face introductory sociology course. *Teaching Sociology, 40*(4), 312–331. <https://doi.org/10.1177/0092055X12446624>
- Edwards, L., & Hughes, K. (2011). *Dual enrollment for high school students*. Retrieved from <https://eric.ed.gov/?id=ED521460>
- Ferguson, C., Baker, P., & Burnett, D. (2015). Faculty members' perceptions of rigor in dual enrollment, accelerated programs, and standard community college courses. *New Directions for Community Colleges, 2015*(169), 83–91. <https://doi.org/10.1002/cc.20135>
- Giani, M., Alexander, C., & Reyes, P. (2014). Exploring variation in the impact of dual-credit coursework on postsecondary outcomes: A quasi-experimental analysis of Texas students. *The High School Journal, 97*(4), 200–218.
- Greenberg, A. R. (1989). *Concurrent enrollment programs: College credit for high school students*. Phi Delta Kappa Educational Foundation. Retrieved from <https://eric.ed.gov/?id=ED313936>

- Helms, J. L. (2014). Comparing student performance in online and face-to-face delivery modalities. *Journal of Asynchronous Learning Networks*, 18(1). Retrieved from <https://eric.ed.gov/?id=EJ1030563>
- Hiesterman, M. (2013). *High school students attending college: A study of the dual enrollment program and its impact on the postsecondary institution of Brevard Community College* (University of Central Florida). Retrieved from <https://stars.library.ucf.edu/etd/2639>
- Higher Learning Commission. (2014). *Dual credit: For institutions and peer reviewers* (p. 3). Higher Learning Commission.
- Hoffman, N., Vargas, J., & Santos, J. (2009). New directions for dual enrollment: Creating stronger pathways from high school through college. *New Directions for Community Colleges*, 2009(145), 43–58. <https://doi.org/10.1002/cc.354>
- Howley, A., Howley, M. D., Howley, C. B., & Duncan, T. (2013). Early college and dual enrollment challenges: Inroads and impediments to access. *Journal of Advanced Academics*, 24(2), 77–107. <https://doi.org/10.1177/1932202X13476289>
- Hughes, K. L. (2010). Dual enrollment: Postsecondary/secondary partnerships to prepare students. *Journal of College Science Teaching; Washington*, 39(6), 12–13.
- Hughes, K. L., & Edwards, L. (2012). Teaching and learning in the dual enrollment classroom. *New Directions for Higher Education*, 2012(158), 29–37. <https://doi.org/10.1002/he.20012>
- Irvin, M. J., Hannum, W. H., de la Varre, C., & Farmer, T. W. (2010). Barriers to distance education in rural schools. *Quarterly Review of Distance Education*, 11(2), 73–90.
- Jaggars, S. S., Edgecombe, N., & Stacey, G. W. (2013). *What we know about online course outcomes. Research overview*. Retrieved from <https://eric.ed.gov/?id=ED542143>

Jaggars, S. S., & Xu, D. (2010). *Online learning in the Virginia Community College System*.

Retrieved from <https://eric.ed.gov/?id=ED512396>

Johnson, J., & Strange, M. (2007). *Why rural matters 2007: The realities of rural education*

*growth*. Retrieved from Rural School and Community Trust website:

<https://eric.ed.gov/?id=ED498859>

Jones, S. J. (2014). Student participation in dual enrollment and college success. *Community*

*College Journal of Research and Practice*, 38(1), 24–37.

<https://doi.org/10.1080/10668926.2010.532449>

Jones, S. J. (2017). Supporting the mission through dual enrollment. *New Directions for*

*Community Colleges*, 2017(180), 75–83. <https://doi.org/10.1002/cc.20283>

Kanny, M. (2014). *Forks in the pathway? Mapping the conditional effects of dual enrollment by*

*gender, first-generation status, and pre-college academic achievement on first-year*

*student engagement and grades in college* (UCLA). Retrieved from

<https://escholarship.org/uc/item/43q1t1bp>

Kanny, M. A. (2015). Dual enrollment participation from the student perspective. *New*

*Directions for Community Colleges*, 2015(169), 59–70. <https://doi.org/10.1002/cc.20133>

Karp, M. M. (2012). “I don’t know, I’ve never been to college!” Dual enrollment as a college

readiness strategy. *New Directions for Higher Education*, 2012(158), 21–28.

