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Communicating Student Outcomes: A Mixed Methods Study of Communication Effectiveness

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LOYOLA UNIVERSITY CHICAGO

COMMUNICATING STUDENT OUTCOMES:
A MIXED METHODS STUDY OF COMMUNICATION EFFECTIVENESS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE GRADUATE SCHOOL
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

PROGRAM IN RESEARCH METHODOLOGY

BY

NICHOLAS BRANSON

CHICAGO, IL

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ABSTRACT

Higher education institutions in the United States face an urgent need to use evidence of their students' outcomes to inform improvements and increase educational attainment. Data about student outcomes are abundant and professionals who interpret and report the data are commonplace today. Yet, the higher education landscape continues to be challenged to effectively apply student outcome evidence to enact institutional improvements. The literature from a variety of fields offers many ways that comprehension and use of evidence can be facilitated. This research explores the effect of communication mode, specifically infographics, videos, and written reports, on comprehension and use of student outcomes evidence. The study asks to what extent differences in communication mode affect comprehension and use and how and why those differences exist. Using a single community college as a case site and faculty and staff within the site as participants, this mixed method study leveraged observations, interviews, and surveys in a multi-phase structure. Quantitative and qualitative evidence demonstrated that videos were a more effective communication mode than infographics or written reports for maximizing faculty and staff comprehension and potential use of student outcome data. Elements of communication modes that help explain differences included quality, scope of information, presentation, demands on the audience, and order of multiple modes. These findings have implications for the future practices of communicating student outcome evidence in higher education institutions so that faculty and staff understand data that is essential to making improvements for students.

CHAPTER ONE

THE NEED TO COMMUNICATE STUDENT OUTCOMES EFFECTIVELY

Introduction

If I begin the first sentence of this research study in an unconventional way, does it affect my readers' understanding and potential use of the research I will share? While that is certainly not a typical way to begin, it articulates the central question of this work: does communication matter? Certainly, the field of communication has numerous techniques and there is a wealth of knowledge about the importance of communication in a variety of contexts. Here, the question is about communication of evidence about student outcomes in the context of higher education. It is about the ways, especially unconventional ways, we communicate that evidence and communication's importance to fostering improvement in colleges and universities in the United States.

While there are many topics of communication within higher education institutions, communication about student outcomes evidence is of central importance in the conversation about organizational effectiveness and improvement. Here, I consider student outcomes to refer to a variety of short-term and long-term achievements by college students that include but are not limited to student learning outcome attainment, course grades, accumulation of credits, persistence between semesters and years, and graduation rates. In modern society we rely heavily on evidence to inform decision-making, or at least value that approach, particularly when it comes to assessing or evaluating the extent to which organizations accomplish their goals and

how they could improve (Dahler-Larsen, 2012; Higher Learning Commission, 2019; Kuh et al., 2015). Change based on evidence is informed change that can accomplish established goals (McClintock & Snider, 2008). Evidence plays a key role in guiding change in higher education institutions seeking to improve and better serve students. Over 15 years of research in community college improvements has led Achieving the Dream, a national organization focused on improving student success in higher education, to conclude that data is one of seven critical elements to building a student-focused culture that facilitates student achievement (Achieving the Dream, 2018). The research presented here focuses on this higher education context where there is a heavy emphasis on the need for evidence to inform improvements. More importantly, there is a very real need for higher education institutions to improve their organizational effectiveness so that students can achieve outcomes they seek, especially successful completion of economically valuable credentials.

Why Change is Needed in Higher Education

Despite robust educational and economic systems, today America faces an imbalance with more jobs requiring higher education credentials than potential employees holding higher education credentials (Carnevale et al., 2013). With current educational attainment levels, the country will suffer from a lack of educated workers to fill jobs. Higher education is increasingly important to acquire and maintain living wage jobs. Yet completion of college credentials remains depressingly lower than what is needed (Carnevale et al., 2013; United States Department of Education, 2015). In 2009, then-President Barack Obama set a goal for the country: 60% of Americans aged 25 and older were to have a college credential by the year 2020 (Kanter et al., 2011). This goal was in response to the evidence predicting an economy

increasingly reliant on middle- and high-skilled jobs that would require some form of post-secondary education. Additionally, the goal sought to ensure a well-educated and informed public able to participate effectively in a robust democracy (Kanter et al., 2011). The ambitious target shifted attention from a long-standing focus on access to higher education toward *success and completion* of the students who did access college (United States Department of Education, 2015). Many states set their own goals to align with the national agenda with some tied to institutional funding, and as many as 42 had educational attainment goals as of the writing of this work (Marcus, 2019).

It was within this context that higher education grew increasingly aware of its need to hold up a mirror and investigate evidence about outcomes of students within its institutions. Higher education accrediting agencies and state higher education systems began putting more pressure on institutions to explain the outcomes that students at their institutions achieved or did not achieve. It was no longer enough to say that the outcomes of students were simply the result of the students themselves; colleges and universities were being asked how they were holding themselves responsible for student outcomes (Kuh et al., 2015). Furthermore, accrediting agencies and institutions alike began asking what *evidence* was being used to understand student learning and progress, and how it was being used to inform organizational improvements that would benefit student outcomes (Higher Learning Commission, 2007; Kuh et al., 2015; Maki, 2010). Higher education needs evidence to improve successful student completions and accomplish the ambitious goals set at national and state levels, as well as some targets tied to institutional funding (Ortagus et al., 2020).

By 2020, when Obama had hoped 60% of Americans would have completed a college education, only 48% of Americans aged 25 or older had obtained a college credential (United States Census Bureau, 2021). There has been progress; in 2009 about thirty-nine percent of Americans aged 25 and older held a college credential (United States Census Bureau, 2016), so we have seen a nine-point increase in the proportion of Americans who completed college. Focusing more narrowly on Americans aged 25 to 34, 41% had attained a postsecondary credential in 2009 and 52% in 2020 (Organisation for Economic Co-operation and Development, 2020; United States Census Bureau, 2021). Still, we are far from the goal, and, at this rate, it could be another twenty years before we reach it (Marcus, 2019). Another two decades could mean a drastically different economy (Dintersmith, 2019) where even an improvement in educational attainment might still leave the country in a position where education levels do not match labor market demands.

During this same time and prior, colleges and universities have seen only incremental improvements in student outcomes. Perhaps the most important student outcome metric for higher education, the graduation rate, has increased only slightly over almost two decades (National Center for Education Statistics, 2020). Of the cohort of students beginning at over 6,000 four-year U.S. institutions in 1999, 54.4% completed a college credential within six years; among students in the same type of cohort beginning at four-year institutions in 2014, 60.1% completed a college credential within six years (National Center for Education Statistics, 2020). Only 32.0% of students beginning at the country's approximately 1,500 two-year institutions in 1999 completed a credential within three years. Eighteen years later, in 2017, another set of students began at two-year colleges and only 36.0% completed a credential within three years

(National Center for Education Statistics, 2020). Nationally, just under 34 million Americans, or 15.2% of those over age 25 have earned some college credits but no higher education credential (United States Census Bureau, 2020). Still others entered college with hopes of earning a credential and left before earning any credits. These data reveal nearly two decades of American higher education institutions failing to enable students' accomplishment of their goals to earn credentials.

While more of the American population has a higher education credential now than in the past, I would argue that change is a result of more students accessing higher education rather than improvement in the system that saw only slight improvements in the rate of college completions over the past 20 years (National Center for Education Statistics, 2018; National Center for Education Statistics, 2020). With some fluctuations, enrollment of new, first-time students in colleges and universities has generally increased during this timeframe; over three million new, first-time students enrolled in college in 2017, about one hundred thousand more than in 2002 (National Center for Education Statistics, 2018). Yet, in recent history, and particularly in the near future, colleges and universities will face increasingly smaller populations of young adults that have driven enrollment growth (Grawe, 2018). We cannot simply rely on more individuals moving through a system that facilitates completion of the same small fraction of its students. Given the current enrollment and completion trends, higher education institutions must deliver more effectively on their missions to educate the public if we want to have a well-prepared workforce and citizenry.

In this context, researching and understanding patterns of students' outcomes becomes increasingly important. We cannot continue the progress that has been made, and certainly

cannot accelerate, without understanding the current state of student outcomes and applying what we learn to redesign the educational system. Evidence, and use of evidence, is critical to inform improvements in colleges and universities. Higher education institutions cannot afford to guess at how to improve student outcomes.

Evidence in Higher Education

Tracking evidence about student outcomes is not a novel idea for higher education. The Integrated Postsecondary Education Data System (IPEDS), one of the most wide-spread national data collection efforts for higher education because it is required of institutions participating in student federal financial aid programs, began in 1985 (Aliyeva et al., 2018). Early analyses focused on enrollment and completion of postsecondary students, but tracking of student outcomes has become more complex, measuring several student milestones and outcomes (Aliyeva et al., 2018). The lack of improvement in student outcomes is not that these institutions simply lacked the data to know how well their students were doing.

Still, even with the evidence about student outcomes, institutions of higher education would also need people to interpret and communicate that data to facilitate organizational change. Here too higher education has had a long history. For over five decades, higher education institutions have built this capacity, often described as decision support or organizational intelligence, by establishing institutional research offices on campus (Howard et al., 2012). Just as collection of evidence about student outcomes grew increasingly complex in the context of increasing pressure to make improvements, the profession of institutional research evolved with higher credentialing of personnel, increased number of office staff, and maturity in the types of work completed (Howard et al., 2012). Still, after decades of data collection and

personnel dedicated to researching how effective colleges and universities are, the mild advances in student outcomes suggest that few organizational improvements have materialized.

If the data exist about student outcomes and higher education institutions invest in personnel to analyze and report on the data, why, then, haven't these efforts translated to significant improvements in student outcomes? This context begs the question of how exactly evidence about student outcomes are actually used to improve organizational practices. Many factors could influence whether or not evidence is used by individuals or organizations. Use of evidence, or lack of use, can be influenced by the organizational culture, the will to make changes, decision-making processes, leadership, the quality of the evidence, research practices, the incentives and disincentives involved in making changes, and many other factors (Kuh et al., 2015; Patton, 1997). In this work, I focus on the role of communication as one factor that can influence the use of evidence about student outcomes in higher education.

Research Problem and Purpose of Study

The research problem I address in this study is to establish evidence about how different modes of communicating student outcome data might influence comprehension of and use of the data for decision-making. Communication modes in this study refer to the format in which student outcomes data are presented (e.g., written reports, infographics, videos). In a higher education environment increasingly emphasizing the use of data, and with explicit expectations that student outcome data be communicated and used (Columbus State Community College, 2015; Higher Learning Commission, 2007), colleges and universities seek to leverage evidence to inform decisions. The use of assessment or evaluation findings has been the subject of much literature because use is considered by some to be an integral part of the evaluation or assessment

process (Banta & Palomba, 2015; Christie & Alkin, 2012). However, that literature largely focuses on the approaches, methods, and organizational processes that can contribute to use of data about student outcomes. There is an underlying assumption that communication of the results between those who analyze evidence and others who could take action based on the results is sufficient to facilitate, let alone encourage, evidence-informed decision-making and improvements in higher education. There does not appear to be well-established best practices for *communication*, particularly communication of evidence regarding student outcomes, for the purposes of encouraging understanding and use. To be sure, there are best practices in graphic design that have been applied to data communication (see Evergreen, 2017; Nussbaumer Knaflic, 2015), and other studies about specific communication modes (see Chan et al., 2017; Putorti et al., 2020; Torres, 2009). However, the overall mode of communication, especially differences between infographics, videos, and written reports, has not been extensively explored in the higher education sphere.

Data overload or fatigue further complicates the environment in some organizations (Evergreen, 2017). This sense of feeling overwhelmed seems to have, in part, contributed to the desire to simplify reporting of data and information and generate new data products. My research uses the term “data products” to refer to the physical or virtual artifacts that present student outcomes data; every data product uses some mode of communication, but the data product is the individual item generated rather than the mode being used to communicate. For example, a written report about student graduation rates is an individual data product with the communication mode being a written report; a college likely uses written reports as a communication mode for many other data products with different topics. In the fields of

institutional effectiveness and business intelligence, data overload has meant some shifting from traditional written research reports with comprehensive explanations of the data and context about the study to simplified infographic-type memos that tend to highlight a few key findings and leave little room for contextual details (Evergreen, 2017). Audio-visual formats like videos are yet another possible mode of communicating research findings that might serve as an in-between option with the visual appeal and focus of an infographic as well as some of the contextual details of a written report. In fact, literature on audio-visual communication techniques supports the notion that videos especially facilitate important characteristics of storytelling that correspond to audience interest and impact (Hart, 2011). Given the relative novelty of the use of video to communicate research findings, as well as a general lack of evidence about the most effective modes for communicating student outcome findings, this study seeks to establish some evidence that would explore effectiveness of these different modes.

There are two central research questions explored in this work:

- (1) To what extent are there differences in the comprehension and potential use of student outcome data based on the mode of communicating the data (particularly comparing infographics, videos, and written reports)?
- (2) How and why does the mode of communicating student outcome data (and particularly the use of infographics, videos, and written reports to communicate) affect the comprehension and potential use of the data?

These questions can help address a gap in understanding about how to effectively facilitate much-needed, evidence-informed improvements in higher education.

Scope and Plan for this Research

Given the potentially broad application of the topics explored by this research, the boundaries of this study are important to highlight. I leverage literature from a variety of fields, detailed in Chapter Two, to provide a foundation for evaluation and assessment practices as well as communication considerations that have implications for data understanding and use. While the bodies of literature I explore have extensive depth, I focus on the aspects of others' research that are most relevant to communication and use of evidence. At the core, my research focuses on communication modes. Three communication modes in particular are central to this research: infographics, videos, and written reports. While other modes of communication exist, the research here focuses on these three modes as representative of a range of communication types, which is further explained in Chapter Three.

This study held other key factors constant. The context for this study was held constant by using one suburban Illinois community college, College of Lake County, as a case within which to explore different modes of communicating evidence about the college's students. While the topic has broader relevance to higher education and to many other industries relying on the use of evidence for organizational improvement, this study focused on student outcomes in one college. This helped to remove other factors, like organizational culture or importance of evidence to the industry for example, that could have influenced variation in the understanding and use of evidence.

I also held consistent the quality of the evidence being communicated across the different modes of communication. Audiences who question the quality of evidence provided might be less likely to use such evidence. To avoid introducing this factor, the reliability and accuracy of

the content of the data products studied here was held constant. Additionally, the general theme or topic of the evidence provided was consistently about outcomes of students enrolled at the community college that served as the case site for this research. The topic of data products in this study refers to the subject matter contained within each data product. While one could explore the use of evidence on a variety of topics in higher education (e.g., college finances, employee satisfaction, public perceptions), this study only considered evidence about student outcomes because it is a core element of the case college's mission. Still, some variation in content topic of the communicated evidence is helpful to understanding the phenomenon being studied. Different topics could be more or less conducive to different types of communication. In this study, I highlighted two different topics in the data products used, both still a type of student outcomes evidence. These limitations in scope helped isolate the effect of communication modes and reduce variation in findings that could be explained by other factors.

To explore the research questions in this research, I used a mixed methods case study approach. Faculty and staff at College of Lake County provided their insight about different modes of communicating student outcomes data. The methodological approach, detailed in Chapter Three, allowed for three iterative phases of research. The first phase focused on key informant interviews and helped inform the design of a survey used in a second phase. Analysis of the survey in the second phase provided direction for sampling of interviewees in a third phase. I intentionally designed this approach to effectively explore the two research questions of this study. Comparative analyses of different modes of communication were used to understand the extent of differences between the modes. Interviewing and observations were used to explore why differences exist and to provide contextual details for this case study. This design

plan and scope for the study allowed for an in-depth exploration of communication's role in fostering improvement in student outcomes in higher education.

Conclusion

If higher education institutions in the United States are to accomplish their missions of providing an educated public and workforce, there is work to do to improve student outcomes. Evidence to inform those improvements is critical. Yet how that evidence is communicated and the impact that communication can have on how well evidence is understood and ultimately used is one key step in the process of achieving improved outcomes. This topic needs further research, and this study contributes. In Chapter Two, literature from multiple fields has been woven together to provide a foundation of knowledge upon which this research builds. Literature from educational evaluation, assessment of student learning in higher education, data visualization in business, the psychology of visual representations, and storytelling through communication methods are connected to comprehensively discuss the multiple facets of this topic. Chapter Three details the methods used in this research, providing further details about the multi-phased, mixed-method approach. Chapter Four presents the findings of this study and Chapter Five concludes with a summary discussion and implications of the research. Taken as a whole, this work provides one substantive research contribution to better understanding one component of the process of leveraging evidence to inform and foster improvement in higher education student outcomes.

CHAPTER TWO

WHAT WE KNOW ABOUT COMMUNICATING EVIDENCE AND INSPIRING USE

Introduction

Don't we already know how to inspire action from evidence about postsecondary student outcomes? From both my professional career of over a decade working in higher education institutional effectiveness offices as well as my research on the topic of use of evidence, my simple answer is no. As established in Chapter One, despite long-standing access to student outcome evidence and dedicated resources to analyze and communicate it, there has been little improvement of student outcomes tied to the application of evidence to solve problems. To be sure, literature from multiple fields speaks to several different factors that influence how evidence is or is not used. Still, there are gaps in knowledge, especially about the implications of different modes of communication. While communication modes are certainly not the only important contributor to how well evidence is used, this study explores how important communication modes can be in the higher education context.

The extant literature discussed here serves several purposes. First, this review weaves together literature from multiple fields to provide a comprehensive picture of knowledge regarding the use of evidence in organizations. Second, the literature frames the rationale for focusing on communication modes as opposed to a number of other elements that might impact use of evidence. Lastly, the literature helps provide a foundational understanding of the many variables that influence use, and that were controlled for or at least acknowledged in the design

and analysis conducted for this study in order to isolate the effect of communication modes to the extent possible.

There are numerous factors that influence the way in which data are ultimately used to inform decisions or action and the review here details those factors. The process of conducting research and generating evidence is a helpful mechanism for organizing these factors. Thus, this literature review is structured to loosely mimic the chronological steps one might take in conducting research. These steps relevant to the literature review are depicted in Figure 1.

Figure 1. Elements of Research that Can Affect Use



Each step illustrated in Figure 1 has unique considerations for the extent to which evidence generated by research activities is ultimately used.

Defining the Research Purpose

Why one is conducting research and how one defines what constitutes the research, even as an early step in the research process, can influence the ultimate use of the research findings. In this study, the focus is on student outcomes data in higher education and particularly applying an evaluation and assessment lens. Certainly, there are a variety of research approaches familiar in the higher education landscape, but the act of researching student outcomes as a measurement of institutional effectiveness for higher education is an act of evaluation or assessment for colleges and universities. Evaluation, like assessment, is a way of investigating phenomena that is applied in many different fields and in different ways, and there is a lack of a single, universally accepted definition in both cases (Banta & Palomba, 2015; Schwandt, 2015). Still,

some of the key definitions offered can be helpful in illustrating the landscape in evaluation and assessment and the relationship to use in higher education. Here, I focus on three main definitional considerations: (1) valuing as a part of evaluation and assessment, (2) distinguishing monitoring from evaluation and assessment, and (3) types of evaluation and assessment. All of these considerations have implications for communication and use of findings.

Valuing as Part of Defining Evaluation and Assessment

Because assessment and evaluation are not static, uniform activities, but rather approaches to understanding phenomena that have been developed and cultivated in the work of practitioners, considering the practice or actions needed as a way to form a definition fits well for both. In evaluation and assessment literature, one perspective considers that evaluation/assessment is a systematic, logical process of judging the value of an object (i.e., program, experience, course, activity, etc.) (Maki, 2010; Schwandt, 2015). This approach requires specific methods that lead to a judgement of value to truly be considered evaluation (Schwandt, 2015). Accreditation and accountability pressures call for assessment in higher education to provide evidence not just that students are learning, but that the learning and the assessment processes themselves are consequential (i.e., results are used to establish learning experiences that provide value to learners) (Kuh et al., 2015). Another viewpoint considers evaluation and assessment to be a type of applied social science research, where the methods are largely the same as those used in other types of social science research, but the purpose of the research is to monitor programs, collect data in methodologically-sound ways, and to often draw conclusions about causal impacts of the program being studied (Schwandt, 2015; Suskie, 2018; Walvoord, 2010). Resolution of these two perspectives is not necessarily essential to understanding the field of

evaluation, and perhaps not even critical to practitioners who might fluctuate between perspectives or blend these ideas together.

However, these perspectives have important implications for communication and use of results because they can influence whether value judgements and other types of statements can be communicated. One important point of agreement in assessment of student learning literature is that the practice of assessment necessarily includes the *use* of assessment results (Banta & Palomba, 2015; Kuh et al., 2015; Maki, 2010; Suskie, 2018; Walvoord, 2010;). While many evaluation practitioners emphasize use of results to varying degrees (Christie & Alkin, 2012), evaluators do not agree that use is a necessary component of evaluation to the same extent that assessment experts do. Regardless, the inclusion or exclusion of value judgements has important implications. If value judgements are to be made, the practitioner can communicate about the worth of a program or educational experience to participants and/or a broader organization, like a college or university. Those in positions to use the information might continue or discontinue, expand or contract, or redesign the program or educational experience for improved impact. Without these value judgements, the practitioner can communicate about how well the program or educational experience allows participants to achieve intended outcomes, but not whether those outcomes are worthwhile. Those in positions to use the information might be more limited to managing the existing program toward the existing outcomes and would perhaps have a more difficult time finding evidence to justify why the achievement of outcomes is valuable.

Distinguishing Monitoring from Evaluation and Assessment

To further differentiate evaluation and assessment from other measurement activities, some practitioners characterize these practices as monitoring versus evaluation. Monitoring

involves tracking to measure progress on stated goals and to provide evidence that a program is completing the actions it planned to, providing expected deliverables (Schwandt, 2015). While assessment literature does not commonly use the term “monitoring” some authors characterize assessment in a similar way. For some, assessment of student learning is a process of determining the goals through stated objectives educators want students to reach and then measuring if those goals are reached to inform decisions about future improvement (Suskie, 2018; Walvoord, 2010). Monitoring is useful as a management tool for accountability of programs and to inform modifications to programs to better meet intended objectives. What distinguishes evaluation from monitoring is a focus on the value of the accomplishments of a program, not simply documenting what the accomplishments are (Schwandt, 2015). Schwandt clarifies that “evaluation focuses on objective, independent judgements of value around outputs, processes, and outcomes” (loc. 361). Similarly, some consider higher education assessment as a systematic process of examining student work against standards of judgement to determine how well students are able to meet expected outcomes as well as the *value* that college experiences bring to students (Maki, 2010).

This distinction has important implications for use of evaluation and assessment results. Monitoring approaches can be used to make decisions about changes to a program or learning experience that could result in better achievement of an intended outcome. In addition to those decisions, evaluation approaches can be used to make decisions about whether the program or learning experience is a worthwhile effort to produce the outcomes that it does or whether the outcomes are worth pursuing in the first place.

While there is debate about how to define assessment and evaluation as their own terms, there is also no agreement about how these two terms are distinguished from one another. Although we will not arrive at a single definition of these terms, the definitions are important to the topic of communicating and using findings. When evaluation involves making judgements, there is an underlying assumption that the evaluation process will conclude by communicating a value judgment. Schwandt (2015) explains that there is an evaluative, persuasive argument that communicates not only the evidence found, but what the evidence says about the value of the subject studied. Certainly, whether the communication about evaluation results includes this type of persuasive argument or simply conveys achievement of monitoring activities can greatly change if and how an audience can comprehend and use the results communicated. As noted, most assessment of student learning definitions embed an element of using results to make improvements to student learning. In these ways, communication and use of results can be shaped by the definition and approach of the research before it even begins. Likewise, the types of evaluation and assessment can influence communication and use.

Types of Evaluation, Assessment, and Use

Another important distinction in the evaluation literature is the difference between types of evaluation, which can also have implications for what results are communicated and how they could be used. Again, no single definition of evaluation types is agreed upon in the field, but Schwandt (2015) identifies several types. Implementation and process evaluations, as well as program monitoring, focus on what occurs in an intervention and how it functions, with a typical purpose of tracking progress and understanding how an intervention might change current processes to improve in the future. Outcome evaluation focuses on the outcomes experienced by

intervention participants (Schwandt, 2015). Assessment of student learning is one form of outcome evaluation; the focus is on evaluating the extent to which participants in a learning experience are achieving specified learning outcomes (Suskie, 2018; Walvoord, 2010). Impact evaluation or assessment might consider the longer-term or broader-scale *impact* a program has on participants (perhaps after an intervention has concluded), which might go beyond the shorter-term, more immediate *outcomes* participants might achieve (Schwandt, 2015).

While all of these types of assessments and evaluations are valuable in their own rights, the type has relevance for what information can be communicated and potentially used as a result of the evaluation or assessment. The type of evaluation dictates whether evaluation results would emphasize processes, outputs, outcomes, or social impacts, at a narrow or broad scale. All of these types of results have potential uses and in reality many practitioners combine these types of evaluation and assessment (Schwandt, 2015); here the important point is that audiences might be more or less inclined to use results based on the type.

Evaluation literature also recognizes multiple types of *use*, which provide helpful categorizations for the assessment literature as well. Instrumental use, when decision makers use findings to change a program (Fleisher & Christie, 2009), coincides most directly to the type of use assessment professionals today promote most heavily; Kuh et al. (2015) refer to this as “consequential use,” where assessment results are used to modify institutional policies and practices to improve student learning. Conceptual use provides stakeholders with new knowledge or understanding of a program (Fleisher & Christie, 2009), but this type of use is often not valued as a true “use” in the assessment literature (Kuh et al., 2015; Maki, 2017), with an exception perhaps of assessment results that can be used to demonstrate successes that do not

necessarily require changes (Suskie, 2018). Symbolic use, described in evaluation literature as using evaluation to justify a preexisting stance or represent rational action by an organization (Mark, 2009), also has parallels in assessment. Higher education institutions have been critiqued by accrediting agencies and assessment professionals for oversimplifying measurement of student learning and documenting results to support the status quo rather than evoke improvements in teaching and learning (Kuh et al., 2015; Walvoord, 2010). Finally, process use, or changes made based on participating in the evaluation process (Patton, 1997), also has a somewhat negative view in the assessment literature. While process improvements are important, especially when an assignment or assessment tool is used for the first time, Suskie (2018) argues that the assessment results should be reviewed to make improvements to teaching and learning instead of changes to the tools used to measure learning.

Importantly, a lack of use is another potential outcome in addition to the types already described. Assessment professionals today lament the overabundance of assessment results that may be informative for higher education stakeholders but that do not inspire action or change (Kuh et al., 2015) and many evaluators acknowledge non-use as a major problem in the field (Fleischer & Christie, 2009). Although inaction can be a hallmark of political or persuasive use (McCormick, 1997; Patton, 1997), assessment experts tend not to characterize the inaction as intentional (Kuh et al., 2015) like evaluators might. Nevertheless, the absence of use is a feature of both evaluation and assessment practices and serves as one driver for further researching the role of communication in inspiring use. For the purposes of this study, the various types of use observed is important to understanding the relationship between communication modes and potential use.

Identifying the Philosophical Approach

Given that no single definitions of evaluation and assessment are agreed upon in these fields, it is not surprising that the approaches to evaluation and assessment can also have differences in terms of underlying assumptions and the level of emphasis placed on using results. While there is generally agreement on the importance of using results across the assessment literature, there are differences in perspectives about the foundational philosophies driving assessment practices. The evaluation literature provides a helpful framework for conceptualizing differences in the emphasis on using results as well as foundational underpinnings of the approaches taken by different practitioners.

In their thorough review of the evaluation field, Christie and Alkin (2012) identify three key paradigms, each with a foundational purpose for evaluating and a primary focus: (1) a pragmatic paradigm connected to a foundation of social accountability and a prioritization of use, (2) a postpositivist paradigm connected to a foundation of social inquiry and a prioritization of methods, and (3) a constructivist paradigm connected to a foundation of epistemology and a prioritization of valuing. Mertens and Wilson (2019) expand upon this work to identify a fourth priority for some evaluators: social justice, rooted in a transformative paradigm. While assessment literature does not have a parallel schema for categorizing assessment practitioners or their emphases, key assessment works can be put into conversation with evaluation literature in this framework. Because my research focuses on communication to inspire use, the evaluation tradition that prioritizes use is most pertinent. Still, evaluation philosophies that focus on methods, valuing, and social justice have lessons to offer about use that are highlighted here.

Emphasizing Accountability, Continuous Improvement, and Use

The evaluators and assessment professionals focused on use present perhaps the most germane perspectives for this study's investigation of communicating research findings and use of those findings. Evaluators, more so than assessment experts, have discussed nuances in types of use (Weiss, 1980), and whether use of results should be the primary driver of evaluation decisions (Christie & Alkin, 2012), but social accountability serves as a shared foundation for this tradition in both evaluation and assessment practices (Christie & Alkin, 2012). Alkin (1972) defined three types of accountability: (1) goal accountability to determine if appropriate goals have been established, (2) process accountability to determine if reasonable procedures to accomplish the goals have been developed and executed, and (3) outcome accountability to measure the extent to which goals have been achieved. Christie and Alkin (2012) suggest that higher education accreditation is a modern example of process accountability. Kuh et al. (2015) would argue that today accrediting agencies and governmental entities are interested not just in effective institutional processes for measuring student learning (process accountability), but also that learning is designed to meet labor market demands (goal accountability), and that students actually benefit and demonstrate value added by attending college (outcome accountability).

Stepping beyond the compliance and accountability perspective that dominates much of higher education learning assessment (Kuh et al., 2015), Ewell (2009) describes two competing assessment paradigms: accountability and continuous improvement. For Ewell and others, the ideal purpose of assessment lies in the ongoing improvements made to teaching and learning as a result of assessment findings, not simply meeting requirements that accrediting agencies use to hold institutions accountable. Kuh et al. (2015) seek to reconcile these two paradigms by

arguing that assessment that is used effectively to make improvements in student learning will also fulfill accreditation requirements that have expanded in recent history to demand not just that institutions assess learning, but that they also use it. Likewise, Maki (2010) acknowledges that accreditors ultimately want to see effective use of assessment results but takes a slightly stronger approach in affirming the need to make student learning needs the *central* focus of any assessment practice. The continuous improvement focus aligns directly with the underpinnings of Stufflebeam's CIPP (context, input, process, product) model in evaluation, with its focus on use and cyclical approach to continually provide information to decision-makers (Christie & Alkin, 2012).

Along with a foundation in accountability and continuous improvement, assessment and evaluation approaches in the use-focused tradition often include an underlying pragmatist paradigm. Use-focused evaluators and assessment experts alike take a pragmatic approach to seeking an explanation of reality that makes the most sense given the evidence at the time and sufficiently allows stakeholders to make decisions. These practitioners do not sacrifice the potential for providing useful information for the sake of methodological orthodoxy to produce single truths or for exploration of many constructed realities even if they acknowledge the existence of multiple truths (Christie & Alkin, 2012; Kuh et al., 2015; Maki, 2010; Mertens & Wilson, 2019; Walvoord, 2010). Understanding that use-focused practice stems from a pragmatic paradigm and foundations in accountability and continuous improvement is important to consider in this study. The degree to which these underlying frames are present in the context studied here contributes to explaining the outcomes discovered.

The Importance of Methodology to Use

There are both evaluation and assessment experts who primarily focus on the methods, or more accurately the methodology, in their approach to their work rather than use of results, but these experts also have important lessons to offer in terms of use. At its core, the methods focus entails prioritizing methodological considerations sometimes instead of, but often as the means of facilitating, use or valuing (Christie & Alkin, 2012; Mertens & Wilson, 2019). Generally sharing a positivist or post-positivist theoretical frame, practitioners in this tradition explore how to apply scientific methodology to approach a truth supported by rigorous evidence (Christie & Alkin, 2012). The foundation of the methods focus in social inquiry guides the types of evidence researchers in this tradition produce to be communicated or used. Stemming from a historical need to evaluate government-funded social programs in the United States (Shadish & Luellen, 2012), the methods-focused evaluators investigated the causal connections between programs and specified outcomes. Likewise, assessment practitioners in a social inquiry tradition focus on the causal link between a learning experience and students' learning outcomes (Suskie, 2018).

For these practitioners, the causal connections are facilitated by prioritizing well-designed methodology. The use of experimental design, quasi-experimental design, randomized control trials, and program theory is a key feature of evaluators in this tradition including Don Campbell, Thomas Cook, Peter Rossi, and Huey Chen (Christie & Alkin, 2012). For assessment experts, convincing evidence involves direct measurements of student learning by observing and reviewing examples of students' learning as opposed to indirect measurements such as students' perceptions about their learning (Banta & Palomba, 2015; Suskie, 2018). Well-designed, direct assessments are viewed as essential to connecting the learning experiences to observed learning

(Ewell, 2002; Suskie, 2018), which echoes Campbell's focus on experimental methods and internal validity to draw causal inferences (Shadish & Luellen, 2012). Additionally, Suskie (2018) sees assessment as a research activity that, when properly designed to produce convincing evidence, is the *tool* to arrive at a link between teaching practice and student learning. This approach is similar to the theory-driven evaluation developed by Chen and expanded upon by Rossi and Weiss where a detailed theory of how a program or intervention results in an outcome is developed to help guide the logic of the evaluation (Christie & Alkin, 2012).

These methodological approaches are seen by evaluators in this tradition, and even governmental agencies like the United States Department of Education (American Evaluation Association, 2003), to provide the rigorous evidence needed to accurately draw causal conclusions about a program being evaluated and the outcomes that result from it. For this study, it is most relevant to acknowledge that the social inquiry philosophical foundation of a methods-focused tradition can and has emphasized methodological considerations as a key prerequisite of useful results. The underlying assumption here is that an evaluator must produce results with the best methods to generate trustworthy findings that could be used. In this research, attending to methodological considerations is important to measuring and understanding potential use of student outcome evidence.

The Importance of Actors to Use

In Christie and Alkin's (2012) third branch of evaluation practitioners, valuing is the primary focus grounded in constructivism. For evaluators in this tradition, the use of results is preceded by an understanding that there are many realities constructed by actors in any context rather than a single reality. It is critical to understand those actors, their interpretation of their

social world, and their values and biases to reach a deep, highly contextualized understanding of a phenomenon (Christie & Alkin, 2012). In assessment literature, considerations for multiple realities and the relativity of who can know what are discussed more frequently as counter-arguments to conducting assessment of student learning at all; there are serious concerns among higher education faculty and staff about how anyone could measure student learning given its complexity and the impossibility of getting inside of students' minds, leaving some to ask why assess at all (Suskie, 2018; Walvoord, 2010). Yet given that assessment is an accreditation requirement in higher education and perhaps because assessment professionals responsible for this work are the key experts in assessment literature (Kuh et al., 2015), the concern over how one can know student learning and who knows it is often met with methodological solutions (like inter-rater reliability approaches or rubric norming) to arrive at an assessment process that produces useful results despite the concern (Walvoord, 2010). Still, there is a clear consideration for who conducts assessment in relation to what is being assessed; for example, when faculty with a firm understanding of the learning context assess their own students' work, use of results is more likely to occur (Kuh et al., 2015). The key ramifications for use are that those conducting evaluations or assessments need to consider *who* conducts and participates in evaluation and assessment activities because these decisions can impact if and how results are used.

Evaluation and Assessment Used to Advance Social Justice

A fourth tradition in evaluation and assessment leverages a transformative paradigm to emphasize the purpose of evaluation and assessment as a force for social justice (Mertens & Wilson, 2019). This approach interrogates contextual power, privilege, and inequities through evaluation and assessment to identify and amplify viewpoints of marginalized groups (Mertens

& Wilson, 2019). By acknowledging that evaluation results can lead to decisions about what resources are provided to which people, and these decisions can help reproduce or shift inequalities, practitioners in this frame see evaluation as an important tool to promote social justice (Christie & Alkin, 2012). Within this approach, cultural norms are valued; culturally responsive evaluation approaches emphasize that evaluation only has value when cultural context is fully considered in communities of color and/or poverty (Hood et al., 2015). Likewise, Maki (2017) argues that assessment of student learning, when conducted in an effective, real-time, and continual manner, can be a force for reducing educational inequities, particularly racial and socio-economic inequities that have been systemic in higher education. The transformative approach can serve as a powerful process not simply for understanding phenomenon, but for advancing human rights through the act of evaluation as well as the findings (Mertens & Wilson, 2019).

The implications for use of results in this framework are that the application of evaluation and assessment findings ought to be focused on reducing power inequities and social injustices. In my research, the context and the extent to which the organization is committed to social justice are important to consider. Communication of results that suggest change to become a more equitable organization might be welcomed in a context committed to social justice but met with resistance in one that does not strongly value social justice. Each paradigm and approach provide important considerations to describe in the context for this research, including the organizational culture around accountability, continuous improvement, methodological rigor, valuing of various actors, and commitment to social justice.

Designing and Planning the Research

Following the steps of the research process, after defining the work and understanding the undergirding foundations and paradigms one might next arrive at determining the scope of the research. The unit of analysis and scope, or how narrowly or expansively the evaluation seeks to understand an intervention's effects, can impact the type of results as well as the potential communication and use of them.

Scope and Units of Analysis

Evaluation practitioners study a wide range of units of analysis, sometimes referred to as the "evaluand," as well as scopes in evaluation research. Schwandt (2015) explains that evaluators often review social interventions or programs, which can be narrow and isolated to a single site or broad networks on a national or international scale, as well as overarching policies implemented through a web of programs. Different types of evaluations could be applied to various units of analysis and program scopes. From the evaluation literature, the unit of analysis and scope helps shape what can be said and ultimately used in research results (Schwandt, 2015).