<https://doi.org/10.1002/he.20011>

Karp, M. M. (2015). Dual enrollment, structural reform, and the completion agenda. *New*

*Directions for Community Colleges*, 2015(169), 103–111.

<https://doi.org/10.1002/cc.20137>

- Karp, M. M., Bailey, T. R., Hughes, K. L., & Fermin, B. J. (2004). *State dual enrollment policies: Addressing access and quality*. Retrieved from <https://eric.ed.gov/?id=ED484432>
- Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D. W., & Bailey, T. R. (2007). *The postsecondary achievement of participants in dual enrollment: "An analysis of student outcomes in two states."* Retrieved from <https://eric.ed.gov/?id=ED498661>
- Karp, M. M., & Hughes, K. L. (2008). Study: Dual enrollment can benefit a broad range of students. *Techniques: Connecting Education and Careers (JI)*, 83(7), 14–17.
- Kim, J., & Bragg, D. (2008). The impact of dual and articulated credit on college readiness and retention in four community colleges. *Career and Technical Education Research*, 33(2), 133–158. <https://doi.org/info:doi/10.5328/CTER33.2.133>
- Kingston, N. M., & Anderson, G. (2013). Using state assessments for predicting student success in dual-enrollment college classes. *Educational Measurement: Issues and Practice*, 32(3), 3–10. <https://doi.org/10.1111/emip.12014>
- Kinnick, K. N. (2012). The impact of dual enrollment on the institution. *New Directions for Higher Education*, 2012(158), 39–47. <https://doi.org/10.1002/he.20013>
- Kirby, D., Barbour, M. K., & Sharpe, D. B. (2012). Student perceptions and preferences for tertiary online courses: Does prior high school distance learning make a difference?: *American Journal of Distance Education*, 26(1). Retrieved October 17, 2018, from [https://www-tandfonline-com.libproxy.unl.edu/doi/abs/10.1080/08923647.2012.646089?casa\\_token=iE-8HhoX3p4AAAAA:7ZCNWrRLKvSOB82SAgB4xj-qVCdodW4ZSy3A5dn07Hdu9YN2Re1w8XQf6vtUNsqq40bB8U4yBSVpzw](https://www-tandfonline-com.libproxy.unl.edu/doi/abs/10.1080/08923647.2012.646089?casa_token=iE-8HhoX3p4AAAAA:7ZCNWrRLKvSOB82SAgB4xj-qVCdodW4ZSy3A5dn07Hdu9YN2Re1w8XQf6vtUNsqq40bB8U4yBSVpzw)

- Kleiner, B., Lewis, L., & Greene, B. (2005). *Dual enrollment of high school students at postsecondary institutions: 2002-03. E.D. TAB. NCES 2005-008*. Retrieved from <https://eric.ed.gov/?id=ED484632>
- Klopfenstein, K., & Lively, K. (2012). Dual enrollment in the broader context of college-level high school programs. *New Directions for Higher Education*, 2012(158), 59–68. <https://doi.org/10.1002/he.20015>
- Kronholz, J. (2011). High schoolers in college: Dual enrollment programs offers something for everyone. *Education Next*, 11(3), 26–31.
- Krueger, C. (2006). *Dual enrollment: Policy issues confronting state policymakers. Policy brief*. Retrieved from <https://eric.ed.gov/?id=ED493711>
- Lichtenberger, E., Witt, M. A., Blankenberger, B., & Franklin, D. (2014). Dual credit/dual enrollment and data driven policy implementation. *Community College Journal of Research and Practice*, 38(11), 959–979. <https://doi.org/10.1080/10668926.2013.790305>
- Lieber, C. M. (2009). *Increasing college access through school—Based models of postsecondary preparation, planning and support* (p. 36). Retrieved from Educators for Social Responsibility website: [http://www.sedl.org/secc/events/10/hs\\_rti\\_march/files/lieber\\_hsrti\\_summit\\_incr\\_coll\\_access\\_handout\\_final.pdf](http://www.sedl.org/secc/events/10/hs_rti_march/files/lieber_hsrti_summit_incr_coll_access_handout_final.pdf)
- Lowe, A. I. (2010). *Promoting quality: State strategies for overseeing dual enrollment programs*. Retrieved from <https://eric.ed.gov/?id=ED537071>
- Lukes, L. A. (2014). Considerations and recommendations for implementing a dual-enrollment program: Bridging the gap between high school and college level science. *Journal of College Science Teaching*, 44(1), 17–22.

- Marken, S., Gray, L., & Lewis, L. (2013). *Dual enrollment programs and courses for high school students at postsecondary institutions: 2010–11*. National Center for Education Statistics. Retrieved from <https://eric.ed.gov/?id=ED540156>
- Maxwell, J. A. (2013). *Qualitative research design: An interactive approach*. (3rd ed.). Thousand Oaks, CA: SAGE Publications.
- McCarthy, C. R. (1999). Dual-enrollment programs: Legislation helps high school students enroll in college courses. *Journal of Secondary Gifted Education, 11*(1), 24–32. <https://doi.org/10.4219/jsge-1999-610>
- McCauley, D. (2007). *The impact of advanced placement and dual enrollment programs on college graduation* (Masters, Texas State University). Retrieved from <https://digital.library.txstate.edu/handle/10877/3597>
- Medvide, M. B., & Blustein, D. L. (2010). Exploring the educational and career plans of urban minority students in a dual enrollment program. *Journal of Career Development, 37*(2), 541–558. <https://doi.org/10.1177/0894845309350920>
- Merriam, S. B., & Tisdell, E. J. (2016). *Qualitative research: A guide to design and implementation* (4th ed.). San Francisco, CA: Jossey-Bass.
- Mertens, D. M. (2015). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative and mixed methods* (4th ed.). Thousand Oaks, CA: SAGE Publications.
- Mohker, C. G., & McLendon, M. K. (2009). Uniting secondary and postsecondary education: An Event history analysis of state adoption of dual enrollment policies. *American Journal of Education, 115*(2). Retrieved October 15, 2018, from <https://www-journals-uchicago-edu.libproxy.unl.edu/doi/10.1086/595668>

- National Center for Education Statistics. (2018). *The condition of education 2018*. U.S. Department of Education. Retrieved from <https://eric.ed.gov/?id=ED583502>
- Nebraska's Coordinating Commission for Postsecondary Education. (2019). *Access college early scholarship 2017-18 year-end report*. Retrieved from [https://ccpe.nebraska.gov/sites/ccpe.nebraska.gov/files/doc/ACE\\_2017-18.pdf](https://ccpe.nebraska.gov/sites/ccpe.nebraska.gov/files/doc/ACE_2017-18.pdf)
- O'Neill, D. K., & Sai, T. H. (2014). Why not? Examining college students' reasons for avoiding an online course. Retrieved October 17, 2018, from <https://link-springer-com.libproxy.unl.edu/article/10.1007/s10734-013-9663-3>
- Padron, E. J. (2009). An American crisis. *Presidency*, 12(1), 18–23.
- Platt, C. A., Raile, A. N. W., & Yu, N. (2014). *Virtually the same?: Student perceptions of the equivalence of online classes to face-to-face classes*. 10(3), 15.
- Pretlow, J., & Patteson, J. (2015). Operating dual enrollment in different policy environments: An examination of two states. *New Directions for Community Colleges*, 2015(169), 21–29. <https://doi.org/10.1002/cc.20129>
- Provasnik, S., KewalRamani, A., Coleman, M. M., Gilbertson, L., Herring, W., & Xie, Q. (2007). *Status of education in rural America*. National Center for Education Statistics.
- Purnell, R. (2014). *A guide to launching and expanding dual enrollment programs for historically underserved students in California*. Retrieved from <http://rpgroup.org/Portals/0/Documents/Archive/Dual-Enrollment-Toolkit-Updated-Dec2015.pdf>
- Pyzdrowski, L. J., Butler, M. B., Walker, V. L., Pyzdrowski, A. S., & Mays, M. E. (2011). Exploring the feasibility of dual-credit mathematics courses in high school via a web-enhanced, blended model. *The Journal of General Education*, 60(1), 43–60.