Assessment practitioners also apply their approaches to different units of analysis and think in both narrow and broad scopes. Some focus narrowly on small units of analysis, like courses or assignments, to assess student learning (Suskie, 2018; Walvoord, 2010). Others take a broad approach and consider assessment as a method for improvements at both the micro level (course, program, etc.) and macro level (organization) (Banta & Palomba, 2015; Maki, 2010). Maki's (2010) focus on program and institutional-level assessments considers learning within a course as well as the impact of that course-level learning to the larger program and institution within which the course is nested. Importantly, this scope and broader units of analysis lend

itself to communicating value statements about organizations and programs that Maki (2010) seeks. By looking across courses to programs and institutional experiences, Maki is able to consider questions about the value of individual learning experiences in the context of a student's entire experience at an institution, measure how well learning transfers (or impacts) new experiences and judge the degree to which different instructional approaches and environments facilitate learning.

To be clear, however, it is the scale at which Maki (2017) is talking about assessment, not so much the timeframe, that facilitates value judgements of learning experiences; Maki's work around "real-time student assessment" strategies calls for practitioners to judge learning experiences as they occur, not to wait to consider results until well after students have completed their learning experience. Of course, the hierarchical nature of higher education institutions (with courses nested in programs, nested in divisions or colleges, all nested within an institution), lends itself to this type of fluctuation in scope that can offer different perspectives about student learning. Evaluation approaches have also considered how systems interact (Patton, 2011), but could perhaps learn from assessment literature and often embedded assessment practitioners on the complex ways these connections within an organization may also contribute to using results.

Regardless of which unit of analysis assessment practitioners focus on, there is agreement that this is an important consideration for use. Walvoord (2010) sees course level learning outcomes as an important unit of analysis because it is familiar and close to faculty who would use the results. Maki (2017) strongly argues for assessment as a vehicle for improving student learning experiences and sees the importance of expanding beyond course level learning outcomes to program and institution levels so that improvement is seen organizationally. In

evaluation literature, although the unit of analysis and scope might be more commonly driven by the type of evaluation and methodological considerations, these factors are still important to what findings can be communicated and the likelihood of those findings being used.

Considering the Researcher Role and Relationship to Context

The role of the evaluator or assessment professional, including their position related to the context studied, how they engage with stakeholders in the research design, and how they engage with stakeholders in making value judgements, can also affect communication and use of research findings.

Researcher Position and Role in Research Context

An important dimension to practitioner roles is their position within or outside of research sites. Those involved in assessment of student learning are often embedded within the higher education institution (Kuh et al., 2015) rather than working for an external organization, which can be the case for many evaluators (Schwandt, 2015). With assessment, the person or team serving to facilitate assessment has the task not just of engaging stakeholders from a single program, but across numerous academic divisions and departments as well as co-curricular programs. While internal evaluators and assessors might have a deeper contextual knowledge of an organization (Moss, 2001; Schwandt, 2015), they still must rely heavily on others, who often are not organizationally accountable to them, to develop context- or field-specific instruments to measure student outcomes (Kuh et al., 2015). The sheer volume of assessment and evaluation in a higher education organization necessitates the collaboration and interdependence between assessment offices and faculty and staff to effectively use assessment results (Bers & Seybert, 1999; Kuh et al., 2015; Moss, 2001; Walvoord, 2010). External evaluators, who may be more

likely to focus on one evaluand at one point in time rather than all assessment activities that an internal expert might be engaged in, might have more flexibility to determine how they engage stakeholders to best facilitate communication and use.

The potential for findings generated by researchers to be used can also depend on the context being studied, and particularly the organizational capacity for evaluation and learning (Fleischer & Christie, 2009). An organization that values asking and answering questions about its operations can be a more conducive environment for the use of evaluation and assessment (Fleischer & Christie, 2009). Additionally, conducting evaluation itself can help build this conducive environment and value of organizational learning when evaluators facilitate a collaborative approach with stakeholders (Preskill & Torres, 1999). Assessment professionals, perhaps because of their higher likelihood of being internal to the organization they are studying, have long emphasized the importance of assessment as an act of organizational capacity-building that improves colleges and universities (Achieving the Dream, 2018; Kuh et al., 2015). These practitioners serve an important role in helping to embed decision-making and dissemination of assessment results into faculty (“end user”) spaces like curricular development, committee work focused on student learning, and teaching and learning centers (Kuh et al., 2015; Maki, 2010; Moss, 2001). Given the ongoing nature of assessment and the ideal goal of engaging faculty in continuous execution and use of assessment (Kuh et al., 2015; Maki, 2010), these perspectives might also be likened to Cousins’ promotion of sustained, structured, active participation of users in evaluation processes to develop organizations (Christie & Alkin, 2012).

Researcher Role in Relation to Stakeholders

The ways in which practitioners engage with stakeholders during the process of conducting evaluations or assessment can also impact use. Early methods-focused evaluators like Campbell argued for distancing the evaluator from that being evaluated and interested stakeholders to preserve an objective stance (Shadish & Luellen, 2012). Others, including Cronbach and Weiss (Christie & Alkin, 2012) and Suskie (2018), argue that involving decision-makers early in the research design process helps determine the relevant questions to be addressed and increases the likelihood that results will be used.

In the use-focused tradition of evaluation and assessment, the evaluator plays a key role in engaging potential users, albeit in a variety of ways depending on the specific evaluator, in order to design the research to produce useful information for the users (Christie & Alkin, 2012; Kuh et al., 2015). Evaluators like Stufflebeam and Wholey sought to provide information to inform changes to be made by program managers and decision-makers (Christie & Alkin, 2012). Similarly, assessment professionals like Kuh et al. (2015), McClintock and Snider (2008), and Walvoord (2010) see assessment as the vehicle for fulfilling the information needs of accreditors and government oversight agencies in making decisions about the quality or viability of an educational institution. Yet, these assessment experts also see other important users of assessment results, like faculty, drawing them closer to Patton's approaches.

Patton's (2012; 1997) "utilization-focused evaluation" has provided a long-standing, prominent model in the tradition of use-focused evaluations. Patton (1997) recognizes the need to find "primary intended users," who are individuals most likely to use evaluation results and engage these users early in the evaluation process. Likewise, assessment professionals

emphasize the importance of early engagement of faculty and student development staff who are in positions to make on-the-ground improvements for student learning (Kuh et al., 2015; Maki, 2010; Walvoord, 2010). Walvoord states simply, “it is easy to assume that accreditors are the only audience for assessment... assessment is not about collecting data; it’s about who needs the information for what purposes” (loc. 650).

The relationship of the evaluator to stakeholders is an important topic in valuing-focused evaluation as well. Evaluators in this tradition build relationships with stakeholders to be responsive to their interests as they develop evaluation approaches (Abma & Windershoven, 2008; Stake, 2012). For Maki (2010) and Moss (2001), assessment and evaluation are useful insofar as they provide direction that helps stakeholders answer their questions about how well their educational practices are facilitating student outcomes. Maki (2017) promotes the use of rubrics designed with stakeholders to provide clear judgements about the quality of students’ learning, and by extension students’ learning experiences. Stake and other evaluators like him engage with stakeholders to represent their perspectives in the evaluation, but not necessarily for the purposes of encouraging use of results as with utilization-focused evaluation (Christie & Alkin, 2012), or Maki’s (2010) assessment approach.

The researcher role in relation to stakeholders is also important to consider when results are being interpreted and communicated. While Suskie, Weiss, and Cronbach recognize the evaluator or assessor plays a role in surfacing evidence to stakeholders, the stakeholders are the ultimate decision-makers and the evaluator or assessor serves as a sort of educator or facilitator to inform decision-makers (Christie & Alkin, 2012; Suskie, 2018). Higher education institutional researchers, internal to organizations, have found that evidence-informed decision-

making relies heavily on continuous, long-term communication, relationship-building, and educative processes with stakeholders (McClintock & Snider, 2008; Moss, 2001).

Scriven argues that evaluation requires that value judgements be made by the evaluator (Christie & Alkin, 2012). Similarly, Maki (2010; 2017) emphasizes assessment as essentially a judgement of the value of teaching and learning experiences. However, Maki (2010) sees the role of the assessment professional as providing expertise on the process and methods of assessment, but not as the one making judgements; that role is reserved for educators with the contextual expertise to make judgements of (and decisions about changes to) student learning experiences. Like Maki, Eisner, with a background in curriculum design as an artist, suggests that judgements ought to be made by the connoisseur and critic, who has deep knowledge of the content being evaluated and is in a position to know what to look for in order to make value judgements (Christie & Alkin, 2012). While some recommend a clearly communicated value judgement from the evaluator and others advocate for such judgements to be made by knowledgeable stakeholders (Christie & Alkin, 2012), others suggest there is a role for both the evaluator and stakeholder in partnership to develop statements of value judgements (Maki, 2010). Despite differences in approaches and opinions on the relationship, it is clear that the interaction between practitioners and stakeholders can influence the communication of findings and value judgements, which can influence use of findings.

Practices in Conducting Evaluation and Assessment that Influence Use

In addition to definitions, foundational underpinnings, scopes, and researcher roles, the specific practices associated with conducting assessment and evaluation are another important contributor to the ultimate use of results. As fields developed largely by practitioners, reviewing

how these professionals conduct evaluations and assessments and their perspectives on how their *actions* contribute or do not contribute to use, provides further insight about how to facilitate use of results (Fleischer & Christie, 2009). As we have learned, the use-focused evaluation tradition stems from decision-oriented theorists who work to optimize the design of an evaluation and engagement with stakeholders so that the evaluation can best assist key stakeholders in making decisions most relevant to their work (Christie & Alkin, 2012). Likewise, most assessment professionals conduct their practice in a similar way, designing measurement tools like tests, rubrics, etc. that are most relevant to stakeholders (Kuh et al., 2015; Maki, 2010).

Just as Patton (Christie & Alkin, 2012) encourages evaluators to be adaptive and nimbly adjust evaluation questions and approaches during an evaluation to better fit user needs, so too have assessment professionals recognized the need for flexibility across academic disciplines and over time to foster use (Kuh et al., 2015; Walvoord, 2010). Although faculty are not always engaged in interpreting and making judgements about assessment results, this flexible approach is encouraged as another step to fostering use (Kuh et al., 2015), just as it plays a role for utilization-focused evaluation (Patton, 1997). Analysis and communication of findings throughout the process of an evaluation is seen as another practice that fosters use of results (Fleischer & Christie, 2009). Employing these practices often requires thoughtful collaboration between evaluation and assessment practitioners and decision-makers (Moss, 2001). Decisions are rarely made immediately upon seeing data, but rather after stakeholders have had time to digest the information, reflect on it, and determine potential changes to implement (Moss, 2001), and evaluators can help facilitate these steps with decision-makers (McClintock & Snider, 2008).

Although evaluation professionals might not consider adhering to high standards of methodological rigor to be the most influential factor contributing to use (Fleischer & Christie, 2009), some evaluators do prioritize methods. Researchers might not always agree on which specific methods to use (see Campbell, Cook, Cronbach, and Rossi as described by Christie & Alkin, 2012), but the practices of developing rigorous data collection tools and analyses that attend to generalizability, reliability, and validity are common for some as a prerequisite to creating useful findings (Banta & Palomba, 2015; Christie & Alkin, 2012; Suskie, 2018). Similarly, conducting evaluations in ways that establish a balance of power among stakeholders or evoke reductions in social inequities are not seen as the most influential contributor to use (Fleischer & Christie, 2009). Still, these approaches involve intentionally seeking to illuminate power structures in the studied context, engaging and elevating marginalized voices through the data collection and analysis processes, and leveraging the evaluation process to advocate for principles of democracy, participation, and/or social justice (Christie & Alkin, 2012; Greene, 2006; Mertens & Wilson, 2019). Proponents of these approaches would argue that these practices make the evaluation process not just useful, but useful in a way that has a positive impact on the studied context and broader society (Greene, 2006; Maki, 2017).

Identifying and engaging stakeholders in discussion of use throughout the evaluation or assessment process, attending to careful design and construction of measurement tools, and focusing attention on particular populations are all *actions* that practitioners take while conducting their research. While practitioners prioritize these practices differently, each of the specific strategies described here is believed to have some influence (even if to varying degrees) over the use of results (Fleischer & Christie, 2009). Beyond these factors that influence use,

there is a critical step in communication of evaluation or assessment findings that must occur for any use to take place.

Communicating Findings

To reach the step of using results, the assessment or evaluation findings must be communicated in a way that facilitates understanding and inspires action. Communication and presentation of findings has been identified in the literature as one of several potential barriers or facilitators of use of data (Fleischer & Christie, 2009; McClintock & Snider, 2008). This research focuses on modes of communication that represent a range of text and visual presentation of evidence organized to tell a story about a topic. Thus, it is important to consider literature about three aspects of communicating research results: (1) the visual representation of data, (2) storytelling techniques to communicate research findings, and (3) various modes for communicating research results.

There are many ways to summarize data visually and with text as well as modes of communication. My research builds on best practices established in the literature regarding data visualization and storytelling to consider how different modes of communication influence understanding and use; as such, this review does not provide an exhaustive analysis of all types of data representations or methods of summarizing findings outside of storytelling techniques. This section leverages literature from the assessment and evaluation fields because it offers valuable ideas about communicating *assessment and evaluation* results specifically; it also leverages literature about communicating any type of research. The focus here is on *how* findings are communicated (decisions about how information is represented visually, communicated as story, and disseminated through various modes) rather than *what* information

ought to be included, which is covered extensively across the assessment literature (Banta & Palomba, 2015; Kuh et al., 2015; Maki, 2010; Suskie, 2018; Walvoord, 2010).

Data Visualization

Communication of any kind involves content to be communicated and when the content is data, the visual representation of both quantitative and qualitative data is important to the audience's understanding of the content. For the purposes of this study, key lessons on data visualization are summarized because these best practices were applied consistently across modes of communication tested through this research. Although visualizations are not the main concept analyzed for this research, the visualization literature provides an important context and underlying basis to develop effective communication products that was applied in this study.

As an early prominent thinker in the field, Tufte (1990; 1997; 2001) provided a foundation of practical guidance for how to present quantitative data in visually appealing tables, charts, and graphs. Much of Tufte's work expanded on design principles to establish suggestions for maximizing data and minimizing ink (data-to-ink ratio) (1990), careful use of color (2001), and layering and separating data in ways that contribute to, rather than distract from, the data presented (2001), among other design recommendations. For Tufte (1990), the importance of data visualization goes beyond a matter of displaying numbers on a page; visual representations provide an audience with insights that cannot be accomplished purely through text. He views visualization as a means to make decisions about complex data or problems (1997), and in this way develops the link between use of findings and the visual representation of those findings. Following Tufte, other researchers also focus on the role of aesthetics in data visualizations. They highlight the importance in creating not only understandable, but appealing representations

of data to effectively attract attention and generate interest in data (Cawthon & Vande Moere, 2007; Vande Moere & Purchase, 2011).

Several other authors, including Evergreen (2017), Few (2004), and Nussbaumer Knaflic (2015), build on Tufte's data visualization foundation by expounding new techniques for data representation made possible with modern graphing technology. These practitioners in technology, business, and assessment fields, provide extensive practical guidance, based primarily on their work and consulting experiences, for creating a variety of charts, graphs, tables, and other data representations (Evergreen, 2017; Few, 2004; Nussbaumer Knaflic, 2015; Suskie, 2018). While research in the visual design field is leveraged to justify some of these authors' suggestions, there is an underlying assumption that design principles applied to data representation will lead to better understanding. Few (2004; 2006) makes this type of assumption not only in display of individual visualizations, but also in collections of visualizations in dashboards. Lacking concrete evidence to support these claims is problematic because there are disagreements in the literature about the best designs of data visualizations; for example, Evergreen (2017) promotes the use of simple text statements accompanying graphs to cue the readers to meaning, but Stanton and Lagesse (2018) encourage the elimination of text completely to not distract readers' focus. Design principles might rightly be a path to clear communication of findings to improve understanding and use of information, but stronger evidence is needed to demonstrate the effectiveness of various visual representations, especially embedded within various communication modes.

Still, the field is not completely without empirical evidence to support suggestions about effective data visualizations. Using lab study experiments, Cleveland and McGill (1984)

identified a hierarchy of visual representations from most to least effective, which provided some foundational evidence about how well common charts and graphs used today could be interpreted by viewers. Nussbaumer Knaflic (2015) references cognition of visual information in her work, and cognitive psychology has important contributions to offer. A certain cognitive load is required to process each visual component presented to an audience member; as a result, effective visualizations maximize the most critical ideas to communicate and minimize elements that do not add (or detract from) informative value since these elements only waste brain power of the audience (Nussbaumer Knaflic, 2015). Others used different terminology, like Tufte's (2001) notion of the "data-ink ratio" or Duarte's (2010) "signal-to-noise ratio," to acknowledge the same importance of minimizing distraction and maximizing the most relevant finding in any data visualization to leverage viewers' cognitive load most effectively.

Further research on different visualizations provides additional viewpoints on human processing of information. Borkin (2014) found that memorability of data visualizations is not always maximized by a minimalist, simplistic approach. Rather, the most memorable visualizations were those with higher visual density, those that incorporated text within the visual, and those that used less common types of visuals (pictograms, tree/network diagrams, and grid/matrix style visuals were more memorable than common graphs like pie, bar, and line charts) (Borkin, 2014). Ware (2004) finds, like Borkin (2014), that sensory images that depict the message to be communicated (e.g., pictures, graphics of objects represented by the data, etc.) have an added benefit of easier understanding and consistent interpretation across contexts, while visualizations utilizing components that must be learned and interpreted (e.g., bar charts) call on additional cognitive processing for the audience. The way the human eye reacts to color choices,

brightness variations, and proximity and connectedness in visualizations can also suggest differences in effectiveness (Ware, 2004). Color can be an important tool to unify a visual and draw attention to particularly important data points (Evergreen, 2017; Ware, 2004), but must also reflect appropriate meaning in the cultural context of the viewers to be effective (Nussbaumer Knaflic, 2015). Cognitive processing of information might not mean that a viewer has been moved to act upon the data shown, but building awareness is an important precursor to use (Schoenfeld, 1965).

The design principles, practitioner experience, and cognitive research of data visualizations provide important lessons for how best to represent data. While stronger evidence of the effects of design on end users' understanding and use of information could still be generated, some progress has been made in this space (Borkin, 2014). Still, there are important gaps in knowledge the present study addresses. For one, the data visualization literature focuses on a variety of data types, but evaluation and assessment of student outcomes, with a specific audience of educators involved in creating the experiences that led to the data, is not a focus in data visualization literature. Additionally, the visual representation of data is only one aspect of communicating findings; storytelling with data and modes of communication are two other important considerations.

Storytelling with Data

As we have explored, both evaluation and assessment fields have strong traditions in encouraging use of findings. Storytelling techniques hold special promise for encouraging use because they can evoke emotions, change perspectives, and potentially lead to action (Hart, 2011; Lateef, 2014; Stanton & Lagesse, 2018). As Nussbaumer Knaflic (2015) explains,

communicating research findings by storytelling with data is an often overlooked, but powerful strategy for encouraging action from stakeholders. Storytelling techniques can be particularly motivating when combined with effective data visualizations that help illustrate the author's message (Duarte, 2010; Nussbaumer Knaflic, 2015).

Because many stakeholders are regularly exposed to a high volume of data and often have little time or expertise to interpret the data, researchers across disciplines are concerned with how to break through the noise with meaningful findings (Dahler-Larsen, 2012; Knowles, 2018). Storytelling is one approach to help provide focused, meaningful communications of research findings (Knowles, 2018; Kosara & Mackinlay, 2013). Many practitioners and researchers discuss narrative storytelling approaches including what components to include, strategies for constructing narratives, utility of narratives in certain contexts, and even effects of narrative approaches on audiences (Creamer, 2018; Prins et al., 2017; Stake, 1995; Yin, 2014). Knowles (2018) argues that organizing data into thoughtful stories can help relay information that would otherwise be ignored because it presents data in a structured way that helps scaffold findings into valuable insights (Knowles, 2018). Furthermore, stories have elements that, when activated, have psychological effects on and can evoke reaction from an audience (Knowles, 2018), making it a communication technique highly relevant to this research focused on communication that inspires action.

Psychological Effects of Storytelling

Storytelling provides a mechanism for communicating research findings as well as a process for drawing an audience member through understanding and potentially using information. Schoenfeld (1965) describes the stages of communication and the need for

researchers to (1) introduce main findings to generate awareness, (2) demonstrate importance to build interest, (3) explain relevance of findings, (4) apply examples for an audience to imagine adoption of an idea or use of information, and (5) summarize how the research could be used by an audience. Storytelling can facilitate these stages of communication and is especially helpful in building interest and providing a means for an audience to imagine the real application of a research finding (stages 2 and 4 in Schoenfeld's (1965) work).

Storytelling can also contribute to the persuasiveness of a narrative through the phenomenon of "transportation." Transportation is when a reader or audience member's mental systems and capacities become focused on the events occurring in the story, with limited or less awareness of one's reality while immersed in the story (Green & Brock, 2000). Transportation can reduce negative cognitive responses and counterarguments to points supported by the story as well as create strong feelings for story characters, whose experiences or beliefs can influence the reader (Green & Brock, 2000). The experiences described in a story also seem more real via transportation, which contributes to a reader's acceptance and connection to the concepts described in the story (Green & Brock, 2000). Additionally, the way in which stories transport readers to a reality different from their present one also provides a powerful mechanism for the reader to ultimately envision mimicking or reinforcing key story lessons in the reader's present reality (Green & Brock, 2000); this is not unlike Schoenfeld's (1965) description of the need to provide effective examples for an audience to understand potential application of key concepts.

Emotional connections are an important byproduct of storytelling for readers (Shen et al., 2014). Storytelling can surface underlying emotions and values that are important to communicate in research findings so that a relationship with stakeholders can be developed to

support use of results (Goodyear et al., 2014). In their work to understand the differences between narrative stories and informational news articles, Shen et al. (2014) tested different types of written communication with readers and found that narrative stories had a slightly higher impact than informational pieces in terms of influencing readers' attitudes and opinions. Empathy felt by the readers of narrative stories seemed to be a driving factor behind the influence of stories (Shen et al., 2014). Green and Brock (2000) would agree that this emotional connection developed by the transportation that occurs as a person reads a story is what distinguishes it from traditionally presented arguments, which rely on logical, cognitive reasoning. To be sure, not all stories are equally impactful. Stories that facilitate connection to the audience are those that pull readers along with a protagonist facing a crisis or threat from an initial inciting incident, building toward a turning point, and reaching a resolution (Hart, 2011). Building on this literature, the data products used to communicate evidence in this research were designed to tap into psychological benefits of storytelling, specifically intentional structure.

Visual Storytelling

The combination of storytelling with effective data visualizations can be an especially impactful method for encouraging action from an audience (Nussbaumer Knaflic, 2015). Bongshin et al. (2015) describe visual data stories as a set of evidence-based facts that are visualized to emphasize a specific message and organized in a meaningful way to support the author's overall communication goal. Some practitioners might consider individual visual representations of data (e.g., a single chart or graph) as data "stories," (Few, 2006; Nussbaumer Knaflic, 2015), but others would argue visual stories require an intentional structure connecting multiple visualizations and narrative explanation (Bongshin et al., 2015). Importantly, there is

also a distinction between narrative techniques applied through text, and the visual data stories focused on by Bongshin et al. (2015) because of their integration of data visualization techniques. Visual storytelling seeks to combine best practices identified in the research of data visualization as well as narrative forms of communicating findings, making it a particularly interesting focus for additional investigation.

Like any communication approach, storytelling can be done more or less effectively. Done well, stories can persuade audiences to agree with a certain viewpoint, or to take action (Lateef, 2014), which is precisely the dilemma facing evaluation and assessment professionals seeking to foster use of results. Assessment and evaluation experts can learn from this body of literature the importance of communication, and specific storytelling and data visualization strategies within communication, as a precursor to reaching use of findings by an audience. Nevertheless, storytelling too requires further research and evaluation. The current literature promotes research to increase understanding the effectiveness of a story, as well as where, when, and why visual storytelling is successful (Bongshin et al., 2015; Kosara & Mackinlay, 2013). My research applies storytelling as a method of communication to determine if this method along with data visualizations is more or less effective at fostering understanding and potential use when surfaced to audiences through different modes of communication.

Communication Modes

Communicating assessment results involves not only representing the data in visually effective formats or constructing narratives, but also disseminating findings in a format that allows others to glean insights and act on the data. We know that communications that contextualize data within an organization are critically important in evidence-informed decision-

making (Moss, 2001; Terenzini, 1993). We also know that creating a communication plan and sharing evidence throughout an evaluation or assessment process can contribute to effective use of results (Fleischer & Christie, 2009). Which communication modes help to accomplish these goals and ultimately contribute to understanding and use is the focus here. As noted previously, “communications modes” in this work refers to the formats in which data are presented to an audience (e.g., written reports, memos, infographics, in-person presentations, videos, etc.).

Supported by practitioners’ experience in the evaluation, assessment, and institutional research fields rather than empirical evidence, several authors make practical suggestions for effective communication approaches. Some institutional researchers have found success with in-person presentations to decision-makers with whom these typically embedded researchers can foster long-term relationships (Bers & Seybert, 1999; Moss, 2001; Sanders & Filkins, 2009). Some evaluators emphasize the use of thick description and narratives to produce effective written evaluation reports (Stake, 1995). Others, needing to disseminate findings to large numbers of stakeholders across an organization, describe standardized assessment report templates in their discussion of communicating findings (Banta & Palomba, 2015). Most practitioners in these fields, however, do not advocate for a single mode or type of communication, but instead acknowledge the potential for various modes applied to various audiences.

Evaluation and assessment practitioners provide a litany of options for communicating with different audiences in various formats (written reports, infographics, scorecards, dashboards, bulleted lists, oral presentations, etc.) as well as spaces (committee meetings, institutional leadership meetings, newsletters, websites, etc.). However, most fall short of

detailing which specific communication methods and modes are more or less effective for which audiences (Maki, 2010; Suskie, 2018; Torres et al., 2005; Walvoord, 2010). Torres (2009) provides a detailed account of various formats to fit different purposes. Further, she organizes various communication formats on a range of most to least interactive (Torres, 2009). Dale's work estimated percentages of the information people are likely to recall based on reading, hearing, seeing, or combinations of those activities (Bers & Seybert, 1999). In a presentation of Leslie Goodyear's (2001) work, Torres et al. (2005) also highlight the audience engagement facilitated through unconventional forms of representing findings like poems. Goodyear et al. (2014) suggest that storytelling techniques can be applied through multiple modes including written storytelling, as well as more unusual modes like focus group discussions of stories and pairing evaluation participants to share their own stories with one another.

Still, there is a heavy dependence on experience rather than empirical evidence in the literature discussing communication modes. Additionally, some of the existing research does not account for more modern communication modes like infographics and videos. As a result, the literature offers limited insight about the effectiveness of different communication modes, particularly nontraditional and modern modes. Posing the question to herself of which communication format is best, Suskie (2018) responds that "it depends on what your audiences need to see and how they prefer to receive information" (p. 338). This response falls short of the demands of higher education assessment today. If assessment is intended to be used widely by educators across an institution, not to mention in a real-time, cyclical pattern (Maki, 2017), it is difficult to imagine how an assessment professional could effectively determine the best communication method for many different audiences with unique needs without some evidence

about which methods have been shown to demonstrate understanding and use. Significant challenges in competency of communicating information in our current digital age have been found among students in social science fields who will become the next generation of evaluators, assessors, and institutional researchers (Pinto et al., 2018). Evidence about which communication techniques work is essential.

To help provide some of this much-needed evidence, I explore the effects of three modes of communication: traditional written reports, visually focused infographics, and videos. These modes provide a range of characteristics that is explicated in more detail in Chapter Three. The literature already explored about storytelling and data visualization is based in the application of these techniques primarily in traditional written reports or presentations; thus, I will not further detail written report techniques here but instead focus on the literature that explores the effectiveness of infographics and videos.

Infographics

Infographics are brief, visual summaries of data, often using icons, shapes, or pictures to represent key information. Given the relative novelty of infographics, there is limited research on their effectiveness as a communication mode. Infographics have been shown to be helpful in distilling complex information into a simple format (Otten et al., 2015) and providing clear statements or visuals of research findings (Olfert et al., 2019). The visual appeal of infographics, which often apply best practices of data visualization, makes them particularly attractive as potential forms of communicating research findings (Olfert et al., 2019). The simplicity and brevity of infographics does hold dangers for oversimplification or loss of important contextual details (Otten et al., 2015). Additionally, while infographics can encourage understanding of

findings, there is still room to improve the degree to which findings are understood in infographic representations, particularly in the case of statistical findings (Olfert et al., 2019). Collaboratively creating infographics and bringing interdisciplinary experts from research and design fields together to create these communication products is one strategy for balancing a fair representation of findings with easily understood visuals (Otten et al., 2015). Infographics hold special appeal for bridging a divide between expert researchers intimately familiar with findings and non-expert audiences in positions to use the evidence; while some early research supports this potential for infographics, more evidence is needed to understand the effectiveness of this communication mode in encouraging use of findings (Olfert et al., 2019; Otten et al., 2015). My research adds evidence regarding infographics as well as video formats.

Videos

While not a main mode of communicating research historically, audio-visual formats, such as online videos, are not only becoming more prevalent, but also are increasingly cited by academic researchers as sources in their own research (Kousha et al., 2012). Still, online videos appear to have primary impact in the public realm rather than among academics, based on the number of views and volume of interactions with online videos as well as research citations (Sugimoto & Thelwall, 2013). Importantly, academics as presenters of information in online video formats are as popular or more popular than non-academics presenting content, suggesting that academics can reach audiences with this type of format if desired (Shearer & Gottfried, 2017; Sugimoto & Thelwall, 2013). Indeed, some research has shown audience preference for video formats over text-based information (Walthouwer et al., 2015), although there is less evidence about the use of video to present scientific findings (Putorti et al., 2020).

Video formats provide some psychological advantages over text-based modes of communication (Putorti et al., 2020). Videos can engage and grab attention of an audience more effectively than text-based information (Koehler et al., 2005). Additionally, information is easier to process and requires less cognitive effort in modes combining audio and visual elements, which can improve comprehension (Sweller, 1994). Perhaps most importantly to this study, videos can influence an audience member's engagement and response to information more effectively than written text (Koehler et al., 2005; Putorti et al., 2020; Yadav et al., 2001).

Focusing on audio-visual formats in particular, several case studies suggest good potential for combining data visualization and storytelling within this specific communication mode. Chenail's (2011) review of YouTube videos found that online videos provided a way to share research results to broad audiences in an effective and aesthetically pleasing format. In their eye-tracking study, Colliot and Jamet (2018) found that videos of instructors communicating online course content fostered learners' motivation and engagement in their learning. Chan et al. (2017) evaluated a web-based video series about understanding health-related research evidence. They found that the video format, with its use of animation and narration, contributed to participants' greater understanding of the material as well as participants' confidence in using what they had learned from the videos in their own lives (Chan et al., 2017). Putorti et al. (2020) sought to understand whether the application of effective video communication techniques in the context of sharing scientific research findings would have positive benefits for audiences. They found that compared to a written communication (a press release), the video format promoted better comprehension, higher perceived pleasantness and a stronger interest in learning more about the scientific findings (Putorti et al., 2020). Each of

these cases support the notion of effectiveness of video as a communication mode within certain contexts and for particular purposes. My work adds to this body of studies, focusing on the higher education context in great need of effective communication modes that encourage understanding and use of student outcomes data.

Conclusion

In each step of a research process, from defining the work to communicating findings, there are opportunities to influence the ultimate use of results. Evaluation and assessment literature provide extensive exploration of the implications of definitions, philosophical approaches, research design, researcher roles, and conducting research on the use of findings. While the impact of communication on use is explained primarily by practitioner experience rather than empirical evidence, there are well-researched techniques, like data visualization and storytelling, that help facilitate understanding and use of research findings. Communication modes have been explored to some extent as well, but the literature across many fields, and especially in the higher education landscape, has produced limited evidence about the effects of different communication modes. Comparison of different modes, especially unconventional modes for higher education like infographics and videos, is especially lacking in existing research. This study explores this topic and offers empirically-derived, rather than experience-focused, findings about which communication strategies yield the highest levels of use of student outcomes data in a higher education context.

CHAPTER THREE
METHODOLOGY TO EXPLORE THE RELATIONSHIP BETWEEN
COMMUNICATION MODES, COMPREHENSION, AND USE

Introduction

How can we measure which communication modes lead to comprehension and potential use of student outcome evidence in higher education? As we have learned, current higher education student outcomes reveal a need for organizational improvements across colleges and universities. Evidence to inform those improvements exists, as does extensive literature about research practices that best facilitate use of the evidence. Yet, the important step of communicating the evidence that creates a bridge between the research practices and the use of research findings could benefit from additional empirical investigation. More evidence about effective communication modes could contribute to the fields of research methodology, evaluation, assessment, and higher education. This study explored the effectiveness of different modes of communicating student outcome data in one higher education institution. Here, I measured effectiveness by the comprehension and potential use of student outcome evidence. A multi-phase, integrated mixed method design was applied to study one higher education institution as an instrumental case. The design leveraged benefits of both qualitative and quantitative research to ultimately develop a holistic understanding of communication modes and their implications for higher education.

Research Questions

This study explored two main research questions listed in Figure 2. Both qualitative and quantitative data were used to help answer both research questions, however, the first leaned more heavily on quantitative data while the other relied primarily on qualitative data. Consistent with other mixed methods research, I used mixed methods for this study because it had two separately stated, but linked questions (Creamer, 2018). Ultimately, the mixed methods approach allowed for a more comprehensive picture of the phenomenon explored by these two questions.

Figure 2. Research Questions

Primary Method	Research Question
Quantitative	To what extent are there differences in the comprehension and potential use of student outcome data based on the mode of communicating the data (particularly comparing infographics, videos, and written reports)?
Qualitative	How and why does the mode of communicating student outcome data (and particularly the use of infographics, videos, and written reports to communicate) affect the comprehension and potential use of the data?

In this research, I focus specifically on communication. As detailed in Chapter Two, several other factors can influence comprehension, and especially use of evidence. Those factors include defining the research purpose, identifying a philosophical approach, designing and planning the research, considering the researcher role, and conducting the research. In order to best isolate the effects of communication, this study holds constant these other factors, which is described in the design section of this chapter. In Chapter Four, the findings emphasize the themes related to communication given the focus and approach of this research. In Chapter Five,

these other factors are explored to the extent that they emerged from this research and help provide important considerations for the relationship between this study and prior literature.

I selected three modes of communication to investigate (infographics, videos, and written reports) because they provide an important range of style, as previously described. Written reports, which are common in higher education institutional research, have the greatest opportunity to provide details and contextual information about the research findings. Infographics focus on aesthetic appeal but allow for less detail and contextual information. Videos, with a combination of visuals and audio narration, are situated between written reports and infographics allowing for both aesthetic appeal and some degree of details to be communicated.

Additionally, all three modes selected allow for independent viewing by an audience. Torres (2009) characterizes several communication modes by their degree of interaction with the audience and considers video presentations to be “somewhat interactive,” while memos, probably most akin to infographics, as well as written reports are “least interactive.” While this scale provides one interesting lens with which to distinguish modes, the purpose of my research is to investigate communication modes that do not require direct interaction between the researcher and the audience. Given the need for higher education practitioners across institutions to have exposure to evidence to inform their work, direct interaction in the forms of presentations or discussions is not practically possible in all cases, even if a helpful method for internal research professionals (McClintock & Snider, 2008; Moss, 2001). Modes that allow for independent viewing are essential, and which ones work best is what this research explored. Infographics, videos, and written reports, all able to be viewed by an audience at will, provide an

intentional range of characteristics and relate to common and trending practices in communication of evidence as noted already in Chapter Two.

It is also important to emphasize that the research questions of this study focus on *potential* use of evidence. Prior literature well-documents that applying evidence to make a decision often involves long-term, iterative, and ongoing processes, especially in a higher education context (Bers & Seybert, 1999; McClintock & Snider, 2008; Moss, 2001). Given that this research sought to capture initial impressions about data products rather than trace long-term application of the information presented in them, the focus here is on what might provoke someone toward using student outcome evidence. Thus, the research questions intentionally explore *potential* use. This concept is explored further as a limitation of the study and in discussion in Chapter Five, but here it is important to note to explain why this research did not thoroughly investigate decision-making processes, which are often longer-term than the timeframe for this study.

Paradigmatic Assumptions

Both pragmatism and dialectical pluralism form a foundation that undergirded the design and methodological decisions of this work. Given that this research posed multiple types of questions and uncovered findings that hold practical importance, it was well-supported by pragmatic traditions that emphasize the benefits of applying mixed methods approaches to respond to multiple types of questions within the same study (Johnson & Onwuegbuzie, 2004) and the prioritization of practical knowledge (Creamer, 2018). This study placed equal priority on quantitative and qualitative elements and leveraged the different strands for the purposes of complementarity and development. In Chapter Four, I establish a dialogue between the two data

types that helps develop a robust picture the phenomenon studied, as in the dialectical pluralism tradition (Greene, 2007). Although I convert some qualitative data to quantitative ratings, which is inconsistent with typical practices in the dialectical pluralism paradigm (Creamer, 2018), the conversion technique served a practical purpose to help synthesize findings, which aligned to my pragmatic paradigm. My research design was based on both practical considerations to answer multiple research questions as well as an intentional decision to share deeper insights from the intersections of qualitative and quantitative findings.

Purposes for Using Mixed Methods

There were two main purposes for utilizing mixed methods in this research study: complementarity and development. First, this research investigated multiple facets of the same topic (both what as well as how and why differences between communication modes exist), as complementarity studies typically do (Creamer, 2018). Second, mixing of methods occurred throughout the research process for the purposes of developing data collection instruments (described in the Research Design section), a common rationale for utilizing mixed methods (Creamer, 2018). Overall, this study capitalized on the strengths of quantitative and qualitative approaches, mixing at strategic points to help contribute to the development of the two strands and ultimately an enhanced understanding of the research problem.

Research Design

To explore the research questions for this study, I applied a strategic and intentional design. The design balanced practical considerations with a rigorous methodological approach and the benefits of a mixed methods study. Two overarching elements were central to the design of this study: the use of a case study and the use of multiple phases.