- Reese, S. (2008). Doubling the opportunity for success. *Techniques: Connecting Education and Careers (J3)*, 83(7), 18–21.
- Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). London: SAGE Publications.
- Seidman, I. (2013). *Interviewing as qualitative research: A guide for resarchers in education & the social sciences* (4th ed.). New York, NY: Teachers College Press.
- Smith, D. (2007). Why expand dual-credit programs? *Community College Journal of Research and Practice*, 31(5), 371–387. <https://doi.org/10.1080/10668920600932884>
- Speroni, C. (2011). *Determinants of students' success* (p. 47). New York, NY: National Center for Postsecondary Research, Teachers College, Columbia University.
- Sullivan-Ham, K. (2010). *Impact of participation in a dual enrollment program on first semester college GPA* (Ph.D., Walden University). Retrieved from <http://search.proquest.com/docview/763425513/abstract/210A8F30B6094D53PQ/1>
- Swanson, J. (2008). *An analysis of the impact of high school dual enrollment course participation on post - secondary academic success, persistence and degree completion* (Doctoral Dissertation). University of Iowa.
- Taylor, J. L. (2015). Accelerating pathways to college: The (in)equitable effects of community college dual credit. *Community College Review*, 43(4), 355–379. <https://doi.org/10.1177/0091552115594880>
- Taylor, J. L., Borden, V. H. M., & Park, E. (2015). State dual credit policy: A national perspective. *New Directions for Community Colleges*, 2015(169), 9–19. <https://doi.org/10.1002/cc.20128>

- The National Alliance of Concurrent Enrollment Partnerships. (2018). Retrieved October 20, 2018, from <http://www.nacep.org/>
- Thomas, N., Marken, S., Gray, L., & Lewis, L. (2013). Dual credit and exam-based courses in U.S. public high schools: 2010-11. *Washington, DC: U.S. Department of Education, National Center for Education Statistics, 59.*
- Tobolowsky, B. F., & Allen, T. O. (2016). On the fast track: Understanding the opportunities and challenges of dual credit. *ASHE Higher Education Report, 42(3), 7–106.*  
<https://doi.org/10.1002/aehe.20069>
- Tobolowsky, B. F., & Ozuna Allen, T. (2016). (Un)intended consequences: The first-year college experience of female students with dual credits [Text]. Retrieved November 4, 2018, from  
<http://www.ingentaconnect.com/content/fyesit/fyesit/2016/00000028/00000001/art00002>
- Tyler-Smith, K. (2006). Early attrition among first time eLearners: A review of factors that contribute to drop-out, withdrawal and non-completion rates of adult learners undertaking eLearning programmes. *Journal of Online Learning and Teaching, 2(2), 73–85.*
- Waits, T., Setzer, J. C., & Lewis, L. (2005). Dual credit and exam-based courses in U.S. public high schools: 2002-03. *Washington, DC: U.S. Department of Education, National Center for Education Statistics, 85.*
- Weisberg, A., Hughes, K. L., & Edwards, L. (2011). *Different approaches to dual enrollment: understanding program features and their implications.* Retrieved from  
<https://folio.iupui.edu/handle/10244/949>

- Wladis, C., Hachey, A. C., & Conway, K. (2013). Are online students in STEM (science, technology, engineering and mathematics) courses at greater risk of non-success? *American Journal of Educational Studies*, 6(1), 65–84.
- Wladis, C., Hachey, A. C., & Conway, K. M. (2015). The representation of minority, female, and non-traditional STEM majors in the online environment at community colleges: A nationally representative study. *Community College Review*, 43(1), 89–114.  
<https://doi.org/10.1177/0091552114555904>
- Yin, R. K. (2016). *Qualitative research from start to finish* (2nd ed.). New York, NY: The Guildford Press.
- Young Jr., R. D., Joyner, S. A., & Slate, J. R. (2013). Grade point average differences between dual and nondual credit college students. *Urban Studies Research*, 2013. Retrieved from <https://www.hindawi.com/journals/usr/2013/638417/abs/>
- Young Jr., R. D., Slate, J. R., Moore, G. W., & Barnes, W. (2014). Dual credit programs: A conceptual analysis of the literature. *Journal of Education Research*, 8(1–2), 30.
- Zinth, J. D. (2016). 50-State comparison: Dual/concurrent enrollment policies. Retrieved November 6, 2018, from Individual State Profile website: <https://www.ecs.org/dual-concurrent-enrollment-policies/>
- Zuidema, D. R., & Eames, K. J. (2014). Comparison of high school dual-enrollment and traditional first-term general/organic/biochemistry college chemistry class outcomes. *Journal of Chemical Education*, 91(12), 2058–2063. <https://doi.org/10.1021/ed500516x>

## Appendix A

Official Approval Letter for IRB project #19241 - New Project Form

April 12, 2019

Trentee Bush  
Department of Educational  
Administration NCTA Curtis  
NE 69025

Marilyn Grady  
Department of Educational  
Administration TEAC 128 UNL  
NE 685880360

IRB Number: 20190419241EX  
Project ID: 19241  
Project Title: The Perceived Role of Online STEM Dual Credit Courses in  
Rural Nebraska High Schools

Dear Trentee:

This letter is to officially notify you of the certification of exemption of your project for the Protection of Human Subjects. Your proposal is in compliance with this institution's Federal Wide Assurance 00002258 and the DHHS Regulations for the Protection of Human Subjects at 45 CFR 46 2018 Requirements and has been classified as exempt. Exempt categories are listed within HRPP Policy #4.001: Exempt Research available at: <http://research.unl.edu/researchcompliance/policies-procedures/>.

- o Date of Final Exemption: 04/12/2019
- o Review conducted using exempt category 2b at 45 CFR 46.104
- o Funding (Grant congruency, OSP Project/Form ID and Funding Sponsor Award Number, if applicable): N/A

We wish to remind you that the principal investigator is responsible for reporting to this Board any of the following events within 48 hours of the event:

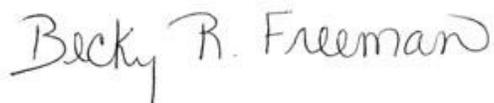
- \* Any serious event (including on-site and off-site adverse events, injuries, side effects, deaths, or other problems) which in the opinion of the local investigator was unanticipated, involved risk to subjects or others, and was possibly related to the research procedures;
- \* Any serious accidental or unintentional change to the IRB-approved protocol that involves risk or has the potential to recur;
- \* Any protocol violation or protocol deviation
- \* An incarceration of a research participant in a protocol that was not approved to include prisoners

- \* Any knowledge of adverse audits or enforcement actions required by Sponsors
- \* Any publication in the literature, safety monitoring report, interim result or other finding that indicates an unexpected change to the risk/benefit ratio of the research;
- \* Any breach in confidentiality or compromise in data privacy related to the subject or others; or
- \* Any complaint of a subject that indicates an unanticipated risk or that cannot be resolved by the research staff.

This project should be conducted in full accordance with all applicable sections of the IRB Guidelines and you should notify the IRB immediately of any proposed changes that may affect the exempt status of your research project. You should report any unanticipated problems involving risks to the participants or others to the Board.

If you have any questions, please contact the IRB office at 402-472-6965.