Case Study Design

One community college (College of Lake County) was selected as a case site where faculty and staff from the site reacted to different modes of communicating student outcome evidence. In order to test the specific modes of interest in this study (infographics, videos, and written reports) and to control for consistency between the information in each mode, data products were created for this study. As noted in Chapter One, a data product is a physical or virtual artifact that presents student outcome data. For respondents to compare modes of communication, data products using the communication modes of infographics, videos, and written reports were generated and used in this research; these data products, which provided the artifacts respondents reacted to, are described further later in this chapter.

The rationale for selecting one case site and creating data products (rather than using existing data products) was twofold. First, in alignment with the pragmatic approach of this study, I had convenient access to the case site as an employee of College of Lake County (see Researcher Role in this chapter for more details). More importantly, the college studied was an instrumental case that provided an in-depth example of the ways in which communication and use of student outcome data play out in a practical setting. The data products created for this study also served a practical purpose because they featured real outcomes data of students who attended College of Lake County and provided faculty and staff with information relevant to their work. Second, using one case site and creating data products served an important methodological purpose. By focusing this work on a single context and by creating the data products, which summarized research on student outcomes, I was able to hold many factors that can influence comprehension and use (see Chapter Two) consistent. I attended to the factors

related to the research process (e.g., philosophical underpinnings, research design and plans) and communication practices within the data products generated; see the Data Products section below for more details. I controlled for factors related to context (e.g., researcher role, interaction between researcher and stakeholders) by using one case site. This intentional design helped to minimize the influence of many factors known in the literature to affect comprehension and use of data and to prioritize investigation of communication modes, which is the focus of the research questions in this work.

The Case and Context

The case for this research was College of Lake County (CLC), a community college in the north suburbs of Chicago, Illinois with annual enrollment of over 20,000 students (Office of Institutional Effectiveness, Planning & Research, 2020). There are several important elements of this case's context that helped inform the research approach and how the study proceeded. First, the College of Lake County had a well-established Office of Institutional Effectiveness, Planning, and Research that was trusted for its methodologically rigorous work and that generated several reports about student outcomes on a regular basis. Readership and use of reports primarily functioned on an as-needed, voluntary basis. There were mixed levels of awareness of the data products generated about student outcomes, and thus a wide variation in how often data were accessed and used to inform improvements in student success. The Office of Institutional Effectiveness, Planning, & Research had a website that provided a repository of data products as well as a data warehouse where users could view or create tables to summarize student data. There had not been a systematic process for communicating student outcome data to the general college audience prior to this study. While student outcome data were made

available to stakeholders through reports, these actions were sporadic and not integrated into regular practice for most employees. The vast majority of data products were written reports, summary tables, and slide show presentations. There had been some isolated examples of other types of communications including infographics and videos, but no evidence about the best fitting mode had been generated to inform decisions about a standard process for communicating student outcome data.

What made College of Lake County somewhat unique was the transformation sought at the institution at the time of this study to improve communication and use of evidence. College of Lake County's accrediting body, the Higher Learning Commission (HLC), had explicit expectations that colleges were both assessing students' learning and educational outcomes and communicating and using assessment data for continuous improvement (Higher Learning Commission, 2007). Additionally, the college joined Achieving the Dream, a national non-profit focused on capacity-building in community colleges, in 2019. Acknowledging the importance of data to achieving its goals to improve equitable student outcomes and recognizing the current gap in data use at the institution, the college was actively working to create changes that would foster a culture of inquiry and evidence among employees.

These cultural conditions can make organizations especially conducive to using evidence (Fleischer & Christie, 2009). As explained in Chapter Two, the literature suggests that the organizational culture related to accountability, continuous improvement, methodological rigor, valuing of stakeholders, and social justice are all components that can contribute to use. At CLC, the culture was attuned to accountability and continuous improvement and upheld methodological rigor through its well-respected IEPR department. The college sought to bring

many employees into the practices of inquiry and evidence with a particular interest in advancing equitable educational experiences (College of Lake County, 2019). Holding these conditions constant by using one case site helped my study acknowledge these factors but focus on the effects of communication modes. CLC's interest in building its data capacity makes this research especially relevant to the college, which can serve as an example to other colleges seeking to make similar advancements in their use of evidence. In this way, CLC provided an instrumental case (Stake, 1995) as one example of an American community college facing accreditation requirements and interest in improving use of evidence.

Additionally, this case was selected because of my own local knowledge about the case. As an embedded employee in the institution, the access and contextual knowledge that I brought to understanding this case contributed to the nuanced interpretation of data (Yin, 2014). Furthermore, there was a practical dimension to the case selection; the knowledge generated will hopefully yield practical implications for the ways in which CLC decides to communicate student outcome data in the future and how it upholds its ethical obligations to share the results of employees' work directly with them. If the employees of the institution are expected to use evidence to enact continuous improvements in their work, they must be provided the evidence in ways that facilitate that continuous improvement. This practical knowledge with an ethically important dimension fits with Flyvbjerg's (2001) notion of *phronesis*, supporting the use of the case for its ability to generate context-specific, practical knowledge. Although using a single case site allowed for some consistency in context, organizational culture evolves over time. Consistent with case study approaches, I leveraged ongoing observations and remained flexible in the design of the project in order to be responsive to shifts in the context (Wells et al., 1995).

Data Products

Before detailing the sequential phases of the research design, it is critical to explain the data products that were so central to this study. Like the case site, the data products were part of the context because they communicated the student outcome data that participants were comprehending and potentially using. As explained, to investigate the research questions, participants in this study viewed data products that represented different communication modes. Six total data products were created for this study using real student outcomes evidence from CLC: an infographic, video, and written report about course outcomes and an infographic, video, and written report about graduation rates (see Appendix A). The decisions around the development of these data products relied upon the context and best practices in the literature.

The two topics selected to be featured in data products, course outcomes and graduation rates, were selected for their relevance in CLC's context. As the primary researcher familiar with both the institutional context as well as this study, I identified the topics to feature in the data products based on the following criteria:

- (1) The topics were about outcomes of college students who were enrolled at the time of this study or had formerly attended CLC.
- (2) The topics were broad enough in scope that a general audience of faculty and staff would be able to adequately answer the survey questions about data products (e.g., the topics did not reference student outcomes at a specific academic program or department level that would not typically be reviewed or used by faculty or staff outside the department).

- (3) The topics related to current institutional efforts and conversations to improve successful outcomes of students (i.e., provided evidence that could inform continuous improvement for student success).

To finalize the specific topics, I consulted with three college leaders familiar with student outcome evidence and current student success work. We agreed on the topics of graduation rates and course outcomes based on the criteria above, and then I created the six data products. Two topics were selected so that two surveys could be administered, one with each set of data products, and to see if the topic featured in the data products correlated to differences in comprehension and use of the student outcome evidence.

The data products were created utilizing practices that best contribute to stakeholder comprehension and use, as established in the literature. Each data product included a value judgement about the student outcomes presented, an important practice to distinguish the pieces from monitoring and help with sense-making for the audience (Schwandt, 2015). The two topics selected allowed for all data products to focus on the college as the unit of analysis and provide a broad-scope, outcomes evaluation, which would be of interest to a wide audience (Banta & Palomba, 2015). All data products drew on practices to encourage use from multiple paradigms of prior researchers. All data products offered suggested actions to take based on the evidence, akin to a use-focused approach (Christie & Alkin, 2012). All used and articulated the same, high-quality methodology to analyze the data presented to bolster the audience's confidence in using results (Christie & Alkin, 2012). All included a statement explaining that any CLC employee could have a role in acting on the data, emphasizing the importance of actors like value-focused practitioners (Christie & Alkin, 2012). Lastly, all data products featured evidence

about equity across outcomes for minoritized populations; this is a practice transformation-focused evaluators might have used (Mertens & Wilson, 2019) and was also important for CLC as an institution focused on equitable student outcomes. Lastly, I applied best practices in data visualizations and storytelling techniques, particularly intentional structures, to all data products. Not all aspects of narrative storytelling could be leveraged given that the nature of the topics, but visual storytelling techniques were applied to the extent possible. The goal of these consistencies was to both create high-quality data products based on known best practices and to eliminate other factors that are known to influence comprehension and use.

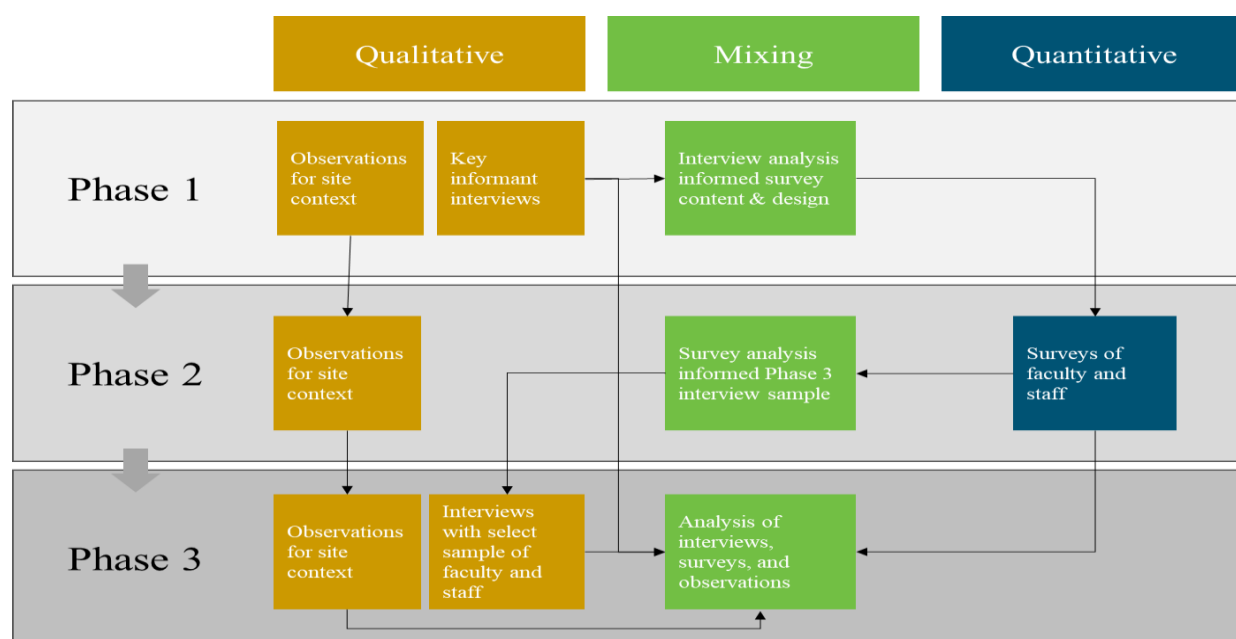
Data products did vary to some extent, however. Given that the communication modes differed, the data products needed to present the information with more or less detail, in different sequences, and varied balance between text, visuals, and audio. Generally, the data visualizations were the same across data products, but infographics utilized picture-style visuals common to that mode. Videos animated the data visualizations, as is common to that mode. Rather than aim for complete consistency, I sought to apply best practices known from the literature to all data products, and to leverage the unique benefits of each mode to the fullest extent. As described below, Phase 1 interviews with key informants provided a quality control check to help ensure that the data products created for this study were sufficiently similar to compare.

Phases of the Design

Another intentional part of the overall design was to use a multi-phased approach. I used both sequential and concurrent strands over a period of time to understand the research problem, leveraging mixed methods strategies described by Creswell and Plano Clark (2011). The

strategic, phased design, informed by frameworks of pragmatism and dialectical pluralism (Creamer, 2018; Greene, 2007), allowed for equal priority and contributions from quantitative and qualitative elements. Quantitative data were collected through two surveys of faculty and staff that generated comparisons by communication mode of respondents' understanding and potential use of student outcomes data. Qualitative data were collected through observations and interviews that generated descriptions of the context and themes to explain comparisons between communication modes. Equal priority of these elements is consistent with the purposes for using mixed methods: for each method to complement the other and help develop each strand of research in order to enhance validity and understanding (Creamer, 2018). The three phases of this study each built on the last to explore the research questions. Figure 3 below illustrates the phases of the study, the qualitative and quantitative components, and how they were mixed; these phases and each element are explained in further detail throughout this chapter.

Figure 3. Research Design



Phase 1

Phase 1 focused on observations to describe the site context and interviews to inform development of the data products and surveys to be administered in Phase 2. Observations helped provide detail about CLC as well as the typical data products communicated in the college and their similarities and differences to the products used in this study. Interviews in this phase served two purposes. First, the interviews investigated considerations for how different modes of communication vary and what types of information would be important to collect in broader surveys of CLC faculty and staff. For example, the interviews suggested that prior experience using student outcomes data was an important characteristic to collect in the surveys because it might help explain propensity for using results presented during this study.

Second, the interviewees in this phase reviewed drafts of all of the data products (Appendix A contains final versions) prior to including them in the surveys. This step led to adjustments in the data products, per interviewee suggestions, to minimize unnecessary differences and check for consistent quality between them to better isolate the impact of the communication mode. These interviews also helped illuminate differences inherent to the communication modes that could not be controlled for but are acknowledged in the final analysis. These interviews informed the design and content of the surveys and also formed a basis of qualitative evidence, which was reviewed again in conjunction with additional interview data collected in Phase 3.

Phase 2

Phase 2 of the research focused on surveys of CLC faculty and staff, which were developed from the data collected and analyzed in Phase 1. Two similar surveys were

conducted, one featuring the data products about student graduation rates and the other featuring the data products about student course outcomes; this allowed for similar measurement of comprehension and use by communication mode across two different student outcomes topics. In both surveys, each respondent was randomly assigned to see one of three data products, each representing a different communication mode (infographic, video, or written report). After viewing one of the data products in the survey, each respondent was asked the same set of questions about comprehension of the findings presented in the data product and hypothetical use of the information in their own practice.

Phase 2 analysis focused on comparison of these results across the three communication modes. The extent of differences in comprehension and use was quantified in this analysis. This step helped to explore what differences exist between communication modes as well as variations by data product topic (graduation rate and course outcomes) and respondent characteristics like prior experience with student outcome data and number of times reviewing the data product. The Phase 2 analysis was also used to further refine the interview instrument for Phase 3. The post-survey interviews at the case site helped explore the findings from the survey in more depth, particularly asking about how and why faculty and staff thought differences existed between different communication modes, as measured in the survey. Finally, the Phase 2 analysis was also used to identify a sample of participants for the interviews in Phase 3 (see Sampling below).

Phase 3

Phase 3 of the research entailed a second round of interviews with a sample of faculty staff at CLC. These interviewees, different from those interviewed in the first set of interviews

during Phase 1, had less extensive knowledge of the data communication that had already occurred at CLC compared to interviewees from Phase 1. The sample was selected based on the Phase 2 analysis and represented a range in comprehension, use, and communication mode (see Sampling section). Although survey respondents in Phase 2 saw only one data product with one mode of communication while taking a survey, Phase 3 interview participants were provided with three data products showing the information communicated in three modes on the same topic. These interviews explored in detail how and why differences between communication modes (as seen in the analysis of the survey in Phase 2) existed. The analysis steps of Phase 3 were the most substantial of the full design and entailed the most integration of data types. The Phase 3 interview responses were analyzed along with the Phase 1 interviews to determine key themes. These themes were compared to survey results (additional details are provided in the analysis section). With multiple points of integration, this study was not simply a multiple method study (Creamer, 2018), or a quasi-mixed design (Teddlie & Tashakkori, 2006), but a mixed method approach where qualitative and quantitative strands were mixed at strategic points throughout the research.

Sampling

This study explored one main sample, the case site (College of Lake County), as well as sub-samples embedded within it. The sampling approaches included convenience sampling as well as purposive and maximum variation sampling at different phases of the research. The case site and context have already been described in the Research Design section of this chapter. Here, I focus on the samples selected within the case site in each phase of the research.

Case Samples

Within the case, there were multiple embedded samples that served different purposes throughout the study. Sampling of observations was based on specific meetings while sampling for surveys and interviews was based on CLC employees. Observations were conducted of five committee or taskforce meetings, three small group discussions, and one college-wide event at CLC that pertained to student outcomes data. The sampling criteria for observations was based on whether a meeting, discussion, or event would include student outcome data and conversation about it. For committees and taskforce meetings, formal meeting agendas were used to determine this selection criteria; however, flexibility consistent with case study research (Stake, 1995; Wells et al., 1995) was used to select less formal, small-group discussions for observation throughout the study.

During Phase 1, the members of CLC's Data Team were targeted for interviews as a purposeful convenience sample. Since its formation in 2019, this taskforce was charged with reviewing practices of data use and helping to cultivate a culture of inquiry and evidence among faculty and staff around the college. Five Phase 1 interviews were conducted with three faculty, a student affairs dean, and an information technology staff member, all of whom participated in the Data Team. These members were familiar with assessment and evaluation activities as well as communication of student outcomes data already in existence at the college, and thus made sense as key informants to help develop the faculty and staff survey and check for consistency between data products.

Within Phase 2, the full population of active faculty and staff at CLC (1,129 employees) were invited to participate in the surveys. As explained in the research design, to improve the

number of responses and to investigate the impact of different topics highlighted in the data products, two surveys were administered, each with a different topic featured in data products. The sample for both surveys was the same: all CLC faculty and staff. Individuals were able to take each survey only once but could participate in both administrations since the topics in the data products were different and they could still provide valuable input. This is important to note because the response rate calculated here could include responses in both survey administrations from the same individuals. Nevertheless, Table 1 shows the response rate overall and by employee groups for the two surveys. The smallest response rate was among adjunct faculty, who are a large group of employees but tend to have lower survey response rates at CLC given their part-time employee status and that they may be working at other organizations.

Table 1. Survey Responses by Employee Type

Respondent Role	Total Employees (N)	Survey Responses (n)	Response Rate
Full-time faculty	217	50	23%
Adjunct faculty	315	10	3%
Staff	597	76	13%
Total	1,129	138*	12%

Note: Two respondents did not identify their role; they are included in the total count but not listed with any respondent role.

Table 2 shows the distribution of responses across surveys and communication modes. Each survey had a similar number of respondents. Similarly, distribution was fairly even between communication modes because of the random assignment to a mode within the survey; differences that exist were the result of respondents who began the survey but did not complete and are not included in the findings of this study. It is important to note that throughout Chapters

Three and Four the total survey sample size fluctuates where respondents might have chosen not to respond to specific questions.

Table 2. Survey Responses by Survey Topic and Communication Mode

Communication Mode	Course Outcomes Survey Topic		Graduation Rate Survey Topic		Both Survey Topics	
	% of Communication Mode		% of Communication Mode		% of Communication Mode	
	n		n		n	
Infographic	24	47%	27	53%	51	100%
Video	23	50%	23	50%	46	100%
Written Report	24	59%	17	41%	41	100%
All Modes	71	51%	67	49%	138	100%

In Phase 3, a sub-set of the survey respondents were selected as interviewees. The survey results were used to segment potential interviewees for a purposeful sample. First, respondents' comprehension and use were quantified based on survey responses (see further details in the Data Analysis section). To create a maximum variation sample and gather varied perspectives, I selected three interviewees who had relatively low levels of comprehension and use, and three interviewees who had relatively high levels of comprehension and use for each of the three data products and from both surveys for a total of eighteen interviews. Respondents were able to self-select interest in follow-up interviews in the survey instruments, and 49 volunteered to participate in an interview. Ultimately, the 18 selected for interviews were chosen based on their comprehension and use. The result was the maximum variation, purposeful sample shown in Table 3 below.

Table 3. Phase 3 Interview Participants by Survey Communication Mode, Comprehension and Use Scores, and Topic

Communication Mode Viewed in Survey	Comprehension & Use Levels in Survey	Course Outcomes Survey Topic	Graduation Rate Survey Topic	Both Survey Topics
Infographic	Low	2	1	3
	High	2	1	3
Video	Low	1	2	3
	High	2	1	3
Written Report	Low	1	2	3
	High	1	2	3
All Modes	Low	4	5	9
	High	5	4	9
Total		9	9	18

While this study did not explicitly seek to use mixed methods for the purposes of initiation or to find divergence, sampling a range of responses was important to a comprehensive investigation of the research questions (Creamer, 2018). The maximum variation sampling technique allowed this research to investigate which respondents might be outliers and which have important considerations to answer the how and why question proposed (Merriam & Tisdell, 2015). Additionally, Phase 3 interviews allowed for collection of evidence that might have converged or diverged from survey responses. Although findings tended to converge in this study, this practice of looking for both similar and different results was important to comparing quantitative and qualitative strands, consistent with dialectical pluralism (Greene, 2007) and a broad interpretation of triangulation (Mathison, 1988).

Sample Characteristics

Attention was paid to gather responses in interviews and surveys from employees with different characteristics to help ensure results would represent multiple perspectives and employees. The methodology used to assign respondents randomly to a data product allowed for fairly even composition of respondents based on role and experience with the topics covered in the data products (see Tables 4-7). As shown in Table 4, there was a higher proportion of faculty and lower proportion of staff who do not work directly with students among respondents who saw a written report in the surveys compared to those who saw an infographic or video. Still, the make-up of respondents who saw each type of communication mode had representation across faculty and staff roles at the college. While the distribution of Phase 3 interview participants prioritized a range of comprehension and use across modes over employee role, the interview participants represented multiple employee roles. Interview participants proportionally matched the breakdown among survey respondents fairly well (see Table 5). These distributions across roles makes the comparisons less likely to be grounded in differences between employee roles. In fact, the findings detailed in Chapter Four did not differ by employee role. Interview participants explained that one's role might contribute to differences in initial interest in the topic or the way one might use the information but given that the topics covered in this research were widely applicable to all faculty and staff, all could have a baseline comprehension and some form of potential use of the information.

Table 4. Number of Survey Respondents by Role and Communication Mode

Respondent Role	Respondents who saw infographics		Respondents who saw videos		Respondents who saw written reports		All respondents	
	n	% of total	n	% of total	n	% of total	n	% of total
Full-time faculty	19	37%	14	30%	17	41%	50	36%
Adjunct faculty	2	4%	5	11%	3	7%	10	7%
Staff who work directly with students as primary role	12	24%	8	17%	12	29%	32	23%
Staff who do not work directly with students as primary role	18	35%	17	37%	9	22%	44	32%
No response	0	0%	2	4%	0	0%	2	1%
Total	51	100%	46	100%	41	100%	138	100%

Table 5. Number of Phase 3 Interview Participants by Role

Participant Role	Interview Participants	
	n	% of total
Full-time faculty	5	28%
Adjunct faculty	1	6%
Staff who work directly with students as primary role	5	28%
Staff who do not work directly with students as primary role	7	39%
No response	0	0%
Total	18	100%

Additionally, varying levels of experience with the topics covered in the data products were present across all three communication modes. Prior experience had implications for comprehension and use of information, but with a mix of respondents and experience the modes of communication could be compared. One exception, as shown in Table 6 below, was among

infographic viewers where there was a higher proportion who felt somewhat experienced and lower proportion who did not feel experienced with the topics compared to those who viewed a video or written report. Interview participants did not exactly match the distribution of experience seen among survey respondents but were fairly similar as shown in Table 7. Of the ten who considered themselves “not experienced” in their survey response, only one volunteered for a Phase 3 interview, but did not meet other selection criteria for interviews.

Table 6. Survey Respondents’ Prior Experience with Data Product Topics

Communication Mode	Total Respondents	% of Communication Mode				
	n	Very Experienced	Experienced	Somewhat Experienced	Not Experienced	No Response
Infographic	51	11.8%	33.3%	52.9%	2.0%	0.0%
Video	46	10.9%	37.0%	39.1%	8.7%	4.3%
Written Report	41	14.6%	36.6%	36.6%	12.2%	0.0%
All Modes	138	12.3%	35.5%	43.5%	7.2%	1.4%

Table 7. Phase 3 Interview Participants’ Prior Experience with Data Product Topics

Participant Experience with Topic	Interview Participants	
	n	% of total
Very experienced	1	6%
Experienced	8	44%
Somewhat experienced	9	50%
Not experienced	0	0%
No response	0	0%
Total	18	100%

With a fairly similar demographic profile between respondents viewing each type of data product, and each respondent having seen only one data product in the survey, the survey responses provided interesting comparative data. The interview respondents represented a range of viewpoints and perspectives to provide insights about the communication modes and had the added benefit of seeing three data products about the same topic (representing all three

communication modes) when participating in the interview. To be sure, a respondent's position or prior experience are not the only factors that might influence their comprehension or use of evidence of student outcomes. Still, across these demographics, clear patterns emerged about the differences in comprehension and use by mode of communication, as described in Chapter Four.

Data Collection

The Research Design and Sampling sections of this chapter already detailed much of the data collection activities for this study. A detailed data collection and analysis management plan used for this study is shown in Appendix B. Data collection protocols can be found in Appendices C-G. Figure 4 summarizes the data collection efforts and sampling. The data collection activities as well as timing are summarized here to provide a clear picture of the order of this multi-phase study and the span of time between phases. Timing between data collection activities was kept as short as possible to minimize potential for other factors to affect respondents' views and to reduce the likelihood Phase 3 interviewees would forget their experience taking the survey in Phase 2.

Figure 4. Data Collection Summary

Phase of Data Collection	Type of Data	Type of Collection (Instrument)	Sample	Timeline
Phases 1-3	Qualitative	Observations	Convenience sample of 5 meetings, 3 discussions, and 1 event at case site	May-October 2021
Phase 1	Qualitative	Case site pre-survey interviews	5 key informants from Data Team	July 2021
Phase 2	Quantitative	Case site survey	138 faculty and staff among all active employees (1,129)	July-August 2021
Phase 3	Qualitative	Case site post-survey interviews	18 faculty and staff from purposive maximum variation sample	September-October 2021

In Phase 1 of the research, two data collection activities began: observations and key informant interviews with Data Team members. Observations took place throughout the course of the study and Phase 1 interviews took place in July of 2021. Interviews were selected as a data collection method to better understand how and why different communication modes have been more or less effective previously and to compare draft data products for this study, asking questions befitting of the qualitative approach (Merriam & Tisdell, 2015). Observation was selected as the key mode to provide context for the case and actors within the organization. Observations are traditionally used in case study as a method for understanding the context and especially for witnessing the authentic reality of how actors within the case behave (Stake, 1995). The observations occurred sporadically as opportunities arose and constituents agreed to participate.

In Phase 2, the surveys of CLC faculty and staff were the most appropriate way to test for differences in comprehension and potential use between communication modes. The two surveys used in this study asked similar questions and were identical in structure (see Appendices E and F). The main difference between the two surveys was that in the first survey, the data products that respondents saw were about course outcomes and in the second survey the data products were about graduation rates. Questions asking about comprehension of these data products differed between surveys to reflect the topic presented in the data products. The remainder of the surveys utilized the same questions. This allowed for the data across both surveys to be combined for analysis. Because respondents were randomly assigned to see one data product in each survey representing one communication mode, and then answered the same questions, the resulting quantitative data provided a clear basis for measuring the extent to which there were

differences in comprehension and potential use of student outcome data. The administration of the first survey began in mid-July 2021, about one week following the conclusion of Phase 1 interviews and the second survey began in late July 2021 and ran through mid-August 2021. Each survey was open for responses for approximately three-and-one-half weeks.

Finally, interviews were selected in Phase 3 of the research to best fit “how” and “why” questions explored in that stage. Interviews, which allow for conversation as well as probing or follow-up to explore details or clarify, were a well-suited method to ask questions that solicited open-ended responses and gather qualitative evidence (Merriam & Tisdell, 2015). Following survey analyses to identify a purposeful sample, Phase 3 interviews were conducted in September 2021 (except one completed during the first week of October). I used multiple data collection techniques to suit the purposes and questions at each phase of this study. In addition to mixing quantitative and qualitative data to inform data collection protocols and sampling, analyses conducted in this research also leveraged both types of evidence and mixing.

Data Analysis

With qualitative and quantitative data generated through this research, data analyses relevant to both types of data were employed. Additionally, strategies specific to mixing of the two strands in analyses were a key feature of this mixed methods study. The analyses are outlined below within the two research questions of this study.

Analyzing Differences in Comprehension and Use Between Communication Modes

Measuring the extent of differences in comprehension and potential use between communication modes relied primarily on survey responses. To add to the reliability of measurements of comprehension, multiple analyses were conducted to check for internal

consistency (Price et al., 2013). Respondents' comprehension was captured in two primary ways in the surveys: (1) respondents' own written summary, and (2) answers to quiz-style questions about the content of the data product, each with a single correct answer and three incorrect answers. Importantly, survey respondents were asked to provide their own brief written summary in the survey prior to seeing the quiz questions, which, if seen first, might have provided clues about what to include in a summary and detracted from the goal of capturing the respondents' own words. Figure 5 below outlines the two approaches to capturing comprehension of respondents as well as analyses used to quantify comprehension.

Figure 5. Comprehension Measurements

Comprehension Question Type	Method to Capture in Survey	Method to Analyze
Respondent written summary of data product	Immediately after viewing a data product (infographic, video, or written report), each respondent was asked to briefly summarize in their own words the main points they took away from the data product.	Each response was rated for accuracy on a scale of 0-3 and for depth on a scale of 0-3 based on the correct information in the summary as well as how specific and detailed it was.
Respondent quiz question answers	After typing a summary, respondents were asked a set of five, multiple-choice, quiz-style questions where they were asked to identify the correct answer from a set of four possible options. Each question asked about one of the main student outcomes evidence findings presented in the data products.	Each quiz question was scored as correct or incorrect and a percent correct (out of five questions) was calculated for each response.

These comprehension measurements were compared across communication modes using descriptive statistics and frequencies. Segmentation by respondent characteristics like prior data experience and the number of times the respondent viewed the data product while taking the survey provided depth to the comparative analyses. Additional analyses included calculating

effect size as well as comparison of means and t-tests to understand the significance of differences between communication modes. Statistical testing was limited given the number of responses but was integrated in findings where relevant.

Similar to comprehension, I sought reliable quantitative measurement of use by applying multiple approaches to survey responses. Before describing these approaches, it is important to note that in most of the data collected use was actually measured in terms of *potential* for use, in alignment with the research questions. Respondents were asked about their likelihood to use evidence, how they might use it, and why, but whether or not respondents actually did use the evidence was not tracked (unless mentioned explicitly by respondents) given the timing and scope of this study. These measurements fit the research questions here, which consider whether perceptions of potential use differ when higher education practitioners are exposed to different modes of communicating student outcomes evidence.

Use was measured through three questions in the surveys. To help reduce the potential for socially desirable responses, a multi-layered approach with increasing levels of specificity was employed (Abbey & Meloy, 2017). Respondents were first asked how likely they would be to use the information they viewed in a data product to take action in their role on a Likert scale, with options of “very likely,” “likely,” “unlikely,” “very unlikely,” and “not sure.” Then, respondents were asked to describe in their own words how they would use the information; so even those who might have felt that it was socially desirable to respond that they were likely or very likely to use the information would also have to explain a specific type of use. This strategy allowed the analysis to check for criterion validity (Price et al., 2013), expecting those who were likely to use information to be able to articulate how they might use the information in their own

words. In most cases across all three communication modes, respondents who said they were likely to use the information also provided clear uses of it in their own words. Only nine respondents said they were very likely or likely to use the information but did not supply a written response about how; these respondents spanned all three modes with four responding about an infographic, three about a video, and two about a written report. With such small counts, no conclusions could be drawn about the variability between modes, but the analysis suggested that both methods of measuring potential use were reliable and valid in this study. In addition to the likelihood for use and type of use, respondents could provide reasons they would or would not use the information based on a set of reasons as well as an opportunity to supply additional reasons.

While respondents' self-reported likelihood of using the information provided some insight to potential use, given that most respondents were likely to use the information across communication modes, taken alone this measure might also reflect a feeling among respondents that they ought to use the information. As another way to balance this measure, respondents' initial text summary of the data product they viewed was coded for connections made to institutional initiatives, personal actions to take, and future learning about explanations for the data presented. Similar to the coding used on these responses to measure accuracy and depth of the summary, a rating of zero-to-three was used based on the presence of a connection point and how many connection points the respondent referenced in their summary. Figure 6 summarizes the three methods used to capture and analyze potential use of evidence.

Figure 6. Potential Use Measurements

Use Question Type	Method to Capture in Survey	Method to Analyze
Respondent rating of likelihood to use evidence	Response to “Based on the summary, how likely are you to take action in your role or use the information you saw?” with options of: very likely, likely, unlikely, very unlikely, and not sure.	Number and percent of responses were calculated per response option. Very likely and likely were combined as were very unlikely and unlikely for some analyses.
Respondent description of how they would use evidence	Respondents were asked to provide a brief description in their own words about how they would use the evidence seen in the data product they viewed.	These responses were compared to respondents’ ratings of likelihood to use evidence to analyze consistency between responses. Responses were also coded for types of use.
Respondent written summary of data product	Immediately after viewing a data product (infographic, video, or written report), each respondent was asked to briefly summarize in their own words the main points they took away from the data product.	Each response was rated for number of connections made to institutional initiatives, personal actions, and future learning ideas on a scale of 0-3.

Most respondents across communication modes said they would be likely or very likely to use the information presented in data products. To provide further depth and richness to the analysis, respondents’ text explanations about how they would use the evidence were analyzed. Each of these survey responses was coded as referencing one or more types of use outlined in Figure 7. The types of use categorized in this study relate to conceptualizations about types of use noted in Chapter Two, which are also outlined in Figure 7.

Figure 7. Types of Use

Use Type	Definition in This Study	Related Concepts from Extant Literature
Personal action	The respondent referenced directly applying the information to an action they would take in their own role or with colleagues they work with directly.	This type of use most closely mirrors what the literature references as consequential use (Kuh et al., 2015) or instrumental use (Fleisher & Christie, 2009) because the individual is expecting to take some action or make a change based on the evidence they viewed.
Institutional initiatives	The respondent referenced contributing to institutional initiatives mentioned in the data products. The initiatives related to the student outcomes evidence presented and were intended to improve the student outcomes.	In some cases, this type of use seemed to be symbolic use (Mark, 2009; Kuh et al., 2015; Walvoord, 2010) when the respondent said they would provide general support of the institutional initiatives but might not have cited a specific action they would take to provide that support. In other cases, respondents said they had a better or new understanding of the purpose behind institutional initiatives and the impact they can have, which aligns to conceptual use referenced in the literature (Fleisher & Christie, 2009).
Learning	The respondent referenced learning new information, gaining a better understanding of information they had previously heard, or a desire to learn more details about the student outcome evidence they viewed.	These explicit references to learning new information or deeper understanding align nicely to conceptual use (Fleisher & Christie, 2009).
Sharing	The respondent referenced sharing the data product or the evidence within it to other colleagues as part of their process for discussing student outcomes.	Process use typically refers to a change made not necessarily as a result of outcomes but rather a change to how those outcomes are collected or measured as a result of undergoing an evaluation (Patton, 1997). The “sharing” use type does not exactly match what has previously been referred to as process use. However, just as process use talks about changes to the process of measuring as a result of participating in an evaluation respondents describing sharing described how they would change their process of communicating about student outcomes as a result of participating in this study.

While all of these types of use have advantages and disadvantages well-articulated in the literature, they still constitute types of use that can speak to transformation of evidence to action. For the case site studied in this research, where the institution was seeking to empower

individuals to take personal action, execute on well-supported institutional initiatives, provide opportunities for learning about student outcomes, and improve communication, all four of these types of potential use were beneficial. In this research, respondents did not reflect examples of non-use, political, or persuasive use which might have negative impacts CLC's goals.

Analyzing How and Why Communication Modes Affect Comprehension and Use

The second question of this study explored how and why differences in comprehension and potential use exist between communication modes. Qualitative data were collected and analyzed as the primary source to contribute to this question, with supporting quantitative evidence used as relevant. Qualitative data generated through interviews and observations were analyzed during Phases 1 and 3 of the study. The primary analysis technique used was categorical aggregation whereby themes were identified from a coding process applied to the qualitative data (Stake, 1995). Themes identified during Phase 1 helped inform adjustments to the surveys and data products for Phase 2. Themes identified during Phase 3 were combined with Phase 1 themes and organized into a framework explaining different communication modes. Rich descriptions of respondents' thoughts and relevant quotes were compiled to support key findings. Although themes from the existing literature were considered during the qualitative data analysis, an inductive approach was applied to the data generated in this study to consider new possible explanations (Yin, 2014) for why different communication modes might correspond to varying levels of understanding and potential use of student outcome data. Throughout the thematic coding, special attention was paid to which data product each interviewee initially saw while taking the survey as well as their level of comprehension and use

based on survey responses. This attention in qualitative analyses led to insights about leveraging multiple communication modes in a strategic order, which is explained in Chapter Four.

Mixed Methods Analyses to Explore Communication Modes

To support both research questions, mixed methods analyses were also employed. Consistent with some mixed methodology studies, the mixed analyses in this study focused on extreme case sampling, cross-case comparison, transformation, and blending, as well as meta-inferences (Creamer, 2018). The extreme case sampling was already described as the approach used to identify Phase 3 interviewees (see Case Samples section). Because the qualitative interviews of Phase 3 were designed to depend on the analysis of survey results in Phase 2, this sequential mixed analysis technique was not simply a sampling procedure but also a strategy for mixing the methods (Teddlie & Tashakkori, 2009). Cross-case comparisons were a key feature of the mixed analysis that connected themes from qualitative analyses with quantitative evidence to illustrate different features of the three communication modes studied. The mixed methods analyses also included transformation and blending. As already described, some qualitative responses in surveys were transformed into quantitative data in a conversion type of analysis (Creamer, 2018). Blending, where categories or factors were generated from one method to inform the other method (Creamer, 2018) was an important strategy in this study. Themes from the Phase 1 interview analysis identified factors to measure in the quantitative surveys. Likewise, survey responses helped inform questions to ask in Phase 3 interviews.

Most important in this study was an analysis of quantitative and qualitative evidence jointly to draw meta-inferences (see Creamer, 2018) across the data. The qualitative themes as well as the quantitative data are presented together in Chapter Four to illuminate the points of

convergence and divergence between the two types of data. As has been shown in other studies, joint displays were used to help highlight insights that otherwise might not be revealed by showing the confirmation, expansion, and discordance between results (Bustamante, 2017). Although the different strands of this study each contributed more heavily to one of the two research questions, the findings and analyses helped demonstrate the relationships between the questions, supported by both the qualitative and quantitative strands. Ultimately, through quantitative, qualitative, and mixed analyses, both types of data were leveraged to explain multiple dimensions of communicating student outcome evidence.

Researcher Role

It is important to describe my role as both the researcher in this study and as an employee at the case site, College of Lake County. In my position during the time of this study, Director of Student Success Strategy, I was not involved in the analysis and routine reporting of student outcomes data but did have responsibility in helping to communicate important evidence to inspire improvements to faculty and staff practices. In a prior position at the case site, I was involved closely in analyzing and reporting student outcome evidence regularly.

There were both advantages and disadvantages to my role as a researcher and practitioner at the case site. The benefits of my role as a practitioner/researcher were my awareness and understanding of the case and its context as well as my understanding of the broader context of student outcome evidence in higher education. Few researchers external to the organization would be able to understand as deeply the complex context and relationships between the external Higher Learning Commission accreditation standards, the role of CLC's Data Team as important key informants, and the institution's history and aspirational future with student

outcomes data. Additionally, as an embedded staff member within the college, I was able to see how the context developed over the time of this study and understand respondent references to past practices. Over a decade of experience in institutional effectiveness has given me a sharp understanding of the broad trends in higher education focused on use of evidence to inform improvements. These experiences helped make this research apply in practical ways for CLC as the college builds a culture of inquiry and evidence. Lastly, my personal relationships with faculty and staff from around the institution helped provide me access to data sources and eased my efforts to build rapport in interviews.

My role as a practitioner/researcher and closeness to my case had disadvantages as well. There were many potential sources of bias and influence in my role. In the past, I prepared several of the research products that had been used previously to communicate student outcomes data to employees. I created the data products that were used in this study as well, which was made clear to Phase 1 interviewees so that they could provide guidance on adjustments to make to the data products. During Phase 1 interviews, Data Team members might have felt obligated to provide positive feedback about these data products given that I created them. Any interviewee familiar with my prior experience at CLC might have also deferred to my expertise in research rather than express their own views candidly. Additionally, my internal role might have made me susceptible to interpreting results of this study in a certain way based on contextual knowledge and not necessarily concepts represented in the evidence I collected. The potential for interviewees to provide inaccurate responses and for me to introduce my bias in analyses because of my multiple roles put this study at some risk. However, I worked to minimize this risk through several strategies.

First, I used multiple strategies during data collection. To address the potential bias particularly from Data Team members familiar with the data products I created, I wrote an interview protocol (see Appendix D) that explicitly called attention to my role and encouraged candid responses. Faculty and staff participating in the surveys and Phase 3 interviews were not told that I created the data products used in the study. The audio narration used in the videos was recorded by another person external to CLC so that respondents would not recognize the voice in the videos. To be sure, survey and Phase 3 interviewees might have assumed I created the data products, but survey respondents could remain anonymous if desired and the Phase 3 interview protocol encouraged candid responses as in the Phase 1 interviews (see Appendix D). Bias in the survey was also mitigated through the survey design. Because the survey randomly assigned respondents to only one of three data products, any bias toward me that faculty and staff might have would have been distributed relatively evenly across the three communication modes. The *difference between* the modes was the main focus of my analysis, and thus could still be pursued despite potential skewing across all modes (which, if present at all, is expected to be minor and in a positive direction across all communication modes).

Second, I also used analysis strategies to address drawbacks of my practitioner/researcher role. Member checks with interviewees were conducted to verify that respondents felt their thoughts were accurately represented in summary descriptions. Mixing and comparing the interview results from the first round, where respondents knew I created the data products, and third round, where respondents did not necessarily know, helped to balance potential bias from interviews. Lastly, a second researcher external to CLC independently coded a sample of six Phase 3 interview transcripts. The second researcher and I compared coding and found

agreement between themes. If disagreement between themes was found, additional interviews would have been coded by the second researcher, but the initial analysis demonstrated that my interpretation of interview responses was not biased by my internal knowledge and position.

At the time of this writing as a staff member of CLC who champions the college's student success strategies, I expect to have some influence over how the college decides to share and use student outcome data after this study. Rather than try to avoid my influence, I recognize the limitations it creates in the data findings and offer some strengths this allows the project. Unlike some other types of research that try to eliminate potential bias, case study can embrace the local knowledge and possible influence of the researcher (Stake, 1995). Aside from the knowledge that was gained through this research to contribute to the fields of assessment and institutional effectiveness, the very practical knowledge gained through my role as a practitioner and researcher is a key benefit for CLC and for the participants in the study. Not only can I share the findings of this research, but I also anticipate having the opportunity to help enact effective communication techniques discovered through this study.

Validity, Quality, and Limitations

For the mixed method study, questions of validity and quality can be complex, especially in iterative, multi-phase designs like the one employed in this research. However, strategic design and points of integration in mixed methods can help strengthen the validity of the research (Greene, 2007). In my study, I have done exactly this. The Phase 1 qualitative interviews were used to explore topics that would need to be captured in the quantitative CLC surveys. The survey results from Phase 2 were then used to determine who to interview and

what differences ought to be expanded upon in Phase 3. This structure helped to minimize the potential threats to validity that might have occurred with two completely separated strands.

Some practitioners focus less on validity specifically and instead measure quality of mixed methods studies through a variety of means (Howe & Eisenhart, 1990). The connection between research questions and appropriate data collection and analysis methods is a key feature of quality (Howe & Eisenhart, 1990), and part of the intentional decisions and design presented in this study. Additionally, making the background assumptions and paradigm explicit, in this case pragmatism and dialectical pluralism, helps to explain the research decisions (Howe & Eisenhart, 1990).

Despite efforts to design a quality study by mixed methods researchers' standards, this study, like all others, has limitations. Importantly, the knowledge generated is practical, context-dependent knowledge about CLC instead of generalizable knowledge. Another major limitation of this study is that the samples were not random or necessarily representative samples that would have more robustly allowed for generalizable knowledge. Additionally, the design of this study could have led to limitations in the types of questions asked in the survey and Phase 3 interviews. Although it might have been a strength to use initial analyses to inform the development of these protocols, it could have also limited the types of information solicited in these phases. To minimize this risk, I remained open to new themes and topics that emerged from these phases of the research and revisited the analyses conducted in earlier phases to help explain points of divergence. As explained in the researcher role section, my relationship to the case also created some important considerations for potential bias in this research. While these

limitations are critical to remember, I have worked to minimize these through the methodological design and strategies of this research.

Conclusion

From the current state of college student outcomes and prior literature, we know that communication of student outcome evidence is both essential and complex. This study makes strides in understanding that complexity by exploring how communication modes can foster audiences' comprehension and potential use of evidence to inform improvements. The mixed methods approach allowed me to investigate what differences exist between different modes of communication as well as how and why those differences exist. The iterative, multi-phase design was informed by pragmatic and dialectical pluralism paradigms. It leveraged benefits of both qualitative and quantitative methods of research to develop different phases of the design and create a holistic picture of this phenomenon.

CHAPTER FOUR
FINDINGS ON THE RELATIONSHIP BETWEEN COMMUNICATION
MODES, COMPREHENSION, AND USE

Introduction

Communication can create an effective bridge between student outcome evidence and the understanding and use of that evidence to make changes in higher education institutions. But what type of communication works and what about that communication makes it work? In this study, participants were best able to comprehend evidence about student outcomes through video communications. Additionally, potential use of student outcome evidence was most likely to be inspired from video communications. Importantly, infographics and written reports can support deeper comprehension and ongoing use of the evidence, especially when paired with videos. While these findings might seem obvious given that the videos typically require less time on the part of the viewer to digest the information, this research helps affirm why videos can be effective. Because written reports are relied upon so heavily in higher education institutional effectiveness practices, the benefits of other modes of communication might not be widely understood. The *extent* of value brought through videos as well as infographics helps inform all types of higher education practitioners who might wonder if it is worth investing new time, training, and energy into learning new ways of communication.

The findings are organized here to address the two research questions of this study. First, this chapter will demonstrate that differences in comprehension and potential use do exist when

comparing communication modes. The extent of difference between modes as well as the existence of differences across respondent characteristics and behaviors will be explored. Next, this chapter details how and why modes of communication correspond to different levels of comprehension and use. Each theme that helps explain differences between modes will build toward a framework for understanding communication modes as well as the importance of sequencing different modes to maximize positive impact.

Differences in Comprehension and Use by Mode of Communication

To begin, the findings here will address the first research question and demonstrate to what extent there are differences in the comprehension and potential use based on the mode of communication. Overall, differences exist, with videos providing the best mode for comprehension and use. Videos appear to work best regardless of prior experience with the topic and the number of times the information is reviewed. This finding is well-supported by the evidence collected in this research where the quality of the infographics, written reports, and videos that were compared was held consistent across modes. As noted in Chapter Three, two topics were covered in data products in this study; although analyses explored potential differences in comprehension and potential use based on the topics of the data products, differences were not found or were much smaller in scale compared to differences across communication modes regardless of topic. Thus, I primarily present findings that combine data from both surveys.

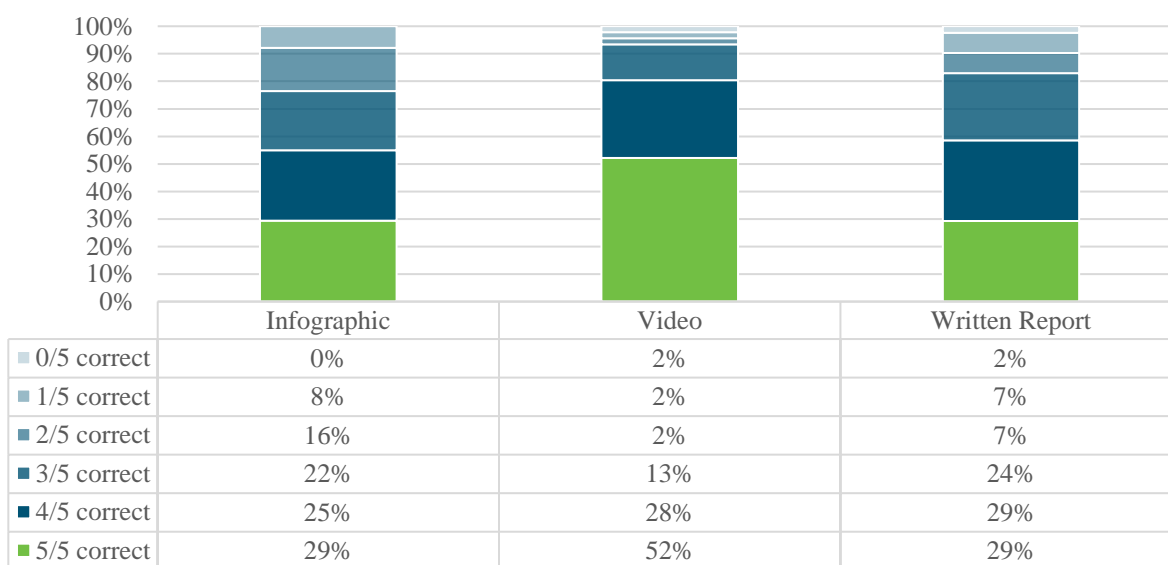
Differences in Comprehension of Evidence

We start here with comprehension because understanding evidence is an important precursor to being able to use the evidence to inform improvements. Videos appear to provide

the most beneficial communication mode for viewer comprehension and recall of the information. Although respondents who viewed infographics and written reports were also able to comprehend the material well, those who viewed the videos, on average, were better able to retain and explain the information that they viewed about student outcomes.

As explained in the methodology, there were multiple methods used to measure comprehension; here, the objective, correct or incorrect quiz question responses will be used to provide an overall comparison of comprehension and other methods will support additional findings throughout this chapter. Looking at survey respondents' quiz question data, videos have a clear advantage over infographics and written reports. Figure 8 shows the distribution of responses across the number of quiz questions answered correctly. More than half (52%) of those who viewed the videos correctly answered *all five* quiz questions about the data products while less than one-third (29%) of respondents who viewed the infographics and written reports correctly answered *all* quiz questions.

Figure 8. Correct Responses on Quiz Questions by Mode of Communication



As shown in Figure 9, the average percent correct response on the five quiz questions for those seeing a video in the survey was 84% meanwhile the average percent correct for those viewing an infographic was 71% and the average percent correct for those viewing a written report was 72%. Videos also had a slightly lower standard deviation, suggesting more consistency among respondents who viewed videos. While the sample size in this case poses challenges to statistical significance testing, the differences in the average percent correct seen between videos and infographics and videos and written reports is statistically significant at the 80% confidence interval (infographic compared to video has a z-score of 1.54; written report compared to video has a z-score of 1.339). This is a lower level of significance than traditionally used in social science research but suggests that there is a fair likelihood (80%) that the differences seen between communication modes are not simply due to chance and that there might be value in future studies repeating this type of examination at a larger scale to better measure statistical significance. Supporting this notion, there is a medium effect size found when comparing the mean percent correct on quiz questions between videos and infographics (Cohen's $d = 0.53$) as well as videos and written reports (Cohen's $d = 0.49$).

Figure 9. Comprehension by Mode Based on Average Percent Correct on Quiz Questions

Communication Mode	Number of Respondents	Quiz Questions		Qualitative Supporting Evidence
		Avg. Percent Correct	Std. Dev.	
Infographic	51	71%	0.26	Visually appealing, but some elements difficult to interpret
Video	46	84%	0.23	Engaging, clear, easy to understand
Written Report	41	72%	0.26	Challenging to read fully and remember all information
All Modes	138	75%	0.25	

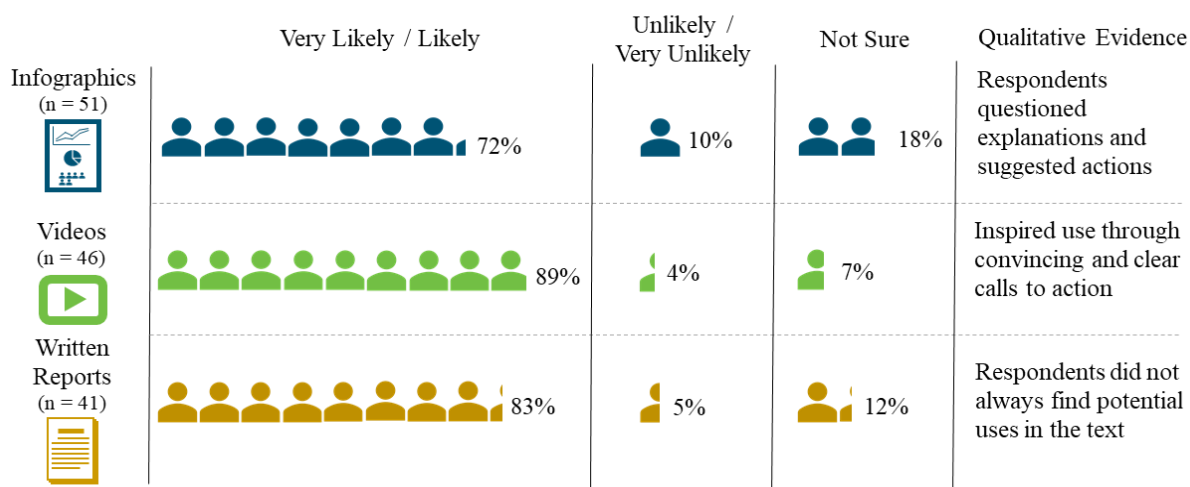
Overall, those viewing video data products seemed much better prepared to understand and recall key points about the data presented than those who reviewed the same information in infographics or written reports. Interviews supported this finding with multiple respondents saying that they felt clear about the key points after watching the videos but were more challenged by the infographics and written reports. Ultimately to see improvement in educational attainment for students, higher education practitioners need to not just understand but *use* student outcome evidence.

Differences in Use of Evidence

Similar to the patterns seen with comprehension, videos were associated with the greatest potential for use when compared to written reports and infographics. As noted in Chapter Three, potential use of evidence was measured in multiple ways; to provide an overall picture of use, this chapter first looks at respondents' own self-reported likelihood to use the evidence they saw in the survey. Based on likelihood to use the information, videos held the greatest promise. Over half (57%) of the respondents who saw a video when taking a survey said that they were

“very likely” to use the information presented and another third of respondents (33%) said they were “likely” to use the information, totaling nearly 90% of respondents. Comparatively, 83% of those who viewed a written report and 73% of those who viewed an infographic said they were very likely or likely to use the results. Interestingly, videos seemed to provide more confidence among respondents in their potential use; higher proportions of respondents who viewed a written report or infographic said they were “not sure” if they would use the information. Figure 10 displays a summary of these figures along with related qualitative evidence. For a detailed table showing quantitative data about likelihood for use by communication mode, see Table 16 in Appendix H.

Figure 10. Likelihood to Use Evidence Summary



When asked why they might be unsure about using the information, several respondents said that the infographic or written report did not suggest specific actions for them or that they felt uncertain of what actions they could take; only one of the respondents who viewed the video had this type of reason for being uncertain about using the information. Although displayed differently according to the mode, all three communication modes included the same information

about potential action steps for faculty and staff. Among the respondents who were very likely or likely to use the information, videos were said to have a clear and convincing call to action (37% would use the video information because they found it convincing). Among those viewing an infographic who said they would use the information, 27% said they found it convincing. Among those viewing a written report who planned to use the information, 26% found it convincing. In interviews, those who saw infographics shared that they questioned the potential explanations and suggested actions listed in the data products, wondering where those ideas came from and whether they were worth pursuing as uses of the evidence. Those who viewed written reports often did not remember or notice the suggested actions.

Despite these differences, the majority of respondents across all communication modes said they were likely or very likely to use the information and selected several reasons they would use the data. Most respondents who were likely or very likely to use the information found that the information was related to their role. Many also wanted to learn more about the topic. These various types of use are explored in more detail later in this chapter to help illustrate the types of use provoked because of the features of different communication modes.

Differences in Comprehension and Use Across Respondent Characteristics

Perhaps more convincing are how these trends in comprehension and use play out when examined across how experienced each respondent felt with the topic covered in the data products and how many times respondents reviewed the data products. The student outcomes topics covered in the data products in this research had not been reported institution-wide in the research context prior to being available through the surveys of this research study. However, given that the case study site had many individuals with varying levels of interest and access to a

variety of student outcomes evidence, this study could not fully control for exposure to this information prior to the survey. The vast majority of employees at the study site would have had no way of reviewing the information prior to the survey but capturing respondents' prior experience with *similar* data on the same topics (course outcomes or graduation rates) was an important feature to measure.

Additionally, respondents could have viewed whichever data product they were exposed to in the survey multiple times during the completion of the survey. Although the survey instructions asked participants to view the data product and then complete the survey questions, there was no technical way to control or prevent a respondent from downloading the data product, printing it, taking a screenshot, or leaving an internet browser window open to return to the data product. While that meant that respondents could have viewed the information while completing the survey, introducing another complexity to understanding the findings, it also better mimics the real-world circumstances in which employees would have open access to view a data product as much as desired through the internal website of the college's Office of Institutional Effectiveness, Planning, and Research.

To understand the potential impact of multiple views and prior experience with the topics, this information was captured in the survey. Respondents self-rated their level of experience with the topic and how many times they reviewed the data product seen in the survey, noting that there was no "correct" answer to this question to avoid respondents feeling that they should answer that they only viewed the data product one time. Regardless of experience and number of times respondents viewed the information, videos still had the highest comprehension and likelihood for use compared to infographics and written reports.

Differences in Mode Considering Respondents' Prior Experience

When looking at comprehension scores by levels of experience, those who viewed the videos in the survey had the highest scores across levels of prior experience as shown in Table 8. In general, those who felt somewhat experienced, experienced, and even very experienced with the topics had higher comprehension when viewing the videos as opposed to the infographics or written reports. Among those who said they had no experience with the topic previously, four respondents who viewed the videos had the lowest average comprehension score (50% correct response on quiz questions) when compared to one respondent who viewed the infographic (60% correct response on the quiz questions) and five respondents who viewed the written reports (68% correct response on the quiz questions). It is difficult to draw any conclusions from this seemingly contradictory trend among respondents who were not experienced with the topic because there were so few in this category and the respondents had a wide range in the percent of quiz questions they answered correctly. Overall, videos seem most useful regardless of how much experience with a topic one might think they have. In interviews, participants supported this finding by suggesting that the videos work especially well for wide audiences with a variety of experience with the topics.

Table 8. Comprehension by Experience with Topic and Communication Mode

Communication Mode	Very Experienced		Experienced		Somewhat Experienced		Not Experienced		Total	
	N	Avg. Quiz % Correct	N	Avg. Quiz % Correct	N	Avg. Quiz % Correct	N	Avg. Quiz % Correct	N	Avg. Quiz % Correct
Infographic	6	86.7%	17	68.2%	27	68.9%	1	60.0%	51	70.6%
Video	5	92.0%	17	84.7%	18	86.7%	4	50.0%	44	83.2%
Written Report	6	76.7%	15	73.3%	15	69.3%	5	68.0%	41	71.7%
All Modes	17	84.7%	49	75.5%	60	74.3%	10	60.0%	136	75.0%

The appeal of videos to a variety of faculty and staff with different levels of prior experience applies to use as well. Regardless of communication mode, faculty and staff more experienced with a topic felt most confident they would use the information presented. However, among experienced or somewhat experienced respondents (the largest groups), those who viewed videos were more likely to say they would use the information than those who viewed an infographic or written report. As explained already, there were not many respondents who viewed infographics or written reports saying that they were *unlikely* to use the information; rather, more who viewed those modes responded that they were *not sure* if they would use the information. Table 9 summarizes these findings. Regardless of prior experience, interviewees explained that videos had a clear and motivating call to action, but it was more challenging to identify potential uses of the information presented in written reports and infographics. One interviewee with several decades of teaching experience revealed that she was not sure what to do with the information in an infographic until she later watched the video.

Table 9. Likelihood of Use by Communication Mode and Prior Experience with Topic

Communication Mode	Self-reported prior experience with topic	Total Respondents	Self-reported Likelihood to Use Information in the Data Product		
			Very Likely / Likely	Very Unlikely / Unlikely	Not Sure
		n	row %	row %	row %
Infographic	Very experienced	6	66.7%	16.7%	16.7%
	Experienced	17	70.6%	17.6%	11.8%
	Somewhat experienced	27	74.1%	3.7%	22.2%
	Not experienced	1	100.0%	0.0%	0.0%
Video	Very experienced	5	100.0%	0.0%	0.0%
	Experienced	17	88.2%	11.8%	0.0%
	Somewhat experienced	18	88.9%	0.0%	11.1%
	Not experienced	4	100.0%	0.0%	0.0%
Written Report	Very experienced	6	100.0%	0.0%	0.0%
	Experienced	15	73.3%	6.7%	20.0%
	Somewhat experienced	15	86.7%	0.0%	13.3%
	Not experienced	5	80.0%	20.0%	0.0%
All Modes		136	81.6%	6.6%	11.8%

Differences by Mode Considering Number of Data Product Views

Perhaps greater comprehension and likelihood of use was the result of respondents reviewing the data products repeatedly. Logically it would make sense that the more times one reviews something the more likely they would be to recall the information and think about ways to use it. As noted previously, respondents were able to view the data product they saw in the survey as much as they liked. If this explained higher comprehension and use, we would expect to see a greater percentage of those who viewed videos to have watched the videos multiple times. However, the opposite trend materialized.

Those who viewed the video in the survey tended to view it only one time, and multiple interviewees said they did so because they felt confident that they understood the information and did not need to watch again. In fact, over three-fourths of those who saw a video in the surveys reported viewing the video only one time. Meanwhile, less than 40% of those who saw an infographic or written report in the surveys reported viewing the data product once. In the cases of infographics and written reports, respondents were much more likely to view the content at least two or more times as shown in Table 10.

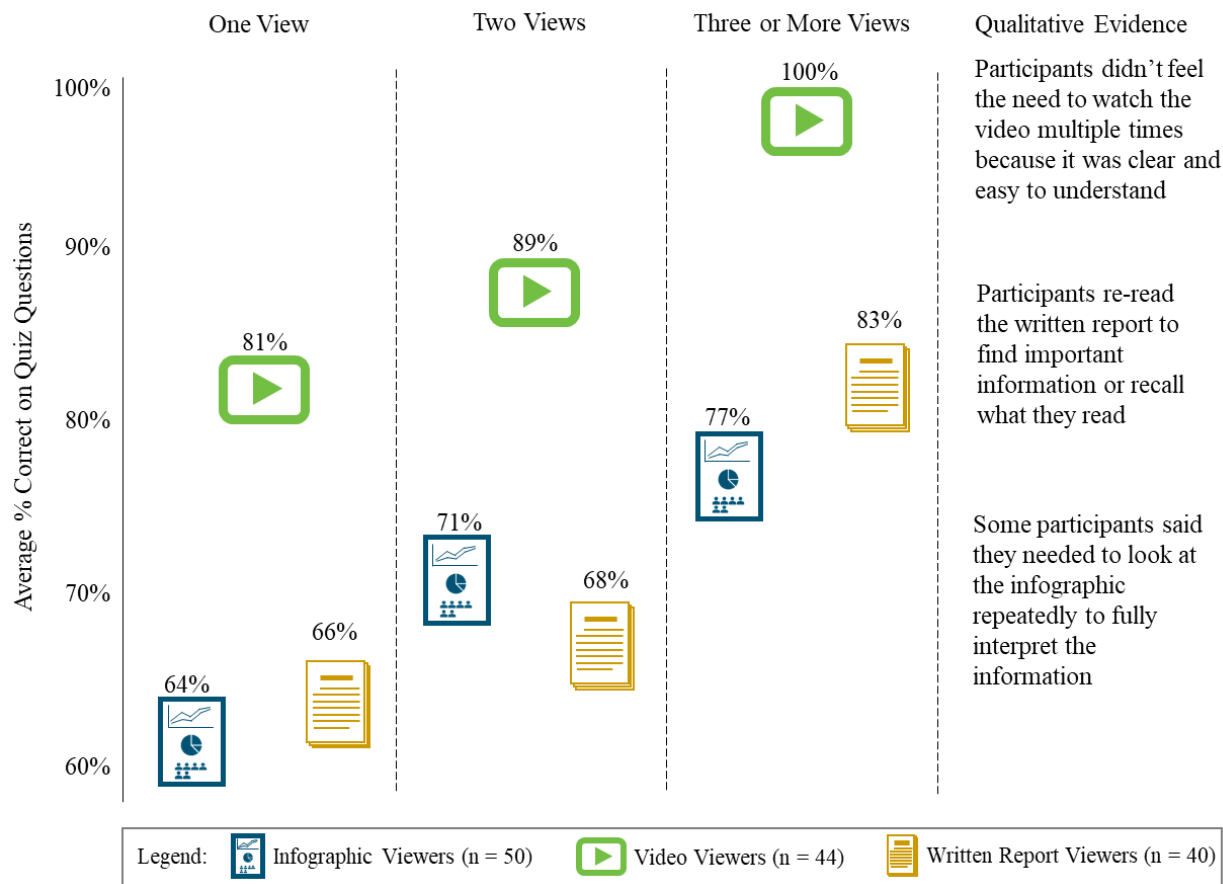
Table 10. Respondents by Times Viewed Data Product and Communication Mode

Communication Mode	Total Respondents	Number of Times Respondent Viewed Data Product During Survey			
		Once	Twice	Three or More Times	No Response
	n	row %	row %	row %	row %
Infographic	51	37.3%	31.4%	29.4%	2.0%
Video	46	76.1%	15.2%	4.3%	4.3%
Written Report	41	39.0%	29.3%	29.3%	2.4%
All Modes	138	50.7%	25.4%	21.0%	2.9%

Regardless of mode, respondents who viewed data products twice or three or more times tended to have higher comprehension, which one would expect. However, video-viewers maintained the highest comprehension scores compared to those who viewed infographics and written reports, regardless of how many times the data products were viewed. This was most apparent comparing comprehension based on the quiz questions within the survey. Those who viewed a video just once were much more likely to have correct responses compared to those who viewed an infographic or written report once. For detailed quantitative findings, see Table

17 in Appendix H. Figure 11 illustrates the gaps in comprehension by mode across multiple views with qualitative evidence to help explain the differences.

Figure 11. Comprehension by Number of Data Product Views



The data from this research suggest that it takes a person three or more times reviewing an infographic or written report to reach a similar level of comprehension to what is seen among a person watching a video just one time. Looking at the quiz question scores, the average percent correct among those viewing a written report three times (n=12, 83%) slightly exceeded the average percent correct among those viewing a video one time (n=35, 81%). To be sure, this study was not designed specifically to measure comprehension based on number of times an

individual reviewed information and further research would need to be conducted for this type of comparative analysis. Still, the trends suggest that important differences in comprehension can occur between different modes of communication.

Similarly, videos held a stronger relationship to use than infographics and written reports, regardless of how many times a data product was viewed. Viewing a video multiple times seemed to correspond to even higher likelihood for use compared to viewing a video one time. Those who viewed written reports three or more times had a high likelihood for use, but overall videos had the strongest likelihood for use. For those who viewed infographics, a fairly consistent percent of respondents said they would be unlikely or unsure of how to use the information regardless of how many times they viewed it, keeping the likelihood to use infographics lower than videos as shown in Table 11.

Table 11. Likelihood to Use Information by Communication Mode and Number of Views

Communication Mode	Number of times respondent viewed data product during survey	Total Respondents	Self-reported Likelihood to Use Information in the Data Product		
			Very Likely / Likely	Very Unlikely/ Unlikely	Not Sure
		n	row %	row %	row %
Infographic	Once	19	73.7%	10.5%	15.8%
	Twice	16	75.0%	6.3%	18.8%
	Three or more	15	66.7%	13.3%	20.0%
Video	Once	35	88.6%	5.7%	5.7%
	Twice	7	100.0%	0.0%	0.0%
	Three or more	2	100.0%	0.0%	0.0%
Written Report	Once	16	87.5%	6.3%	6.3%
	Twice	12	75.0%	0.0%	25.0%
	Three or more	12	91.7%	8.3%	0.0%
All Modes		134	82.1%	6.7%	11.2%

Regardless of prior experience or times reviewing the content, videos provided the best mode for understanding and use. Respondents were better able to comprehend the video content and think of a way they could apply the student outcome evidence. Although written reports and infographics can provide readers with a good understanding of the information, they both require additional review of the content, regardless of readers' prior experience, to mimic the comprehension and likelihood for use facilitated by videos.

How and Why Modes of Communication Differ

Based on the evidence gathered through surveys and interviews, differences do seem to exist between communication modes, both in terms of comprehension of information and potential use of it. How, though, do communication modes differ and why might those differences result in varied levels of comprehension and use? Furthermore, what benefits, and drawbacks of each communication mode are revealed by exploring how and why they differ? Qualitative data from interview responses along with quantitative data from surveys helped identify what matters to explaining differences between modes of communication.

Across interviews, four main themes emerged to explain the variability in effectiveness between communication modes: quality, scope of information included, presentation of information, and demands on the audience viewing the data product. Of course, these themes are very closely connected and relate to one another, which will be noted as they are explored. In addition to these four themes that help explain the differences *between* modes of communication, another important theme emerged about the group of communication modes *together*: all modes of communication can be helpful, especially if shared with the audience in a strategic order beginning with a video, followed by an infographic, and then a written report. To organize these

findings, I start by describing each of the four themes that explain differences between modes and mapping each mode into a communication framework. Then, I explore the effects of presenting multiple communication modes in a strategic order, adding to the framework.

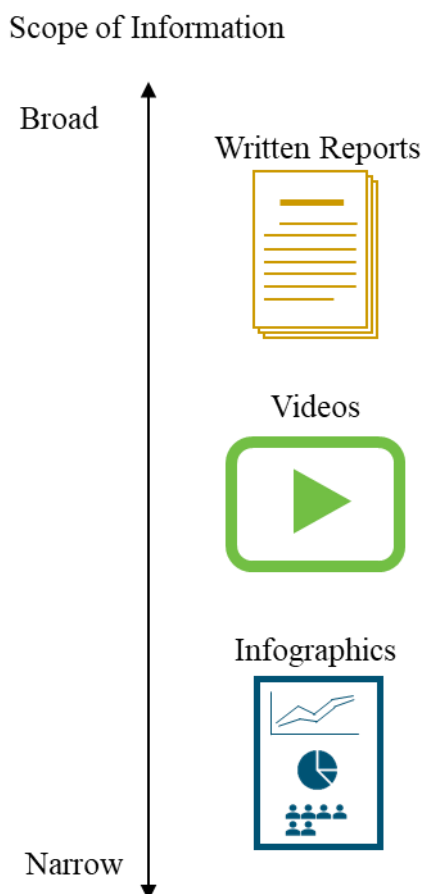
Quality

The quality of the data product encompasses several features that collectively speak to how well the information included in a data product is put together. The readability/understandability of information, clarity, structure, and flow of information all contribute to quality. In many cases, respondents commented that they were able to understand the information presented and consider potential uses because the data products they viewed were “readable,” “clear,” and had meaningful “structure and flow.” Across interviews, respondents felt that all of the data products provided a high level of quality, thanks in part to Phase 1 interviews conducted to help control for balanced quality. Major differences, then, were not prevalent between modes of communication in terms of quality but several respondents mentioned that they could have been had any data product not been of high quality. Importantly, high quality for a video or infographic did not mean that it exactly mirrored a written report, but instead that each data product was created as a good model for the mode used. For example, videos were relatively short in length which is a best practice in video communication noted by multiple interviewees. Written reports provided details and organization expected of an academic paper. Infographics were concise and easy to view quickly. Although videos seem most beneficial for comprehension and use overall, high-quality infographics and written reports provide important benefits because of their unique scope, presentation, and demands on the audience.

Scope of Information

The scope of information included in the data products was a key feature that interviewees said impacted their understanding and potential use of the information. Interviewees referred to the “comprehensiveness” or “depth” that corresponded to different modes of communication. There was agreement that written reports provided the broadest scope and most depth, and infographics provided the narrowest scope and least amount of depth. Videos were positioned in between, with a slightly broader scope than infographics, but not as much as written reports. Importantly, Phase 1 interviews suggested that all three data products still provided the same information, although the different formats allowed for variability in the details and the way those details could be communicated. Regardless of whether the communication modes technically did have narrower or broader scope, however, those viewing the data products *perceived* a difference and that perception mattered to their understanding and potential use of the information. The differences in scope might also seem obvious given the nature of infographics, videos, and written reports. What is important to learn here is that these differences have positive and negative implications for both comprehension and use. Figure 12 displays the modes along a range of scope, which will be explored in further detail below.

Figure 12. Scope of Information by Mode of Communication



How Scope Relates to Depth in Understanding

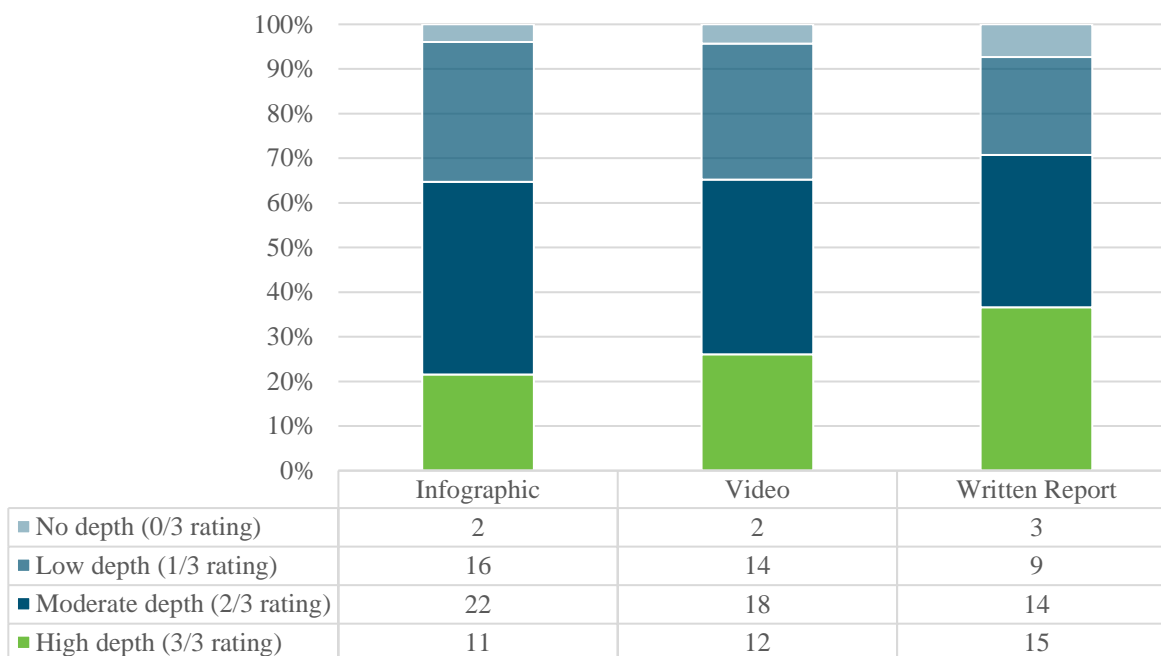
First, the scope had clear implications for depth of understanding. Respondents' own written summaries of the data products in the survey were analyzed for depth. Written reports correlated to the highest ratings for depth in survey respondents' summaries of the content, which corresponds to the detailed and comprehensive scope of information included in a written report. Interviewees said that the details in the written reports were most helpful for their in-depth understanding of information. Table 12 and Figure 13 summarize the quantitative findings related to depth.

Table 12. Depth Ratings by Communication Model

Communication Mode	Number of Respondents	Depth Rating (Scale of 0-3)	
		Avg.	Std. Dev.
Infographic	51	1.82	0.82
Video	46	1.87	0.86
Written Report	41	2.00	0.95
All Modes	138	1.89	0.87

Perhaps not surprisingly because they presented the information in the briefest form, infographics had the lowest score for depth. Depth of understanding from videos was slightly better than infographics but not as great as written reports, which aligns to videos' moderate scope of information. Additional survey responses support this notion as well; 86% of those who viewed infographics rated them good or excellent for comprehensiveness, but 96% of those who viewed videos and 100% of those who viewed written reports rated those data products as good or excellent in terms of their comprehensiveness.