Sincerely,



Becky R.  
Freeman, CIP  
for the IRB



University of Nebraska-Lincoln Office of Research and Economic Development  
[nugrant.unl.edu](http://nugrant.unl.edu) 

## Appendix B

### **Participant Email Contact Script**

Dear superintendent/dual credit coordinator,

I am Trentee Bush, a doctoral student at the University of Nebraska-Lincoln in the Educational Administration department. I am studying online STEM dual credit courses delivered to rural Nebraska high schools for my dissertation topic.

You are being asked to participate in this study based on your relationship to the community college or high school and the role you play in making decisions to offer dual credit courses.

Should you choose to participate, this study will take approximately 75 minutes of your time. The first portion of the study is a survey that can be accessed at the link below:

The information you provide will be kept confidential and only be used for the purposes of this project. Your participation in this project is voluntary. The only known risks are possible exposure of some non-public information during the interview process. However, you will have the chance to provide a pseudonym and all names and locations will be de-identified in the report of the study. You can refuse to participate at any time without harming your relationship with UNL. There are no direct benefits to participation.

If you have any questions about the survey, the study, if you or wish to be removed from the study, please do not hesitate to contact me, the researcher, at [trentee@northeast.edu](mailto:trentee@northeast.edu) or 402-613-3159.

Thank you,

Trentee Bush

## Appendix C

**Qualtrics Institutional Demographic Survey**

- Describe your role in providing dual credit courses at your institution?
- You have the option to choose a pseudonym. If you would like to use one throughout this research project please write it in the box:
- How long have you been in that role?
- Please provide the names of partner institutions who receive/provide online STEM dual credit courses from/to your institution.
- How many dual credit courses are offered at your institution?
  - How many partner institutions (other high schools or colleges) do you work with?
  - How long has your institution offered dual credit courses?
  - Of the current dual credit offerings, how many are considered STEM courses?
  - How many of these STEM courses are offered in an online format?
- How many students are enrolled at your institution?
  - How many students currently participate in dual credit courses at your institution?
  - On average, how many credit hours of dual credit courses do your students complete?
- Historically, how many students have completed dual credit courses?
  - How many faculty at your institution are involved in dual credit courses (teaching or proctoring)?
- What percentage of their teaching load is dedicated to dual credit courses?

## Appendix D

### **Informed Consent**

#### Informed Consent Provided Prior to Demographic Survey

#### **Welcome to the research study!**

My name is Trentee (Tee) Bush. I am conducting a study involving online STEM dual credit courses at rural Nebraska high schools. If you are 19 years of age or older and are being contacted for this study through your role as a dual credit “coordinator” at a community college or as a high school superintendent of a school fitting the criteria you may participate in this research.

#### **What is the reason for doing this research study?**

This project aims to understand the role of online STEM dual credit courses. This study will be conducted at Nebraska community colleges and rural high schools being defined as 50 miles or more from an institution of higher education. Dual credit coordinators at community colleges and high school superintendents, will help provide insight into the role these courses are playing in the educational outcomes for the students and the institutions. Understanding the rarely studied impact of dual credit, especially online STEM courses, will help inform future decision-making on curricular offerings, including student impact and financial implications.

#### **What will be done during this research study?**

You will be asked to respond to an institutional demographic survey which should take no longer than fifteen minutes and will be completed by participants willing to take part in this study.

Interview participation in this study will require approximately one hour of your time. You will be asked to participate in an interview conducted via web-based video conferencing (i.e. Zoom). Participation will take place at your convenience via the video conferencing system. You may also choose to opt-out of the follow-up interview and still participate in the first-round interviews.

**What are the possible risks of being in this research study?**

You may expose some non-public information during the interview process. However, you will have the chance to provide a pseudonym and all names and locations will be de-identified in the report of the study.

**What are the possible benefits to you?**

You will have access to the research findings after the publication of the dissertation is complete. Currently, very minimal data of this topic is published by the state of Nebraska. The data will provide community college and public schools information about providing dual credit.

**How will information about you be protected?**

Your responses during your interview will be kept confidential via the use of a chosen pseudonym and will only be shared with the secondary investigator. You will be asked to create your own pseudonym to ensure your privacy. All recordings and any identifying documentation will be kept secured on a password-protected computer belonging to the researcher.