Figure 13. Distribution of Depth Ratings by Communication Mode



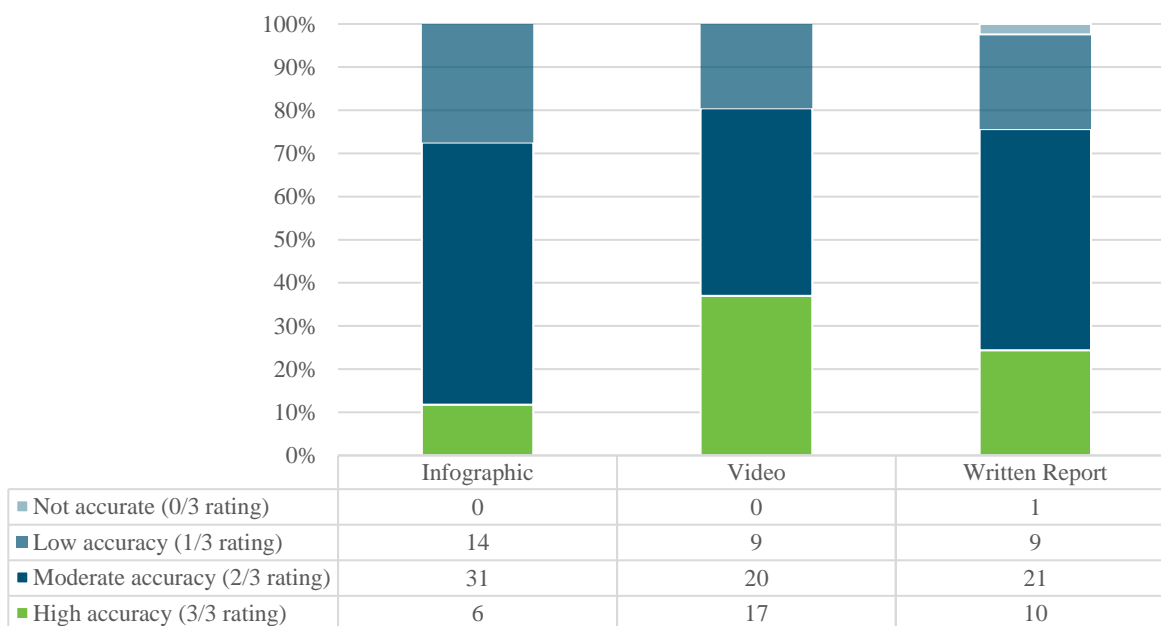
How Scope Relates to Accuracy in Understanding

Despite the benefits related to depth of understanding, the broader scope of written reports made it difficult to know which pieces of information were most important to remember leading to implications for accuracy of respondents' summaries. Those who viewed written reports in the survey were, on average, less accurate in their summaries of the data products when compared to those who viewed videos. Table 13 and Figure 14 summarize ratings of accuracy across modes.

Table 13. Accuracy Ratings by Communication Mode

Communication Mode	Number of Respondents	Accuracy Rating (Scale of 0-3)	
		Avg.	Std. Dev.
Infographic	51	1.82	0.59
Video	46	2.17	0.74
Written Report	41	1.98	0.76

Figure 14. Distribution of Accuracy Ratings by Communication Mode



When asked about written reports, interviewees said that specific information or key points were more difficult to recall or re-find in the written reports given their length and scope of information included. Infographics also had lower accuracy scores compared to videos, and interviews helped illuminate a possible explanation. The infographics focused on visualizations of data with very brief text explanations of the meaning behind the numbers, percentages, icons, and graphs displayed making them difficult for some to interpret at times. This was true primarily among interviewees who viewed the infographic first when taking the survey, which aligns with the lower comprehension scores seen in the survey for those viewing the infographic. One faculty member described her experience having read the infographic multiple times during the survey trying to make sense of why the graphs showing trends in student grades were important and what it really meant to her role. She could tell it was important information but found the sense-making process to be challenging without more details.

The length of the videos themselves (at 5-6 minutes) speaks to underlying decisions about the scope and depth of information that could be included. To cover the same main ideas that took up four-to-six pages of text and graphs in written reports, the videos needed to concisely and strategically state the information in a structured, logical flow that allowed the viewer to be guided in their understanding of the student outcome evidence. At the same time, the video format allowed an opportunity to provide additional narration and context not present in the limited scope of the infographics. According to one interviewee, the video provided the right amount of information where the infographic provided not quite enough, and the written report provided so much that it made her not want to read it at all. Videos left faculty and staff feeling confident that they understood the information given that there was not too much or too little to know presented in the data products. Even when faculty and staff were pressed about what might be missing from videos, those who suggested anything also added that inclusion of additional content would probably go beyond the scope of the videos and trigger additional demands for time and cognitive processing that would be a disadvantage to comprehension and potential use.

How Scope Relates to Sharing Evidence as a Form of Use

Lastly, the scope of information included had implications especially for one type of use: sharing the evidence with others. Because infographics were not daunting in the depth of information included and seemed to have the narrowest, most focused scope, many respondents viewed them as the most beneficial format to share with others. Although respondents agreed that written reports were the most comprehensive, they also felt that most faculty and staff would not have time to read the reports or would find the depth of information overwhelming. Faculty

and staff appreciated that the infographics emphasized key points about student outcome evidence and did not require a lot of time to read detailed text. These findings coincided with results from the survey (see Table 14) where respondents who viewed infographics were most likely to say they were very likely or likely to share the infographic they viewed with others compared to those who were asked about sharing a video or written report.

Table 14. Likelihood to Share Data Product by Communication Mode

Communication Mode	Total Respondents	Likelihood to Share Data Product					
		Very Likely	Likely	Likely	Unlikely	Very Unlikely	Not Sure
	n	row %	row %	N	row %	row %	row %
Infographic	51	33.3%	49.0%	25	9.8%	0.0%	7.8%
Video	45	44.4%	33.3%	15	6.7%	2.2%	13.3%
Written Report	41	34.1%	41.5%	17	12.2%	0.0%	12.2%
All Modes	137	37.2%	41.6%	57	9.5%	0.7%	10.9%

Caution is needed, though, in disseminating an infographic with limited scope of information. Three interviewees who had viewed the infographics prior to other modes noted that they did not appreciate the infographics' brief explanations about what might be causing the student outcomes displayed in the data product and what further action should be taken. In fact, these respondents felt somewhat frustrated that the infographics seemed to suggest actions that did not acknowledge what faculty and staff at the college were already doing. They also felt unconvinced by the suggested causes of the trends displayed in the infographics. One faculty member summarized her frustration this way:




I was left to try and draw my own conclusions on [the actions for improvement]... and I needed more depth. [The actions listed] weren't irrelevant, and I don't mean to sound

like a snob saying I'm twenty years in [to teaching] and I know how to do everything, but at some point, I'm like wait a minute I do that already and now you're telling me to do it.

Although infographics might be used widely for sharing evidence, there is a risk given their limited scope of *discouraging* consequential use that would lead faculty and staff to apply learning to their practice.

Figure 15 summarizes the quantitative and qualitative evidence related to scope of information. For each communication mode explored in this research the scope has important implications for comprehension and use. These considerations are the first part of a communication framework that is further developed by considering visual presentation and demands on audience.

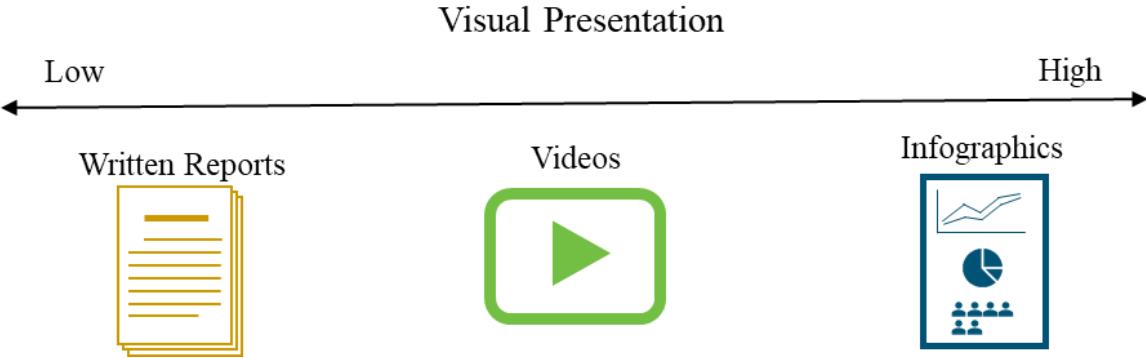
Figure 15. Scope of Information Summary

	Mode	Quantitative Evidence	Qualitative Evidence
Broad	Written Reports 	<ul style="list-style-type: none"> Provides the best mode for depth of understanding (average depth rating of 2.00 on 3-point scale was higher than other modes) 	<ul style="list-style-type: none"> Broad scope allowed for most detailed information that might be desired by some Identifying and recalling important points was difficult with broad scope
Scope of Information	Videos 	<ul style="list-style-type: none"> Provides the best mode for accuracy of understanding (average accuracy rating of 2.17 on 3-point scale was higher than other modes) 	<ul style="list-style-type: none"> Moderate scope was manageable for recalling important information accurately and providing a fair amount of depth
Narrow	Infographics 	<ul style="list-style-type: none"> Provides the best mode for sharing with others with 82% of respondents saying they would be very likely or likely to share infographics 	<ul style="list-style-type: none"> Narrow scope facilitated quick reviews of information Lack of detail led to confusion and frustration for some

Presentation of Information

How the information was presented through each communication mode was another frequent theme among interviewees that helped explain differences. The way student outcomes evidence was visualized was referenced in most interviews, with overwhelmingly positive feedback about the visuals used to summarize the data. Across communication modes, interviewees felt that the components of each data product where data were presented in a graph or other visualization were the most successful, attention-grabbing, and important parts of the data products. Prior literature affirms this notion; data visualization matters to telling a data story and allows people to interpret sometimes complex data in a quick, simple way (Evergreen, 2017; Nussbaumer Knaflic, 2015). Respondents agreed that infographics provided the highest degree of visual representation of information and the least amount of text whereas written reports provided the most text and least visualization. Videos also had a high degree of visualization but included other unique features like audio and text that accompanied visuals, which played an important role for respondents. The presentation of information has effects on both the understanding of evidence as well as the potential use of it. Similar to scope, there are benefits and drawbacks across communication modes when it comes to presentation of information. Figure 16 shows the range of visual presentation with the communication modes mapped, which is explored further in this section.

Figure 16. Visual Presentation by Mode



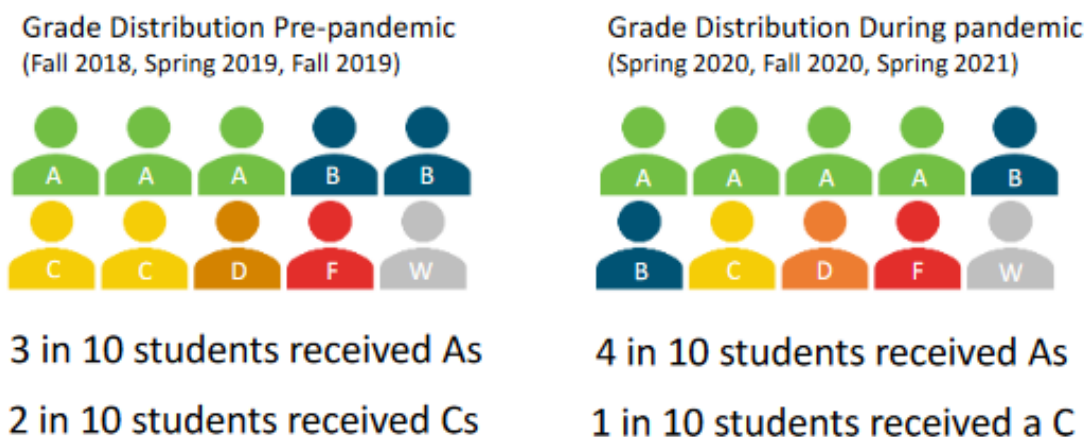
How Presentation of Information Relates to Comprehension

Visual cues across all modes of communication were helpful tools for respondents’ comprehension, but the types of visuals differed across modes and have differing influence on comprehension. In the written reports, most of the information was presented via text. Headers, bullet points, and paragraph breaks were helpful for readers to break down the information in the text. The visualizations of data that were present in graphs and tables were some of the most helpful elements of the written reports for interviewees. However, most respondents felt that there was too much text and not enough visual representations of information to make the written reports appealing and helpful for most faculty and staff. They were not incorrect in this assumption; in fact, in the surveys where respondents were randomly assigned to an infographic, written report, or video at the beginning of the survey, there were many more respondents who exited and did not complete the survey after seeing the written report than those who exited after seeing the infographic or video. Over one-third of those who began and saw a written report exited the survey, and respondents were less likely to exit if they saw an infographic or video. It seems that even the sight of the dense text was enough to turn interested faculty and staff away

from engaging more in the evidence about student outcomes. One interviewee explained that seeing the blocks of text made her feel overwhelmed and like she did not want to read the report. Others found it to be well-done, but dry reading that was hard to remain focused on.

By contrast, interviewees greatly appreciated the highly visual nature and minimal text of the infographics. In addition to data visualizations like traditional bar and line graphs, the infographics in this study also incorporated a variety of icons and other types of visual representations of data besides graphs, as is a common feature of infographics (Borkin, 2014). Interviewees appreciated these visual representations, specifically calling out two that were presented in a more non-traditional method in infographics but more traditionally with graphs in written reports and videos. For example, several interviewees referenced the visualization re-displayed in Figure 17 as the most helpful way to understand the change in student grade distribution mentioned in the data products (and the same information was presented in line graphs in the videos and written reports). While the graph forms of this information were helpful, the infographic simplified the information in this visual and used color effectively to help the reader interpret the information.

Figure 17. Visualization Used in Course Outcomes Infographic



The presentation of information in the video format was also extremely important to comprehension, but for different reasons. The data visualizations used in the videos were mostly the same graphs, charts, and icons used in infographics and written reports. Yet the video format added movement to the presentation of visualizations. As one interviewee explained, “I really liked the movement of the visuals and charts in the video... that helped me see the changes over time in the data and was more attention-grabbing.” Drawing the eyes’ attention to important points is important for comprehension (Ware, 2004). For example, a line chart used in the written report and infographic is a static image, but in the video, each line representing a different group of students was drawn from left to right and viewers saw the changes over time for each group animated on the screen. Visual movements like this were synced with audio narration, which was another feature that aided comprehension among faculty and staff.

Both seeing and hearing the information simultaneously allowed viewers to be guided in their interpretation of the visual information. Importantly, brief text statements were also used on screen that echoed key words spoken in the audio narration. The combination of audio *and* visual seemed most impactful. Multiple respondents who viewed an infographic first while taking the survey said that they didn’t quite understand the information until they saw the video, which provided audio explanations of the same visualizations. “I was trying to understand some of the graphs in the infographic and then when I watched the video it all kind of came together for me,” explained one respondent. Although the information was the same, the modality of an audio explanation to accompany the visualization seemed especially effective from the interviewees’ perspectives. These differences in the presentation of information, from text-

heavy written reports to highly visual infographics and audio-visual videos also have important relationships to different uses of student outcome evidence.

How Presentation of Information Relates to Use

Just as the unique ways information is presented across modes of communication relate to different benefits and drawbacks for comprehension, so too do those unique features relate to use. Overall, videos seemed best to inspire use, but each mode has benefits for different types of use. As noted in Chapter Three, survey respondents were asked about how they would use the information and their responses were categorized into different types of use. Table 15 shows the percent of respondents within each mode of communication who described each type of use. Respondents might have referenced multiple types of use and their response would count toward each type.

Table 15. Types of Use by Communication Mode among Survey Respondents Who Said They Would Use the Information

Communication Mode	Respondents	Type of Use				
		Initiative	Personal	Learning	Sharing	No Use Type Mentioned
	n	% of Mode	% of Mode	% of Mode	% of Mode	% of Mode
Infographic	37	24.3%	51.4%	5.4%	13.5%	10.8%
Video	41	12.2%	70.7%	9.8%	7.3%	7.3%
Written Report	34	29.4%	52.9%	11.8%	8.8%	5.9%

Personal action was the most common type of use mentioned across all three communication modes, but a substantially higher percentage (71%) of respondents who viewed a video in the survey wrote about personal use when compared to those who viewed a written report (53%) or infographic (51%). Comparing the infographic to video, this difference is

significant at the 90% confidence level. Those viewing an infographic were most likely to share information, which was noted already as a benefit of infographics' narrow scope. Those who viewed an infographic or written report were more likely to speak to institutional initiatives when compared to those who viewed a video. These differences in types of use can be attributed at least in part to differences in the presentation of information across these modes.

Written reports, with detailed text were slightly more likely to be connected with applying the content to institutional initiatives compared to the other modes. Multiple interviewees explained that if they were working on an institutional initiative or project related specifically to the topic in the written reports, they would want this type of detailed text information. Both the broad scope, noted previously, and the more formal presentation seemed to give interviewees some assurance about the veracity of the information, making it acceptable to apply to institutional efforts. Additionally, the details of the text, like most good research, evoked more questions and desire to learn more information at a slightly higher level compared to infographics and videos. As one respondent explained, "I love the video, but the video isn't enough for me. To do a deep dive I want that [written report]." Still, the dense text was a deterrent for others who reported that they never read about the potential actions to take in the written reports because they came at the end of the data products and the interviewees simply didn't read that closely by that point in the text or didn't read that far at all.

Perhaps the most effective feature of the infographics was that the presentation of the information allowed for practitioners to easily refer back to the material for future use. This feature speaks to an underlying service that an infographic can provide. "It is like having pretty notes from the video," explained one interviewee, who went on to say that she would share the

infographic with her colleagues as a discussion prompt and take-away document they could refer to multiple times as they considered how they could contribute to improved student outcomes. Other interviewees echoed this sentiment sharing that the infographic reduced the demand for the audience to figure out what information was important to remember. Interviewees thought that infographics could be reviewed quickly and easily shared with internal or external stakeholders, hung in an office, or posted in open space for viewing.

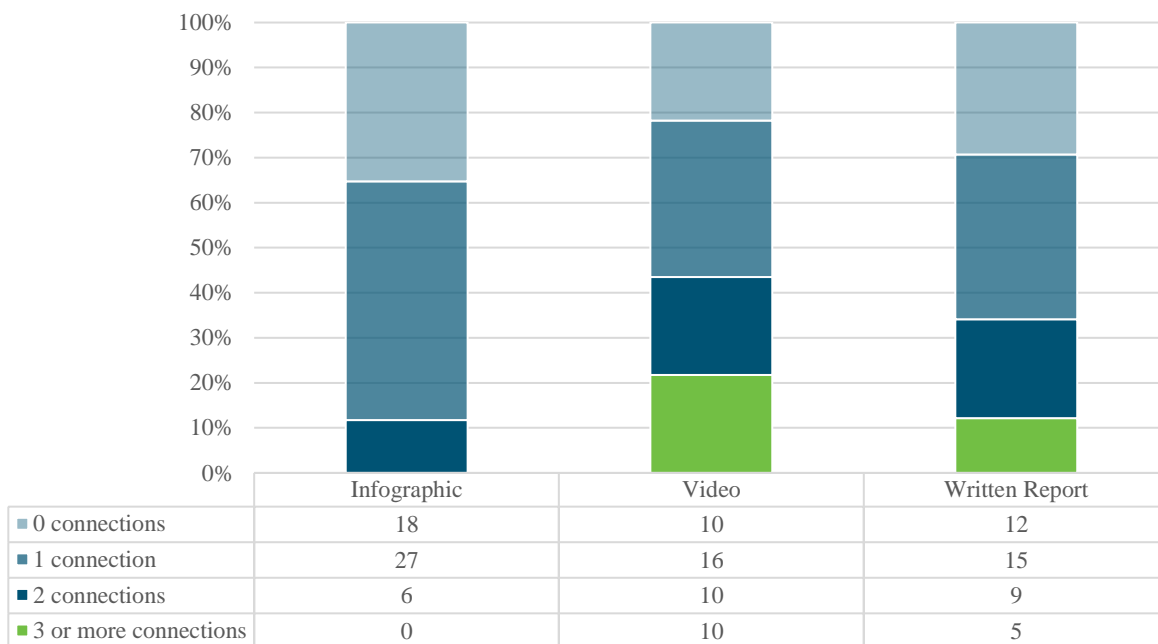
It makes sense, then, that infographics had a slightly higher likelihood to be used by sharing the data products with others as previously noted. This notion of sharing the information is an important type of use itself but might also lead to other forms of use among faculty and staff. Videos had the greatest uncertainty about being shared, and interviews revealed that some respondents, while they enjoyed the video, felt less confident in whether others would find it difficult to access or refer back to from a technical and logistical perspective.

Still, videos were the most likely to be used in some way, and most prominently connected individuals to a use within their own work. Interview responses revealed that videos inspired viewers personally much more than infographics or written reports, which helps explain this difference in personal use. That inspiration and personal connection was sparked primarily by the audio which was unique to the video format. Faculty and staff felt encouraged by the audio narration that provided clear suggestions to take action. One interviewee commented that the video really provided an emotional connection to the information and inspired her in a way the infographic and written report could not. Here, the quality of narration is important because audio that was not emotive enough, overly dramatic in tone, or not well-paced would not have the positive impacts on potential use, as noted by several interviewees. Although written reports

and infographics explicitly stated there were ways any employee could apply the content of the data products to their work, respondents best understood and were encouraged toward action when they literally heard it suggested in the video.

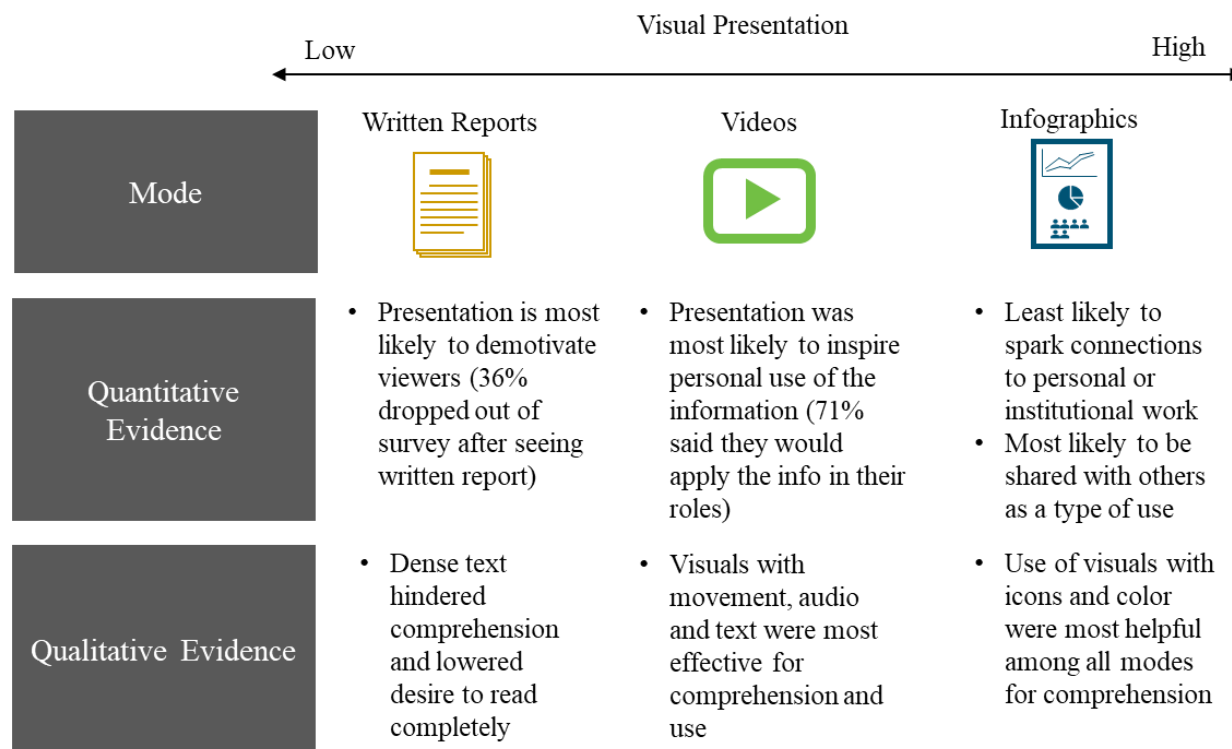
It is not surprising, then, that videos also correlated to the highest likelihood of respondents making connections between the content of the data product and potential uses like contributions to institutional initiatives, applications to their own work, or further data they would like to explore. As noted in Chapter Three, another method used to measure potential use among respondents was to code for *connections* to potential uses made in respondents' summary of the data products in the survey. Overall, respondents who viewed a video during the survey were more likely to make a connection to a potential type of application of the information and made more of those connections. Seventy-eight percent of respondents who viewed a video made at least one connection in their own summary of the information (rating of 1, 2 or 3) compared to 71% of those reading a written report and 65% of those who viewed an infographic, as shown in Figure 18. Additionally, those who viewed videos were most likely to make several connections with 22% of this group making three or more connections to potential uses of the information compared to 12% of those viewing written reports and 0% of those viewing the infographic making the same number of connections.

Figure 18. Use by Communication Mode Based on Connections Made in Respondents' Summaries



Overall, the presentation of data through visually appealing and understandable methods across any mode of communication about student outcome evidence was an important feature for every faculty and staff member interviewed. Figure 19 summarizes key quantitative and qualitative findings that explain the implications of visual presentation across modes. While faculty and staff felt that the presentation of the information was most successful in the videos, the infographics also provided an excellent presentation of information, and where visualizations were used in the written report, they were helpful. The written reports, with mostly text, took much longer for interviewees to review and process, and time is critical to weigh as a demand on those expected to ultimately use evidence about student outcomes.

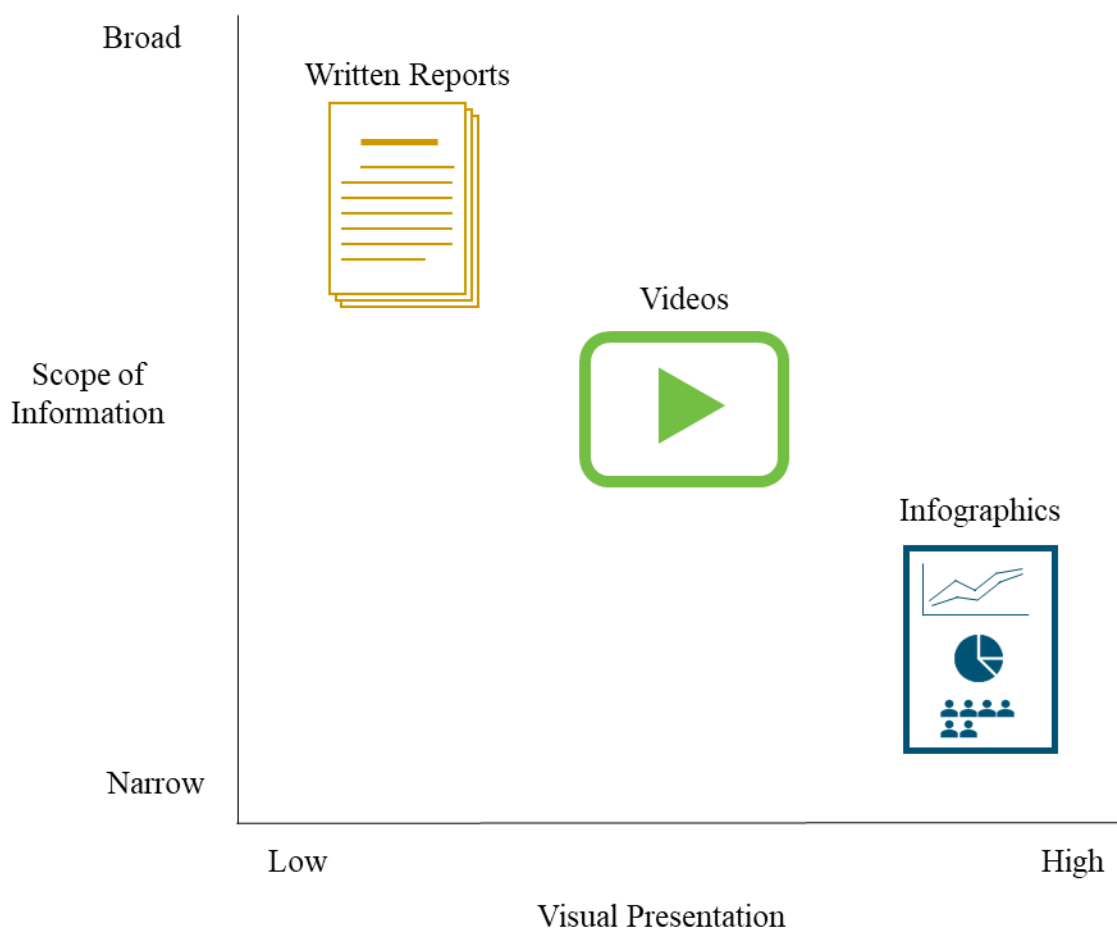
Figure 19. Summary of Presentation of Information



Demands on Audience

The scope and presentation of information is closely related to the demands each data product places on the audience. Within this theme, faculty and staff talked about the length and time it takes to review the different modes of communication as well as how easy or difficult it is to digest the information and the cognitive processing needed to understand and potentially use the information. Respondents agreed that videos and infographics were far less demanding on the audience compared to written reports. Infographics were slightly more demanding than videos for most of the respondents. Figure 20 maps the communication modes both in terms of scope of information and visual presentation. This framework for understanding communication modes and the implications for understanding and use is detailed in this section.

Figure 20. Demands on Audience by Scope and Presentation



Generally, less demand on the respondents helped them understand the information. When the burden of interpreting text to identify what points are most salient is taken out of the data product as a result of the communication mode, the audience can instead focus on the main points articulated and reflect more readily on how they might use the information. The narrower scope and focus on critical information in the infographics and videos, especially presented visually, helped minimize the demand on the audience. Achieving this effect, though, required that the infographics and videos were of a high quality so that the audience did not doubt what was being presented and spend mental bandwidth weighing the quality of the piece instead of

focusing on the content and its potential application. Holding quality constant across modes, the presentation and scope influenced the demands on the audience, which in turn affected comprehension and use.

Demands of Written Reports

Given the comprehensive scope of information in the written reports as well as the length of primarily text content, the demands on the audience were highest with the written reports. Almost all interviewees commented on the length of the reports and the time it takes to read the content as a negative feature. With a number of other work tasks to complete on a daily basis, faculty and staff felt that they simply would not have the time or not prioritize their time to read a written report like those presented. One respondent referring the written report shared candidly, “I would never read this... from like a productivity standpoint, unless I had like nothing else to do, which almost never happens.” Additionally, because of the presentation of mostly text, it took a lot of cognitive processing to identify the most salient information and potential actions to take. One interviewee who saw a written report while taking the survey took three-four hours of time to read the report and review other college documents, like the institutional strategic plan, as well as materials for her department in order to draw connections and prepare to discuss the student outcomes evidence with colleagues in her department. While this type of interaction with a data product is ideal, none of the interviewees except for two said they would do this type of in-depth, time-consuming work. Both of those who took significant time to read and process the written reports saw those data products first in the survey and so they did not know other options were possible at the time; both agreed that the other modes of communication are more efficient and effective at least for a broad overview because they are far

less demanding on the audience. These respondents and others noted that the detail of the written reports is helpful for those who want to engage in a thorough review, but this wouldn't be the preference for most. Although written reports provide helpful depth, there is a risk of reaching a small audience of committed individuals with time to engage fully in the text of the report and discouraging a larger audience unwilling or unable to spend the time needed to read the reports.

Beyond the demands influencing whether faculty and staff even engage with the information, among those who do there are negative effects associated with the demands of written reports. In respondents' summaries of the data products, those who viewed written reports articulated fewer connections between the information and potential applications when compared to videos. As noted already, the written reports provided some suggested connections in text format toward the end of the documents, which respondents could have simply repeated in their own words. This presentation of the information was a clear disadvantage for those who viewed the written report not only because the information was presented in text, but because respondents were taxed by the demands of reading a long report and had little bandwidth for the information at the end of the report. Although interviewees agreed that the placement of the information made sense as a logical flow and matched the flow of information in other modes of communication, the demands of the written report were so great that the information was simply not recalled by some. Several interviewees said that they hadn't remembered seeing these suggested connections despite having read the full report; two suggested that they might have remembered this information with a better visual cue like bullet points or a numbered list, which they felt would have reduced the reading burden for them. The presentation as well as scope of

the written report combines to create a demanding experience for the audience to comprehend and use the information.

Demands of Infographics

The demands on the audience for infographics corresponded to positive and negative effects. On one hand, the narrow scope of information allowed for a short length and small amount of time needed to review the content. That was largely seen as a benefit among respondents, as were the visualizations that helped display the evidence in understandable ways. However, for some respondents, the abundance of visuals with very little text to fit within the narrow scope of the data product led to a greater audience demand. For some, the infographic became difficult to interpret and understand without closely reviewing it. Some reported reviewing the infographics several times to try to comprehend the content and why it was important. Although respondents did not directly state this, the higher demand to find meaning in the visuals might help explain why respondents were somewhat less likely to use infographics and less likely to make connections between the infographics' content and potential uses. As has been shown, there was more uncertainty in the likelihood to use infographics.

Additionally, some respondents added that the brevity and mostly visual information drew their attention toward other demands. The scope and presentation made them wonder if there was other important information that was being excluded. When the audience questions whether additional information might be withheld given the narrow scope, their attention is drawn away from comprehending the information and considering potential use. Although the highly visual, narrow scope of the infographics made them the easiest and seemingly quickest to

review for some respondents, there are clear drawbacks to this mode that can result in greater demands on the audience.

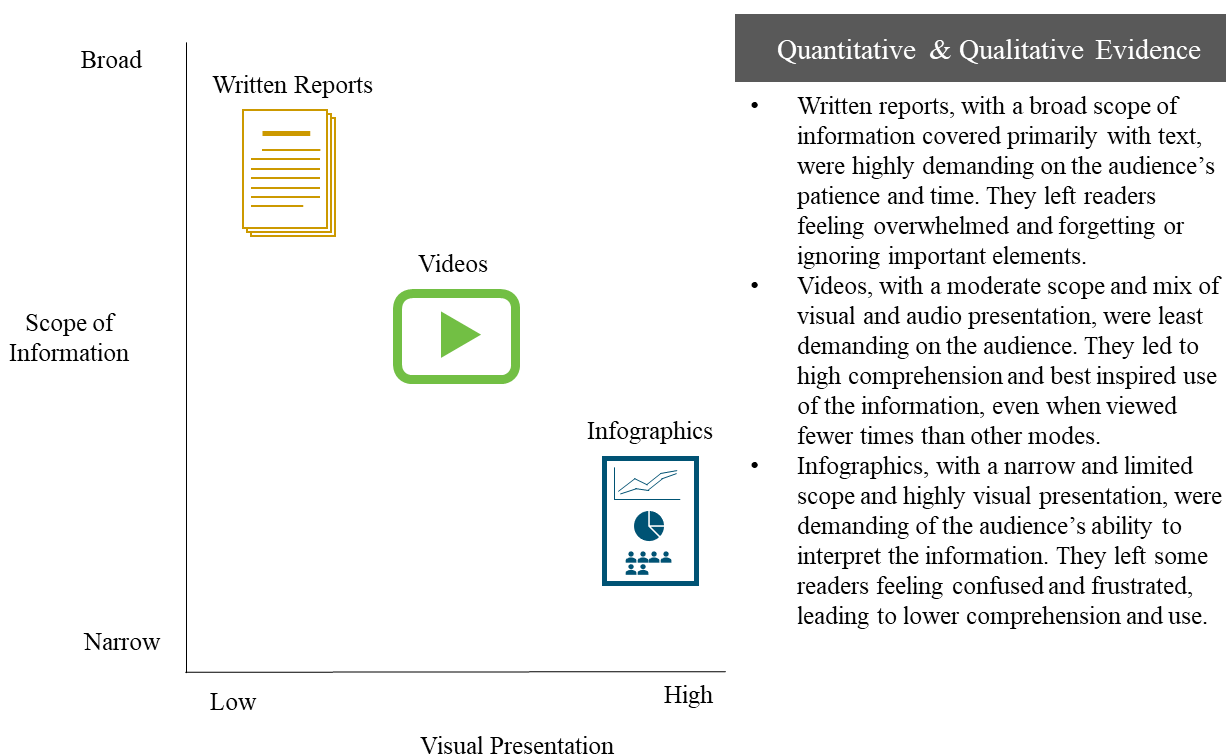
Demands of Videos

Overall, respondents felt that videos placed the least demands on the audience and thus were best for comprehension and potential use of student outcome evidence. Videos demanded less of the viewer because they provided a digestible scope of information presented in a format that tuned into a viewers' visual and auditory processing systems. Technically a viewer might be using *more* parts of their brain when viewing a video compared to an infographic or written report, but as one interviewee put it when describing the video, "you did the thinking for me." She elaborated that the video allowed her to follow along with the information in a guided way where she could hear explanations of the charts, graphs, icons and text she was seeing; while headers were helpful guideposts in infographics and written reports, they were not as beneficial as audio. Additionally, the pacing of the video was important so that the information did not move too quickly and allowed viewers to process it as the audio played and visuals changed. Except for one minor pacing suggestion from one interviewee, the videos used in this study were well-paced according to the interviewees who found this to be very helpful in their understanding of the content. The well-paced audio applied to the effective visuals of the infographic seemed to widen the scope of the videos slightly and avoid the negative effects infographics had on audience demands for some respondents.