**What are your rights as a research subject?**

You may ask any questions concerning this research and have those questions answered before agreeing to participate in or during the study.

For study related questions, please contact the investigator(s):

Principal Investigator: Trentee Bush, MS – [trentee@northeast.edu](mailto:trentee@northeast.edu) – 402-613-3159

Secondary Investigator: Marilyn Grady – [mgrady1@unl.edu](mailto:mgrady1@unl.edu) – 402-472-0974

For questions concerning your rights or complaints about the research contact the Institutional Review Board (IRB): • Phone: 1(402)472-6965 • Email: [irb@unl.edu](mailto:irb@unl.edu)

**What will happen if you decide not to be in this research study or decide to stop participating once you start?**

You can decide not to be in this research study, or you can stop being in this research study (“withdraw”) at any time before, during, or after the research begins for any reason. Deciding not to be in this research study or deciding to withdraw will not affect your relationship with the investigator or with the University of Nebraska-Lincoln.

You will not lose any benefits to which you are entitled.

**Documentation of Informed Consent**

You are voluntarily making a decision whether or not to participate in this research study. By clicking on the I Consent button below, your consent to participate is implied. You should print a copy of this page for your records.

Please note that the subsequent demographic survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

I consent, begin the study.

I do not consent, I do not wish to participate.

## Appendix E

**Semi-Structured Interview Questions**

- What role do online STEM dual credit courses have in rural Nebraska high schools?
  - How has this role changed during the last 10 years?
  - What role should these courses play in the next 10 years?
    - Do you expect these course offerings to grow or decline? Why?
- How do online STEM dual credit courses impact the institution? The students?
  - Does your institution offer financial incentives for students to enroll in or complete dual credit courses?
    - What type of incentives? Give examples.
  - What are the financial implications for the providing of online STEM dual credit courses for the institution?
    - How do these courses financially impact the institution in the short-term? Long-term?
  - What are financial implications for the providing of online STEM dual credit courses for the student?
    - How do these courses financially impact the student in the short-term? Long-term?
  - What are the academic implications for the institution?
    - How do online STEM dual credit courses make a difference academically for the institution?
    - How do online STEM dual credit courses change the curricular offerings of the institution?

- What are the academic implications for the student?
  - How do online STEM dual credit courses make a difference academically for the student?
- What eligibility requirements does your institution place on dual credit enrollment?
  - How can these eligibility requirements be improved?
- What other benefits do online STEM dual credit courses provide for the high school students who are attempting to complete them?
  - What are some examples of differences (positive or negative) you have seen in student performance based on participation in online STEM dual credit courses?
  - What pitfalls do online STEM dual credit students experience?
    - What types of support systems (if any) are in place for students struggling with online STEM dual credit courses?
- What benefits do online STEM dual credit courses provide for the institution?
  - How can student success be increased in online STEM dual credit courses?
    - What skills or opportunities should students have to be more successful in these courses?
  - What are the challenges the students must overcome to be successful in online STEM dual credit courses?
    - How are these challenges monitored?
    - What (if any) communication occurs between the institutions to ensure student success?

- What (if any) communication occurs between the institution and the student to ensure student success?
- What supplemental support does the institution (high school or college) provide for students in online STEM dual credit courses?
- Who leads the partnership with the online STEM dual credit courses?
  - How is this partnership maintained?
- Describe the faculty/instructors involved in the online STEM dual credit courses.
  - What are their credentials?
  - What is their primary teaching role?
    - Define the role of the onsite instructor or monitor at the high school who helps with coursework or technical issues during school hours.
  - What is the institution's satisfaction level with the faculty or teaching scenario?
  - What changes to the current teaching situation would enhance the online STEM dual credit learning potential?
- Describe other challenges the institution faces with online STEM dual credit delivery.
  - Cost?
  - Maturity of student?
  - Student records (transcript grades)?
  - Technical logistics?
  - Scheduling issues?