Interviewees also felt that the video format appealed to the widest possible audience because it connected to multiple types of learning styles, thus providing a reasonable demand on the viewer regardless of their learning style. Four interviewees explicitly mentioned "learning

styles” and the benefit of the video allowing auditory and visual learners a connection to the student outcome evidence. This was especially important for a staff member who felt that it was the most inclusive approach whereby faculty and staff would all have access to an easily digestible format no matter their ability to view, hear, or both view and hear the content. Other interviewees did not always reference learning styles, but similarly felt that videos were best for the widest audience because they were the most engaging and interesting format. Multiple interviewees with experience in technology and social media noted that video aligns with modern consumer trends, where videos continue to become a more dominate preference over text and static pictures. Others found that the video format engaged them because it was fun and enjoyable to watch. “I just found [the video] to be really engaging and fun even to watch,” said one interviewee. Through the lightened demand and benefits of engaging the audience, videos avoid the drawbacks of written reports where respondents struggled to identify critical information and maintain their attention throughout the data product. Figure 21 summarizes the quantitative and qualitative evidence that contributes to the communication framework and relationship of mode to comprehension and use.

Figure 21. Demands on Audience Summary



The guided, storytelling experience of the video allowed the viewers to most confidently and easily comprehend the information and most effectively inspired the viewer to make potential changes. Yet, as shown already, there are benefits to infographics and written reports as well. Communicating with videos alone is not the only solution to avoiding the negative effects of infographics and written reports. Providing multiple modes of communication in a strategic order also mitigates negative effects and maximizes comprehension and use of student outcome evidence.

Order of Communication Modes

In addition to the four features of communication pieces (quality, scope, presentation, and demands on audience), which vary by communication mode, the order of communication modes

can matter to higher education practitioners' understanding and potential use of student outcome evidence. This research did not set out to initially answer a question about how to best leverage multiple modes of communication, but the importance of all modes was a consistent theme in interviews. Faculty and staff clearly felt that different communication modes were more or less helpful, but that each fulfilled a purpose in their understanding and potential use of student outcomes evidence. This finding itself was somewhat surprising given that the information presented across modes in all three data products was the same information; pre-survey interviews were conducted in part to help ensure the consistency of information across data products. Interviewees were questioned whether they would really want to review multiple data products with different modes containing what would be redundant student outcome evidence. They agreed that they would want to view multiple modes even if redundant, because they felt it would enhance their understanding and use, if provided in a helpful order.

The interviews revealed that the most beneficial order of communicating student outcome evidence is to begin with a video communication followed by an infographic and then a written report, which would be read primarily by a limited number of faculty and staff who wanted or needed more detailed information. Among the eighteen interviewees, half specifically suggested that first providing the video, then infographic, then written report would be the most beneficial approach for audience comprehension and use. Seven more interviewees felt that either the video or infographic were most helpful and best to provide first but did not have a strong opinion on which came first. Interestingly, though, all but one of these seven respondents viewed the video or written report first during the survey; this is important because respondents who viewed the infographic first in the survey found that later seeing the video helped clarify the information

and draw connections that they did not fully comprehend with the infographic alone. Thus, these respondents who felt that the infographic or video could come first would not have had the experience of seeing the infographic first to know the challenges with that approach. The two remaining interviewees did not express a firm opinion on order if using multiple communications and overall preferred the infographic over the video; still, both recognized that the video would provide a good introduction to a wide audience. To be sure, the interviewees were responding to the specific data products within this study, so for this pattern across multiple pieces to be true, each of the data products ought to be of high quality and leverage features most relevant to the communication mode. Below, features of each mode are discussed in the order recommended by interviewees to demonstrate the benefits of this sequential, multi-modal approach.

Videos

Videos were recommended as the best communication mode to introduce student outcome evidence for the best initial comprehension of information and inspiration to use the information. Given the quantitative findings demonstrating the benefits of videos compared to infographics and written reports, this trend among interviewed faculty and staff was not surprising. The qualitative evidence helped demonstrate that videos struck a balance in their scope providing enough information without too much detail or too little context. That scope was partially accomplished through a mix of visual presentations with well-paced audio that guided the viewers' understanding and inspired them to connect the evidence to their own work. Both of these features reduced the demand on the audience to interpret the outcome evidence into something meaningful. Videos also had the added benefit of being engaging and even

entertaining to some, which kept viewers watching and helped them recall the information effectively after just one viewing.

Although respondents felt all data products were of high quality, what made videos particularly successful was that they did not try to replicate a written report, which might require a long video with detailed narration. Nor did the videos mirror infographics by relying almost exclusively on visual content. Instead, the videos leveraged the unique features of this mode of communication to great benefit for viewer understanding and use. In doing this, some of the drawbacks of the other communication modes were mitigated. For example, the sense of feeling overwhelmed or overburdened to fully read and remember all parts of a written report can be alleviated by viewing a video first that provides a briefer summary of the key points of the report. One respondent explained, “the video is like a nice movie trailer for the report.” Likewise, the frustration felt by some who viewed infographics first (and thought they seemed oblivious to work faculty and staff were already doing) was dissipated with the videos. These respondents shared that the audio of the videos helped them to better understand the intent of mentioning actions for improvement and that it felt more like an acknowledgement of good work to continue rather than a presumptive command. When viewed first, videos, with their unique features, not only helped avoid drawbacks of infographics and written reports but actually made infographics and written reports more understandable and useful.

An important shortcoming of videos was the ability to refer back to them or share them with others. The survey data found that there was more uncertainty about sharing videos and interviewees helped explained they might not be certain about others’ preference for videos and technical comfort level with video content. Additionally, interviewees felt that after they had a

foundational understanding of the information and were inspired to take action, they would want something they could quickly access to remind them of key points and findings. For that and for sharing information with others, they felt the infographic would work best.

Infographics

Faculty and staff interviewed in this study said that infographics were the second most preferred mode of communicating evidence of student outcome evidence after videos and also felt that infographics were most effective when the reader has been guided through the information at least one time previously with a video. As noted already, the narrow scope and heavily visual representation of infographics made understanding the content a challenge and increased the demand on the audience for some. These drawbacks can be mitigated when a video precedes an infographic. When presented in that order, the infographic becomes a successful reminder about the content in the video.

As already mentioned, one respondent described the infographic as “pretty notes” that she would use to remember the key content from the video without needing to rewatch it later. Having had the guided audio narration, what might have been confusing or frustrating visuals were instead helpful cues to important information. Multiple respondents said they would keep the infographic in a visible spot in their workspaces as a mental reminder about the information. Others planned to watch the video with colleagues and then distribute the infographic as a discussion prompt. Although the information in the infographics was the same as the video, infographics add value by providing something that can be easily shared and quickly reminds faculty and staff about student outcome evidence. Just as a video shown first reduces negative effects of an infographic, an infographic following a video alleviates the challenges posed by

trying to share or revisit a video. Written reports, recommended to be communicated third, to those interested, further enhance video and infographic content.

Written Reports

In the order of communication modes, written reports were unanimously suggested to come last among interviewees. Although some did not have strong opinions about the order if multiple communication modes would be used, they did agree that written reports were unlikely to be read by wide audiences of faculty and staff. A few interviewees directly said they would not read the written reports were it not for this study. However, all agreed that some colleagues might and that it can be helpful to provide written reports to those who want them. Importantly, interviewees who said they would not read the written reports were not commenting on quality of the document. In fact, they agreed that the reports were well done, but explained that they would not spend the time and energy required to read content in this style unless there was a specific expectation set to do so or this was part of formal research literature they were reviewing as part of their work. As already explained, when written reports are viewed first or alone, there are greater risks that the audience does not remember or comprehend all of the information, does not connect it to potential uses, or simply does not have the mental bandwidth to engage fully with the text.

Rather than using written reports as an initial and sole mode of communication, interviewees suggested that these types of data products should be reserved for individuals who want more elaboration on the topic after seeing the video and infographics. This way most faculty and staff can successfully understand and use the information they need by viewing the video and infographic alone, but a smaller contingency of faculty and staff who might be

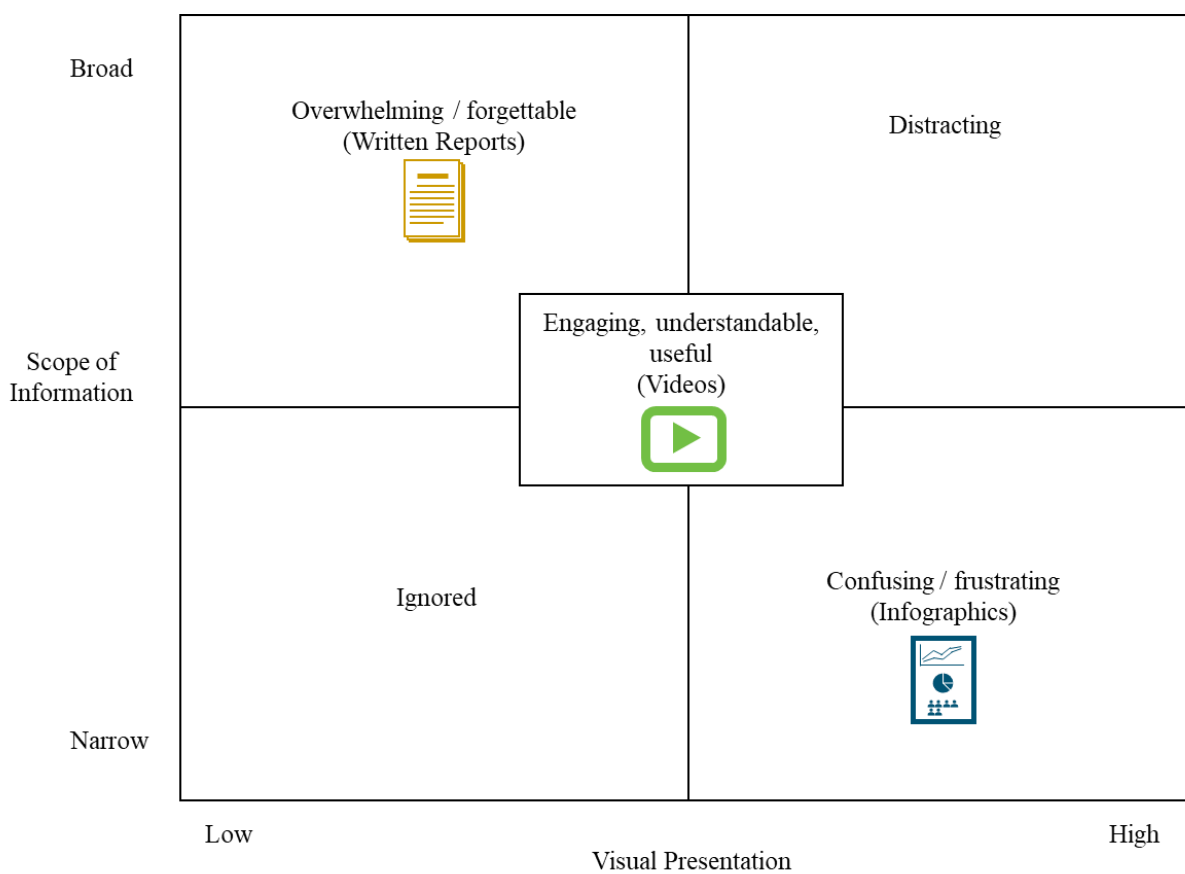
working on a specific project related to the evidence or might have a particular interest in the topic are able to go deeper into the details. Respondents had a difficult time recalling in the written reports the suggested connections between the student outcome evidence and actions faculty and staff could take; instead of this content being ignored, it serves as a helpful set of discussion points when the audience has already been primed with the ideas through the video and infographic and understands more detail from the written report. According to interviewees, the visualizations of the written report were beneficial and work especially well as cues to the most important content when the viewer has already seen those visuals in the shorter video and infographic. Determining the key findings from the evidence has been established, and the written report then better fulfills its role of elaborating on detail that is its strength. In this way, the sequential presentation of multiple modes helps maximize comprehension and potential use.

Conclusion

This research sought to discover whether or not differences in comprehension and potential use of student outcome evidence varied across modes of communication and why. The findings demonstrate that comprehension and potential use of student outcome evidence indeed does vary by communication mode. Videos seem to be best positioned to help the widest audience understand key information in an efficient and effective manner. Not surprisingly the key features of videos that allow for a moderate scope of information to be presented both visually and auditorily make them ideal as the first communication mode to precede infographics and then written reports. Importantly for use of student outcome evidence, a video might inspire, but documents are easiest to refer back to quickly (in the case of infographics) or to dig into more depth (in the case of written reports).

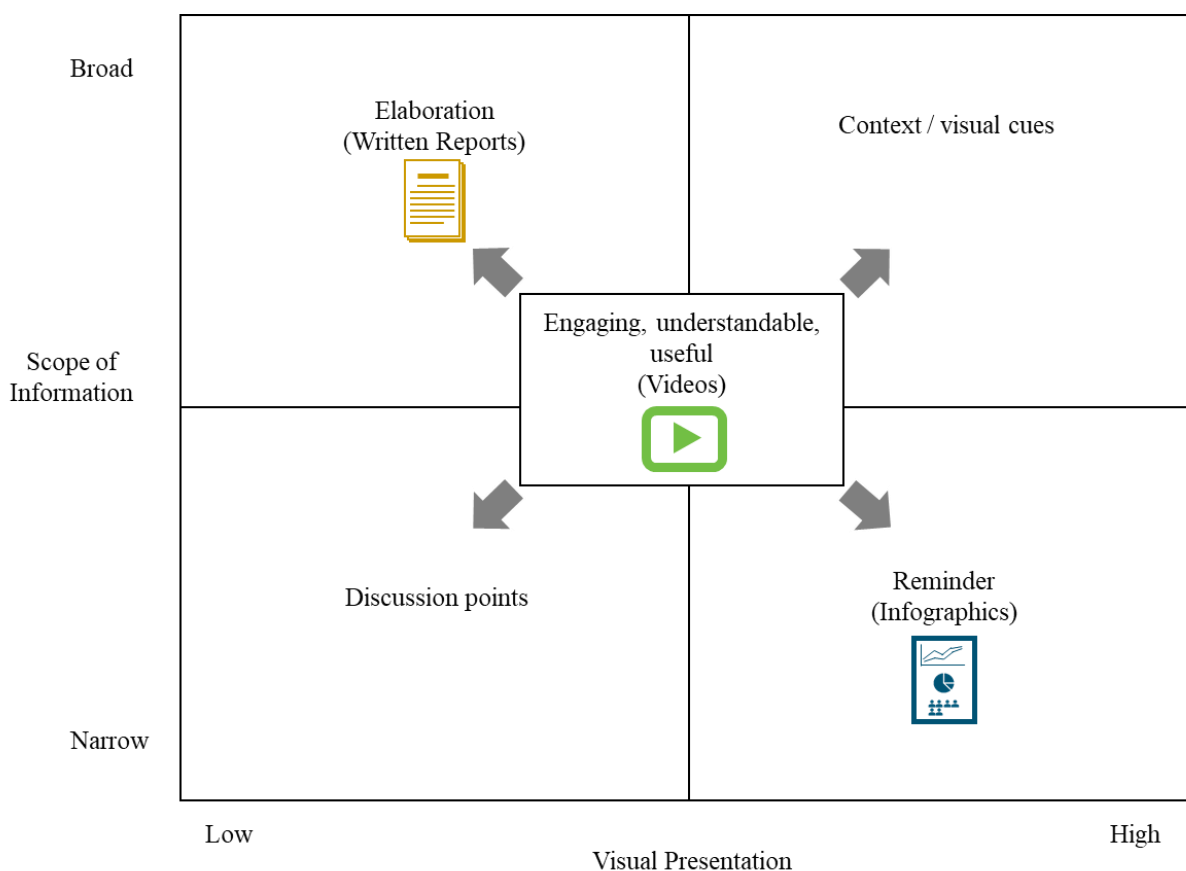
The range of communication modes and their respective features help to establish a framework of the modes and their features. Written reports, with low visual presentation of information and a broad scope can be overwhelming and forgettable. Infographics, with highly visual presentations and narrow scope can be confusing or frustrating. Videos, with a moderate scope and mix of visuals, audio narration, and text, provide an engaging, understandable, and useful mode of communicating student outcome evidence. Elements of infographics that were broader in scope were sometimes distracting to viewers or detracted from the main points of the data products. Elements of the written report where dense text provided narrowly focused details were largely ignored by respondents (as evidenced by some interviewees' admission that they did not recall or read action suggestions at the end of the report). Likewise, text highlighting specific details in the infographic was sometimes ignored by respondents too (again evidenced by their lack of awareness about the information the text contained). The visual in Figure 22 represents this framework, especially when modes are thought of independently. These descriptions of the modes apply when written reports or infographics are viewed first, prior to a video.

Figure 22. Framework for Communication Modes



Importantly, as found in this study, this framework can be altered if multiple modes of communication are used in a strategic order. If a video is seen first, the benefits of a written report and infographic on the same topic can be enhanced as illustrated by Figure 23.

Figure 23. Framework for Communication Modes in Strategic Order



Although each mode has distinct benefits and drawbacks, the research here indicates that they can be used strategically to improve the communication of student outcome evidence. The consideration of communication as a key element in the effort to improve use of evidence and ultimately student outcomes is an important contribution to the literature, which does not include a great deal of empirical evidence about communication modes. The findings of this empirical study demonstrate that at least within the context of one higher education institution seeking to improve outcomes for students, communication modes matter if any change in student outcomes is to be accomplished.

CHAPTER FIVE

DISCUSSION

Introduction

What does this research really mean? If there is one takeaway from this research, it is that communicating in unconventional ways in higher education (echoed by the first sentence of this chapter) can be effective for fostering understanding and use of student outcome evidence. The American higher education system faces a complex challenge to improve educational attainment rates, which is essential for the future workforce and a well-informed public. Although a lot of data about students' progress and outcomes along their educational journeys exist, it must be communicated in ways that are meaningful for faculty and staff within higher education institutions to understand and use the evidence to inform improvements. Building on literature from a variety of fields, this research affirms the importance of communicating evidence with modes, data visualization, and storytelling techniques that allow the audience to relate to the topic, feel confident in the findings presented, identify potential actions to take, and (perhaps most importantly) not feel overburdened to simply make sense of the evidence.

This study sought to explore whether understanding and use of student outcome evidence differs between different forms of communication as well as why and how it might differ. Utilizing best practices from the literature and a mixed methods approach, both research questions were explored, producing interesting findings that connect communication to

comprehension and use. With the findings discovered, this research contributes to the extant literature in three ways:

- (1) It affirms that findings about communication modes from other contexts apply to higher education.
- (2) It provides empirical evidence about communication modes where prior literature often relied on practitioner experiences.
- (3) It adds new information to the limited knowledge about videos as a communication modality by exploring how and why videos work well to communicate evidence.

Throughout this chapter these contributions will be highlighted as key findings are discussed in relationship to the literature. Implications for practitioners as well as ideas for future research will follow the discussion of findings.

Discussion of Findings

The main findings of this research build on literature from several fields as outlined in Chapter Two. The discussion here links the findings to the literature and identifies how this research enhances understanding. It is important to note that this research was conducted within a single higher education institution and might not apply to all higher education settings or contexts where evidence is communicated. Nevertheless, the concepts have interesting connections to literature and potential applications in future research.

Comprehension and Use Differ by Communication Mode and Videos Are Most Effective

Existing research has long established many possible ways to communicate findings. Practitioners often speaking from experience offer readers insights and descriptions of various modes (Maki, 2020; Suskie, 2018; Walvoord, 2010). Some have sought to explain differences

between modes, like Torres' (2009) arrangement of formats in terms of how interactive they are. Unconventional forms of communication and storytelling have been shown to be effective for engaging audiences (Torres et al., 2005). Yet the literature largely depended on practitioner experiences or specific communication examples. The research conducted in this study adds an intentionally designed comparative analysis that provides additional empirical evidence. It demonstrates that communication modes differ and, more importantly, those differences can impact comprehension and use. Furthermore, communication modes evoke varied types of use, including consequential or instrumental use (Fleisher & Christie, 2009; Kuh et al., 2015), symbolic use (Kuh et al., 2015; Mark, 2009; Walvoord, 2010), conceptual use (Fleisher & Christie, 2009), and process use (Patton, 1997).

Although some experts in the field might rely on personal experience and their sense of audience preferences in a given context (Suskie, 2018), that approach might be too subjective and difficult to practice in a higher education context where evidence is ideally communicated quickly to a variety of audiences to maximize the potential for use (Maki, 2010). Knowing the benefits of at least three modes of communication and the range of features that help explain benefits and drawbacks of these modes provides a helpful framework for communicating student outcome evidence. While this study applies specifically to the higher education institution studied, additional research could help affirm the findings in other institutions and contexts.

The data in this research clearly showed that videos correlated to better comprehension and use of evidence when compared to infographics and written reports. The reduced cognitive demand achieved by audio and visual elements was a clear benefit to respondents' comprehension in this study, supporting earlier findings in other contexts (Chan et al., 2017;

Putorti et al., 2020; Sweller, 1994). Additionally, use was best inspired by videos, affirming prior evidence that they influence the audience's engagement and response to information more effectively than written text (Koehler et al., 2005; Putorti et al., 2020; Yadav et al., 2001).

Although the video format might seem less academic or formal, participants in this study felt it was best for the widest audience. Even if a nontraditional mode, other research has suggested that academic practitioners can be just as popular in video modalities as non-academics in online video domains (Shearer & Gottfried, 2017; Sugimoto & Thelwall, 2013). Participants in this study noted the growing preference for video content among consumers, and that trend has been noted by researchers as well (Walthouwer et al., 2015). Given these findings that build on prior literature, the videos might be a powerful method for transforming evidence of student outcomes into the changes higher education needs to better serve students. However, as this research has shown, videos as well as other communication modes should be thoughtfully designed to attend to quality, scope, presentation, and demands on audiences.

Quality of Communication

The quality of the communication piece has important implications for understanding and use. Regardless of the mode of communication, when viewers can easily see that the evidence being presented was collected and analyzed in a methodologically sound manner, they feel more confident in the conclusions drawn from it (Schwandt, 2015; Suskie, 2018; Walvoord, 2010). As seen in this study, the data products were largely viewed as high-quality and trustworthy, but some of the questions about whether infographics excluded important information led to a sense of distrust and, in turn, lower likelihood to fully recall and use the information. The flow of information is another important quality consideration, especially when telling a story with

evidence to evoke a reaction from an audience (Knowles, 2018). The flow of information across all modes in this study was helpful, but it was particularly noticeable and impactful in videos where audio, text, and visuals were displayed in a logical, structured way to inspire action. The productive flow of information also organized content through stages of communication described by Schoenfeld (1965), creating an intentional structure that prior research has found to be important to effective storytelling with visualizations and narrative (Bongshin et al., 2015). These elements of high-quality communication were present across modes and this research helps affirm their importance. These elements can be enhanced or diminished in different communication modes that have different scope, presentation, and demands on the audience.

Scope of Information in Communication

The scope of information included in communications was another important element in this research, which is not discussed extensively in the existing literature as a specific communication consideration. Bers and Seybert (1999) briefly consider length of reports as they offer descriptions of various reporting options based on experience in the institutional effectiveness field, but do not apply evidence to explore the impact of scope. Scope is an important methodological consideration that helps define what will be studied and the extent of outcomes or impacts to measure (Maki, 2010; Schwandt, 2015; Suskie, 2018). Interestingly based on this study, researchers should consider not just the scope of what will be researched, but also the scope of information to include in findings once that research is completed. While not necessarily using the term “scope,” the existing evaluation and storytelling literature does provide some additional discussion about what ought to be included in communications.

The research here affirms that the stages of communication, to introduce main findings, demonstrate importance, explain relevance, share examples for applying results, and summarize how the evidence can be used further (Schoenfeld, 1965), were important elements to include within the scope of a data product. This research adds to this understanding by demonstrating that the communication mode can be more or less effective at delivering these stages. In written reports, readers especially missed the application and potential uses of the information. In infographics with narrow focus, readers struggled to understand the importance and relevance of the information. The moderate scope of videos seemed to attend best to all stages described in Schoenfeld's (1965) work.

Evaluators have had some debate about whether or not to include value judgements in their communication of findings (Christie & Alkin, 2012; Schwandt, 2015). Determining whether to include value judgements in communication of findings is another decision about scope of information. In this study, all data products across modes included value judgements about the evidence presented. Yet the audience's understanding of this information varied by communication mode. Value statements were often forgotten amidst many details and broad scope of the written reports, misunderstood or difficult to interpret in the narrow scope of infographics, and clearly comprehended in videos with moderate scope.

Presentation of Information and Evidence

This study supports the literature emphasizing the importance of visualizing data and contributes additional details. Visualization of data is an important tool for improving comprehension of evidence (Evergreen, 2017; Nussbaumer Knaflic, 2015; Tufte, 2001). The data visualizations in this study were important across modes of communication, reinforcing earlier

research that charts, graphs, and other visual representations of data can be more effective methods for communicating data compared to written text (Evergreen, 2017; Few, 2004; Nussbaumer Knaflic, 2015). This study adds value to prior work by relying on empirical evidence where other literature relies in part on design concepts and practitioner experiences. Practitioner experiences vary, resulting in different perspectives on best designs of visualizations, and this study also adds value by supporting some specific perspectives.

The type of visual, importance of color, and inclusion of text with visuals are all specific design concepts that arose in this study, as in prior literature. Although graphs like line charts or bar graphs are often the most common types of data visualizations, Borkin (2014) and Ware (2004) discovered that visuals featuring icons, pictures, or diagrams were more memorable. Similarly in my research, the icon-based visualization in the infographic was the most popular and understandable representation of data for interview participants. Variation in color was another helpful contributor to understanding in this study. Evergreen (2017) suggests using different colors sparingly to draw attention to important data points. Borkin (2014) found that higher visual density sometimes achieved through color variation can correlate with better recall of the information. This prior research is not necessarily contradictory to what was found in this study but taken all together the research demonstrates that a variety of strategies for using color can be mechanisms to improve comprehension. In the disagreement in the literature about whether to include or exclude text that accompanies a visualization (Evergreen, 2017; Stanton & Lagesse, 2018), this study found, like Evergreen (2017), that simple text statements were helpful for interpreting the data and understanding the potential utility. Even more important in this study was a well-presented story and audio to accompany visualizations.

This research helps support prior literature that found storytelling and video are effective presentation techniques. Participants in this study did not vocalize that the data products they reviewed had resulted in “transportation” where they were immersed in the story as Green and Brock (2000) describe; however, participants in this research did share their appreciation for the story told with the evidence. That story was most engaging and held their attention the best when told through the well-paced, structured flow of the videos. Although more research would be needed to directly relate this to the phenomenon of transportation, perhaps those who viewed the video were more likely to do so only one time compared to those who viewed infographics and written reports because they were better able to focus mentally on the story being told in the videos, which results from transportation (Green & Brock, 2000). The emotional appeal of videos was clearly articulated by participants in this study as important especially in their likelihood to use the information. Emotion evoked by storytelling echoes findings from prior literature (Goodyear et al., 2004; Shen et al., 2014), and the added value of this study is the way in which videos with their audio narration can be even more effective than written text or infographics at telling a story to evoke emotion. Videos and their narration have been found to be effective in other contexts (Chan et al., 2017; Putorti et al., 2020), and this research supports the application of those findings in the higher education context and further details the important role of audio specifically in the comprehension and use of evidence. Here, the presentation of information along with the scope contributed to certain demands on the audience, another important theme from the literature.

Demands Placed on the Audience by Communication Modes

Minimizing the demand on the audience to interpret evidence is an important finding supported by this study and prior research. Given that almost all employees of the college studied for this research have some college credential and many have graduate degrees, one might expect this population to be comfortable and well-equipped to interpret data. This research demonstrates that higher education employees are capable of this task but other demands on their attention make it challenging. As this study showed, even brief written reports of four-to-six pages posed a challenge for faculty and staff who thought it would be difficult to find time for these materials in their usual routine. Delivering evidence in a way that minimizes demands and maximizes attention is critical to break through the high volume of information and evidence inundating people in many aspects of their lives (Dahler-Larsen, 2012).

In existing literature, the demands on the audience have often been researched through the effects of data visualizations on cognitive load. The design and aesthetics of data visualizations can affect the demand on the viewer to process and comprehend the information (Cawthon & Vande Moere, 2007; Duarte, 2010; Nussbaumer Knaflic, 2015; Tufte, 2001; Vande Moere & Purchase, 2011). Although the research presented here did not seek to measure cognitive processing as respondents viewed different communication modes, respondents did self-report ease and difficulty with processing evidence in the data products they reviewed. Like prior literature has found, visual representations were important to respondents' ease in interpreting the information. Furthermore, infographics and videos were much preferred to written reports by participants largely because they did much of the processing of information for them, allowing them more time to consider how to apply the information. This research adds that the demand on

the audience also depends in part on the scope of information included and not simply the aesthetic. Infographics in this research had visualizations matching best design practices established in the literature to minimize cognitive processing but placed a different type of demand on the audience; with a narrow scope, participants in this study understood the student outcome evidence but found it more challenging to interpret the relevance of the evidence and how to apply it. This type of demand was minimized not through different visualizations, but when the same visualizations were presented first in a video with a broader scope that provided a guided interpretation of the visualizations alongside audio and limited text.

Sequencing Multiple Modes of Communication

While different communication modes correspond to different understanding and potential use, this research also found that all three modes studied have important purposes. It is not surprising that a brief summary is a helpful precursor to a longer text; executive summaries and abstracts have long fulfilled this purpose in written text. Yet, as this research shows, it can be even more productive to apply visualization and a moderate scope in videos first. While prior research did not speak to sequencing videos and other communication modes, in combination with this study, prior research does help explain why videos work well as the first mode in a multi-mode approach. First, viewers perceive videos as more pleasant, and they tend to spark interest in the topic (Putorti et al., 2020). Respondents in this research remarked on how well the video engaged them and drew their interest in the topic, leaving them curious for more information. Second, videos can inspire confidence among viewers to use the information presented (Chan et al., 2017) and participants in this study echoed that sentiment through their statements and readiness to use the information after just one viewing. Third, participants in this

study found that watching videos first reduced the demands of interpretation, which can be a common problem of infographics that can oversimplify information and lack contextual detail (Otten et al., 2015). Viewing a video first can help strengthen the benefits of infographics as a mode that further distills complex information with visuals and simple statements (Olfert et al., 2019; Otten et al., 2015). Although this study was not originally designed to focus on order of multiple communication modes, the findings demonstrate that by sequencing modes of communication, higher education professionals can be engaged in the evidence to varying levels and detail depending on their needs and preferences.

This study was also not designed to measure how respondents' perspectives on evaluating student outcomes relate to their response to communication modes. However, respondents felt that multiple modes in a strategic order would help appeal to a variety of faculty and staff; perhaps that is because some modes speak to certain underlying evaluation paradigms. Videos made clear to respondents why the evidence was important and touched on their passion to improve the college for students, a common reason faculty and staff work in the community college studied. In other words, the video spoke to what they valued. As Christie and Alkin (2012) explain, many researchers prioritize valuing and understanding the highly contextualized interests of actors in the site being studied in order to deliver evidence that speaks to these actors. Given that the topics studied in this research focused on improving educational outcomes for community college students, including those most underserved in higher education, there is also a strong connection to social justice and the transformative paradigm (Mertens & Wilson, 2019).

Infographics, with their high likelihood to be distributed, kept as a reminder, discussed amongst a group, and revisited as faculty and staff apply the information, seem to appeal

especially to those with a pragmatic, use-focused perspective. With a foundational understanding and inspiration to act sparked by the video, the infographic provides the evidence in a way that facilitates use; it is exactly this outcome sought by practitioners in the pragmatic tradition (Christie & Alkin, 2012; Ewell, 2009; Kuh et al., 2015; Maki, 2010). Finally, the respondents in this research explained that the written reports would be most important for faculty and staff seeking further methodological details and definitions. Some faculty and staff would want to dig deeper into how the data were collected, data limitations, and the rigor of the findings, much like what methodology-focused evaluators and assessment professionals prioritize (Christie & Alkin, 2012; Suskie, 2018). This study did not focus on this line of connections between evaluation paradigms and communication modes, but the consensus from respondents about ordering multiple modes seems to suggest that multiple priorities of the audience can be satisfied with a multi-modal approach.

Implications for Practice

The findings from this study have important implications for a variety of higher education practitioners. While the communication lessons from this study focus on student outcome evidence in higher education and one should be careful not to generalize, the reasons different communication modes were effective might be applicable to practitioners in other settings. The findings are especially relevant for higher education institutional effectiveness practitioners often charged with communicating student outcome evidence. For these practitioners, this research helps explain a common frustration, highlights an opportunity of interest among faculty and staff, and calls to question typical practices.

A common frustration among institutional effectiveness professionals is the lack of use of evidence in their institutions (Bers & Seybert, 1999). They have good reason for the frustration. They collect and analyze a wealth of student data available at many institutions. They generate reports on numerous student outcomes. Yet there seems to be a frequent struggle to turn this work into action. With the findings of this research in mind, perhaps a disconnect is that often institutional effectiveness professionals are producing written reports that are unlikely to be read and not ideal for inspiring use. It is easy to take a cynical view that faculty and staff are simply uninterested or unwilling to engage in evidence to inform the difficult steps of change. However, that was not the case in this study.

Participants in this research overwhelmingly expressed gratitude for receiving evidence about student outcomes. They were not disinterested or unwilling to view the data products but instead expressed thanks for the opportunity to see this information and learn about the student experience. To be sure, there is some selection bias given that those participating in the study would have opted-in to review the data products and others who did not participate might be more unwilling. However, those who did participate represented a wide range of roles, experiences, familiarity with the topics, and opinions on the effectiveness and utility of the data products. Again, the communication modes, and especially the videos tapped into what the audience valued: students and their outcomes. If faculty and staff are hungry to learn about student outcomes and apply it in their role, perhaps it is not an unwillingness to use evidence, but rather that faculty and staff are juggling competing demands on their time and attention. Text-heavy written reports, although appreciated, are at odds with the reality of time and energy faculty and staff can commit to reviewing evidence.

Still, as institutional effectiveness practitioners, we might wish that others prioritize reviewing student outcome evidence. This study showed that a small number of faculty and staff will. As described previously, one faculty member spent hours reviewing the written report in detail, aligned it to institutional plans, and created discussion prompts for a department meeting where she intended to identify ways her department could contribute to improved student outcomes. This is the ideal dream scenario for institutional effectiveness professionals, but based on the overall evidence in this research, it is just that – a dream. Most faculty and staff would not engage in this type of process let alone have an initial understanding of the information from a written report that is needed to sustain multiple steps for applying the evidence to action.

Although we might want this type of attention to evidence, we should recognize the reality facing most faculty and staff, and consider briefer, guided communication modes that minimize demands to accomplish a high level of attention to evidence. We see simplification and guided experiences popular in other aspects of life too. For example, meal kits have grown in popularity over the past decade, allowing people to get the exact amounts of ingredients needed along with a recipe to cook meals delivered to their homes weekly. Infographics, like these meal kit boxes, include all of the tangible pieces needed for the whole. Videos, like the visual recipe cards of these meal kits explain how these pieces fit together and can be prepared step-by-step to ultimately use the food. A written report comparison might be reading a traditional written recipe and going to the grocery store to purchase all of the items yourself; it demands more time and energy.

While we might still provide traditional forms of evidence in written reports that can include graphs and charts, we should not rely exclusively on this method to drive the evidence-informed decisions and change needed to improve higher education. The current state of student outcomes demands action; showing videos to faculty and staff as a first communication mode can inspire that action. Videos provided the clearest call to action for faculty and staff regardless of their prior experience with the topic. If we know higher education professionals are already taxed with many demands and that further change is needed, minimizing another demand to understand evidence is critical. Furthermore, if the desire to understand the student experience permeates throughout faculty and staff in a variety of roles (as seen in this research), providing communication modes that capitalize on that desire can be a powerful strategy for transformative change in an organization.

Limitations

Several limitations of this study have been noted already throughout the discussion. Those limitations all related to concepts that arose as themes in this research, but that this study did not directly measure given the main objectives. Specific variations in color-use in visualizations were not tested in this study. Although discussed by participants, mental cognition was not directly measured here. Likewise, the concept of transportation and evaluation paradigms certainly apply to the evidence gathered in this study, but participants did not directly use the language associated with these concepts, nor was this study designed to solicit that type of response. These concepts could be measured more directly or thoroughly through future studies.

In addition to these limitations, a few others should be acknowledged. First, across all findings, the role of the researcher as a staff member within the context studied might have an impact. As noted in Chapter Three, several strategies were employed to minimize the potential for participants responding a certain way based on their relationship with me as the researcher. Still, there was no possible way to control completely for this and some participants knew me from work experiences prior to this research study. Importantly, though, the range of responses and mix of quantitative and qualitative data strengthens the findings. In several cases, particularly when participants were critical of current practices for sharing evidence at CLC, it was beneficial to be an embedded researcher who could understand the examples and context to which respondents referred. In a study like this, where new communication modes are tested, it was helpful to be aware of current and prior practices in communication of evidence.

The limitation of the context is important to note as well. This research focused exclusively on one community college as a case site and the faculty and staff who work there. The findings might not be consistent in other higher education settings. As noted in Chapter Three, CLC had a particular context and culture that made it an environment conducive to using evidence to improve equitable student outcomes; an institution with a different culture and context might demonstrate different findings because we know this context is important from the literature (Fleischer & Christie, 2009). Even if the findings of this study were to be replicated in other colleges and universities, the findings might be specific to student outcomes and higher education institutions. Yet, the existing literature conducted in other contexts seems to align to this study's findings. Thus, the relationship between communication modes and comprehension and use could be consistent regardless of context and topic.

Finally, the research questions of this study limit the ability to fully explain certain findings. First, videos were more likely to be viewed one time compared to other modes and facilitated higher comprehension even when compared to multiple viewings of infographics and written reports. This is an interesting finding, but this study did not seek to explain how many views of each communication mode are ideal and comparable. Another key finding was that multiple modes presented in a strategic order can be beneficial. Because this finding was so consistent among participants, it was important to present in this research; however, one should be careful to recognize that this study did not directly test the impact on comprehension and use when individuals review multiple modes in specific sequences. This research can speak most confidently about which modes work best as the *first* to view and relies on participants' qualitative perspectives to advise on the order of additional modes. Still, the benefits and drawbacks of each mode as well as the extant literature supports the explanation for why ordering modes (to begin with videos, then infographics, then written reports) can be most productive for comprehension and use. Lastly, as noted previously, this study measured potential use of evidence because data were collected at one point in time. Although some interviewees referenced how they had already used the evidence they viewed in the survey, most spoke about *potential* uses. Further research could help elaborate on this finding and others.

Future Research

Some of the limitations of this study could be addressed by future research. Repeating this study in other higher education institutions and other contexts would help confirm or refine the findings associated with the community college studied in this research. Further investigations and comparisons of modes could add to this work. A study of the number of

views by mode would help better explain how many views of each mode are ideal to achieve desired comprehension and use. This study also selected three modes of communication to represent a range, but other modes could also be researched. For example, data dashboards are popular mechanisms to communicate evidence (Few, 2006); the findings of this research might suggest that these highly visual representations with little to no text explanations might be best utilized if preceded by a video, which could spark interest in further data exploration. Given that videos were beneficial in part for their audio and visual presentation of evidence, comparing live presentations with audio and visual elements, which have been shown to be effective (Bers & Seybert, 1999; Moss, 2001), might be another important mode to consider. In addition to testing other modes, the order of multiple modes could be further researched.

Directly testing the use of multiple communication modes in varying orders could also help affirm or negate findings of this research. Additional research about why *multiple* modes are helpful would be another interesting avenue to explore in more depth. As alluded to here, perhaps certain modes of communication appeal to viewers' underlying focus on values, social justice, pragmatism, or methodology. It remains to be seen, however, whether individuals mostly connect to one specific focus area/paradigm and relatedly connect best to one type of communication mode, or if individuals have need to satisfy multiple connections to their values, practical concerns, and methodological concerns and thus are most fulfilled through multiple modes that speak to each need.

Lastly, further research could help solidify how well communication modes align to actual use of evidence. This study measured potential use of findings but more data over a longer period of time would be needed to see how well participants' self-reported potential use

resulted in actual use of evidence. This type of longitudinal research could better identify which types of use occur and are not just planned when people are exposed to different communication modes. Several participants in this study also wanted to investigate more evidence as a result of viewing the data products; tracking how faculty and staff revisit the original evidence as well as other evidence and what communication modes they prefer over a longer period of time could add value to the field. A longitudinal study could also better measure how communication of evidence makes people feel and the impact of those emotions. Some participants acknowledged that the data products in this study can make someone feel recognized or ignored, empowered, or defeated, depending on the presentation. While videos largely elicited positive emotional responses, longer-term data collection would be needed to investigate the role of emotions in the process of using evidence over time. Finally, a longitudinal approach would allow for a full vantage point on the relationship between communicating evidence, inspiring action, and measuring the impact of those actions on educational outcomes, which is the ultimate goal.

Conclusion

This work began by posing a simple question: does communication, especially unconventional communication, matter? Through a carefully constructed mixed method study of one higher education institution, this research shows that yes, communicating in modes that are unconventional not only matters but can also be the most effective approach. If videos, paired with infographics, were used more often and written reports were deprioritized as a mode to use when detail is truly critical, student outcome evidence could be widely understood and used.

In a higher education environment struggling to produce credentialed graduates, improvement is needed and requires effective understanding and use of evidence. Students today

cannot afford for higher education practitioners to guess at what works. We need evidence to act with urgency and accuracy. The stakes are high, and the demands are great on faculty and staff to do all they can to support students' success. It is within this context that evidence must be communicated strategically and effectively if we expect higher education practitioners to pay attention to it and actually affect change. As we look to the future of higher education, this research provides hope. We have access to the data, rigorous methods, and experienced researchers. If we can attend now more carefully to our communication, perhaps we can accomplish what was seen on a small scale in this study: clear comprehension and inspiration to use evidence to improve students' outcomes.

APPENDIX A

DATA PRODUCTS PROVIDED TO PARTICIPANTS

Course Outcomes Video

To access the Course Outcomes Video data product, click on the link below:

<https://vimeo.com/682600050>

When prompted, enter the password: COV

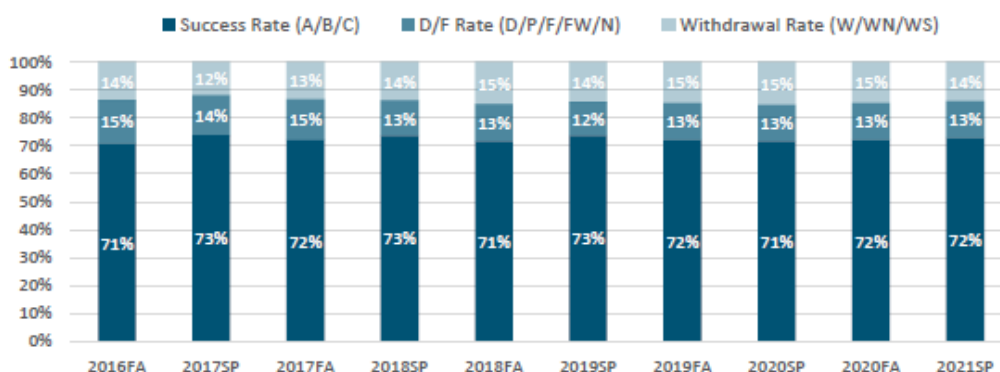
Course Outcomes Infographic

College of Lake County Course Outcomes

CLC uses student course grades as one indicator of student success. Grades are leading indicators of students' long-term success and degree or certificate completion. Improving the college to better facilitate students' successful completion of courses and reduce course attempts that result in withdrawals or grades of D or F is aligned with the college's Strategic Plan, Pillar 1: Access & Success for Students, and Equity in Student Access & Success Plan, Objective 2: Enhance Opportunities for Credit Accumulation.

Course outcomes have remained consistent for the past five years

Percent of Successful, D/F, and Withdrawal Grades out of Total College Enrollments



The distribution of grades has changed during the COVID-19 pandemic

Grade Distribution Pre-pandemic (Fall 2018, Spring 2019, Fall 2019)



3 in 10 students received As
2 in 10 students received Cs

Grade Distribution During pandemic (Spring 2020, Fall 2020, Spring 2021)

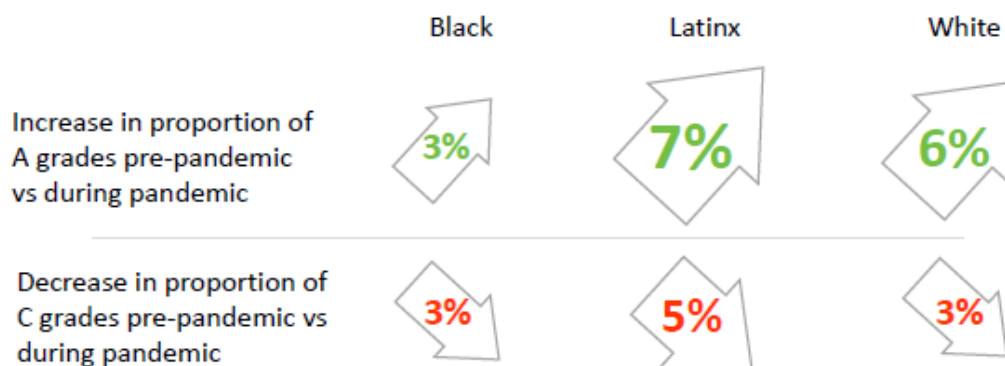


4 in 10 students received As
1 in 10 students received a C

**These changes were statistically significant*

Grade improvements were not evenly experienced across students

Comparing grades in semesters prior to the pandemic and during the pandemic, all racial/ethnic groups saw the trend in increased As and decreased Cs. However, this change was not experienced at the same magnitude across all groups.



Potential Explanations

Consistent Withdrawal Rates

- No full-scale institutional effort to address withdrawal rates yet
- Students cite work and academic concerns as top reasons for withdrawing

Change in Grade Distribution (As and Cs)

- Delivery modality, assignment type, and flexibility
- Canvas learning management system launch
- Student motivation to do well
- Additional and enhanced supports
- Other explanations faculty and staff might know from their experience

Actions for Continuous Improvement

College Initiatives Underway



Full-scale student onboarding, first year experiences, & success course



Case management and field-specialized advising model

College Initiatives Upcoming



Resource students to address financial and basic needs



Faculty Success Framework to enhance teaching & learning

Employee Actions



Connect students to resources that will help them persist



Validate students by telling them CLC is here for them and believes in them

Course Outcomes Written Report

College of Lake County Course Outcomes

Introduction

One of the key metrics College of Lake County uses to measure student success is the grades students earn in the courses they take. A collection of metrics are used to summarize student grades and are referred to as course outcomes. Course outcomes are important because they are leading indicators of students' long-term success and degree or certificate completion; students who are successfully completing courses are making progress toward their educational goals. Course outcomes are one important metric used to measure CLC's effort in Pillar 1 of the Strategic Plan: Access & Success for Students.

Additionally, improving the college to better facilitate course success for students is part of the college's Equity in Student Access & Success Plan. By executing on the objectives within this plan, the college seeks to decrease withdrawal rates and increase the percent of students completing courses with a C or better, which also contributes to increased credit accumulation and momentum toward degree or certificate completion. The Equity in Student Access & Success Plan is *not* about grade inflation; it is about addressing barriers that cause students to withdraw from their courses and faculty enhancing student learning experiences through equity-minded professional development, maintaining high academic rigor, and infusing culturally-relevant teaching practices to serve all students.

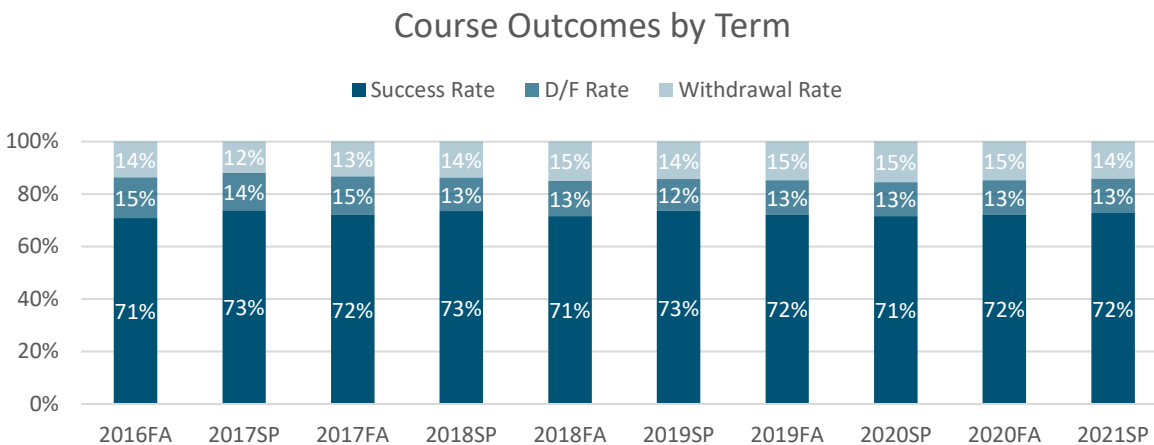
Methodology

Course outcomes are based on students' final grades at the end of a semester. Each attempt students make at a course by enrolling is tracked to measure course outcomes as long as the student is enrolled past the 15% point of the course when they would earn a grade. Students enrolled in multiple courses will have an outcome reported for each course. Specific metrics are defined below:

- **Total enrolled:** the total number of students enrolled in courses past the 15% point.
- **Success rate:** the percent of students who earned a grade of A, B, or C out of the total enrolled.
- **Withdrawal rate:** the percent of students who had a grade of W, WN, or WS (but not FW) out of the total enrolled.
- **D/F rate:** the percent of students who had a grade of D, P, F, N or FW out of the total enrolled.
- **Percent of __ grades:** The percent of a certain grade (A, B, C, D/P, F/FW, W/WN/WS) out of the total enrolled.

Course Outcomes Trends

Over the past five years, course outcomes have remained fairly consistent. The chart below shows success rates, D/F rate, and withdrawal rate in fall and spring terms over the past five years.



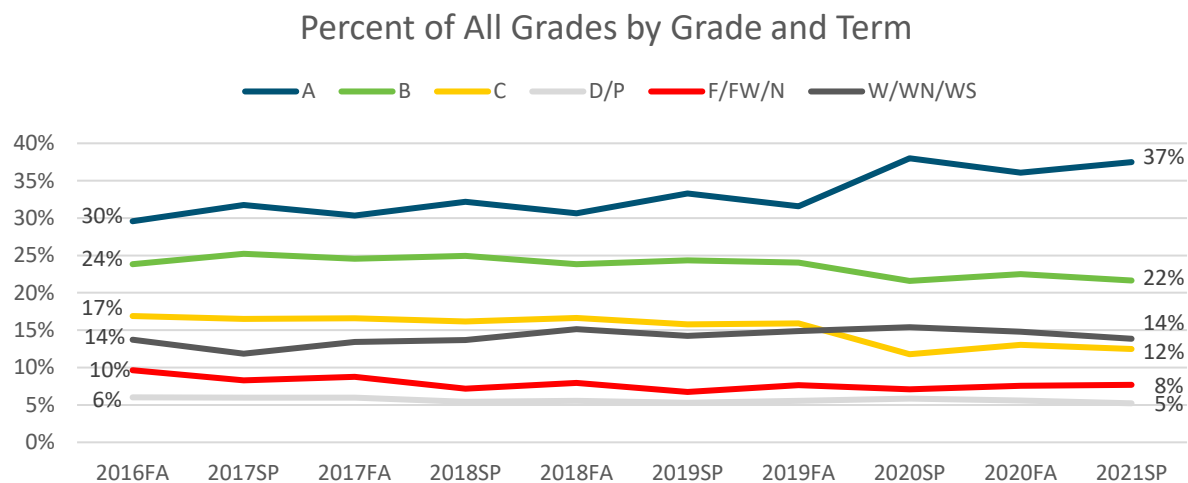
Between 71-73% of all grades were As, Bs, or Cs. About 12-15% of grades were Ds, Fs, or FWs and about 12-15% were withdrawal grades (W, WNs or WSs). From spring 2020 to spring 2021, the college changed grading procedure:

- D grades that counted in GPA were not used and P grades were used, which indicate the student passed the course and do not count in GPA.
- F grades that counted in GPA were not used and N grades were used, which indicate the student did not pass the course and do not count in GPA.
- FW grades that counted in GPA were not used and WS grades were used, which indicate the student did not complete the course and do not count in GPA.

These changes do not appear to have had significant changes in the percent of students successfully completing courses, earning a grade of D, P, F, FW, or N, or the percent withdrawing (grade of W, WN, WS). Given the many changes related to the global COVID-19 pandemic, the grading practice change might have helped CLC students maintain outcomes similar to those experienced prior to the pandemic. While these aggregate rates have not changed significantly over time, there are important differences in specific grades and between racial/ethnic groups.

Grade Distribution

Breaking down students' outcomes to show patterns by grade is a way to further understand this student success metric. The percent of each grade over the past five years of fall and spring terms are shown in the chart below. For example, 30% of all grades in fall 2016 were As.



**Note: percentages might not add to 100% due to rounding*

The percent of grades that were Ds or Ps remained fairly consistent over time between 5-6%. Grades of F, FW, and N combined have typically made up 7-8% of grades, except for fall 2016 where those grades made up 10% of all grades and fall 2017, where those grades made up 9% of all grades. Similarly, grades of W, WN, and WS combined have consistently made up 14-15% of all grades, except in spring 2017, where those grades made up 12% of all grades and fall 2017, where those grades made up 13% of all grades.

There has been interesting variation in A, B, and C grades, however. Starting in spring 2020, the first term of the COVID-19 pandemic and the college's grading practice change in response, the proportion of all grades that were As increased compared to prior terms and the proportion of grades that were Bs and Cs decreased. In fact, when comparing the three sixteen-week semesters during the pandemic (spring 2020, fall 2020, and spring 2021) to the three sixteen-week semesters prior to the pandemic (fall 2018, spring 2019, and fall 2019), there are statistically significant differences. The table below aggregates the grades for these two time periods.

Grade Comparisons Prior to and During COVID-19 Pandemic

Time-frame	Percent of Total Grades in Time-frame					
	A	B	C	D/P	F/FW/N	W/WN/WS
Pre-pandemic (fall 2018, spring 2019, fall 2019)	31.8%	24.1%	16.1%	5.5%	7.4%	14.8%
During pandemic (spring 2020, fall 2020, spring 2021)	37.2%	21.9%	12.4%	5.6%	7.4%	14.7%
Difference	5.3%**	-2.2%**	-3.7%**	0.1%	0.0%	-0.1%

***Significant difference at 99% confidence interval (2-tailed, z-test comparison of proportions)*

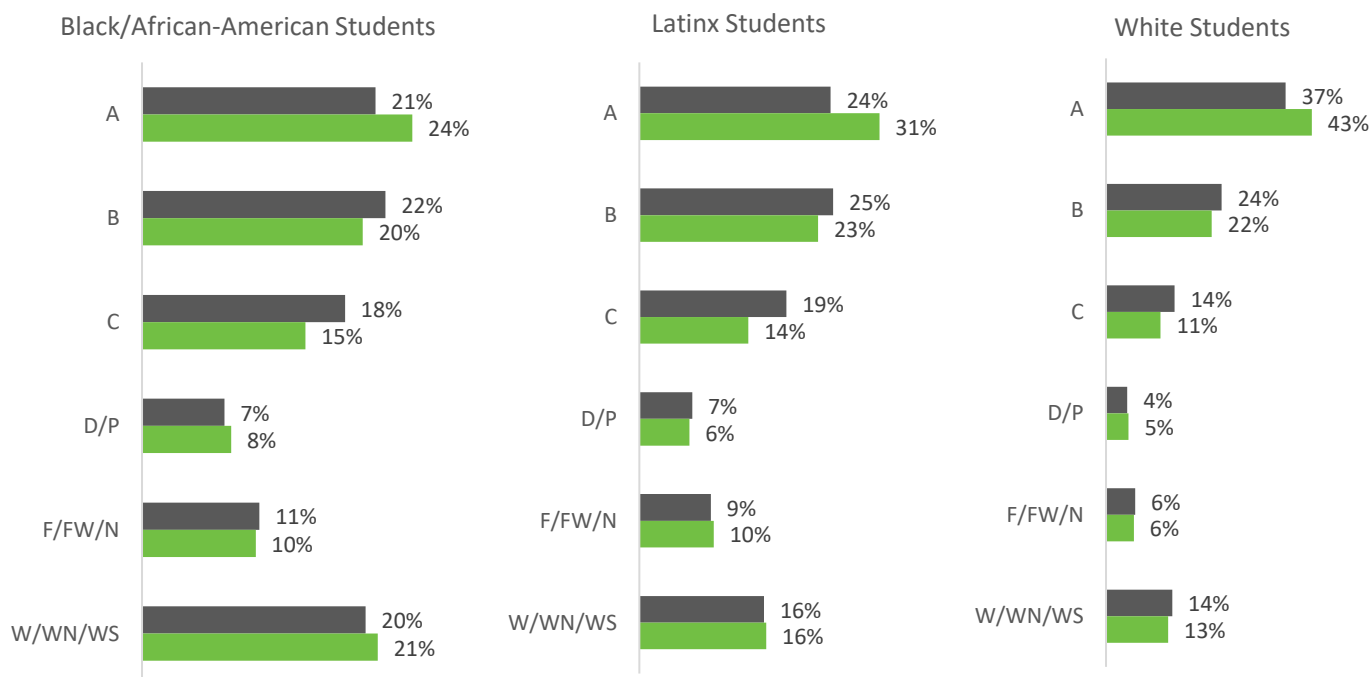
The proportion of all grades in fall 2018, spring 2019, and fall 2019 that were As was 31.8%. The proportion of all grades in spring 2020, fall 2020, and spring 2021 that were As was 37.2%, a 5.3% increase from the three prior terms. Grades of B made up 2.2% less of the total grades and grades of C made up 3.7% less of the total grades when comparing these two time-frames. These changes suggest that more students are earning higher grades than in the past. Disaggregating the data by racial/ethnic group is important to illustrate how this phenomenon has played out across students.

Disaggregation

Course outcomes can be disaggregated by a number of different demographic categories including age group, gender, socioeconomic status, and credit hour load. While many demographic comparisons were analyzed using course outcome data, this report will focus on grade distribution changes among Black and African-American students, Latinx students, and white students for two reasons: 1) the changes in grade distribution were fairly consistent across other demographic comparisons except for these groups and 2) the Equity in Student Access & Success Plan focuses especially on racial/ethnic disparities because of long-standing historical equity gaps. While all racial/ethnic groups saw the trend in increased As and decreased Bs and Cs, this change was not experienced to the same degree across all groups.

Grade Distribution Pre-pandemic & During Pandemic by Race/Ethnicity

■ Pre-pandemic (fall 2018, spring 2019, fall 2019) ■ During pandemic (spring 2020, fall 2020, spring 2021)



The proportion of A grades increased 3% among Black/African-American students, 7% among Latinx students, and 6% among white students. The proportion of B grades dropped 2% across these three groups. The proportion of C grades decreased 3% among Black/African-American students and white students, but 5% among Latinx students. While Black/African-American and white students saw a 1% increase in the proportion of D/P grades, Latinx students saw a 1% decrease. Slight decreases in the proportion of F/FW/N grades were seen for Black/African-American and white students but a slight increase was seen in the proportion of these grades for Latinx students. Black/African-American students have long experienced higher withdrawal rates compared to the overall college average (12-15%), and the withdrawal rate (proportion of W/WN/WS grades) increased even further for this population during the pandemic semesters. Latinx and white students experienced slight changes in the proportion of withdrawal grades.

Potential Explanations

There are many potential explanations for the trends described in this report. Overall, very little change in the withdrawal rates, D/F rates, and success rates over the past five years suggests that there has not been a substantial change or student success initiative targeted at improving course outcomes in recent history at CLC that impacted students' course outcomes, at least not at a broad scale. Withdrawal rates remain high, particularly for Black/African-American students. CLC students most often report withdrawing from courses for employment-related reasons like work demands and schedule conflicting with their coursework. Academic concerns about grades are the next most common reason students cite for withdrawing.

Where some change is seen comparing A, B, and C grades prior to the COVID-19 pandemic to during the pandemic, several potential factors could be at play. During the pandemic, shift in delivery modality might have also resulted in changes to the assignments and activities that counted toward a final grade. Students might have also found more flexibility in how and when to complete work in online modalities that allowed them to be especially successful in class. It is also possible that the students who continued enrollment at CLC through the pandemic were especially committed and motivated to do well in their classes. Additionally, throughout the pandemic CLC continued to provide existing supports and enhanced others. The college provided technology resources like laptops and hotspots for students to assist with adequate access to virtual learning experiences. Tutoring also began offering services virtually as did several other support departments.

Action for Continuous Improvement

First, continued inquiry to investigate the reasons behind the trends seen from this data is one way to act on the overall information. Some potential explanations are suggested in this report, but further exploration is needed to fully explain the trends in student course outcomes. In order to improve persistently similar course outcomes, especially withdrawal rates, CLC faculty and staff will need to take bold action. Reducing withdrawal rates from 14% to 10% as targeted in

the Equity in Student Access & Success Plan requires intentional, full-scale collaborative efforts to address student barriers and ensure equitable access to necessary supports.

There are some action steps currently underway at an organizational level through the work of cross-functional teams. This work is described in the college's Equity in Student Access & Success Plan. Through this plan, CLC is implementing a redesigned student onboarding and first-year experience with full-scale case management, orientation and convocation experiences, and a student success course called College Success Seminar. These experiences are intended to equip students with essential information as they enter the college and contribute to fewer students discontinuing their journey due to lack of information or resources. College Success Seminar will be an opportunity for all students to learn key skills to succeed in college, which can improve students' course outcomes when applied across classes. Also being implemented is a holistic student advising model where each student will have an assigned Academic Success Advisor who specializes in the student's field of interest and partners with faculty to address a variety of obstacles a student might face to successfully completing their coursework. Over the next few years, the college will also work to address student basic needs that, when not adequately met, can interrupt students' journeys. Improvements in teaching and learning are led through faculty professional development and efforts generated from the Faculty Success Framework. These efforts can directly help reduce withdrawal rates and improve learning, which can ultimately translate to improved course grades.

In addition to these large-scale institutional changes, individual employees at CLC can also take action to improve student course outcomes. Supporting the institutional improvements and providing input is one way to assist. Directly connecting with students and ensuring they receive outstanding service in every part of the college is critical to students' desire to remain enrolled and strive for success in every class. For those working directly with students, another important action is consistently validating students in every interaction by telling them the college is here for them, has resources to help, and that CLC faculty and staff believe in their ability to accomplish their educational goals. These steps create an environment not only where students want to be, but inspires them to succeed in each course along their journey.

Graduation Rate Video

To access the Course Outcomes Video data product, click on the link below:

<https://vimeo.com/682600070>

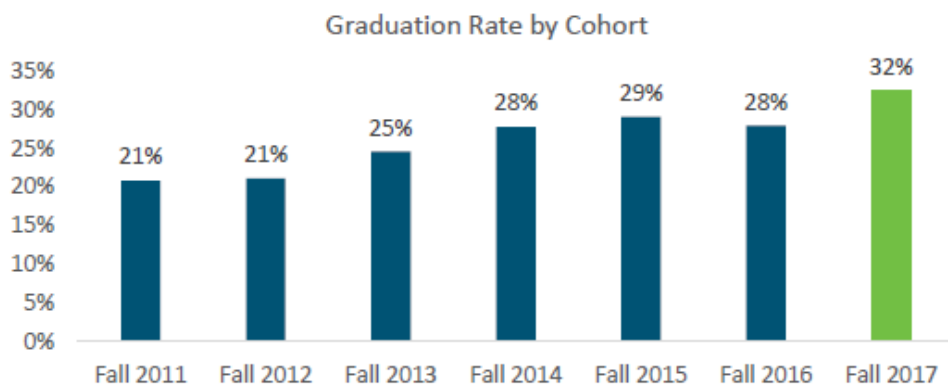
When prompted, enter the password: GRV

Graduation Rate Infographic

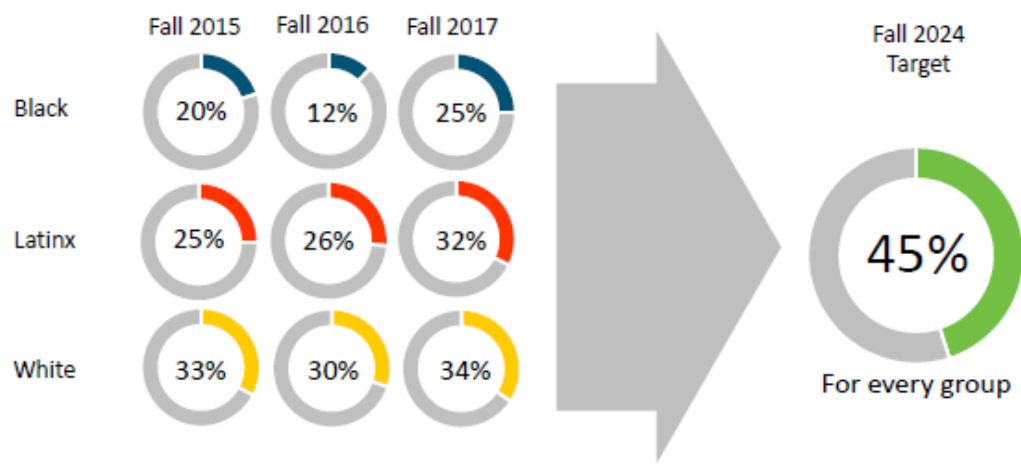
College of Lake County Graduation Rates

CLC uses graduation rate as a key indicator of student success. Graduation rate is based on a three-year tracking period for students who have their first college experience at CLC, enter saying that they want to complete a degree or certificate, and enroll full-time. This metric is important because it directly connects to the core mission of the institution and Pillar 1 of the Strategic Plan: Access & Success for Students. The college's Equity in Student Access & Success Plan sets a target of a 45% graduation rate with no equity gaps for students beginning in fall 2024.

Fall 2017 cohort achieved highest graduation rate

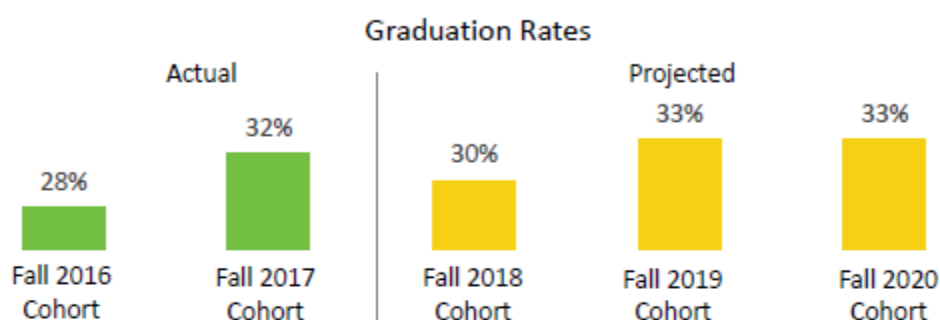


Graduation rates have increased for Black, Latinx, and White students



Graduation rates might remain stagnant without further action

The group who began in fall 2018 will finish their third year in summer 2021, and based on current enrollment and completion patterns, is likely to reach a 30% graduation rate. The fall 2019 cohort in their second year and the fall 2020 cohort in their first year are both tracking to reach a 33% graduation rate.



Potential Explanations

Fall 2017 Cohort 32% Graduation Rate

- Financial & case management supports for some in cohort
- Higher percent of formerly dual credit
- 20% transferred and 11% still enrolled without completing

Projected Graduation Rates of Cohorts in Progress

- If nothing done, leading indicators of enrollment suggest cohorts in progress will follow a pattern similar to the fall 2017 cohort
- CLC's full-scale intentional initiatives have not yet had enough time to impact cohorts

Actions for Continuous Improvement

College Initiatives Underway



Full-scale student onboarding, first year experiences, & success course



Case management and field-specialized advising model



Strategic scheduling and Math and English paths to accelerate credit accumulation

College Initiatives Upcoming



Resource students to address financial and basic needs



Faculty & Employee Success Frameworks to enhance employee experiences and professional learning

Employee Actions



Provide consistently excellent service to our students



Share input and communicate to support college-wide initiatives



Validate students by telling them CLC is here for them and believes in them

Graduation Rate Written Report

College of Lake County Graduation Rates

Introduction

One of the key metrics College of Lake County uses to measure student success is the percent of students who complete a degree or certificate. This metric, called the graduation rate, tracks students who have their first college experience at CLC and enter saying that they want to complete a degree or certificate. This metric is important because it directly connects to the core mission of the institution and the Pillar 1 of the Strategic Plan: Access & Success for Students.

Additionally, improving the college to better facilitate completion for all students is a long-term outcome of the college's Equity in Student Access & Success Plan. Based on this plan, the college has set a target to reach a graduation rate of 45% with no equity gaps for students beginning at CLC in fall 2024. When the target was set, the college had a graduation rate of 29%, based on the cohort of students who began in fall 2015. This report provides data about how more recent cohorts are doing in terms of graduation rate.

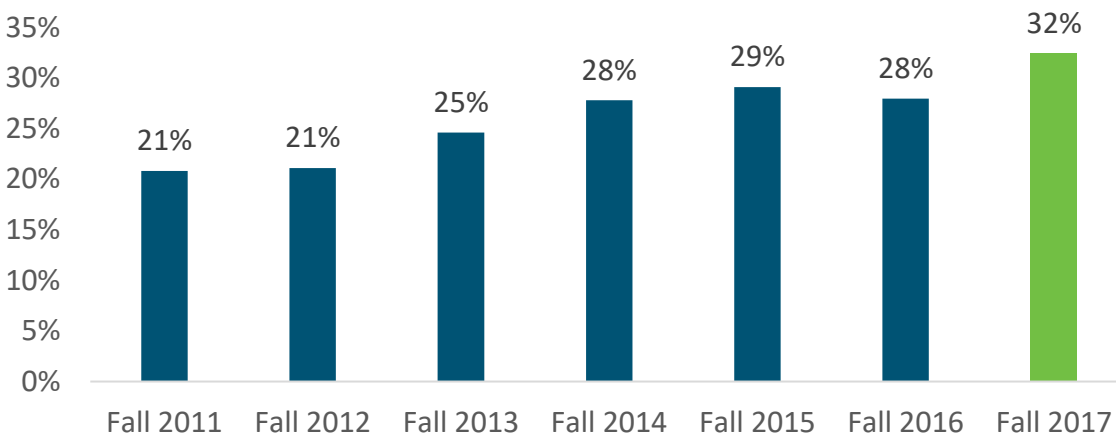
Methodology

To calculate the graduation rate, students who declare that they plan to complete a credential are tracked; students who say they do not want to complete a degree or certificate at CLC are not included in the tracked cohort. Typically, full-time students are tracked for a three-year period (or 150% of normal – 2 years' time). Part-time students are tracked separately for graduation, at longer intervals to provide reasonable time for them to complete. This brief report focuses on the first-time, full-time, degree/ certificate seeking cohorts which typically make up the majority of incoming students each fall semester.

Graduation Rate Trends

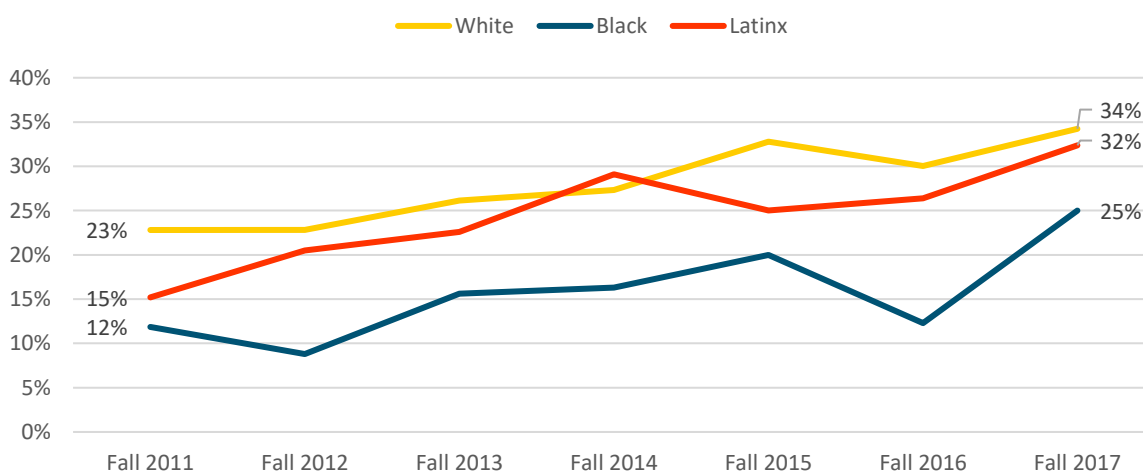
As show in the graph below, the graduation rate has been increasing over the past seven years, with a slight decrease seen for the fall 2016 cohort. The most recent cohort that has completed the three-year tracking period is the fall 2017 cohort, which reached the three-year mark at the end of summer 2020. This cohort has seen the highest graduation rate over the past seven years.

Graduation Rate by Cohort



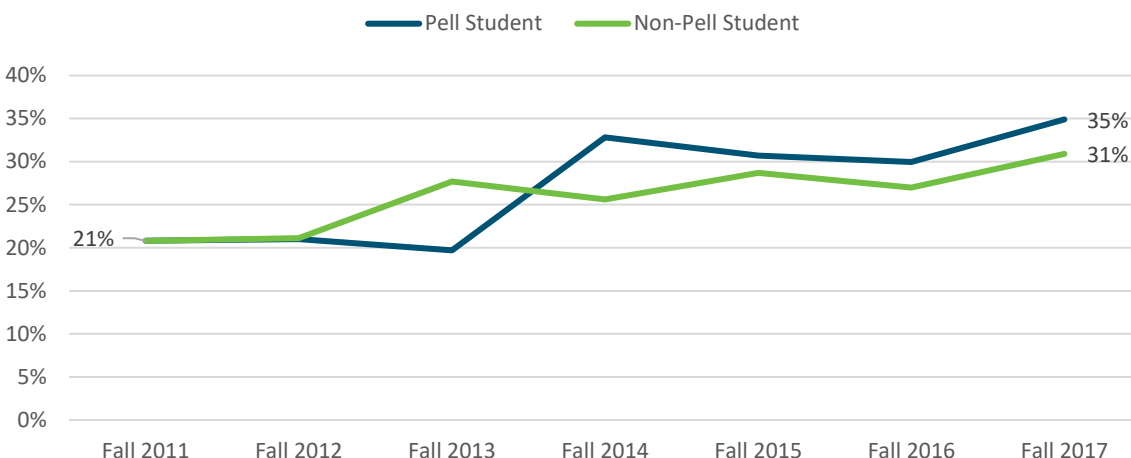
The improvement in graduation rates was also seen across most student demographic groups. The graduation rate for Black (25%), Latinx (32%), and White (34%) students was the highest it has been over the past seven years.

Graduation Rate by Cohort & Race/Ethnicity



Students who received federal Pell grants are often tracked as a proxy for identifying low-income students. For both students who had received Pell and students who did not, the graduation rate of the fall 2017 cohort was higher than the past seven cohorts. As the graph below shows, students who are from lower-income families but receive the financial support of Pell grants tend to graduate at slightly higher rates than students who did not receive Pell and who may or may not be from low-income families. This trend suggests that financial support does help students succeed, and there is still significant work to improve graduation rates for students of all income levels.

Graduation Rates by Cohort and Pell Status



Additional demographic groups are also tracked and are important to monitor; those outlined above are highlighted because CLC has seen large equity gaps for these groups in the past.

While the fall 2017 cohort shows progress from prior year graduation rates, there is still substantial work to be done. Two-thirds of the students beginning in fall 2017 as full-time students with a desire to complete a credential did not successfully complete that goal three years later. It is true that some students might have outcomes besides graduating; almost 20% of the cohort transferred to another institution without completing the credential they originally planned on, and about 11% remained enrolled after three years. These students still did not complete the goal they intended in the time-frame they originally intended. It is important to note that all students in the cohort described in this report began as *full-time* and thus could reasonably be tracked for completing a credential within three years. Although some students are still enrolled at CLC or elsewhere, another 36% of the fall 2017 cohort stopped enrolling at CLC, did not complete a credential, and have not transferred to another institution. To make sure at least 45% of students complete a credential at CLC, significant improvements are needed.

Progress of Recent Cohorts

Graduation rate is an important indicator of students' success, but it is a lagging indicator, meaning that there are many steps students take prior to graduating that signify success. Indicators that lead to graduation rate include continued enrollment, also referred to as retention. Cohorts beginning their experience at CLC in fall 2018, fall 2019, and fall 2020 have not had three full years at CLC that would allow for even comparison of graduation rates, but they can be tracked for retention as one way to determine if these groups of students are on track to meet or exceed the graduation rate of the fall 2017 cohort.

The group who began in fall 2018 will finish their third year in summer 2021, and based on current enrollment and completion patterns, is likely to reach a 30% graduation rate. That would be 2% lower than the fall 2017 cohort. The fall 2019 cohort is currently in their second year and the fall 2020 cohort is in their first year. Each of these cohorts appears to be following fairly similar enrollment patterns as the fall 2017 cohort, but with slightly more short-term certificates already completed by students. If CLC supports these students as well as the fall 2017 cohort, each cohort might reach a 33% graduation rate.

Potential Explanations

A variety of factors likely contributed to the fall 2017 cohort's historically high graduation rate. One contributor is likely that the fall 2017 cohort included a higher percentage of students who had previously enrolled in dual credit courses compared to prior cohorts. Earning credits while in high school moves these students closer to credential completion as they begin at CLC. Another contributor might have been financial and case management support through small-scale programming like CLC's Promise Scholarship Program which began in fall 2017. While a small fraction of the cohort was part of the Promise Scholarship Program, the financial and case management support is a strategy CLC is integrating at a larger scale to benefit more students.

At the time of this report writing, cohorts in progress are expected to reach about the same graduation rate levels as the fall 2017 cohort. We might not see more improvement among these groups because they have not benefitted from recent, full-scale student success initiatives like assigned advisors and intentional, required onboarding and first year experiences. Still, because these cohorts are still in progress, the college community has opportunity to act to sustain and even improve their outcomes.

Action for Continuous Improvement

The fall 2017 cohort had a high graduation rate compared to prior cohorts, but more recent cohorts appear to be on track to achieve a graduation rate that is similar to the fall 2017 cohort. To reach the institutional goal of a 45% graduation rate with no equity gaps, higher graduation rates, not stagnant rates, by more recent cohorts are needed.

There are several action steps currently underway at an organizational level through the work of cross-functional teams. This work is described in the college's Equity in Student Access & Success Plan. Through this plan, CLC is implementing a redesigned student onboarding and first-year experience with full-scale case management, orientation and convocation experiences, and a required student success course called College Success Seminar (for most seeking a credential of sixteen or more credits). Also being implemented is a holistic student advising model where each student's Academic Success Advisor specializes in their fields of interest to strengthen collaborative student support provided by faculty and staff; the model is supported through robust technology that centralizes students' stories. The college is also enhancing students' opportunities to earn credits that count toward a credential earlier in their experience

through strategically scheduled classes as well as modifications to the paths students can take in Math and English to begin earning credit.

Over the next few years, the college will also work to address student basic needs that can interrupt students' journeys when not adequately met. Further development of the Faculty Success Framework and Employee Success Framework can also contribute to students' overall success. These improvements in employee and faculty experiences and professional learning will ultimately benefit students' service and learning experiences at CLC.

In addition to these large-scale institutional changes, individual employees at CLC can also take action to improve student outcomes. Supporting the institutional improvements and providing input is one way to assist. Directly connecting with students and ensuring they receive outstanding service in every part of the college is critical to students' desire to remain enrolled and make progress toward their credential. For those working directly with students, consistently validate students in every interaction by telling them the college is here for them, has resources to help, and that CLC faculty and staff believe in their ability to accomplish their educational goals. These steps create an environment not only where students want to be, but inspires them to complete their educational goals.

APPENDIX B

DATA COLLECTION AND ANALYSIS MANAGEMENT PLAN

Data Collection and Analysis Management Plan

Phase	Activity	Start Date	Completion Date
Phase 1	Observation activities at CLC	May 2021	October 2021
	Initial interviews with Data Team members	July 2021	July 2021
	Analyze data collected during Phase 1	July 2021	July 2021
	Refine survey instrument and data products	July 2021	July 2021
Phase 2	Observation activities at CLC	May 2021	October 2021
	Surveys administered	July 2021	August 2021
	Analyze surveys	August 2021	August 2021
	Create summary of statistics to report findings	August 2021	August 2021
	Refine Phase 3 interview instrument	August 2021	September 2021
	Select sample for Phase 3 interviews	September 2021	September 2021
Phase 3	Observation activities at CLC	May 2021	October 2021
	Conduct Phase 3 interviews	September 2021	October 2021
	Analyze interview data	September 2021	November 2021
	Review data collected across all phases to draw meta-inferences	October 2021	December 2021
	Document findings in dissertation	December 2021	March 2021

APPENDIX C
OBSERVATION PROTOCOL

Observation Protocol

Primary purpose:

- Describe *how and why* the various faculty, staff, and groups discuss and determine how they will use student outcome data.
- Document the sources of summarized results that are referenced by the faculty and staff in live meetings as well as the materials used to communicate student outcomes data

Criteria for sampling:

- Local knowledge/ convenience sampling: Faculty and staff meetings where student outcomes data are part of the meeting agenda.
- Presentations, discussion, and decisions of the Data Team regarding use and/or communication of student outcome data.

Issues to consider:

- Decisions made in and outside of observable meetings.
- Multiple interpretations of “important” findings. Constructed reality of areas to focus on to improve student outcomes.
- Roles of different participants in observed meetings. Who leads discussion of data use? Who supports or counters others’ ideas about using findings? Who takes ownership of communicating or using student outcomes data?

Process:

- Identify meeting to observe
- Prepare by reviewing student outcome data that will be discussed during the meeting
- Inform participants about the observation and use oral consent script before conducting observation. Execute observation if participants consent.
- Use the form that follows as a guide to track and group observations
- Review written notes of meeting to further analyze discussion
- Repeat steps for multiple meetings

Observation Guide

Meeting:

Date of observation:

Participants present: (use pseudonyms)

Relevance of meeting to study topic (to fill out prior to or at beginning of meeting):

- Is student outcomes data an explicit agenda item in the meeting?
- What is the explicitly stated result or goal (if any) of a discussion of student outcome data?
- Does there appear to be implicit result or goals of a discussion of student outcome data?
What is the evidence of that?

Observation Form:

Types of observations		Note about observation	Count of occurrence
Decision references ("I think we should do x")	Explicit justification of an action based on data	(notes here)	
	Implicit justification of an action based on data		
	Justification of an action without reference to or discussion of related data		
	Justification of an action in opposition to data findings		
	Other		
Format References	Reference to infographic		
	Reference to video		
	Reference to written report		
	Reference to combination of formats		
	Other		
Content References (talking about specific assessment findings)	Citing a specific statistic or data point		
	Citing a thematic finding from the data		
	Other		
Other types of discussion / comments			
Non-verbal behaviors			

Summary Notes:

APPENDIX D

PHASE 1 (PRE-SURVEY) INTERVIEW PROTOCOL

Phase 1 Interview Protocol

Primary purpose:

- Explore the opinions of members of the Data Team with regard to options for communicating student outcomes findings.
- Refine survey instrument to reflect the perspective of key Data Team members as faculty and staff who represent the wider survey audience.

Criteria for sampling:

- Local knowledge/ convenience sampling: Data Team members who are aware of the college's student success work and reporting on student outcomes data. Focus on "key informants" from the team who are most familiar with the data products generated at CLC so far, identified by their role and participation with the team over the past year. While newer members of the team who were not participants last year will still be considered for this data collection activity, they will not be prioritized in the sample selection.

Issues to consider:

- Differences between opinions of the Data Team as a whole versus opinions of individual members.
- Multiple interpretations of "important" findings. Constructed reality of areas to focus on to improve student outcomes.
- What obligations do committee members feel to communicate student outcome data, and how does that affect their preferences for the method of communication?

Process:

- Identify Data Team members to interview.
- Prepare by reviewing student outcomes results the members have already seen.
- Ask team members about participating in an interview and schedule a time to talk.
- Send data products (infographic, video, written report) to interviewee in advance of meeting so they are prepared to discuss.
- Obtain consent from members who agree to participate.
- Use the interview guide that follows for semi-structured interviews.

- Review and transcribe audio recording of interview to further analyze the team members' comments.

Phase 1 Interview Guide

Introduction:

Thank you for your interest in speaking with me about the work of the Data Team and the practices of student outcome data use at CLC. Before we begin, I would like to give you a moment to review the informed consent form (provide form to respondent and allow him/her/they to review contents, answer any questions the respondent has, continue with protocol as long as respondent consents).

As you read in the consent form, your participation is completely voluntary, and you are free to end the interview at any time or choose not to answer any question.

First, I'd like to give you a little more background about this project, which I am conducting for my dissertation research, and what I'm hoping to learn. I am interested in learning how individuals and groups communicate and use evidence about student outcomes relevant within their work context. In this specific case, I want to understand the following about CLC's Data Team and its members, like you:

Which way(s) (via infographic, written report, or video) that CLC has previously developed to inform faculty and staff about student outcomes is(are) most effective? Why do you think a certain method or methods of communication are most effective?

Seeing three products (an infographic, written report, and video) on the same topic, what differences exist between them and how can they be made most comparable?

Before we begin, I would like to encourage you to share your thoughts and opinions candidly. Although I have recruited members of the Data Team for this initial phase of the study, your responses do not need to represent the taskforce, but rather your own thoughts and opinions. Your responses will be confidential and will not be shared with other taskforce members.

I would like to know your thoughts about the different ways that student outcome data have been or could be communicated at CLC. Do you have any questions for me at this time?

General Questions

1. We know each other already from working together, but it would be helpful for me to have a better understanding of your experience on the Data Team and with student outcome data. When did you begin participating on CLC's Data Team? What was your prior experience with student outcome data before joining this committee?
2. How would you describe your role on the Data Team? What aspects of the group's work are most important to your own role and work at CLC?

Reviewing Data Products (infographic, video, written report)

3. Now I'd like to ask specifically about the data products I sent to you prior to our interview. You probably remember the same topic covered in three ways: a written report with a set of tables, an infographic summary, and a video summary. Could you describe your own process for reviewing these data products?
 - 3a. Were there specific versions of the findings (written report, infographic, video) that were most helpful for you? Were there sources that were less helpful?
 - 3b. Why do you think certain versions were more helpful? Why were other versions less helpful?
4. As you reviewed the three data products and look at them now [data products will be available in the interview for further reflection], do you think the content presented in each is sufficiently similar for someone reviewing to have the same level of understanding of the material? What ways could these data products be improved to increase their fair comparability?

Sharing and Communicating Student Outcome Data

5. In what ways do you think student outcome data have been shared with faculty and staff at CLC? In what ways do you think data should be shared?
6. Has the method for sharing results been different for different audiences (e.g., faculty, staff, students)? Should it be?

Using Student Outcome Data

7. Which method of summarizing the results – infographic, video, written report – do you think does the best job of encouraging the reader/viewer to use the results?
 - 7a. Why?
8. Within the past year, in what ways have you personally used student outcome data in your work? Have you planned future actions (e.g., professional development, curriculum changes, consulting with faculty/staff) as a result of student outcome data?
 - 9a. (If respondent has personally used results...) Could you describe how you determined what you wanted to do from the data? How did your prior experience with student outcome data factor into your decision about how to use results?

9. Do you have any other thoughts about how the presentation of the data can affect its use?

Closing

Thank you for your time talking with me today.

As I write up my results from this study, it would be helpful for me to have you review how I describe our discussion today. If you are willing, I would be happy to provide a draft of my report when ready.

APPENDIX E
COURSE OUTCOMES SURVEY PROTOCOL

Course Outcomes Survey Protocol

Survey Flow

Block: Introduction Block (2 Questions)

BlockRandomizer: 1 - Evenly Present Elements

Block: Written Report (1 Question)

Standard: Video Block (1 Question)

Standard: Infographic Block (1 Question)

Block: Questions Block (20 Questions)

Block: Interview Sign-up (2 Questions)

Page Break

Start of Block: Introduction Block

Thank you for your interest in participating in this survey! As a member of the College of Lake County community, your input is highly important to this study. This survey should take approximately 15-20 minutes to complete. Please read the information below. **If you wish to participate in the survey, please indicate your consent by selecting "I agree to participate" below.** If you do not wish to participate, please exit the survey by closing your internet browser.

Purpose: The purpose of this study is to investigate how different methods of communicating student outcome data might influence comprehension of and use of the findings. The study is being conducted by Nick Branson, a doctoral student in the School of Education at Loyola University of Chicago, for his dissertation project. In the survey, each participant will view one of three representations of student outcomes data: an infographic, a video, or a written report. You will be asked to respond about only one representation.

Risks/Benefits: There are no foreseeable risks involved in participating in this research beyond those experienced in everyday life. Although there are no direct benefits to participation, you may benefit from the opportunity to reflect on your own use of data and preferences about reporting data. A potential benefit to the College of Lake County is a better understanding of how the college can use student outcome data to make improvements and what methods of communicating data facilitate or inhibit data use.

Confidentiality: Responses will be confidential and shared only with the primary researcher (Nick Branson, a doctoral student at Loyola University Chicago) and supervising researcher (Leanne Kallemeyn, Assistant Professor at Loyola University Chicago). In order to keep your identity confidential, in any publication of the study findings, aggregate data rather than individual responses from the survey will be reported. In the case of quotations from individual responses, pseudonyms will be used for participants in the project. Other identifying information like position or title will not be associated with individual responses in any reporting based on survey data. Data generated for the study will only be used for the purpose of this study. Thematic findings from the survey might be shared with stakeholders at CLC to help make improvements to the communication and use of student outcome data.

Voluntary Participation: Participation in this study is voluntary. If you do not want to be in this dissertation study, you do not have to participate. Even if you decide to participate, you are free not to answer any question or to withdraw from participation at any time without penalty. Your decision to participate in this study will have no effect on your role as an employee of the College of Lake County.

Contacts and Questions: If you have questions about this dissertation research study, please feel free to contact Nick Branson at nbranso@luc.edu or 847-302-8454. If you have questions about your rights as a research participant, you may contact the Loyola University Office of Research Services at (773) 508-2689. By checking the box below, you are indicating that you have read the information provided above and agree to participate in this research study. If you do not wish to participate, please exit the survey by closing your internet browser.

Q3 Please check the box below to agree to participate.

I agree to participate (1)

End of Block: Introduction Block

Start of Block: Written Report

Q2 Before you respond to the survey questions, please review a summary of student course outcomes. The summary provides real information about CLC student outcomes. Once you review the summary, return to the survey to complete the questions (you can leave your browser open while you review the summary). To review the summary click on this link: [Course Outcomes Written Report Summary](#).

Be sure to open and read the summary before proceeding to the next page because the questions that follow will ask you about the information in the summary.

- I have viewed the written report and am ready to answer questions (7)

End of Block: Written Report

Start of Block: Video Block

Q28 Before you respond to the survey questions, please review a summary of student course outcomes. The summary provides real information about CLC student outcomes. Once you review the summary, return to the survey to complete the questions (you can leave your browser open while you review the summary). To review the summary click on this link: [Course Outcomes Video Summary](#).

Be sure to open and view the summary (you might need to click play at the bottom of the screen) before proceeding to the next page because the questions that follow will ask you about the information in the summary.

- I have viewed the video and am ready to answer questions (4)

End of Block: Video Block

Start of Block: Infographic Block

Q29 Before you respond to the survey questions, please review a summary of student course outcomes. The summary provides real information about CLC student outcomes. Once you review the summary, return to the survey to complete the questions (you can leave your browser open while you review the summary). To review the summary click on this link: [Course Outcomes Infographic Summary](#).

Be sure to open and read the summary before proceeding to the next page because the questions that follow will ask you about the information in the summary.

- I have viewed the infographic and am ready to answer questions (7)

End of Block: Infographic Block

Start of Block: Questions Block

Q4 To the best of your ability, please answer the following questions based on what you remember from the sample summary of student course outcomes.

Q5 In your own words, briefly describe the main points you took away from the summary you viewed.

Page Break

Q6 The withdrawal rate (proportion of W/WN/WS grades out of total grades) has remained consistent over the past five fall and spring terms at...

- 8-10% (1)
 - 12-15% (2)
 - 18-20% (3)
 - 27-30% (4)
 - I am not sure (6)
-

Q8 In the summary you viewed, which grade(s) were included in "success rate?"

- As (1)
 - As and Bs (2)
 - As, Bs, and Cs (3)
 - As, Bs, Cs, and Ps (4)
 - I am not sure (5)
-

Q9 Which of the following statements is true about student grades during the COVID-19 pandemic compared to prior to the pandemic?

- The proportion of As and Bs increased (1)
 - The proportion of As decreased and the proportion of Cs increased (2)
 - The proportion of Bs increased and the proportion of Cs decreased (3)
 - The proportion of As increased and the proportion of Cs decreased (4)
 - I am not sure (5)
-

Q10 Which of the following groups experienced the most change when comparing pre-pandemic to during pandemic grade proportions?

- Latinx students (1)
 - Black students (2)
 - White students (3)
 - Male students (4)
 - I am not sure (5)
-

Q11 Which of the following is the most common reason students withdraw from their courses?

- Childcare (1)
 - Academic concerns (2)
 - Finances (3)
 - Work (4)
 - I am not sure (5)
-

Page Break

Q13 Based on the summary, how likely are you to take action in your role or use the information you saw?

- Very likely (1)
- Likely (2)
- Unlikely (3)
- Very unlikely (4)
- I am not sure (5)

Skip To: Q17 If Q13 = Unlikely

Skip To: Q17 If Q13 = Very unlikely

Skip To: Q18 If Q13 = I am not sure

Page Break

Page Break

Q15 Briefly describe the specific action(s) you would take or way(s) you would use the information from the summary.

Q16 Why would you be likely to take action or use the information? Select all that apply.

- I want to learn more about the topic in the summary (1)
- This topic is relevant to my role (2)
- I found the summary to be convincing (3)
- The summary provided clear suggestions of actions I could take (4)
- Other (please specify): (5)
-

Skip To: Q19 If Condition: Selected Count Is Greater Than or Equal to 0. Skip To: Please rate the following aspects of ...

Page Break

Q17 Why would you be unlikely to take action or use the information? Select all that apply.

- I already understand this evidence and knew about it (1)
- This topic is not relevant to my role (2)
- I did not find the summary to be convincing (3)
- I disagreed with the suggested actions in the summary (4)
- I do not know what action I could take in my role (5)
- Other (please specify): (6)
-

Skip To: Q19 If Condition: Selected Count Is Greater Than or Equal to 0. Skip To: Please rate the following aspects of ...

Page Break

Q18 Please provide more details about why you are not sure if you would take action or use the information you saw?

Page Break

Q19 Please rate the following aspects of the summary you viewed on course outcomes based on your opinion:

	Poor (1)	Fair (2)	Good (3)	Excellent (4)	Not sure (5)
Visual appeal (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Easy to understand (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comprehensiveness (how well does the summary cover the topic?) (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usability (how actionable is the information as presented?) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevance to you (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevance to CLC (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality (how confident do you feel in understanding and using the information?) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of interest (how well does the sample capture and maintain your interest?) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20 Please describe what you liked most about the summary:

Q21 Please describe what you liked *least* about the summary:

Q22 How likely would you be to share the summary with a colleague who had not received it?
Assume you would be given an electronic version or hyperlink to allow you to share it.

- Very likely (1)
- Likely (2)
- Unlikely (3)
- Very unlikely (4)
- Not sure (5)

Q30 If you would like to provide any additional feedback about the summary you viewed, you can do that below.

Page Break

Q23 How many times did you view the summary as you answered the questions in this survey?
There is no correct response, this question is meant only to understand your process.

- Once (1)
- Twice (2)
- Three or more times (3)

Q27 Prior to taking this survey, how would you describe your own experience reviewing student course outcomes evidence?

- Very experienced (I review student course outcome evidence as a frequent, regular practice) (1)
 - Experienced (I have reviewed student course outcome evidence several times) (2)
 - Somewhat experienced (I have reviewed student course outcome evidence rarely; OR I am familiar with the topic but have not personally reviewed student course outcome evidence regularly) (3)
 - Not experienced (I have never or very rarely reviewed student course outcome evidence) (4)
-

Q26 Which of the following best describes your role at CLC?

- Full-time Faculty (1)
- Adjunct Faculty (2)
- Student-facing staff (I work directly with students as my primary role) (3)
- Non-student-facing staff (I typically do not work directly with students as my primary role) (4)
- Student-facing professional/administrator (I work directly with students as my primary role) (5)
- Non-student-facing professional/administrator (I typically do not work directly with students as my primary role) (7)
- Other (please specify): (6) _____

End of Block: Questions Block

Start of Block: Interview Sign-up

Q24 **Thank you for your participation in this survey.** Once you click "submit" below, your responses will be recorded.

Follow-up interviews will be conducted with a sample of survey respondents. **If you are willing to be contacted for a potential follow-up interview (30-45 minutes in length) to discuss this topic further, please provide your contact information below.** Contact information is confidential and will not be associated with your responses in reporting on this research.

Q25 Contact information:

- First Name (1) _____
- Last Name (2) _____
- Email address (3) _____

APPENDIX F
GRADUATION RATE SURVEY PROTOCOL

Graduation Rate Survey Protocol

Survey Flow

Block: Introduction Block (2 Questions)

BlockRandomizer: 1 - Evenly Present Elements

Block: Written Report (1 Question)

Standard: Video Block (1 Question)

Standard: Infographic Block (1 Question)

Block: Questions Block (20 Questions)

Block: Interview Sign-up (2 Questions)

Page Break

Start of Block: Introduction Block

Thank you for your interest in participating in this survey! As a member of the College of Lake County community, your input is highly important to this study. This survey should take approximately 15-20 minutes to complete. Please read the information below. **If you wish to participate in the survey, please indicate your consent by selecting "I agree to participate" below.** If you do not wish to participate, please exit the survey by closing your internet browser.

Purpose: The purpose of this study is to investigate how different methods of communicating student outcome data might influence comprehension of and use of the findings. The study is being conducted by Nick Branson, a doctoral student in the School of Education at Loyola University of Chicago, for his dissertation project. In the survey, each participant will view one of three representations of student outcomes data: an infographic, a video, or a written report. You will be asked to respond about only one representation.

Risks/Benefits: There are no foreseeable risks involved in participating in this research beyond those experienced in everyday life. Although there are no direct benefits to participation, you may benefit from the opportunity to reflect on your own use of data and preferences about reporting data. A potential benefit to the College of Lake County is a better understanding of how the college can use student outcome data to make improvements and what methods of communicating data facilitate or inhibit data use.

Confidentiality: Responses will be confidential and shared only with the primary researcher (Nick Branson, a doctoral student at Loyola University Chicago) and supervising researcher

(Leanne Kallemeyn, Assistant Professor at Loyola University Chicago). In order to keep your identity confidential, in any publication of the study findings, aggregate data rather than individual responses from the survey will be reported. In the case of quotations from individual responses, pseudonyms will be used for participants in the project. Other identifying information like position or title will not be associated with individual responses in any reporting based on survey data. Data generated for the study will only be used for the purpose of this study. Thematic findings from the survey might be shared with stakeholders at CLC to help make improvements to the communication and use of student outcome data.

Voluntary Participation: Participation in this study is voluntary. If you do not want to be in this dissertation study, you do not have to participate. Even if you decide to participate, you are free not to answer any question or to withdraw from participation at any time without penalty. Your decision to participate in this study will have no effect on your role as an employee of the College of Lake County.

Contacts and Questions: If you have questions about this dissertation research study, please feel free to contact Nick Branson at nbranso@luc.edu or 847-302-8454. If you have questions about your rights as a research participant, you may contact the Loyola University Office of Research Services at (773) 508-2689. By checking the box below, you are indicating that you have read the information provided above and agree to participate in this research study. If you do not wish to participate, please exit the survey by closing your internet browser.

Q3 Please check the box below to agree to participate.

I agree to participate (1)

End of Block: Introduction Block

Start of Block: Written Report

Q2 Before you respond to the survey questions, please review a summary report about graduation rates. The summary provides real information about CLC student outcomes. Once you review the summary, **please return to the survey to complete the questions** (you can leave your browser open while you review the summary). To review the summary click on this link: [Graduation Rate Written Report Summary](#).

Be sure to open and read the summary before proceeding to the next page because the questions that follow will ask you about the information in the summary.

- I have viewed the written report and am ready to answer questions (7)

End of Block: Written Report

Start of Block: Video Block

Q28 Before you respond to the survey questions, please review a summary video about graduation rates. The summary provides real information about CLC student outcomes. Once you review the summary, **please return to the survey to complete the questions** (you can leave your browser open while you review the summary). To review the summary click on this link: [Graduation Rate Summary Video](#).

Be sure to open and view the summary (you might need to click play at the bottom of the screen) before proceeding to the next page because the questions that follow will ask you about the information in the summary.

- I have viewed the video and am ready to answer questions (4)

End of Block: Video Block

Start of Block: Infographic Block

Q29 Before you respond to the survey questions, please review a summary infographic about graduation rates. The summary provides real information about CLC student outcomes. Once you review the summary, **please return to the survey to complete the questions** (you can leave your browser open while you review the summary). To review the summary click on this link: [Graduation Rate Infographic Summary](#).

Be sure to open and read the summary before proceeding to the next page because the questions that follow will ask you about the information in the summary.

- I have viewed the infographic and am ready to answer questions (7)

End of Block: Infographic Block

Start of Block: Questions Block

Q4 To the best of your ability, please answer the following questions based on what you remember from the sample summary of graduation rates.

Q5 In your own words, briefly describe the main points you took away from the summary you viewed.

Page Break

Q6 What was the three-year graduation rate for the fall 2017 cohort who reached the highest rate among the past seven cohorts?

- 29% (1)
 - 32% (2)
 - 33% (3)
 - 45% (4)
 - I am not sure (6)
-

Q8 In the summary, which students were tracked for graduation rates as they entered college for the first time?

- All students (1)
 - All full-time students (2)
 - Full-time, degree/certificate-seeking students (3)
 - Full-time and part-time degree/certificate-seeking students (4)
 - I am not sure (5)
-

Q9 Which of the following statements is true about graduation rates for the fall 2017 cohort compared to prior cohorts? The graduation rate...

- Decreased among White and Latinx students and increased among Black students (1)
 - Decreased among Black students and increased among Latinx and White students (2)
 - Increased among Black and Latinx students and remained consistent among White students (3)
 - Increased among Black, Latinx, and White students (4)
 - I am not sure (5)
-

Q10 Based on leading indicators of enrollment and early completion, the current projections for graduation rates of the next three cohorts in progress are...

- 30-33% (1)
 - 32-33% (2)
 - 32-36% (3)
 - 33-45% (4)
 - I am not sure (5)
-

Q11 Which of the following is one factor that contributed to the fall 2017 cohort's high graduation rate?

- Case management advising (1)
 - Student success course (2)
 - Required tutoring (3)
 - Previous dual credit experience (4)
 - I am not sure (5)
-

Q13 Based on the summary, how likely are you to take action in your role or use the information you saw?

- Very likely (1)
- Likely (2)
- Unlikely (3)
- Very unlikely (4)
- I am not sure (5)

Skip To: Q17 If Q13 = Unlikely

Skip To: Q17 If Q13 = Very unlikely

Skip To: Q18 If Q13 = I am not sure

Page Break

Page Break

Q15 Briefly describe the specific action(s) you would take or way(s) you would use the information from the summary.

Q16 Why would you be likely to take action or use the information? Select all that apply.

- I want to learn more about the topic in the summary (1)
 - This topic is relevant to my role (2)
 - I found the summary to be convincing (3)
 - The summary provided clear suggestions of actions I could take (4)
 - Other (please specify): (5)
-

Skip To: Q19 If Condition: Selected Count Is Greater Than or Equal to 0. Skip To: Please rate the following aspects of ...

Page Break

Q17 Why would you be unlikely to take action or use the information? Select all that apply.

- I already understand this evidence and knew about it (1)
 - This topic is not relevant to my role (2)
 - I did not find the summary to be convincing (3)
 - I disagreed with the suggested actions in the summary (4)
 - I do not know what action I could take in my role (5)
 - Other (please specify): (6)
-

Skip To: Q19 If Condition: Selected Count Is Greater Than or Equal to 0. Skip To: Please rate the following aspects of ...

Page Break

Q18 Please provide more details about why you are not sure if you would take action or use the information you saw?

Page Break

Q19 Please rate the following aspects of the summary you viewed on graduation rates based on your opinion:

	Poor (1)	Fair (2)	Good (3)	Excellent (4)	Not sure (5)
Visual appeal (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Easy to understand (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comprehensiveness (how well does the summary cover the topic?) (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usability (how actionable is the information as presented?) (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevance to you (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relevance to CLC (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality (how confident do you feel in understanding and using the information?) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Level of interest (how well does the sample capture and maintain your interest?) (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20 Please describe what you liked most about the summary:

Q21 Please describe what you liked *least* about the summary:

Q22 How likely would you be to share the summary with a colleague who had not received it?
Assume you would be given an electronic version or hyperlink to allow you to share it.

- Very likely (1)
- Likely (2)
- Unlikely (3)
- Very unlikely (4)
- Not sure (5)

Q30 If you would like to provide any additional feedback about the summary you viewed, you can do that below.

Page Break

Q23 How many times did you view the summary as you answered the questions in this survey?
There is no correct response, this question is meant only to understand your process.

- Once (1)
- Twice (2)
- Three or more times (3)

Q27 Prior to taking this survey, how would you describe your own experience reviewing student graduation rate evidence?

- Very experienced (I review graduation rate evidence as a frequent, regular practice) (1)
 - Experienced (I have reviewed graduation rate evidence several times) (2)
 - Somewhat experienced (I have reviewed graduation rate evidence rarely; OR I am familiar with the topic but have not personally reviewed graduation rate evidence regularly) (3)
 - Not experienced (I have never or very rarely reviewed graduation rate evidence) (4)
-

Q26 Which of the following best describes your role at CLC?

- Full-time Faculty (1)
- Adjunct Faculty (2)
- Student-facing staff (I work directly with students as my primary role) (3)
- Non-student-facing staff (I typically do not work directly with students as my primary role) (4)
- Student-facing professional/administrator (I work directly with students as my primary role) (5)
- Non-student-facing professional/administrator (I typically do not work directly with students as my primary role) (7)
- Other (please specify): (6) _____

End of Block: Questions Block

Start of Block: Interview Sign-up

Q24 **Thank you for your participation in this survey.** Once you click "submit" below, your responses will be recorded.

Follow-up interviews will be conducted with a sample of survey respondents. **If you are willing to be contacted for a potential follow-up interview (30-45 minutes in length) to discuss this topic further, please provide your contact information below.** Contact information is confidential and will not be associated with your responses in reporting on this research.

Q25 Contact information:

First Name (1) _____

Last Name (2) _____

Email address (3) _____

End of Block: Interview Sign-up

APPENDIX G

PHASE 3 (POST-SURVEY) INTERVIEW PROTOCOL

Phase 3 Interview Protocol

Primary purpose:

- Explore findings of the survey of faculty and staff in more detail.
- Obtain details about why respondents prefer certain modes of communicating student outcome data.

Criteria for sampling:

- Local knowledge/ convenience sampling: All faculty and staff at the College of Lake County are expected to participate in some capacity in the use of student outcome data for continuous improvement. This includes new faculty and staff who might be less familiar with CLC's historical process for communicating student outcomes data. Focus on a range of respondents who viewed one of the three data products (infographic, video, written report) from the survey.

Issues to consider:

- Which data product the respondent viewed in the survey.
- Multiple interpretations of "important" findings. Constructed reality of areas to focus on to improve student outcomes.
- Respondent's own relationship to and opinion of the larger process of evaluating and using student outcomes data.

Process:

- Use survey responses to identify willing participants to sample for post-survey interviews.
- Sample willing participants to obtain an approximately balanced representation of survey-takers who saw the infographic, video, and written report.
- Send sample of potential respondents the post-survey interview recruiting email.
- Schedule a time and place to meet with potential interviewees who agree to participate by responding to recruiting email.
- Obtain consent from members who agree to participate.
- Use the interview guide that follows for semi-structured interviews.
- Review and transcribe audio recording of interview to further analyze the committee

members' comments.

Phase 3 Interview Guide

Introduction:

Thank you for your interest in speaking with me about communicating and using student outcomes data. Before we begin, I would like to give you a moment to review the informed consent form (provide form to respondent and allow him/her/them to review contents, answer any questions the respondent has, continue with protocol as long as respondent consents).

As you read in the consent form, your participation is completely voluntary, and you are free to end the interview at any time or choose not to answer any question.

First, I'd like to give you a little more background about this project, which I am conducting for my dissertation research, and what I'm hoping to learn. I am interested in learning how individuals and groups communicate and use evidence about student outcomes relevant within their work context. In this specific case, I want to understand the following:

Which way(s) (via infographic, written report, or video) that CLC has developed to inform the faculty and staff about student outcomes is(are) most effective?

Why do you think a certain method or methods of communication are most effective?

Before we begin, I would like to encourage you to share your thoughts and opinions candidly. Although the aggregate results might help inform how members of CLC communicate results in the future, your individual responses will be confidential and will not be shared with other CLC employees.

Do you have any questions for me at this time?

General Questions

1. I know a little about your work at CLC, but it would be helpful for me to have a better understanding of your experience at the institution and with student outcome data. Could you start by describing your current position at CLC? When did you begin working in your current role?
2. What has been your experience with student outcome data at CLC?

Reviewing Summary Seen in Survey

3. Now I'd like to ask specifically about the results that you saw in the survey. You viewed the (infographic, video, written report). Here is a copy.

[Interviewer will know which version the interviewee viewed prior to the meeting.

Interviewer will provide a copy of the sample to help refresh the interviewee's memory. A

computer screen with the video will be provided for those who viewed the video; paper copies will be provided for the infographic and written report.]

Could you describe your own process for reviewing the results when presented with this summary?

- 4a. What did you find helpful about this summary? Why do you think certain aspects were helpful?
- 4b. What did you find in this summary that was not helpful or that hindered your understanding? Why do you think certain aspects were not helpful?
- 4c. What, if anything, do you think is missing from this summary?
5. Do you think this summary is an effective method of communicating student outcome data to a wide audience? Why or why not?
6. What changes in your work or in the work of the college might you make if you were presented with this data? How, if at all, does this summary encourage you to take action?

Comparing Modes of Communicating Results

Now I'd like to talk about other possible modes of communicating the same results. I'd like to get your opinion on a couple of options you did not see in the survey.

[Interviewer will know which version the interviewee viewed prior to the meeting.

Interviewer will at this point provide a copy of two samples that the interviewee did *not* see in the survey. A computer screen with the video will be provided for those who viewed the video; paper copies will be provided for the infographic and written report. The interviewee will be provided approximately 5 minutes to look over the other summaries.]

7. Which method of summarizing the data – infographic, video, written report – do you think does the best job of communicating the data to the reader/viewer?
 - 7a. Why?
8. Which method of summarizing the data – infographic, video, written report – do you think does the best job of encouraging the reader/viewer to *use* the information?
 - 7a. Why?
9. Do you have any other thoughts about how the presentation of the data can affect its use?

Closing

Thank you for your time talking with me today.

As I write up my results from this study, it would be helpful for me to have you review how I describe our discussion today. If you are willing, I would be happy to provide a draft of my report when ready.

APPENDIX H
DETAILED TABLES

Table 16. Likelihood to Use Information by Communication Mode

Communication Mode	Self-reported Likelihood to Use Information in the Data Product											
	Very Likely		Likely		Unlikely		Very Unlikely		Not Sure		Total	
	n	% of Communication Mode	n	% of Communication Mode	n	% of Communication Mode	n	% of Communication Mode	n	% of Communication Mode	n	% of Communication Mode
Infographic	16	31.4%	21	41.2%	3	5.9%	2	3.9%	9	17.6%	51	100.0%
Video	26	56.5%	15	32.6%	2	4.3%		0.0%	3	6.5%	46	100.0%
Written Report	19	46.3%	15	36.6%	1	2.4%	1	2.4%	5	12.2%	41	100.0%
All Modes	61	44.2%	51	37.0%	6	4.3%	3	2.2%	17	12.3%	138	100.0%

Table 17. Comprehension Based on Quiz Questions by Times Viewed Data Product and Communication Mode

Communication Mode	Number of Times Respondent Viewed Data Product During Survey							
	Once		Twice		Three or More Times		Total	
	n	Avg. Quiz % Correct	n	Avg. Quiz % Correct	n	Avg. Quiz % Correct	n	Avg. Quiz % Correct
Infographic	19	64.2%	16	71.3%	15	77.3%	50	70.4%
Video	35	81.1%	7	88.6%	2	100.0%	44	83.2%
Written Report	16	66.3%	12	68.3%	12	83.3%	40	72.0%
All Modes	70	73.1%	35	73.7%	29	81.4%	134	75.1%

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Dr. Branson began his professional career conducting community and market research in multiple organizations. He spent over a decade in institutional effectiveness roles at National Louis University and College of Lake County. Currently, Dr. Branson serves as the Director of Student Success Strategy at College of Lake County and leads the college's initiatives to improve students' experiences by collaborating across all units of the institution to drive systemic change that fulfills the college's student success vision.